

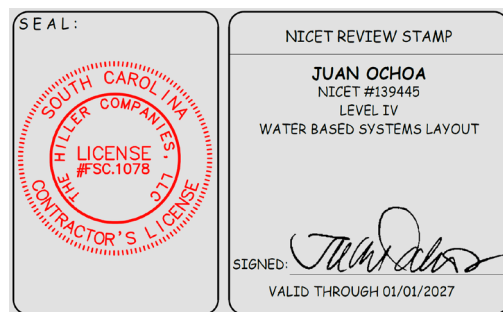


• P.O. Box 1090 • Concord, NC 28026
• Phone (704) 784-4218 • Fax (704) 784-4405

**Home 2 Suites
by Hilton
4-Story Hotel Construction**
475 Hospitality Blvd.
Greenwood, SC 29649

HYDRAULIC CALCULATIONS

**DIVISION 21
FIRE SUPPRESSION SPRINKLER SYSTEMS**





COMMISSIONERS OF PUBLIC WORKS

COMMISSIONERS: ARTHUR C. BUSH, STEPHEN C. GILBERT, HENRY O. WATTS
MANAGER: JEFFERY D. MEREDITH, P.E.

September 30, 2025

Thomas Hardin, Designer
The Hiller Companies, LLC
300 Manor Ave SW
Concord, NC 28025

Re: Dual Hydrant Flow Test Request
Hospitality Drive/Home 2 Suites

Thomas,

Below is the hydrant flow data that you requested.

H1520C167

Static – 53 psi

Residual – 51 psi

H1520C169

Flow – 48 psi (1,160 gpm) *Hydrant Flowed 9/30/2025 at 10:27am

If you need any additional information please feel free to contact me at 864.942.8199.

Thanks,

Russell Holley
Engineering Department
Greenwood Commissioners of Public Works

YOUR NEIGHBORS... WORKING FOR YOU

POST OFFICE BOX 549, GREENWOOD, SOUTH CAROLINA 29648
TELEPHONE (864) 942-8100

TOLL FREE (877) 662-3360

FAX (864) 942-8111

Greenwood County, SC



Parcel ID	6836-796-391	Area	2.31
Property Address	475 Hospitality Blvd	Description	LTS E,F&.38AC(2.29AC TOTAL)
Owner Name	Hospitality Hotel Group LLC	Year Built	0
Mail Address	109 DESTINATION BLVD	SqFt	0
City State Zip	ANDERSON, SC 29621-0000	Bedrooms	0
Purchase Date	11/30/2023	Bathrooms	0
Deed	1645-2983	Half Baths	0
Plat	158-124	Fin Bsmt Sqft	0
FEMA LOMA	No	Unfin Bsmt Sqft	0
Total Tax Value	\$637,500	Tax Exemption	
Total Cap Value	\$0	Appraised By	County
Total Market Value	\$850,000	Tax District	9-City of Greenwood
Assessed Value	38250	On Lake Gwd	N
Subdivision			



Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search, appraisal, survey, or for zoning verification.

Map Scale
1 inch = 100 feet
9/8/2025



Hydraulic Overview

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

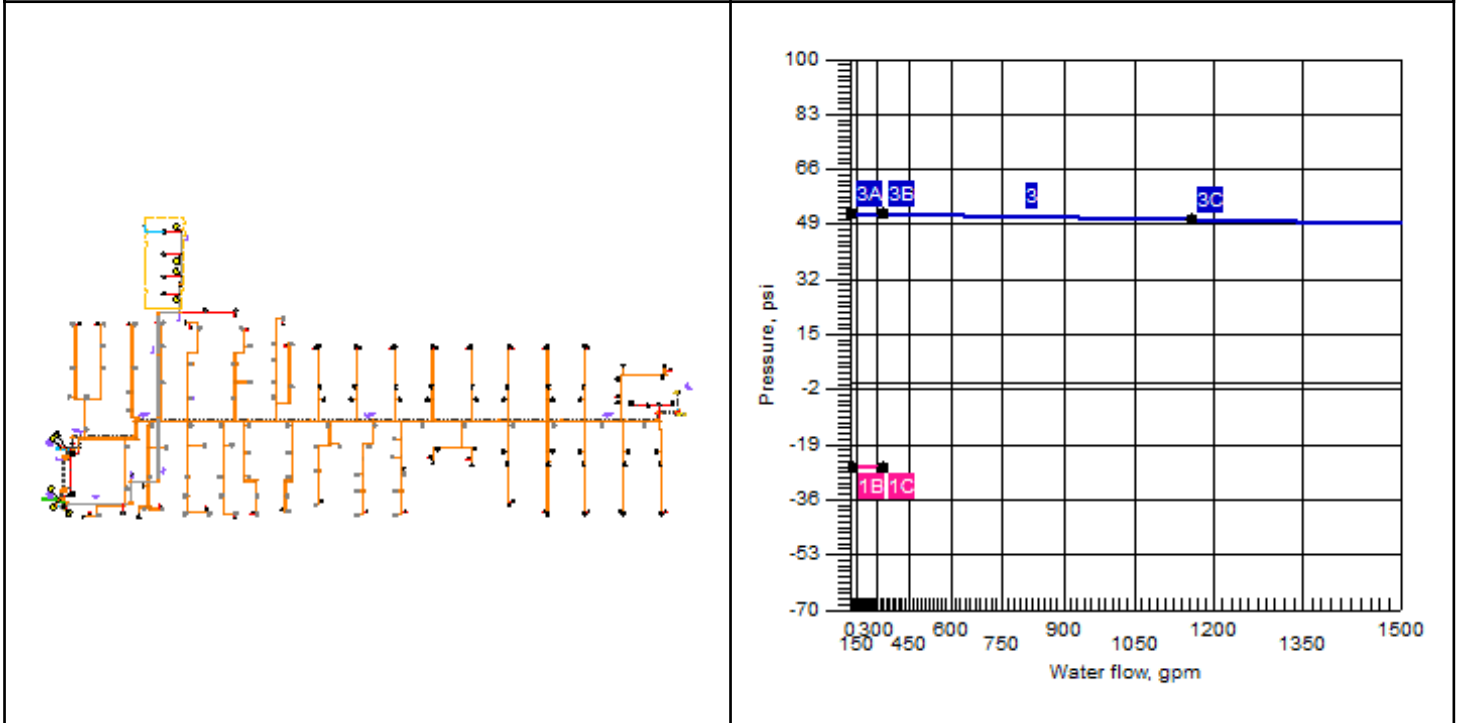
Job		
Job Number	CF0588	
Designer	Thomas Hardin	
Job Name:	Home 2 Suites	
Address 1	475 Hospitality Blvd.	
Address 2	Greenwood, SC 29649	
Address 3		
Phone	(704) 784-4218	FAX (704) 784-4405
State Certification/License Number	NC # 36018 / SC # FSC. 1078-B	
AHJ	LLR / Greenwood FM	
Job Site/Building	New Buldling	

System		
Density	0.15gpm/ft ²	
Area of Application	387ft ² (Actual 387ft ²)	
Most Demanding Sprinkler Data	5.6 K-Factor 19.50 at 12.125	
Hose Streams	250.00	
Coverage Per Sprinkler	130ft ²	
Number Of Sprinklers Calculated	4	Number Of Nozzles Calculated 0
System Pressure Demand	-26.692	
System Flow Demand	79.55	
Total Demand	329.55 @ -26.692	
Pressure Result	+79.497 (150.5%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
1	Water Supply	1160.00	250.00	53.000	51.000	Zone 1 (100)	32.417	0	0.00
8	Pump	300.00		69.830	60.110	P-BOR (5)	-36.031	13.25	79.55
						Zone 2 (200)	32.417	0	0.00
						Zone 3 (300)	32.417	0	0.00
						Zone 4 (400)	32.417	0	0.00

Pumps: Static = Churn (Pressure @ Zero Flow)

Home 2 Suites Greenwood FP (REV-1).cad	Water Supply at Node 1 (1160.00, 0.00, 53.000, 51.000)
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Hydraulic Summary

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Job											
Job Number CF0588				Designer Thomas Hardin							
Job Name: Home 2 Suites				State Certification/License Number NC # 36018 / SC # FSC. 1078-B							
Address 1 475 Hospitality Blvd.				AHJ LLR / Greenwood FM							
Address 2 Greenwood, SC 29649				Job Site/Building New Building							
Address 3				Drawing Name Home 2 Suites Greenwood FP (REV-1).cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.6 K-Factor 19.50 at 12.125				Occupancy Ordinary Group I			Job Suffix				
Hose Allowance At Source 250.00				Density 0.15gpm/ft²			Area of Application 387ft² (Actual 387ft²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 130ft²			
Total Hose Streams 250.00											
System Flow Demand 79.55		Total Water Required (Including Hose Allowance) 329.55									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 7.76 between nodes 130 and 1101											
Maximum Velocity Under Ground 0.82 between nodes 3 and 5											
Volume capacity of Wet Pipes 10037.95gal		Volume capacity of Dry Pipes 29.84gal									
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	250.00	53.000	51.000		1160.00	52.805		329.55	-26.692	79.497
8	Pump		69.830	60.110		300.00	112.198		79.55	32.701	79.497
A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure required by the demand reported within this calculation. No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).											
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell				Contact Title Project Manger					
Name of Contractor: John M. Campbell Company				Phone (704) 254-3214				Extension			
Address 1 102 Winchester Avenue				FAX							
Address 2 Monroe, NC 28110				E-mail milescampbell@johnmcampbellcompany.com							
Address 3				Web-Site http://johnmcampbellcompany.com/							



Water Supply at Node 1

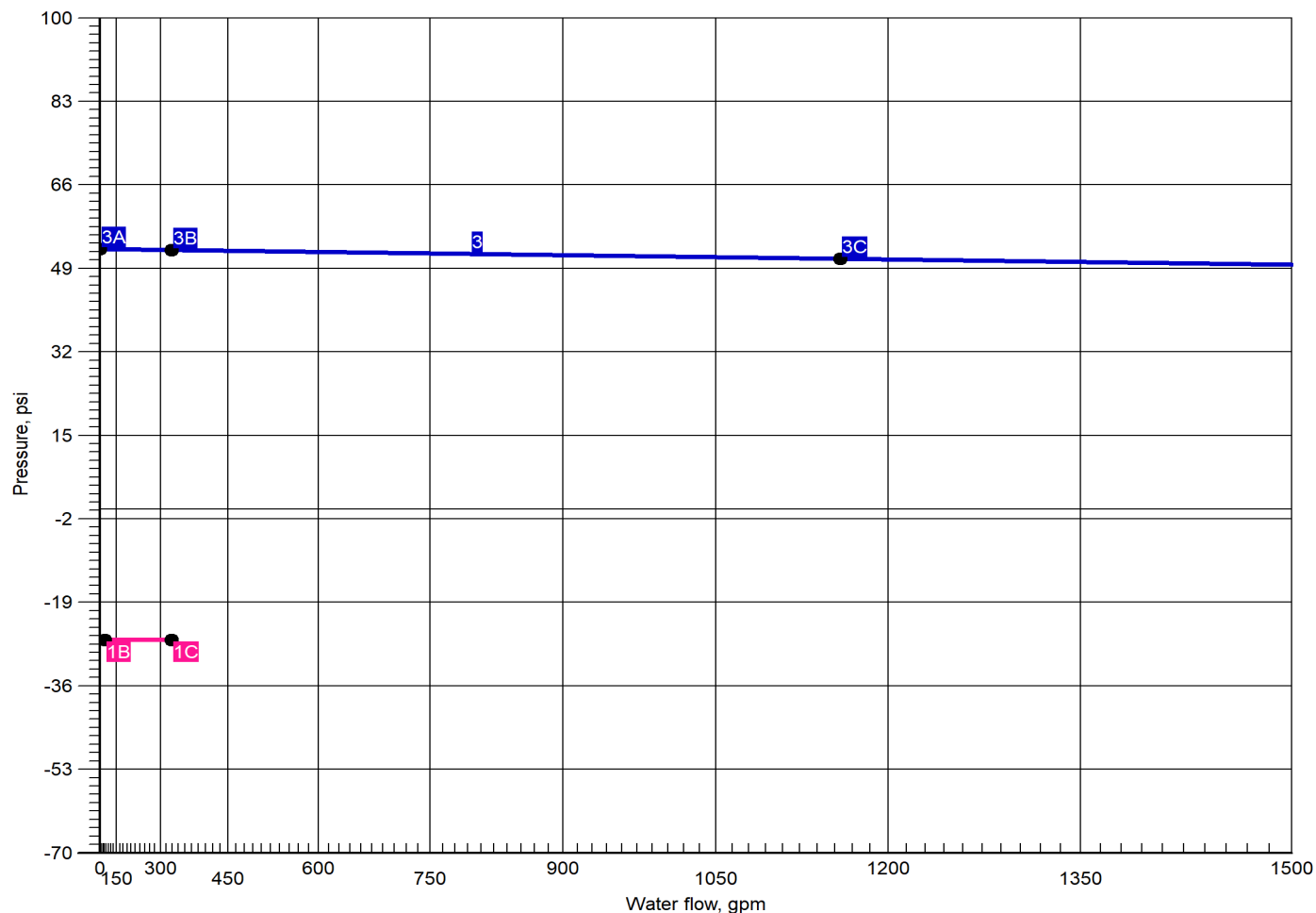
Job Name: Home 2 Suites

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Remote Area Number: Zone 1D - Upper Canopy

1 System Demand
3 Available Water Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: -26.692 @ 79.55 Required Pressure at System Demand (Including Hose Allowance at Source): -26.692 @ 329.55	Available Flow @ 20 PSI: 5271.08
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 53.000 Available Residual Pressure at System Demand: 52.805 @ 329.55 Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).



Pump at Node 8

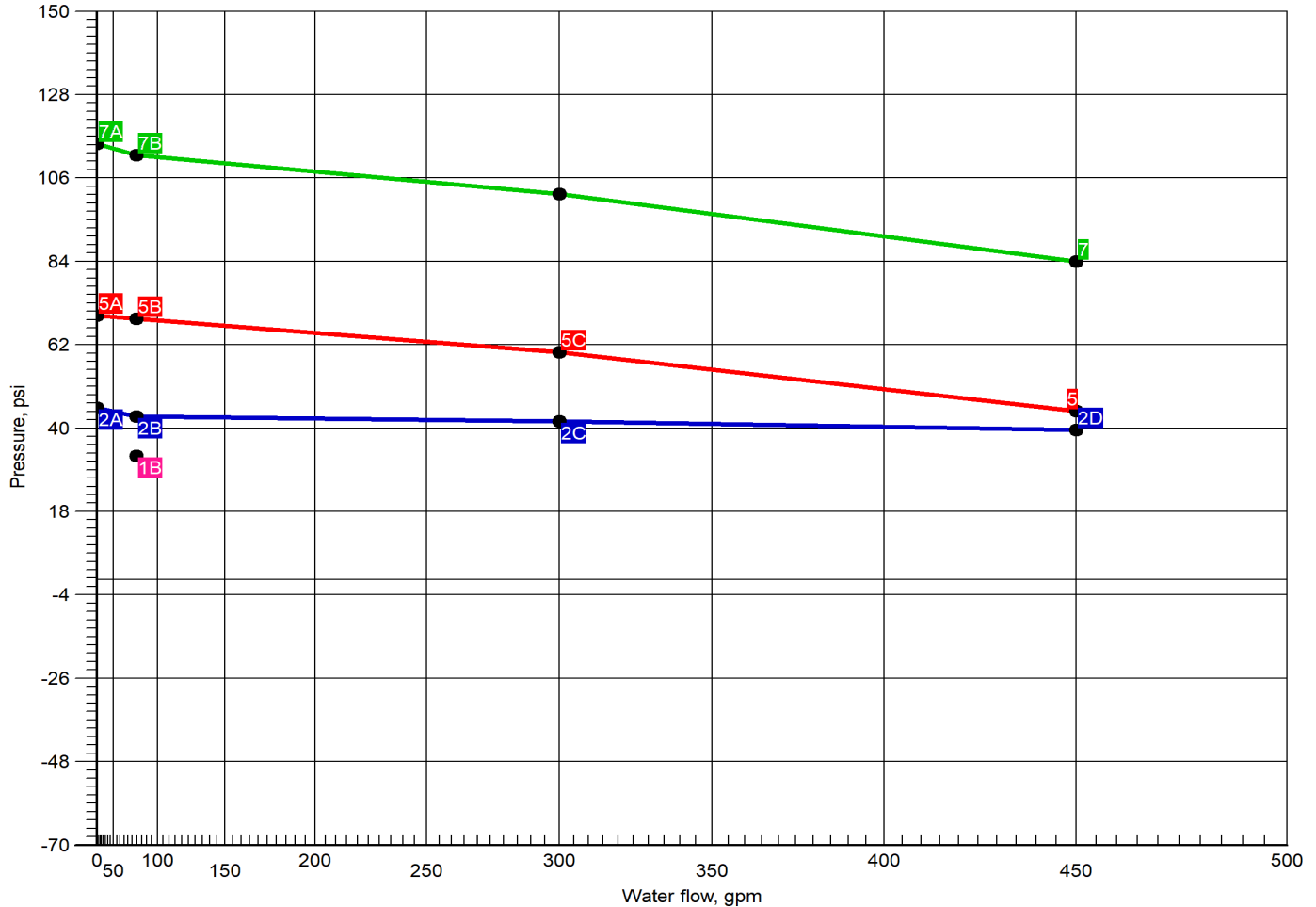
Job Name: Home 2 Suites

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Remote Area Number: Zone 1D - Upper Canopy

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 32.701 @ 79.55	Fire Pump Rating: 60.110 @ 300.00 A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).
2	2A	Available Static Pressure at Pump Inlet: 45.363	
2	2B	Available Residual Pressure at System Demand at Pump Inlet: 43.202 @ 79.55	
2	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 41.824 @ 300.00	
2	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.588 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	Fire Pump Rating: 60.110 @ 300.00 A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).
5	5B	Available Residual Pressure at System Demand: 68.996 @ 79.55	
5	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
7	7B	Available Pressure at System Demand 112.198 @ 79.55	



Summary Of Outflowing Devices

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1101	20.90	19.50	5.6	13.934			
Sprinkler	1102	19.62	19.50	5.6	12.274			
Sprinkler	1103	19.53	19.50	5.6	12.158			
⇒ Sprinkler	1104	19.50	19.50	5.6	12.125			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-4'-6	S	-26.692	79.55
1101	11'-1½	Spr(-13.934)	13.934	20.90
1102	13'-7	Spr(-12.274)	12.274	19.62
1103	13'-7	Spr(-12.158)	12.158	19.53
1104	13'-7	Spr(-12.125)	12.125	19.50
2	-4'-6	T(98'-3½)	-26.694	0.00
3	-4'-6	T(47'-3½)	-26.697	0.00
5	1'-0	P-BOR	-36.031	0.00
6	1'-7		-36.295	0.00
7	1'-7	P1	-36.295	0.00
8	1'-7	P2(-68.996)	32.701	0.00
9	1'-7		32.701	0.00
10	1'-0		32.906	0.00
12	1'-0		32.851	0.00
13	12'-2½	T(37'-8½)	32.417	0.00
50	2'-0	PO(16'-5½)	32.417	0.00
100	8'-6	PO(12'-3½), Zone 1	32.417	0.00
129	4'-8	DPV(7'-0)	30.545	0.00
130	10'-10½	PO(3'-7)	17.005	0.00
131	13'-4	PO(3'-7)	15.098	0.00
132	13'-4	PO(3'-7)	14.957	0.00
133	13'-4	PO(3'-7)	14.918	0.00
200	21'-8	PO(12'-3½), Zone 2	32.417	0.00
300	32'-8	PO(12'-3½), Zone 3	32.417	0.00
400	43'-8	PO(12'-3½), Zone 4	32.417	0.00



Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.0490	19.50	7.24	100		0.173991	6'-11"	Pf 2.692
1104	13'-7"	19.50	5.6	12.125		Sprinkler,	8'-6½"	Pe 0.101
133	13'-4"			14.918		T(3'-7), E(1'-5), PO(3'-7)	15'-5½"	Pv
CM	2.1570	19.50	1.71	100		0.005198	7'-6"	Pf 0.039
133	13'-4"			14.918				Pe
132	13'-4"			14.957			7'-6"	Pv
CM	2.1570	39.03	3.43	100		0.018763	7'-6"	Pf 0.141
132	13'-4"	19.53		14.957		Flow (q) from Route 2		Pe
131	13'-4"			15.098			7'-6"	Pv
CM	2.1570	58.65	5.15	100		0.039859	8'-1"	Pf 0.847
131	13'-4"	19.62		15.098		Flow (q) from Route 3	13'-2"	Pe 1.061
130	10'-10½"			17.005		3E(4'-4½)	21'-3"	Pv
CM	2.1570	79.55	6.98	100		0.070059	115'-3½"	Pf 10.844
130	10'-10½"	20.90		17.005		Flow (q) from Route 4	39'-6"	Pe 2.697
129	4'-8"			30.545		T(8'-9½), 5E(4'-4½), EE(1'-9), DPV(7'-0)	154'-9½"	Pv
ST	2.6350	79.55	4.68	120		0.018864	5'-0"	Pf 0.716
129	4'-8"			30.545			32'-11½"	Pe 1.156
50	2'-0"			32.417		2E(8'-3), PO(16'-5½)	37'-11½"	Pv
ST	6.3570	79.55	0.80	120		0.000259	1'-0"	Pf 0.000
50	2'-0"			32.417				Pe 0.434
12	1'-0"			32.851			1'-0"	Pv
UG	6.2800	79.55	0.82	140		0.000206	179'-9"	Pf 0.055
12	1'-0"			32.851			86'-8"	Pe -0.000
10	1'-0"			32.906		3LtE(14'-2), 4EE(11'-0½)	266'-5"	Pv
FM	6.3570	79.55	0.80	120		0.000259	32'-8½"	Pf 0.048
10	1'-0"			32.906			153'-4½"	Pe -0.253
9	1'-7"			32.701		5E(17'-7), 2BV(12'-7), sCV(40'-3)	186'-1"	Pv
DY	3.0680	79.55	3.45	120		0.008992	0'-0"	Pf 0.000
9	1'-7"			32.701				Pe
8	1'-7"			32.701			0'-0"	Pv
Pump								
8		79.55		32.701		Rating: 60.110 @ 300.00		
7		Q=79.55	3.45	-36.295		Avl.Pressure @ Pump Disch.: 112.198		
DY	3.0680	79.55	3.45	120		0.008992	0'-0"	Pf 0.000
7	1'-7"			-36.295				Pe
6	1'-7"			-36.295			0'-0"	Pv
DY	6.3570	79.55	0.80	120		0.000259	0'-0"	Pf 0.011
6	1'-7"			-36.295			41'-6"	Pe 0.253
5	1'-0"			-36.031		GV(3'-9½), T(37'-8½), P-BOR	41'-6"	Pv
UG	6.2800	79.55	0.82	140		0.000206	394'-0½"	Pf 6.949
5	1'-0"			-36.031			165'-5½"	Pe 2.384
3	-4'-6"			-26.697		LtE(14'-2), 3Ee2(11'-0½), 6EE(11'-0½), BFP(-6.834), GV(4'-8½), T(47'-3½)	559'-6"	Pv
UG	12.4600	79.55	0.21	140		0.000007	329'-2½"	Pf 0.003
3	-4'-6"			-26.697			119'-7"	Pe
2	-4'-6"			-26.694		EE(21'-3½), T(98'-3½)	448'-9½"	Pv
Supply	6.2800	79.55	0.82	140		0.000206	5'-10½"	Pf 0.002
2	-4'-6"			-26.694		Avl.Pressure @ Supply: 52.805	4'-8½"	Pe
1	-4'-6"			-26.692		GV(4'-8½), S	10'-7½"	Pv
		250.00				Hose Allowance At Source		
1		329.55						
Route 2								
DR	1.0490	19.53	7.25	100		0.174420	6'-11"	Pf 2.699
1103	13'-7"	19.53	5.6	12.158		Sprinkler,	8'-6½"	Pe 0.101
132	13'-4"			14.957		T(3'-7), E(1'-5), PO(3'-7)	15'-5½"	Pv
Route 3								
DR	1.0490	19.62	7.28	100		0.175969	6'-11"	Pf 2.722
1102	13'-7"	19.62	5.6	12.274		Sprinkler,	8'-6½"	Pe 0.101
131	13'-4"			15.098		T(3'-7), E(1'-5), PO(3'-7)	15'-5½"	Pv



Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 4								
DR	1.0490	20.90	7.76	100		0.197865	6'-5½"	Pf 2.971
1101	11'-1½"	20.90	5.6	13.934		Sprinkler,	8'-6½"	Pe 0.101
130	10'-10½"			17.005		T(3'-7), E(1'-5), PO(3'-7)	15'-0"	Pv

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)				C Value Multiplier			
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$				Value Of C	100	130	140
				Multiplying Factor	0.713	1.16	1.33
							150
							1.51

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaIV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DeIV	Deluge Valve
SN	Swing Nipple	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
SP	Sprig	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
UG	Underground			Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LtE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV In	Pressure Reducing Valve In
				PRV O	Pressure Reducing Valve Out
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap



Check Point Gauge Data

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1D - Upper Canopy)

Gauge	Available Static Pressure (psi)	Available Residual Pressure (psi)	Required Residual Pressure (nsi)	K-Factor(K)	Flow(gpm)	Elevation(Foot)
P-BOR (5)	45.616	43.466	-36.031	13.25	79.55	1'-0
Zone 1 (100)	112.194	109.096	32.417	0	0.00	8'-6
Zone 2 (200)	106.486	103.388	32.417	0	0.00	21'-8
Zone 3 (300)	101.717	98.619	32.417	0	0.00	32'-8
Zone 4 (400)	96.948	93.851	32.417	0	0.00	43'-8



Hydraulic Overview

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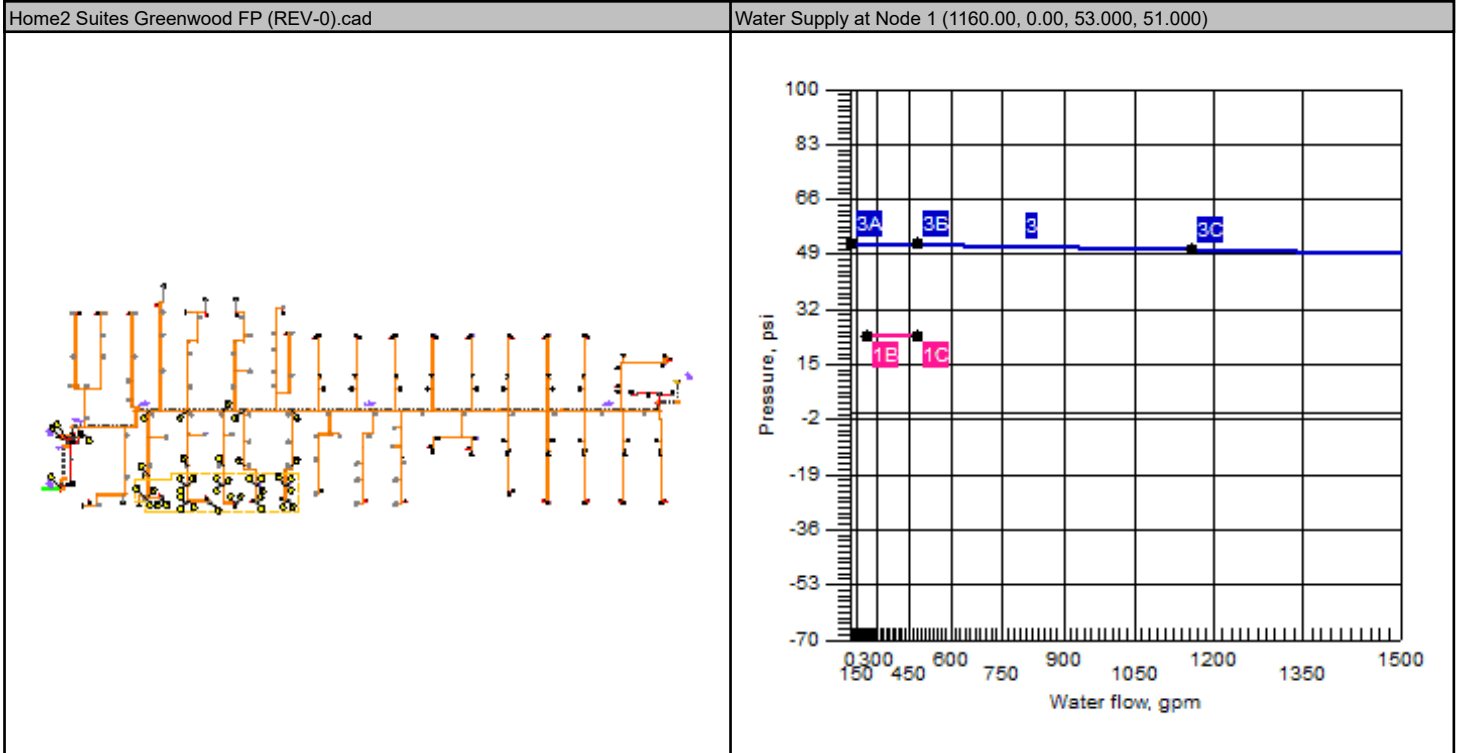
Report Description: Ordinary Group I (Zone 1 - Laundry)

Job		
Job Number CF0588	Designer Thomas Hardin	
Job Name: Home2 Suites by Hilton	Phone (704) 784-4218	FAX (704) 784-4405
Address 1 4-Story Hotel Construction	State Certification/License Number NC # 36018 / SC # FSC. 1078-B	
Address 2 475 Hospitality Blvd.	AHJ LLR / Greenwood FM	
Address 3 Greenwood, SC 29649	Job Site/Building New Buldling	

System		
Density 0.15gpm/ft ²	Area of Application 1500ft ² (Actual 661ft ²)	
Most Demanding Sprinkler Data 5.6 K-Factor 19.50 at 12.125	Hose Streams 250.00	
Coverage Per Sprinkler 130ft ²	Number Of Sprinklers Calculated 11	Number Of Nozzles Calculated 0
System Pressure Demand 23.799	System Flow Demand 233.00	
Total Demand 483.00 @ 23.799	Pressure Result +28.805 (54.8%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
1	Water Supply	1160.00	250.00	53.000	51.000	Zone 1 (100)	72.148	27.43	233.00
8	Pump	300.00		69.830	60.110	P-BOR (5)	13.677	63	233.00
						Zone 2 (200)	70.935	0	0.00
						Zone 3 (300)	70.935	0	0.00
						Zone 4 (400)	70.935	0	0.00

Pumps: Static = Churn (Pressure @ Zero Flow)





Hydraulic Summary

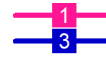
Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Job											
Job Number CF0588				Designer Thomas Hardin							
Job Name: Home2 Suites by Hilton				State Certification/License Number NC # 36018 / SC # FSC. 1078-B							
Address 1 4-Story Hotel Construction				AHJ LLR / Greenwood FM							
Address 2 475 Hospitality Blvd.				Job Site/Building New Building							
Address 3 Greenwood, SC 29649				Drawing Name Home2 Suites Greenwood FP (REV-0).cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.6 K-Factor 19.50 at 12.125				Occupancy Ordinary Group I			Job Suffix				
Hose Allowance At Source 250.00				Density 0.15gpm/ft ²			Area of Application 1500ft ² (Actual 661ft ²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 11		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 130ft ²			
Total Hose Streams 250.00											
System Flow Demand 233.00		Total Water Required (Including Hose Allowance) 483.00									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 23.72 between nodes 101 and 103											
Maximum Velocity Under Ground 2.41 between nodes 3 and 5											
Volume capacity of Wet Pipes 10043.11gal		Volume capacity of Dry Pipes									
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	250.00	53.000	51.000		1160.00	52.605		483.00	23.799	28.805
8	Pump		69.830	60.110		300.00	105.891		233.00	77.086	28.805
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell				Contact Title Project Manger					
Name of Contractor: John M. Campbell Company				Phone (704) 254-3214				Extension			
Address 1 102 Winchester Avenue				FAX							
Address 2 Monroe, NC 28110				E-mail milescampbell@johnmcampbellcompany.com							
Address 3				Web-Site http://johnmcampbellcompany.com/							



Water Supply at Node 1



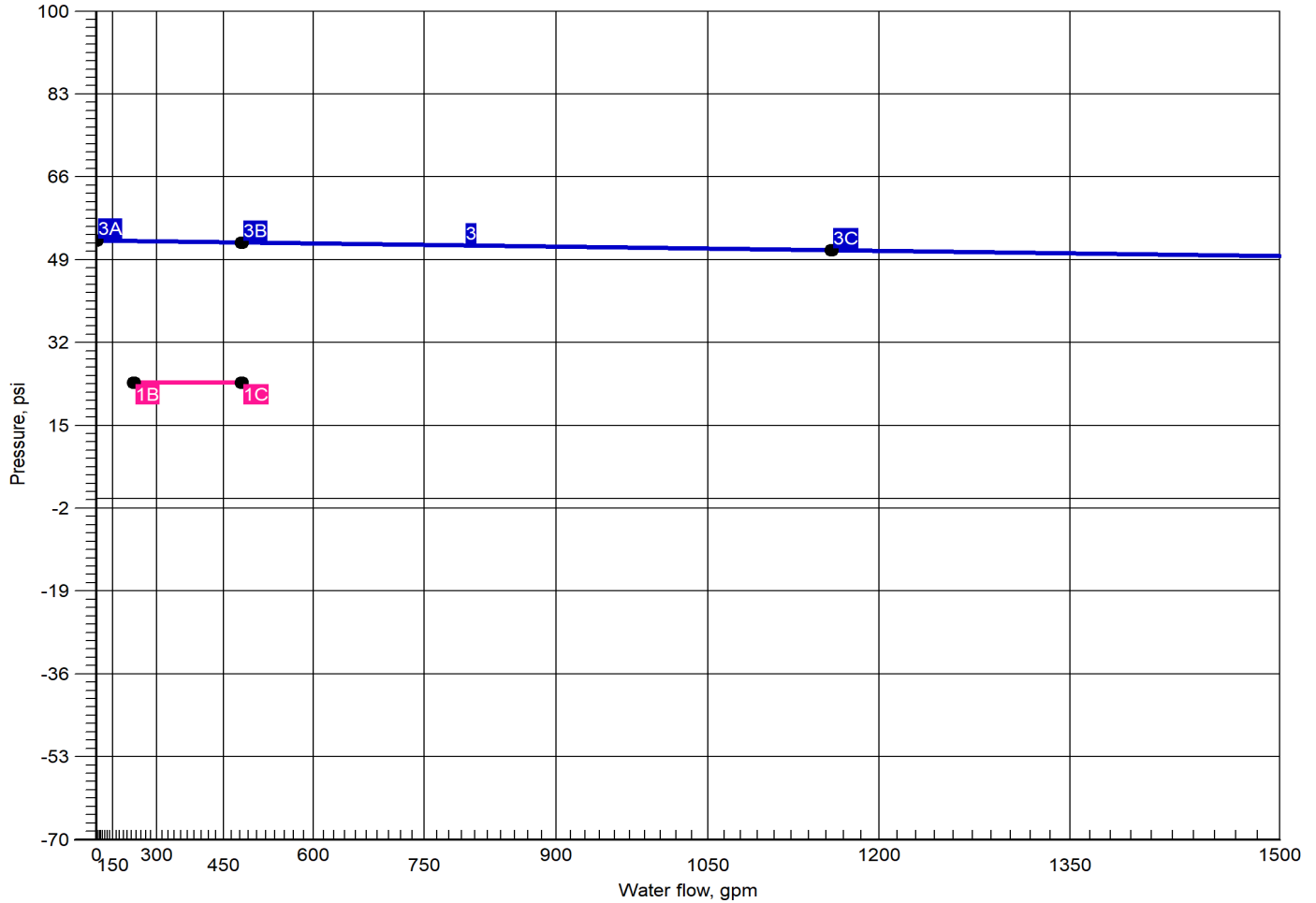
System Demand
Available Water Supply

Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Remote Area Number: Zone 1 - Laundry



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 23.799 @ 233.00	Available Flow @ 20 PSI: 5271.08
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 23.799 @ 483.00	
3	3A	Available Static Pressure at Water Supply at Node 1: 53.000	
	3B	Available Residual Pressure at System Demand: 52.605 @ 483.00	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	



Pump at Node 8

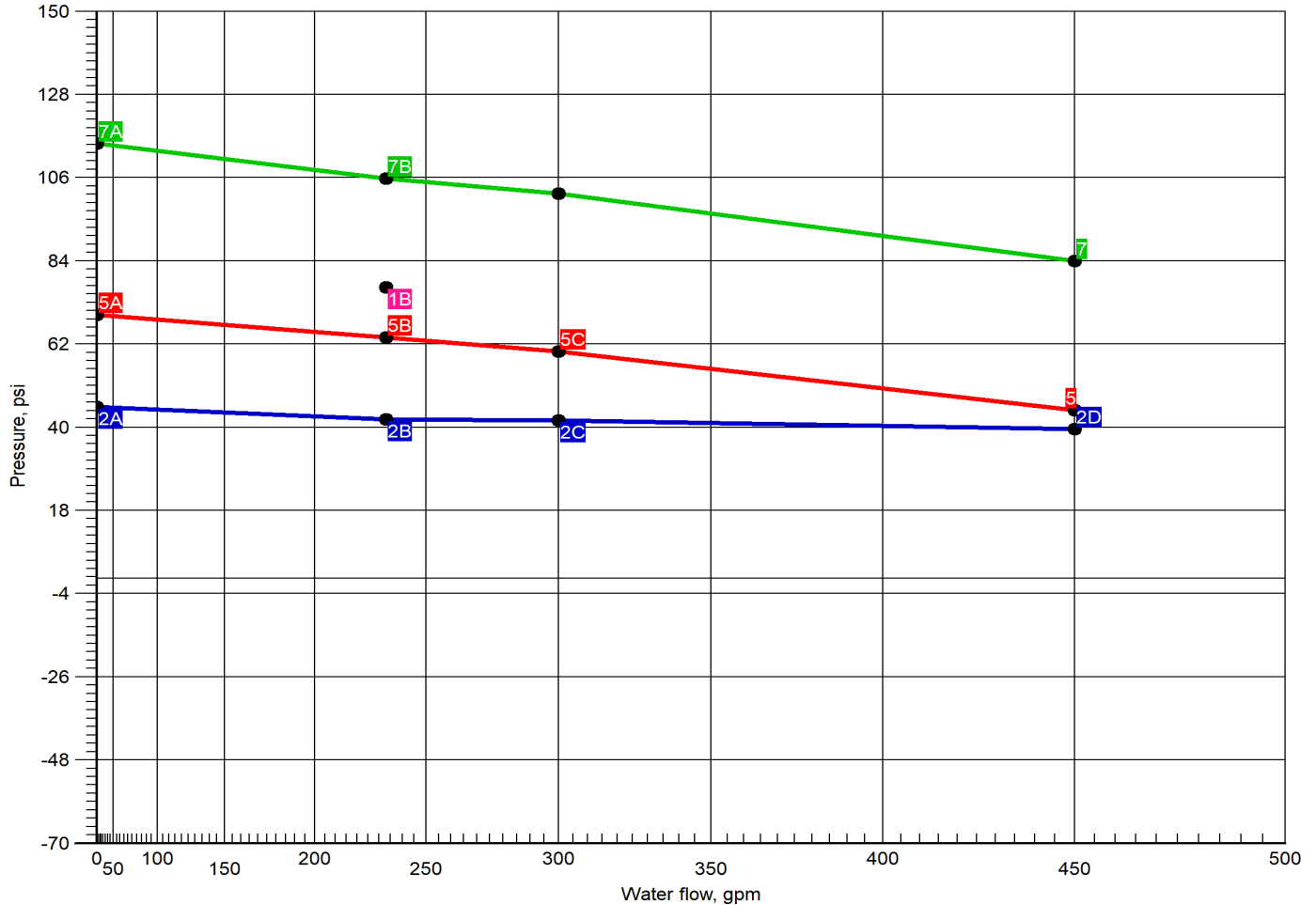
Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Remote Area Number: Zone 1 - Laundry

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 77.086 @ 233.00	Fire Pump Rating: 60.110 @ 300.00
2	2A	Available Static Pressure at Pump Inlet: 45.363	
	2B	Available Residual Pressure at System Demand at Pump Inlet: 42.151 @ 233.00	
	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 41.824 @ 300.00	
	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.588 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	
	5B	Available Residual Pressure at System Demand: 63.740 @ 233.00	
	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
	7B	Available Pressure at System Demand 105.891 @ 233.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1001	24.11	19.50	5.6	18.534			
Sprinkler	1002	23.98	19.50	5.6	18.343			
Sprinkler	1003	20.99	19.50	5.6	14.049			
Sprinkler	1004	20.21	19.50	5.6	13.021			
⇒ Sprinkler	1005	19.50	19.50	5.6	12.125			
Sprinkler	1006	22.15	19.50	5.6	15.642			
Sprinkler	1007	21.22	19.50	5.6	14.363			
Sprinkler	1008	20.55	19.50	5.6	13.466			
Sprinkler	1009	19.90	19.50	5.6	12.623			
Sprinkler	1010	20.51	19.50	5.6	13.416			
Sprinkler	1011	19.88	19.50	5.6	12.607			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-4'-6	S	23.799	233.00
1001	8'-0½	Spr(-18.534)	18.534	24.11
1002	8'-0½	Spr(-18.343)	18.343	23.98
1003	8'-0½	Spr(-14.049)	14.049	20.99
1004	8'-0½	Spr(-13.021)	13.021	20.21
1005	8'-0½	Spr(-12.125)	12.125	19.50
1006	8'-0½	Spr(-15.642)	15.642	22.15
1007	8'-0½	Spr(-14.363)	14.363	21.22
1008	8'-0½	Spr(-13.466)	13.466	20.55
1009	8'-0½	Spr(-12.623)	12.623	19.90
1010	8'-0½	Spr(-13.416)	13.416	20.51
1011	8'-0½	Spr(-12.607)	12.607	19.88
2	-4'-6	T(98'-3½)	23.783	0.00
3	-4'-6	T(47'-3½)	23.759	0.00
5	1'-0	P-BOR	13.677	0.00
6	1'-7		13.346	0.00
7	1'-7	P1	13.346	0.00
8	1'-7	P2(-63.740)	77.086	0.00
9	1'-7		77.086	0.00
10	1'-0		76.988	0.00
12	1'-0		76.586	0.00
13	12'-2½	T(26'-4)	71.512	0.00
100	8'-6	PO(12'-3½), Zone 1	72.148	0.00
101	9'-7		50.016	0.00
102	10'-1	T(5'-0), Tr(1'-0)	21.561	0.00
103	9'-7	T(6'-0), Tr(2'-0)	26.052	0.00
104	10'-1	T(5'-0), Tr(1'-0)	20.250	0.00
105	10'-1	E(7'-0)	18.519	0.00
106	10'-1	T(5'-0), Tr(1'-0)	16.391	0.00
107	10'-1	E(7'-0)	13.837	0.00
108	10'-1	E(7'-0)	18.319	0.00
109	9'-7	T(6'-0), Tr(2'-0)	22.125	0.00
110	10'-1	T(5'-0), Tr(1'-0)	14.501	0.00
111	10'-1	T(5'-0), Tr(1'-0)	13.767	0.00
112	10'-1	E(7'-0)	12.764	0.00
113	10'-1	T(5'-0), Tr(1'-0)	17.249	0.00
114	9'-7	T(6'-0), Tr(2'-0)	20.609	0.00
115	10'-1	E(7'-0)	11.828	0.00
116	10'-1	E(7'-0)	15.501	0.00
117	10'-1	T(5'-0), Tr(1'-0)	17.113	0.00
118	10'-1	T(5'-0), Tr(1'-0)	16.234	0.00
119	9'-7	T(6'-0), Tr(2'-0)	20.092	0.00
120	10'-1	E(7'-0)	14.166	0.00
121	10'-1	T(5'-0), Tr(1'-0)	13.841	0.00
122	10'-1	E(7'-0)	13.229	0.00
123	10'-1	E(7'-0)	12.348	0.00
124	10'-1	T(5'-0), Tr(1'-0)	13.787	0.00
125	9'-7	T(6'-0)	19.821	0.00
126	10'-1	T(5'-0), Tr(1'-0)	16.848	0.00
127	10'-1	E(7'-0)	13.177	0.00
128	10'-1	E(7'-0)	12.331	0.00
200	21'-8	PO(12'-3½), Zone 2	70.935	0.00
300	32'-8	PO(12'-3½), Zone 3	70.935	0.00
400	43'-8	PO(12'-3½), Zone 4	70.935	0.00



Hydraulic Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.1010	19.50	6.57	150		0.064928	2'-0½"	Pf 0.587
1005	8'-0½"	19.50	5.6	12.125		Sprinkler,	7'-0"	Pe -0.884
115	10'-1"			11.828		E(7'-0")	9'-0½"	Pv
BL	1.1010	19.50	6.57	120		0.098110	7'-9"	Pf 1.939
115	10'-1"			11.828			12'-0"	Pe
111	10'-1"			13.767		E(7'-0"), T(5'-0")	19'-9"	Pv
BL	1.3940	39.71	8.35	120		0.115879	5'-4"	Pf 0.734
111	10'-1"	20.21		13.767		Flow (q) from Route 4	1'-0"	Pe
110	10'-1"			14.501		Tr(1'-0")	6'-4"	Pv
BL	1.3940	60.70	12.76	120		0.254069	6'-5½"	Pf 1.890
110	10'-1"	20.99		14.501		Flow (q) from Route 7	1'-0"	Pe
106	10'-1"			16.391		Tr(1'-0")	7'-5½"	Pv
BL	1.3940	60.70	12.76	150		0.168139	18'-9½"	Pf 5.517
106	10'-1"			16.391			14'-0"	Pe 0.217
109	9'-7"			22.125		2Tr(1'-0"), 2T(6'-0")	32'-9½"	Pv
CM	2.0030	184.91	18.83	150		0.225974	13'-4½"	Pf 3.927
109	9'-7"	124.21		22.125		Flow (q) from Route 2	4'-0"	Pe
103	9'-7"			26.052		2Tr(2'-0")	17'-4½"	Pv
CM	2.0030	233.00	23.72	150		0.346576	30'-1½"	Pf 23.964
103	9'-7"	48.09		26.052		Flow (q) from Route 10	39'-0"	Pe
101	9'-7"			50.016		3Tr(2'-0"), 3E(11'-0")	69'-1½"	Pv
DY	2.1570	233.00	20.46	120		0.365105	7'-6"	Pf 21.663
101	9'-7"			50.016			51'-10"	Pe 0.470
100	8'-6"			72.148		T(12'-3½"), E(6'-2"), CV(21'-1"), PO (12'-3½"), Zone 1	59'-4"	Pv
ST	4.2600	233.00	5.24	120		0.013275	5'-0½"	Pf 0.976
100	8'-6"			72.148			68'-5½"	Pe -1.612
13	12'-2½"			71.512		2T(26'-4"), BV(15'-9½")	73'-6"	Pv
ST	6.3570	233.00	2.36	120		0.001890	23'-4"	Pf 0.210
13	12'-2½"			71.512			88'-0"	Pe 4.864
12	1'-0"			76.586		5E(17'-7")	111'-4½"	Pv
UG	6.2800	233.00	2.41	140		0.001508	179'-9"	Pf 0.402
12	1'-0"			76.586			86'-8"	Pe -0.000
10	1'-0"			76.988		3LtE(14'-2"), 4EE(11'-0½")	266'-5"	Pv
FM	6.3570	233.00	2.36	120		0.001890	32'-6"	Pf 0.351
10	1'-0"			76.988			153'-4½"	Pe -0.253
9	1'-7"			77.086		5E(17'-7"), 2BV(12'-7"), sCV(40'-3")	185'-10½"	Pv
DY	3.0680	233.00	10.11	120		0.065657	0'-0"	Pf 0.000
9	1'-7"			77.086				Pe
8	1'-7"			77.086			0'-0"	Pv
Pump								
8		233.00	Velocity	77.086		Rating: 60.110 @ 300.00		
7		Q=233.00	10.11	13.346		Fire Pump Churn Pressure: 69.830		
DY	3.0680	233.00	10.11	120		0.065657	0'-0"	Pf 0.000
7	1'-7"			13.346				Pe
6	1'-7"			13.346			0'-0"	Pv
DY	6.3570	233.00	2.36	120		0.001890	0'-0"	Pf 0.078
6	1'-7"			13.346			41'-6"	Pe 0.253
5	1'-0"			13.677		GV(3'-9½"), T(37'-8½"), P-BOR	41'-6"	Pv
UG	6.2800	233.00	2.41	140		0.001508	394'-0½"	Pf 7.698
5	1'-0"			13.677			165'-5½"	Pe 2.384
3	-4'-6"			23.759		LtE(14'-2"), 3Ee2(11'-0½"), 6EE(11'-0½"), BFP(-6.854), GV(4'-8½"), T(47'-3½")	559'-6"	Pv
UG	12.4600	233.00	0.61	140		0.000054	329'-2½"	Pf 0.024
3	-4'-6"			23.759			119'-7"	Pe
2	-4'-6"			23.783		EE(21'-3½"), T(98'-3½")	448'-9½"	Pv
UG	6.2800	233.00	2.41	140		0.001508	5'-10½"	Pf 0.016
2	-4'-6"			23.783			4'-8½"	Pe
1	-4'-6"			23.799		GV(4'-8½"), S	10'-7½"	Pv
		250.00				Hose Allowance At Source		
1		483.00						
Route 2								



Hydraulic Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
DR	1.1010	19.88	6.70	150		0.067310	2'-0½"	Pf 0.608
1011	8'-0½"	19.88	5.6	12.607		Sprinkler,	7'-0"	Pe -0.884
128	10'-1"			12.331		E(7'-0)	9'-0½"	Pv
BL	1.1010	19.88	6.70	120		0.101710	6'-4"	Pf 1.456
128	10'-1"			12.331			8'-0"	Pe
124	10'-1"			13.787		E(7'-0), Tr(1'-0)	14'-4"	Pv
BL	1.3940	40.40	8.49	120		0.119621	8'-7"	Pf 3.061
124	10'-1"	20.51		13.787		Flow (q) from Route 5	17'-0"	Pe
126	10'-1"			16.848		2E(8'-0), Tr(1'-0)	25'-7"	Pv
BL	1.3940	40.40	8.49	150		0.079163	18'-9½"	Pf 2.756
126	10'-1"			16.848			16'-0"	Pe 0.217
125	9'-7"			19.821		2Tr(1'-0), E(8'-0), T(6'-0)	34'-9½"	Pv
CM	2.0030	40.40	4.11	150		0.013549	16'-0"	Pf 0.271
125	9'-7"			19.821			4'-0"	Pe
119	9'-7"			20.092		2Tr(2'-0)	20'-0"	Pv
CM	2.0030	80.84	8.23	150		0.048899	6'-7"	Pf 0.517
119	9'-7"	40.45		20.092		Flow (q) from Route 3	4'-0"	Pe
114	9'-7"			20.609		2Tr(2'-0)	10'-7"	Pv
CM	2.0030	124.21	12.65	150		0.108241	12'-0"	Pf 1.515
114	9'-7"	43.37		20.609		Flow (q) from Route 8	2'-0"	Pe
109	9'-7"			22.125		Tr(2'-0)	14'-0"	Pv
Route 3								
DR	1.1010	19.90	6.70	150		0.067387	2'-0½"	Pf 0.609
1009	8'-0½"	19.90	5.6	12.623		Sprinkler,	7'-0"	Pe -0.884
123	10'-1"			12.348		E(7'-0)	9'-0½"	Pv
BL	1.1010	19.90	6.70	120		0.101826	6'-8"	Pf 1.493
123	10'-1"			12.348			8'-0"	Pe
121	10'-1"			13.841		E(7'-0), Tr(1'-0)	14'-8"	Pv
BL	1.3940	40.45	8.50	120		0.119896	10'-3½"	Pf 3.272
121	10'-1"	20.55		13.841		Flow (q) from Route 6	17'-0"	Pe
117	10'-1"			17.113		2E(8'-0), Tr(1'-0)	27'-3½"	Pv
BL	1.3940	40.45	8.50	150		0.079345	18'-9½"	Pf 2.762
117	10'-1"			17.113			16'-0"	Pe 0.217
119	9'-7"			20.092		2Tr(1'-0), E(8'-0), T(6'-0)	34'-9½"	Pv
Route 4								
DR	1.1010	20.21	6.81	150		0.069352	2'-0½"	Pf 0.627
1004	8'-0½"	20.21	5.6	13.021		Sprinkler,	7'-0"	Pe -0.884
112	10'-1"			12.764		E(7'-0)	9'-0½"	Pv
BL	1.1010	20.21	6.81	120		0.104796	1'-7"	Pf 1.003
112	10'-1"			12.764			8'-0"	Pe
111	10'-1"			13.767		E(7'-0), Tr(1'-0)	9'-7"	Pv
Route 5								
DR	1.1010	20.51	6.91	150		0.071298	2'-0½"	Pf 0.644
1010	8'-0½"	20.51	5.6	13.416		Sprinkler,	7'-0"	Pe -0.884
127	10'-1"			13.177		E(7'-0)	9'-0½"	Pv
BL	1.1010	20.51	6.91	120		0.107736	0'-8"	Pf 0.611
127	10'-1"			13.177			5'-0"	Pe
124	10'-1"			13.787		T(5'-0)	5'-8"	Pv
Route 6								
DR	1.1010	20.55	6.93	150		0.071541	2'-0½"	Pf 0.647
1008	8'-0½"	20.55	5.6	13.466		Sprinkler,	7'-0"	Pe -0.884
122	10'-1"			13.229		E(7'-0)	9'-0½"	Pv
BL	1.1010	20.55	6.93	120		0.108104	0'-8"	Pf 0.613
122	10'-1"			13.229			5'-0"	Pe
121	10'-1"			13.841		T(5'-0)	5'-8"	Pv
Route 7								
DR	1.1010	20.99	7.07	150		0.074400	2'-0½"	Pf 0.673
1003	8'-0½"	20.99	5.6	14.049		Sprinkler,	7'-0"	Pe -0.884
107	10'-1"			13.837		E(7'-0)	9'-0½"	Pv
BL	1.1010	20.99	7.07	120		0.112423	0'-11"	Pf 0.664
107	10'-1"			13.837			5'-0"	Pe
110	10'-1"			14.501		T(5'-0)	5'-11"	Pv
Route 8								
DR	1.1010	21.22	7.15	150		0.075941	2'-0½"	Pf 0.686
1007	8'-0½"	21.22	5.6	14.363		Sprinkler,	7'-0"	Pe -0.884
120	10'-1"			14.166		E(7'-0)	9'-0½"	Pv



Hydraulic Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
BL	1.1010	21.22	7.15	120		0.114751	10'-0½	Pf 2.069
120	10'-1			14.166			8'-0	Pe
118	10'-1			16.234		E(7'-0), Tr(1'-0)	18'-0½	Pv
BL	1.3940	43.37	9.12	120		0.136434	6'-5½	Pf 1.015
118	10'-1	22.15		16.234		Flow (q) from Route 9	1'-0	Pe
113	10'-1			17.249		Tr(1'-0)	7'-5½	Pv
BL	1.3940	43.37	9.12	150		0.090290	18'-9½	Pf 3.143
113	10'-1			17.249			16'-0	Pe 0.217
114	9'-7			20.609		2Tr(1'-0), E(8'-0), T(6'-0)	34'-9½	Pv
Route 9								
DR	1.1010	22.15	7.46	150		0.082175	2'-0½	Pf 0.743
1006	8'-0½	22.15	5.6	15.642		Sprinkler,	7'-0	Pe -0.884
116	10'-1			15.501		E(7'-0)	9'-0½	Pv
BL	1.1010	22.15	7.46	120		0.124172	0'-11	Pf 0.733
116	10'-1			15.501			5'-0	Pe
118	10'-1			16.234		T(5'-0)	5'-11	Pv
Route 10								
DR	1.1010	23.98	8.08	150		0.095217	2'-0½	Pf 0.861
1002	8'-0½	23.98	5.6	18.343		Sprinkler,	7'-0	Pe -0.884
108	10'-1			18.319		E(7'-0)	9'-0½	Pv
BL	1.1010	23.98	8.08	120		0.143879	5'-5	Pf 1.930
108	10'-1			18.319			8'-0	Pe
104	10'-1			20.250		E(7'-0), Tr(1'-0)	13'-5	Pv
BL	1.3940	48.09	10.11	120		0.165170	6'-11½	Pf 1.311
104	10'-1	24.11		20.250		Flow (q) from Route 11	1'-0	Pe
102	10'-1			21.561		Tr(1'-0)	7'-11½	Pv
BL	1.3940	48.09	10.11	150		0.109307	22'-1	Pf 4.274
102	10'-1			21.561			17'-0	Pe 0.217
103	9'-7			26.052		3Tr(1'-0), E(8'-0), T(6'-0)	39'-1	Pv
Route 11								
DR	1.1010	24.11	8.12	150		0.096134	2'-0½	Pf 0.869
1001	8'-0½	24.11	5.6	18.534		Sprinkler,	7'-0	Pe -0.884
105	10'-1			18.519		E(7'-0)	9'-0½	Pv
BL	1.1010	24.11	8.12	120		0.145265	1'-11	Pf 1.731
105	10'-1			18.519			10'-0	Pe
104	10'-1			20.250		2T(5'-0)	11'-11	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)					C Value Multiplier			
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$					Value Of C	100	130	140
					Multiplying Factor	0.713	1.16	1.33
							150	1.51



Hydraulic Analysis

Job Number: CF0588

Report Description: Ordinary Group I (Zone 1 - Laundry)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend	Units Legend		Fittings Legend	
AO Arm-Over	Diameter	Inch	ALV Alarm Valve	
BL Branch Line	Elevation	Foot	AngV Angle Valve	
CM Cross Main	Flow	gpm	b Bushing	
DN Drain	Discharge	gpm	BaV Ball Valve	
DR Drop	Velocity	fps	BFP Backflow Preventer	
DY Dynamic	Pressure	psi	BV Butterfly Valve	
FM Feed Main	Length	Foot	C Cross Flow Turn 90°	
FR Feed Riser	Friction Loss	psi/Foot	cplg Coupling	
MS Miscellaneous	HWC	Hazen-Williams Constant	Cr Cross Run	
OR Outrigger	Pt	Total pressure at a point in a pipe	CV Check Valve	
RN Riser Nipple	Pn	Normal pressure at a point in a pipe	DeV Deluge Valve	
SN Swing Nipple	Pf	Pressure loss due to friction between points	DPV Dry Pipe Valve	
SP Sprig	Pe	Pressure due to elevation difference between indicated points	E 90° Elbow	
ST Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE 45° Elbow	
UG Underground			Ee1 11¼° Elbow	
			Ee2 22½° Elbow	
			f Flow Device	
			fd Flex Drop	
			FDC Fire Department Connection	
			fE 90° FireLock(TM) Elbow	
			fEE 45° FireLock(TM) Elbow	
			flg Flange	
			FN Floating Node	
			fT FireLock(TM) Tee	
			g Gauge	
			GloV Globe Valve	
			GV Gate Valve	
			Ho Hose	
			Hose Hose	
			HV Hose Valve	
			Hyd Hydrant	
			LtE Long Turn Elbow	
			mecT Mechanical Tee	
			Noz Nozzle	
			P1 Pump In	
			P2 Pump Out	
			PIV Post Indicating Valve	
			PO Pipe Outlet	
			PrV Pressure Relief Valve	
			PRV Pressure Reducing Valve	
			red Reducer/Adapter	
			S Supply	
			sCV Swing Check Valve	
			SFx Seismic Flex	
			Spr Sprinkler	
			St Strainer	
			T Tee Flow Turn 90°	
			Tr Tee Run	
			U Union	
			WirF Wirsbo	
			WMV Water Meter Valve	
			Z Cap	



Hydraulic Overview

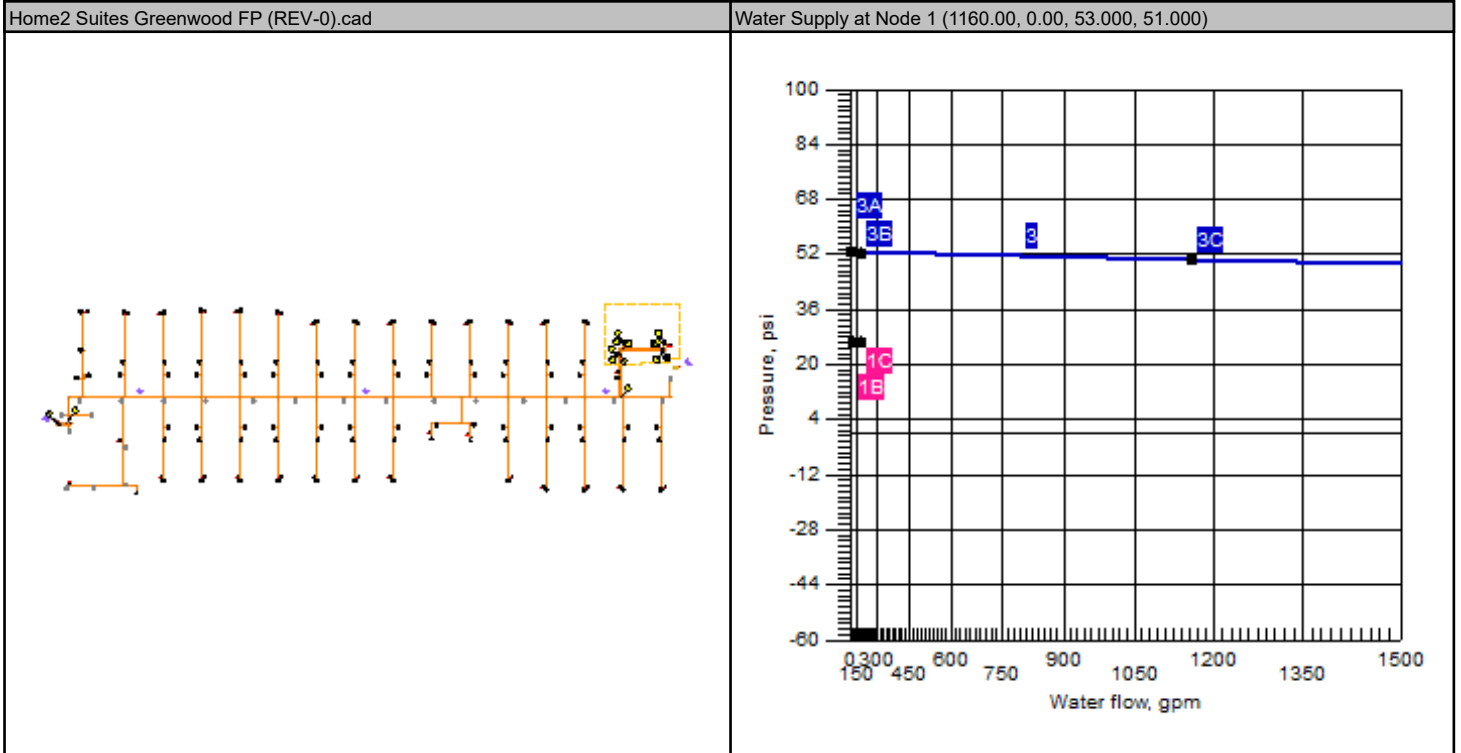
Job Number: CF0588
Report Description: Residential (Zone 2 - King One Bedroom 229)

Job		
Job Number	CF0588	
Designer	Thomas Hardin	
Job Name:	Home2 Suites by Hilton	Phone (704) 784-4218
Address 1	4-Story Hotel Construction	FAX (704) 784-4405
Address 2	475 Hospitality Blvd.	State Certification/License Number NC # 36018 / SC # FSC. 1078-B
Address 3	Greenwood, SC 29649	AHJ LLR / Greenwood FM
		Job Site/Building New Buldling

System		
Density	0.10gpm/ft ²	
Area of Application	484ft ² (Actual 484ft ²)	
Most Demanding Sprinkler Data	5.8 K-Factor 20.01 at 11.900	
Hose Streams	100.00	
Coverage Per Sprinkler	256ft ²	Number Of Sprinklers Calculated 4
		Number Of Nozzles Calculated 0
System Pressure Demand	26.654	
System Flow Demand	86.42	
Total Demand	186.42 @ 26.654	
Pressure Result	+26.278 (49.6%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
1	Water Supply	1160.00	100.00	53.000	51.000	Zone 1 (100)	80.727	0	0.00
8	Pump	300.00		69.830	60.110	P-BOR (5)	16.991	20.97	86.42
						Zone 2 (200)	76.556	9.88	86.42
						Zone 3 (300)	76.556	0	0.00
						Zone 4 (400)	76.556	0	0.00

Pumps: Static = Churn (Pressure @ Zero Flow)





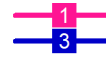
Hydraulic Summary

Job Number: CF0588
Report Description: Residential (Zone 2 - King One Bedroom 229)

Job											
Job Number CF0588				Designer Thomas Hardin							
Job Name: Home2 Suites by Hilton				State Certification/License Number NC # 36018 / SC # FSC. 1078-B							
Address 1 4-Story Hotel Construction				AHJ LLR / Greenwood FM							
Address 2 475 Hospitality Blvd.				Job Site/Building New Building							
Address 3 Greenwood, SC 29649				Drawing Name Home2 Suites Greenwood FP (REV-0).cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.8 K-Factor 20.01 at 11.900				Occupancy Residential			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft²			Area of Application 484ft² (Actual 484ft²)				
Additional Hose Supplies NodeFlow(gpm)				Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft²			
Total Hose Streams 100.00											
System Flow Demand 86.42		Total Water Required (Including Hose Allowance) 186.42									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 29.12 between nodes 205 and 204											
Maximum Velocity Under Ground 0.90 between nodes 3 and 5											
Volume capacity of Wet Pipes 10043.11gal		Volume capacity of Dry Pipes									
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	100.00	53.000	51.000		1160.00	52.932		186.42	26.654	26.278
8	Pump		69.830	60.110		300.00	111.862		86.42	85.583	26.278
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell				Contact Title Project Manger					
Name of Contractor: John M. Campbell Company				Phone (704) 254-3214				Extension			
Address 1 102 Winchester Avenue				FAX							
Address 2 Monroe, NC 28110				E-mail milescampbell@johnmcampbellcompany.com							
Address 3				Web-Site http://johnmcampbellcompany.com/							



Water Supply at Node 1



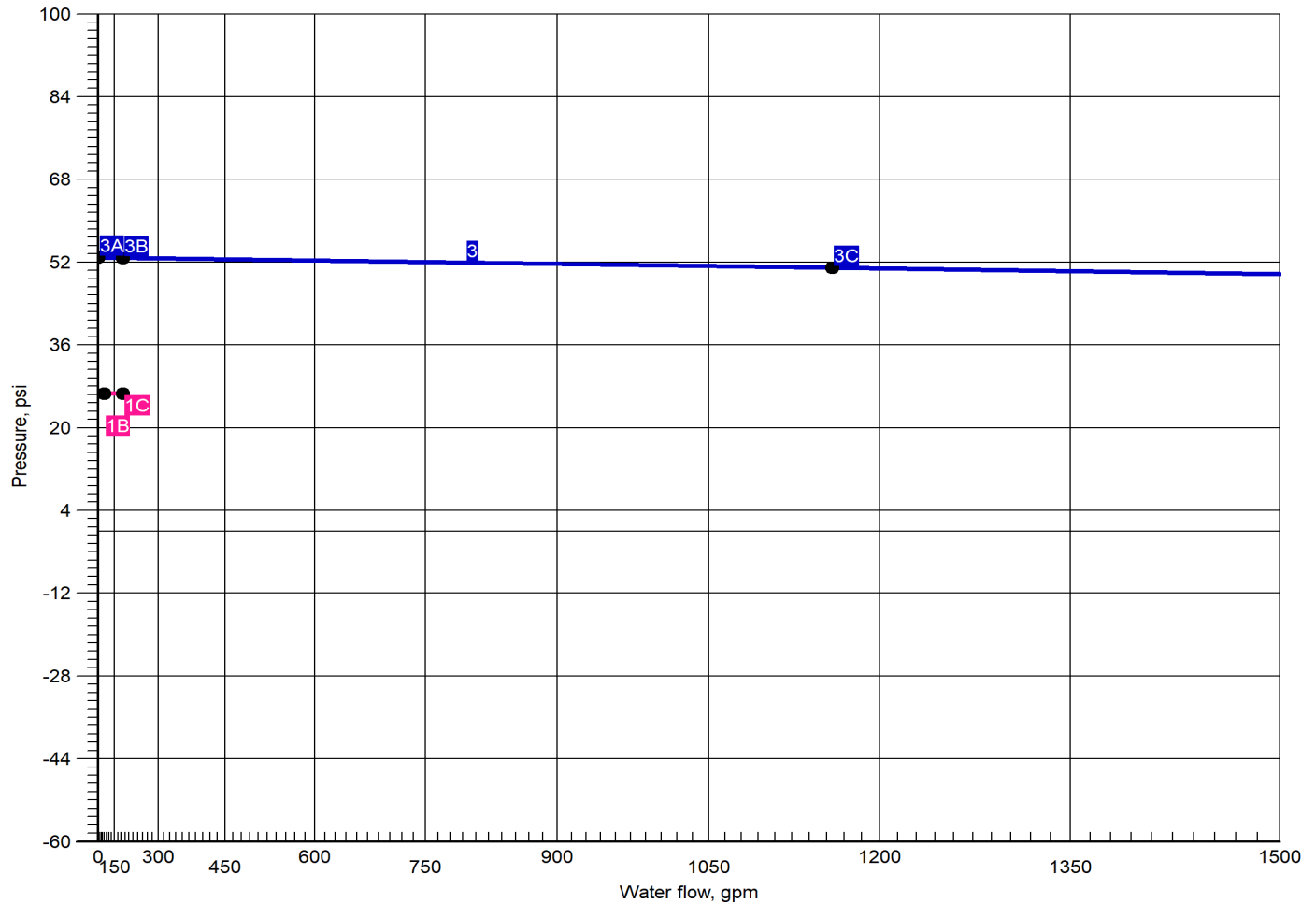
System Demand
Available Water Supply

Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Remote Area Number: Zone 2 - King One Bedroom 229



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 26.654 @ 86.42 Required Pressure at System Demand (Including Hose Allowance at Source): 26.654 @ 186.42	Available Flow @ 20 PSI: 5271.08
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 53.000 Available Residual Pressure at System Demand: 52.932 @ 186.42 Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	



Pump at Node 8

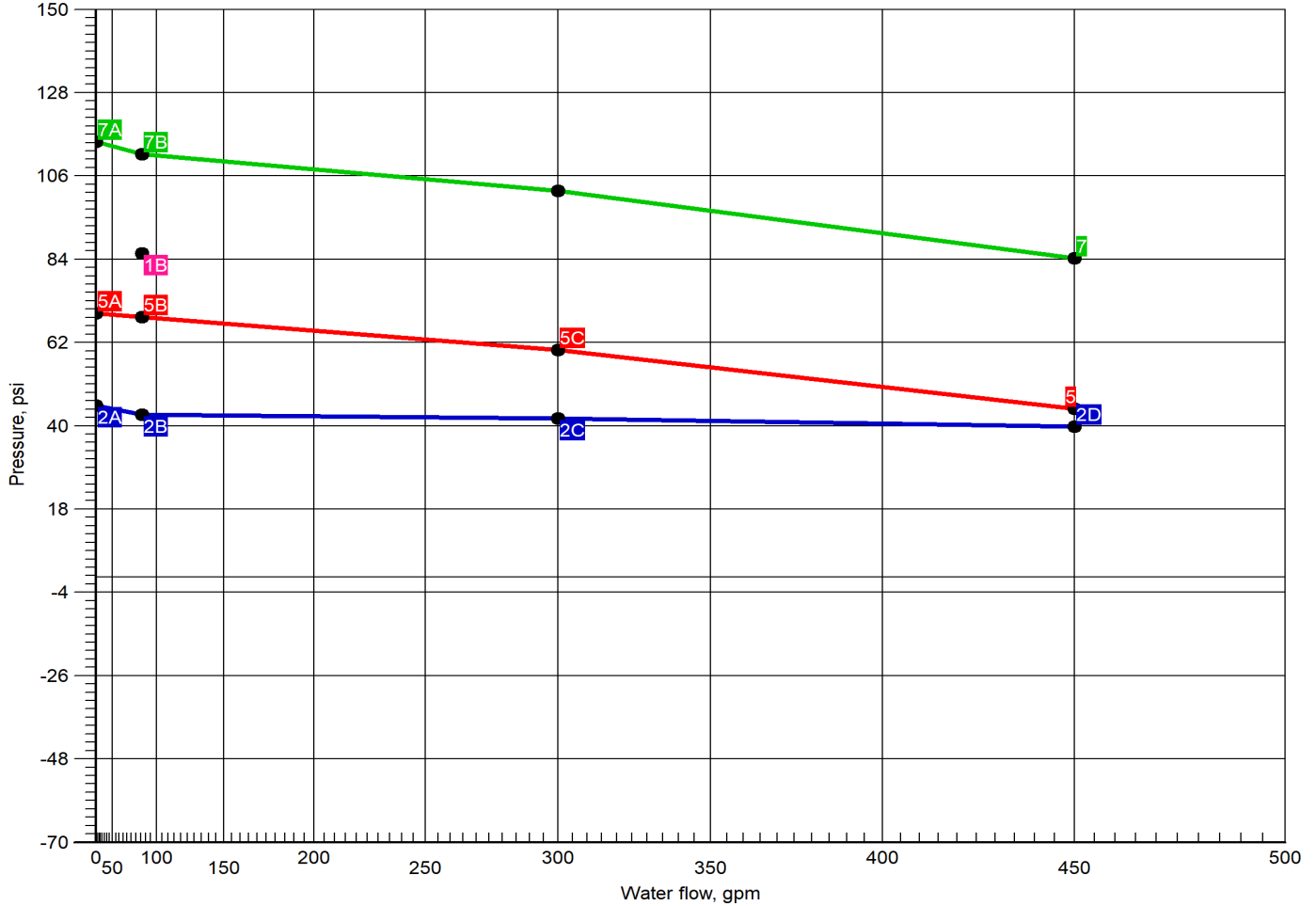
Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Remote Area Number: Zone 2 - King One Bedroom 229

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 85.583 @ 86.42	Fire Pump Rating: 60.110 @ 300.00
2	2A	Available Static Pressure at Pump Inlet: 45.363	
	2B	Available Residual Pressure at System Demand at Pump Inlet: 43.004 @ 86.42	
	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 42.048 @ 300.00	
	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.870 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	Fire Pump Rating: 60.110 @ 300.00
	5B	Available Residual Pressure at System Demand: 68.858 @ 86.42	
	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
	7B	Available Pressure at System Demand 111.862 @ 86.42	



Summary Of Outflowing Devices

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	2301	25.00	17.00	4.9	26.030			
Sprinkler	2302	23.44	20.01	5.8	16.335			
Sprinkler	2303	17.97	17.00	4.9	13.447			
⇒ Sprinkler	2304	20.01	20.01	5.8	11.900			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Node	Elevation(foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-4'-6	S	26.654	86.42
2301	21'-3½	Spr(-26.030)	26.030	25.00
2302	21'-6	Spr(-16.335)	16.335	23.44
2303	21'-3½	Spr(-13.447)	13.447	17.97
2304	21'-6	Spr(-11.900)	11.900	20.01
2	-4'-6	T(98'-3½)	26.651	0.00
3	-4'-6	T(47'-3½)	26.647	0.00
5	1'-0	P-BOR	16.991	0.00
6	1'-7		16.725	0.00
7	1'-7	P1	16.725	0.00
8	1'-7	P2(-68.858)	85.583	0.00
9	1'-7		85.583	0.00
10	1'-0		85.780	0.00
12	1'-0		85.716	0.00
13	12'-2½	T(26'-4)	80.819	0.00
100	8'-6	PO(12'-3½), Zone 1	80.727	0.00
200	21'-8	PO(12'-3½), Zone 2	76.556	0.00
201	22'-10		72.714	0.00
202	22'-10	E(7'-0)	26.241	0.00
203	21'-6	E(7'-0)	16.995	0.00
204	22'-10	T(5'-0), Tr(1'-0)	27.173	0.00
205	22'-10	T(5'-0)	58.479	0.00
206	22'-10	T(5'-0), Tr(1'-0)	18.514	0.00
207	22'-10	T(5'-0), Tr(1'-0)	13.749	0.00
208	21'-6	E(7'-0)	12.393	0.00
209	22'-10	E(7'-0)	13.257	0.00
300	32'-8	PO(12'-3½), Zone 3	76.556	0.00
400	43'-8	PO(12'-3½), Zone 4	76.556	0.00



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.1010	20.01	6.74	150		0.068091	0'-3"	Pf 0.493
2304	21'-6"	20.01	5.8	11.900		Sprinkler,	7'-0"	Pe -0.667
208	21'-6"			12.393		E(7'-0)	7'-3"	Pv
BL	1.1010	20.01	6.74	120		0.102890	3'-9½"	Pf 1.934
208	21'-6"			12.393			15'-0"	Pe -0.578
207	22'-10"			13.749		2E(7'-0), Tr(1'-0)	18'-9½"	Pv
BL	1.1010	37.98	12.80	120		0.336708	13'-2"	Pf 4.765
207	22'-10"	17.97		13.749		Flow (q) from Route 2	1'-0"	Pe
206	22'-10"			18.514		Tr(1'-0)	14'-2"	Pv
BL	1.1010	61.42	20.70	120		0.819403	2'-7"	Pf 8.659
206	22'-10"	23.44		18.514		Flow (q) from Route 3	8'-0"	Pe
204	22'-10"			27.173		E(7'-0), Tr(1'-0)	10'-7"	Pv
BL	1.1010	86.42	29.12	120		1.541217	14'-4"	Pf 31.306
204	22'-10"	25.00		27.173		Flow (q) from Route 4	6'-0"	Pe
205	22'-10"			58.479		Tr(1'-0), T(5'-0)	20'-4"	Pv
CM	2.0030	86.42	8.80	150		0.055322	190'-4"	Pf 14.236
205	22'-10"			58.479			67'-0"	Pe
201	22'-10"			72.714		17Tr(2'-0), 11Cr(2'-0), E(11'-0)	257'-4"	Pv
DY	2.1570	86.42	7.59	120		0.058280	5'-4½"	Pf 3.336
201	22'-10"			72.714			51'-10"	Pe 0.506
200	21'-8"			76.556		T(12'-3½), E(6'-2), CV(21'-1), PO (12'-3½), Zone 2	57'-3"	Pv
ST	4.2600	86.42	1.95	120		0.002119	10'-5"	Pf 0.167
200	21'-8"			76.556			68'-5½"	Pe 4.096
13	12'-2½"			80.819		2T(26'-4), BV(15'-9½)	78'-10½"	Pv
ST	6.3570	86.42	0.87	120		0.000302	23'-4"	Pf 0.034
13	12'-2½"			80.819			88'-0"	Pe 4.864
12	1'-0"			85.716		5E(17'-7)	111'-4½"	Pv
UG	6.2800	86.42	0.90	140		0.000241	179'-9"	Pf 0.064
12	1'-0"			85.716			86'-8"	Pe -0.000
10	1'-0"			85.780		3LtE(14'-2), 4EE(11'-0½)	266'-5"	Pv
FM	6.3570	86.42	0.87	120		0.000302	32'-6"	Pf 0.056
10	1'-0"			85.780			153'-4½"	Pe -0.253
9	1'-7"			85.583		5E(17'-7), 2BV(12'-7), sCV(40'-3)	185'-10½"	Pv
DY	3.0680	86.42	3.75	120		0.010481	0'-0"	Pf 0.000
9	1'-7"			85.583			0'-0"	Pe
8	1'-7"			85.583			0'-0"	Pv
Pump								
8		86.42	3.75	85.583		Rating: 60.110 @ 300.00		
7		Q=86.42		16.725		Fire Pump Churn Pressure: 69.830		
DY	3.0680	86.42	3.75	120		0.010481	0'-0"	Pf 0.000
7	1'-7"			16.725			0'-0"	Pe
6	1'-7"			16.725			0'-0"	Pv
DY	6.3570	86.42	0.87	120		0.000302	0'-0"	Pf 0.013
6	1'-7"			16.725			41'-6"	Pe 0.253
5	1'-0"			16.991		GV(3'-9½), T(37'-8½), P-BOR	41'-6"	Pv
UG	6.2800	86.42	0.90	140		0.000241	394'-0½"	Pf 7.272
5	1'-0"			16.991			165'-5½"	Pe 2.384
3	-4'-6"			26.647		LtE(14'-2), 3Ee2(11'-0½), 6EE(11'-0½), BFP(-7.137), GV(4'-8½), T (47'-3½)	559'-6"	Pv
UG	12.4600	86.42	0.23	140		0.000009	329'-2½"	Pf 0.004
3	-4'-6"			26.647			119'-7"	Pe
2	-4'-6"			26.651		EE(21'-3½), T(98'-3½)	448'-9½"	Pv
UG	6.2800	86.42	0.90	140		0.000241	5'-10½"	Pf 0.003
2	-4'-6"			26.651			4'-8½"	Pe
1	-4'-6"			26.654		GV(4'-8½), S	10'-7½"	Pv
		100.00				Hose Allowance At Source		
1		186.42						
Route 2								
DR	1.1010	17.97	6.06	150		0.055811	1'-6½"	Pf 0.477
2303	21'-3½"	17.97	4.9	13.447		Sprinkler,	7'-0"	Pe -0.667
209	22'-10"			13.257		E(7'-0)	8'-6½"	Pv



Hydraulic Analysis

Job Number: CF0588
Report Description: Residential (Zone 2 - King One Bedroom 229)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
BL	1.1010	17.97	6.06	120		0.084334	0'-10	Pf 0.492
209	22'-10			13.257			5'-0	Pe
207	22'-10			13.749		T(5'-0)	5'-10	Pv
Route 3								
DR	1.1010	23.44	7.90	150		0.091273	0'-3	Pf 0.661
2302	21'-6	23.44	5.8	16.335		Sprinkler,	7'-0	Pe
203	21'-6			16.995		E(7'-0)	7'-3	Pv
BL	1.1010	23.44	7.90	120		0.137919	3'-2½	Pf 2.096
203	21'-6			16.995			12'-0	Pe -0.578
206	22'-10			18.514		E(7'-0), T(5'-0)	15'-2½	Pv
Route 4								
DR	1.1010	25.00	8.42	150		0.102811	1'-6½	Pf 0.878
2301	21'-3½	25.00	4.9	26.030		Sprinkler,	7'-0	Pe -0.667
202	22'-10			26.241		E(7'-0)	8'-6½	Pv
BL	1.1010	25.00	8.42	120		0.155354	1'-0	Pf 0.932
202	22'-10			26.241			5'-0	Pe
204	22'-10			27.173		T(5'-0)	6'-0	Pv

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)				C Value Multiplier				
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$				Value Of C	100	130	140	150
				Multiplying Factor	0.713	1.16	1.33	1.51



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 2 - King One Bedroom 229)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DeV	Deluge Valve
SN	Swing Nipple	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
SP	Sprig	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
UG	Underground			Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LtE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV	Pressure Reducing Valve
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap



Hydraulic Overview

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Job		
Job Number	Designer	
CF0588	Thomas Hardin	
Job Name:	Phone	FAX
Home2 Suites by Hilton	(704) 784-4218	(704) 784-4405
Address 1	State Certification/License Number	
4-Story Hotel Construction	NC # 36018 / SC # FSC. 1078-B	
Address 2	AHJ	
475 Hospitality Blvd.	LLR / Greenwood FM	
Address 3	Job Site/Building	
Greenwood, SC 29649	New Buldling	

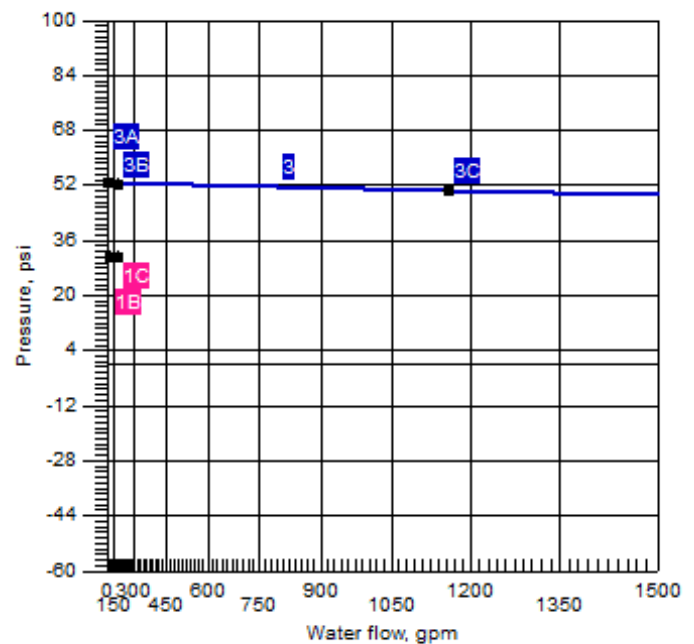
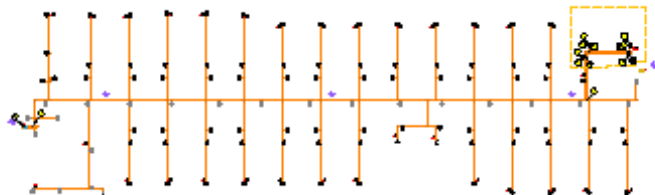
System		
Density 0.10gpm/ft²	Area of Application 484ft² (Actual 484ft²)	
Most Demanding Sprinkler Data 5.8 K-Factor 20.01 at 11.900	Hose Streams 100.00	
Coverage Per Sprinkler 256ft²	Number Of Sprinklers Calculated 4	Number Of Nozzles Calculated 0
System Pressure Demand 31.446	System Flow Demand 86.42	
Total Demand 186.42 @ 31.446	Pressure Result +21.486 (40.6%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
1	Water Supply	1160.00	100.00	53.000	51.000	Zone 1 (100)	85.519	0	0.00
8	Pump	300.00		69.830	60.110	P-BOR (5)	21.783	18.52	86.42
						Zone 2 (200)	81.348	9.58	86.42
						Zone 3 (300)	76.556	9.88	86.42
						Zone 4 (400)	76.556	0	0.00

Pumps: Static = Churn (Pressure @ Zero Flow)

Home2 Suites Greenwood FP (REV-0).cad

Water Supply at Node 1 (1160.00, 0.00, 53.000, 51.000)





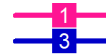
Hydraulic Summary

Job Number: CF0588
Report Description: Residential (Zone 3 - King One Bedroom 329)

Job											
Job Number CF0588					Designer Thomas Hardin						
Job Name: Home2 Suites by Hilton					State Certification/License Number NC # 36018 / SC # FSC. 1078-B						
Address 1 4-Story Hotel Construction					AHJ LLR / Greenwood FM						
Address 2 475 Hospitality Blvd.					Job Site/Building New Building						
Address 3 Greenwood, SC 29649					Drawing Name Home2 Suites Greenwood FP (REV-0).cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 5.8 K-Factor 20.01 at 11.900					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft²			Area of Application 484ft² (Actual 484ft²)			
Additional Hose Supplies NodeFlow(gpm)					Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft²		
Total Hose Streams 100.00											
System Flow Demand 86.42			Total Water Required (Including Hose Allowance) 186.42								
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 29.12 between nodes 304 and 305											
Maximum Velocity Under Ground 0.90 between nodes 3 and 5											
Volume capacity of Wet Pipes 10043.11gal			Volume capacity of Dry Pipes								
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	100.00	53.000	51.000		1160.00	52.932		186.42	31.446	21.486
8	Pump		69.830	60.110		300.00	111.862		86.42	90.375	21.486
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell					Contact Title Project Manger				
Name of Contractor: John M. Campbell Company						Phone (704) 254-3214			Extension		
Address 1 102 Winchester Avenue						FAX					
Address 2 Monroe, NC 28110						E-mail milescampbell@johnmcampbellcompany.com					
Address 3						Web-Site http://johnmcampbellcompany.com/					



Water Supply at Node 1



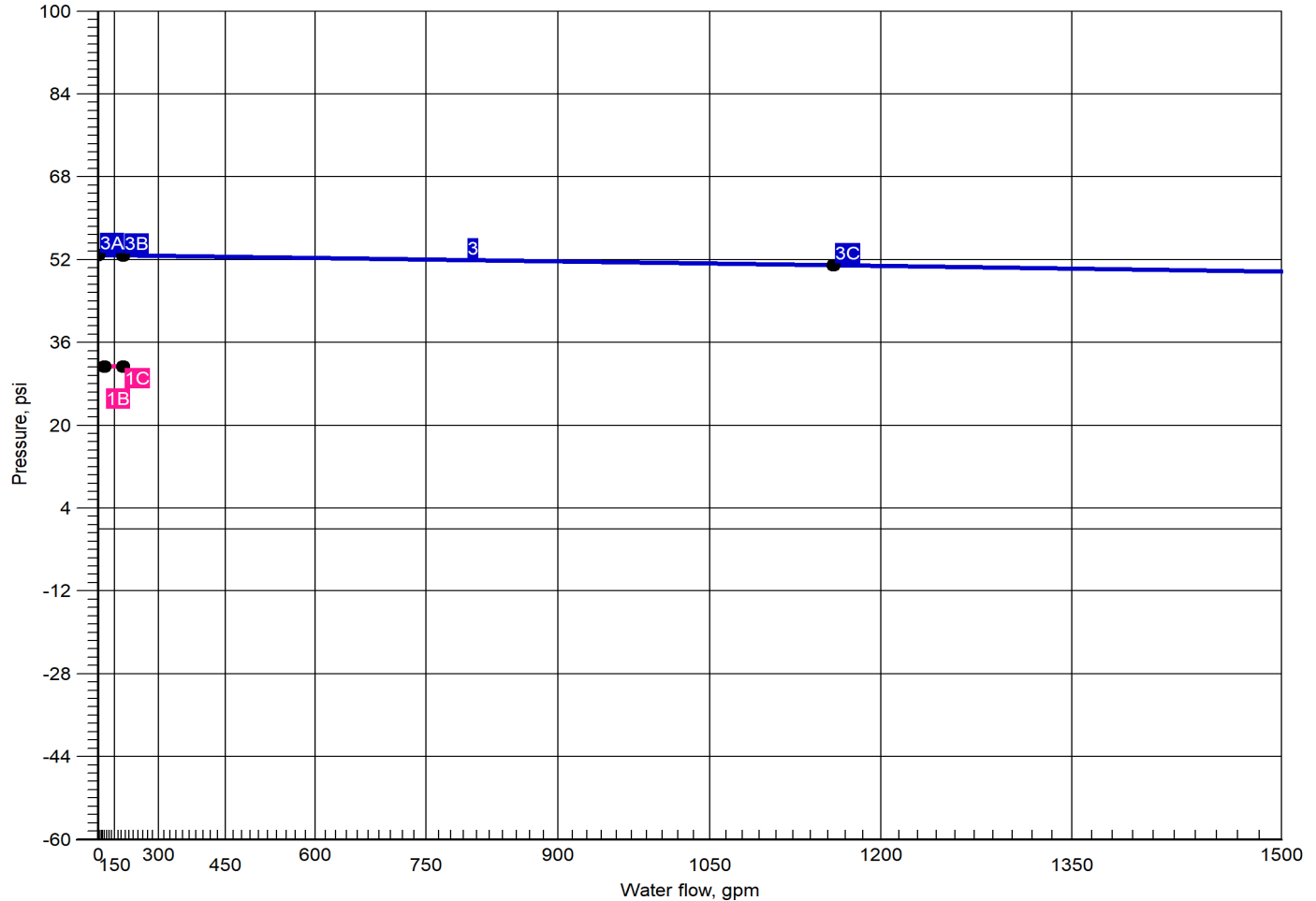
System Demand
Available Water Supply

Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Remote Area Number: Zone 3 - King One Bedroom 329



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 31.446 @ 86.42 Required Pressure at System Demand (Including Hose Allowance at Source): 31.446 @ 186.42	Available Flow @ 20 PSI: 5271.08
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 53.000 Available Residual Pressure at System Demand: 52.932 @ 186.42 Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	



Pump at Node 8

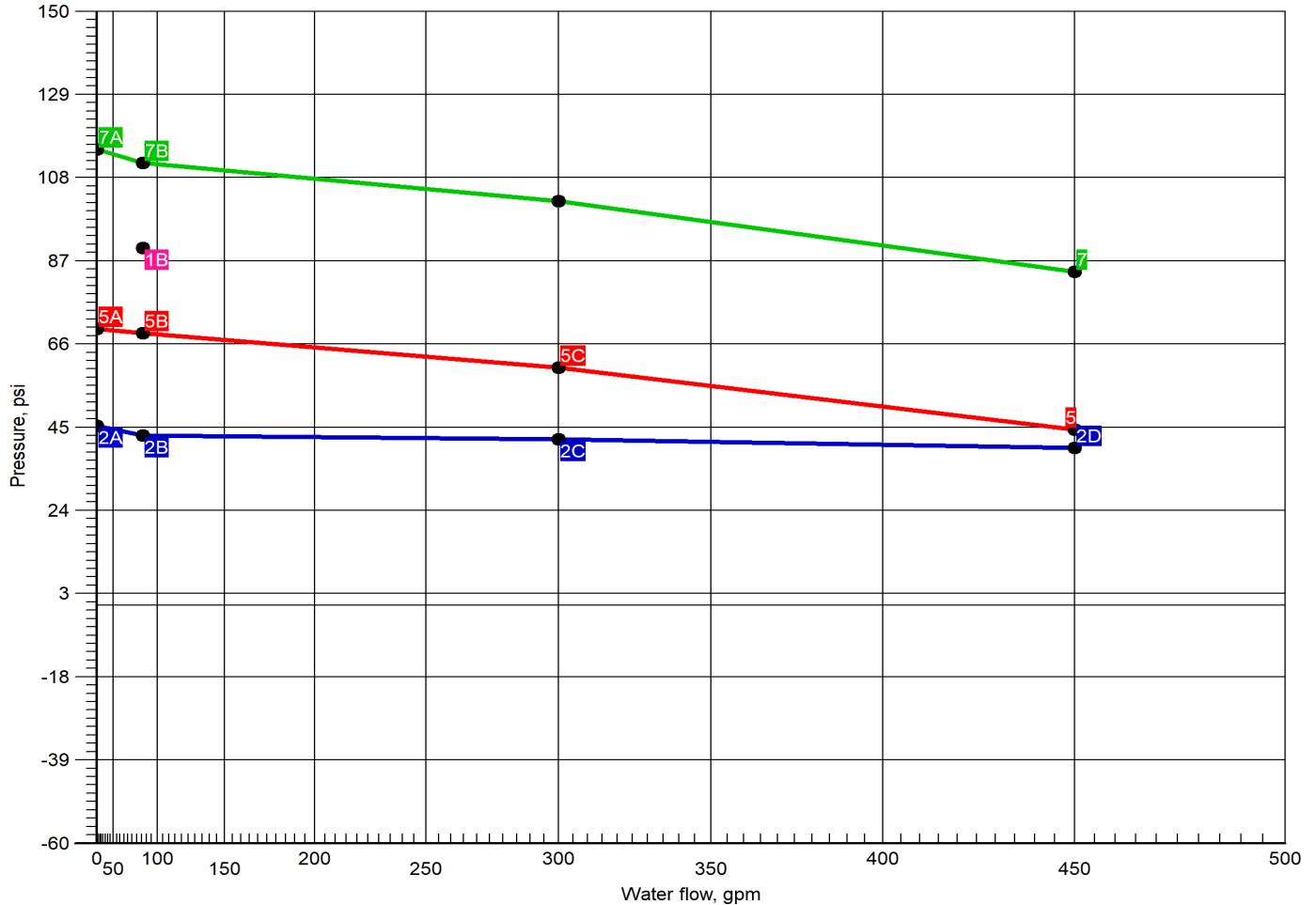
Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Remote Area Number: Zone 3 - King One Bedroom 329

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 90.375 @ 86.42	Fire Pump Rating: 60.110 @ 300.00
2	2A	Available Static Pressure at Pump Inlet: 45.363	
	2B	Available Residual Pressure at System Demand at Pump Inlet: 43.004 @ 86.42	
	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 42.048 @ 300.00	
	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.870 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	Fire Pump Rating: 60.110 @ 300.00
	5B	Available Residual Pressure at System Demand: 68.858 @ 86.42	
	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
	7B	Available Pressure at System Demand 111.862 @ 86.42	



Summary Of Outflowing Devices

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	3301	25.00	17.00	4.9	26.030			
Sprinkler	3302	23.44	20.01	5.8	16.335			
Sprinkler	3303	17.97	17.00	4.9	13.447			
⇒ Sprinkler	3304	20.01	20.01	5.8	11.900			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
1	-4'-6	S	31.446	86.42	
3301	32'-3½	Spr(-26.030)	26.030	25.00	
3302	32'-6	Spr(-16.335)	16.335	23.44	
3303	32'-3½	Spr(-13.447)	13.447	17.97	
3304	32'-6	Spr(-11.900)	11.900	20.01	
2	-4'-6	T(98'-3½)	31.443	0.00	
3	-4'-6	T(47'-3½)	31.439	0.00	
5	1'-0	P-BOR	21.783	0.00	
6	1'-7		21.517	0.00	
7	1'-7	P1	21.517	0.00	
8	1'-7	P2(-68.858)	90.375	0.00	
9	1'-7		90.375	0.00	
10	1'-0		90.572	0.00	
12	1'-0		90.508	0.00	
13	12'-2½	T(26'-4)	85.611	0.00	
100	8'-6	PO(12'-3½), Zone 1	85.519	0.00	
200	21'-8	PO(12'-3½), Zone 2	81.348	0.00	
300	32'-8	PO(12'-3½), Zone 3	76.556	0.00	
301	33'-10		72.714	0.00	
302	33'-10	E(7'-0)	26.241	0.00	
303	32'-6	E(7'-0)	16.995	0.00	
304	33'-10	T(5'-0)	58.479	0.00	
305	33'-10	T(5'-0), Tr(1'-0)	27.173	0.00	
306	33'-10	T(5'-0), Tr(1'-0)	18.514	0.00	
307	33'-10	T(5'-0), Tr(1'-0)	13.749	0.00	
308	32'-6	E(7'-0)	12.393	0.00	
309	33'-10	E(7'-0)	13.257	0.00	
400	43'-8	PO(12'-3½), Zone 4	76.556	0.00	



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.1010	20.01	6.74	150		0.068091	0'-3	Pf 0.493
3304	32'-6	20.01	5.8	11.900		Sprinkler,	7'-0	Pe
308	32'-6			12.393		E(7'-0)	7'-3	Pv
BL	1.1010	20.01	6.74	120		0.102890	3'-9½	Pf 1.934
308	32'-6			12.393			15'-0	Pe -0.578
307	33'-10			13.749		2E(7'-0), Tr(1'-0)	18'-9½	Pv
BL	1.1010	37.98	12.80	120		0.336708	13'-2	Pf 4.765
307	33'-10	17.97		13.749		Flow (q) from Route 2	1'-0	Pe
306	33'-10			18.514		Tr(1'-0)	14'-2	Pv
BL	1.1010	61.42	20.70	120		0.819403	2'-7	Pf 8.659
306	33'-10	23.44		18.514		Flow (q) from Route 3	8'-0	Pe
305	33'-10			27.173		E(7'-0), Tr(1'-0)	10'-7	Pv
BL	1.1010	86.42	29.12	120		1.541217	14'-4	Pf 31.306
305	33'-10	25.00		27.173		Flow (q) from Route 4	6'-0	Pe
304	33'-10			58.479		Tr(1'-0), T(5'-0)	20'-4	Pv
CM	2.0030	86.42	8.80	150		0.055322	190'-4	Pf 14.236
304	33'-10			58.479			67'-0	Pe
301	33'-10			72.714		17Tr(2'-0), 11Cr(2'-0), E(11'-0)	257'-4	Pv
DY	2.1570	86.42	7.59	120		0.058280	5'-4½	Pf 3.336
301	33'-10			72.714			51'-10	Pe 0.506
300	32'-8			76.556		T(12'-3½), E(6'-2), CV(21'-1), PO (12'-3½), Zone 3	57'-3	Pv
ST	4.2600	86.42	1.95	120		0.002119	11'-0	Pf 0.023
300	32'-8			76.556				Pe 4.769
200	21'-8			81.348		Zone 2	11'-0	Pv
ST	4.2600	86.42	1.95	120		0.002119	10'-5	Pf 0.167
200	21'-8			81.348			68'-5½	Pe 4.096
13	12'-2½			85.611		2T(26'-4), BV(15'-9½)	78'-10½	Pv
ST	6.3570	86.42	0.87	120		0.000302	23'-4	Pf 0.034
13	12'-2½			85.611			88'-0	Pe 4.864
12	1'-0			90.508		5E(17'-7)	111'-4½	Pv
UG	6.2800	86.42	0.90	140		0.000241	179'-9	Pf 0.064
12	1'-0			90.508			86'-8	Pe -0.000
10	1'-0			90.572		3LtE(14'-2), 4EE(11'-0½)	266'-5	Pv
FM	6.3570	86.42	0.87	120		0.000302	32'-6	Pf 0.056
10	1'-0			90.572			153'-4½	Pe -0.253
9	1'-7			90.375		5E(17'-7), 2BV(12'-7), sCV(40'-3)	185'-10½	Pv
DY	3.0680	86.42	3.75	120		0.010481	0'-0	Pf 0.000
9	1'-7			90.375				Pe
8	1'-7			90.375			0'-0	Pv
Pump								
8		86.42	Velocity	90.375		Rating: 60.110 @ 300.00		
7		Q=86.42	3.75	21.517		Fire Pump Churn Pressure: 69.83 0		
DY	3.0680	86.42	3.75	120		0.010481	0'-0	Pf 0.000
7	1'-7			21.517				Pe
6	1'-7			21.517			0'-0	Pv
DY	6.3570	86.42	0.87	120		0.000302	0'-0	Pf 0.013
6	1'-7			21.517			41'-6	Pe 0.253
5	1'-0			21.783		GV(3'-9½), T(37'-8½), P-BOR	41'-6	Pv
UG	6.2800	86.42	0.90	140		0.000241	394'-0½	Pf 7.272
5	1'-0			21.783			165'-5½	Pe 2.384
3	-4'-6			31.439		LtE(14'-2), 3Ee2(11'-0½), 6EE(11'-0½), BFP(-7.137), GV(4'-8½), T (47'-3½)	559'-6	Pv
UG	12.4600	86.42	0.23	140		0.000009	329'-2½	Pf 0.004
3	-4'-6			31.439			119'-7	Pe
2	-4'-6			31.443		EE(21'-3½), T(98'-3½)	448'-9½	Pv
UG	6.2800	86.42	0.90	140		0.000241	5'-10½	Pf 0.003
2	-4'-6			31.443			4'-8½	Pe
1	-4'-6			31.446		GV(4'-8½), S	10'-7½	Pv
		100.00				Hose Allowance At Source		
1		186.42						
Route 2								



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
DR	1.1010	17.97	6.06	150		0.055811	1'-6½"	Pf 0.477
3303	32'-3½"	17.97	4.9	13.447		Sprinkler,	7'-0"	Pe -0.667
309	33'-10"			13.257		E(7'-0)	8'-6½"	Pv
BL	1.1010	17.97	6.06	120		0.084334	0'-10"	Pf 0.492
309	33'-10"			13.257			5'-0"	Pe
307	33'-10"			13.749		T(5'-0)	5'-0"	Pv
Route 3								
DR	1.1010	23.44	7.90	150		0.091273	0'-3"	Pf 0.661
3302	32'-6"	23.44	5.8	16.335		Sprinkler,	7'-0"	Pe
303	32'-6"			16.995		E(7'-0)	7'-3"	Pv
BL	1.1010	23.44	7.90	120		0.137919	3'-2½"	Pf 2.096
303	32'-6"			16.995			12'-0"	Pe -0.578
306	33'-10"			18.514		E(7'-0), T(5'-0)	15'-2½"	Pv
Route 4								
DR	1.1010	25.00	8.42	150		0.102811	1'-6½"	Pf 0.878
3301	32'-3½"	25.00	4.9	26.030		Sprinkler,	7'-0"	Pe -0.667
302	33'-10"			26.241		E(7'-0)	8'-6½"	Pv
BL	1.1010	25.00	8.42	120		0.155354	1'-0"	Pf 0.932
302	33'-10"			26.241			5'-0"	Pe
305	33'-10"			27.173		T(5'-0)	6'-0"	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)					C Value Multiplier			
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$					Value Of C	100	130	140
					Multiplying Factor	0.713	1.16	1.33
							150	1.51



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 3 - King One Bedroom 329)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaIV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DeIV	Deluge Valve
SN	Swing Nipple	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
SP	Sprig	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
UG	Underground			Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LtE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV	Pressure Reducing Valve
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap



Hydraulic Overview

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

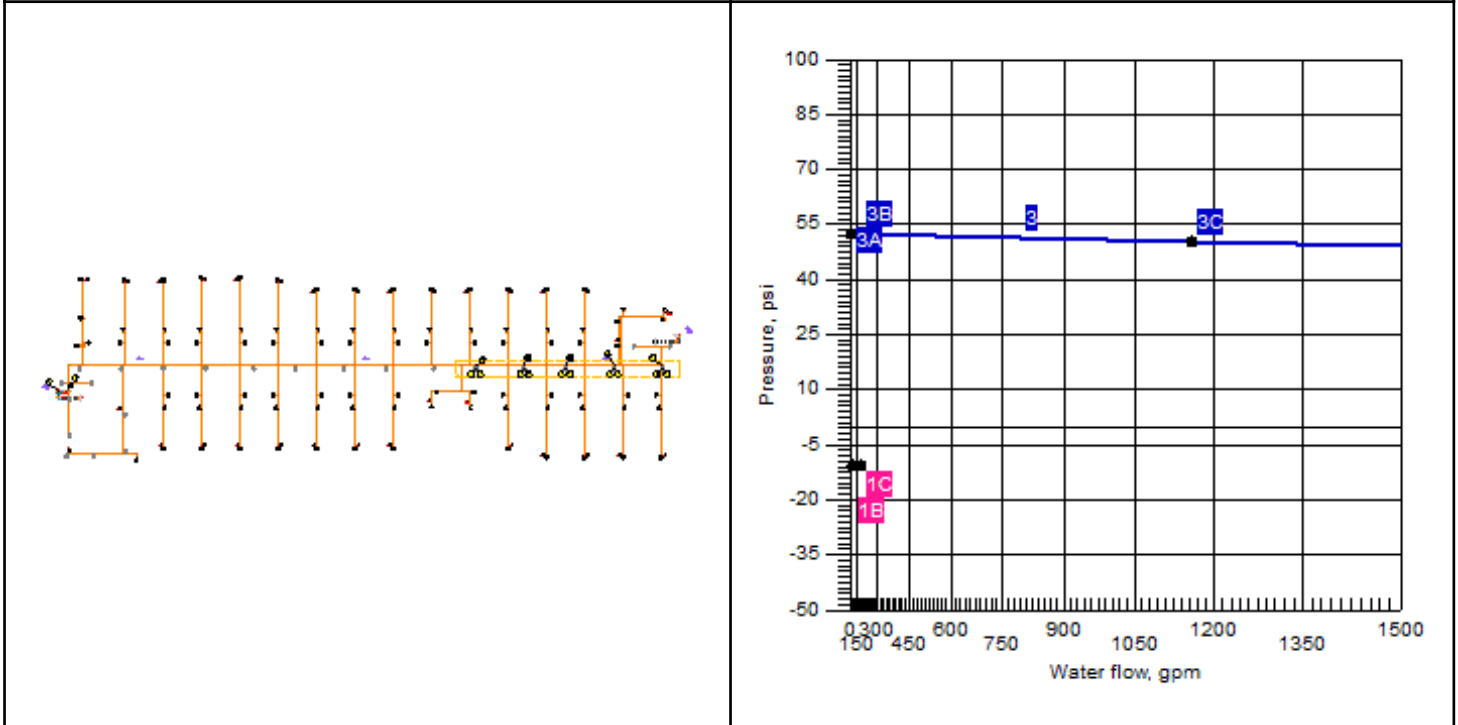
Job		
Job Number CF0588	Designer Thomas Hardin	
Job Name: Home2 Suites by Hilton	Phone (704) 784-4218	FAX (704) 784-4405
Address 1 4-Story Hotel Construction	State Certification/License Number NC # 36018 / SC # FSC. 1078-B	
Address 2 475 Hospitality Blvd.	AHJ LLR / Greenwood FM	
Address 3 Greenwood, SC 29649	Job Site/Building New Buldling	

System		
Density 0.10gpm/ft ²	Area of Application 411ft ² (Actual 411ft ²)	
Most Demanding Sprinkler Data 4.9 K-Factor 17.00 at 12.037	Hose Streams 100.00	
Coverage Per Sprinkler 256ft ²	Number Of Sprinklers Calculated 5	Number Of Nozzles Calculated 0
System Pressure Demand -10.710	System Flow Demand 87.78	
Total Demand 187.78 @ -10.710	Pressure Result +63.641 (120.2%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
1	Water Supply	1160.00	100.00	53.000	51.000	Zone 1 (100)	43.260	0	0.00
8	Pump	300.00		69.830	60.110	P-BOR (5)	-20.440	19.42	87.78
						Zone 2 (200)	39.087	14.04	87.78
						Zone 3 (300)	34.294	14.99	87.78
						Zone 4 (400)	29.501	16.16	87.78

Pumps: Static = Churn (Pressure @ Zero Flow)

Home2 Suites Greenwood FP (REV-0).cad	Water Supply at Node 1 (1160.00, 0.00, 53.000, 51.000)
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Hydraulic Summary

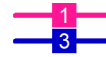
Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Job											
Job Number CF0588					Designer Thomas Hardin						
Job Name: Home2 Suites by Hilton					State Certification/License Number NC # 36018 / SC # FSC. 1078-B						
Address 1 4-Story Hotel Construction					AHJ LLR / Greenwood FM						
Address 2 475 Hospitality Blvd.					Job Site/Building New Building						
Address 3 Greenwood, SC 29649					Drawing Name Home2 Suites Greenwood FP (REV-0).cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 4.9 K-Factor 17.00 at 12.037					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 411ft ² (Actual 411ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 5		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft ²		
Total Hose Streams 100.00											
System Flow Demand 87.78			Total Water Required (Including Hose Allowance) 187.78								
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 8.94 between nodes 401 and 403											
Maximum Velocity Under Ground 0.91 between nodes 3 and 5											
Volume capacity of Wet Pipes 10043.11gal			Volume capacity of Dry Pipes								
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	100.00	53.000	51.000		1160.00	52.931		187.78	-10.710	63.641
8	Pump		69.830	60.110		300.00	111.765		87.78	48.124	63.641
A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure required by the demand reported within this calculation. No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).											
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell					Contact Title Project Manger				
Name of Contractor: John M. Campbell Company					Phone (704) 254-3214				Extension		
Address 1 102 Winchester Avenue					FAX						
Address 2 Monroe, NC 28110					E-mail milescampbell@johnmcampbellcompany.com						
Address 3					Web-Site http://johnmcampbellcompany.com/						



Water Supply at Node 1



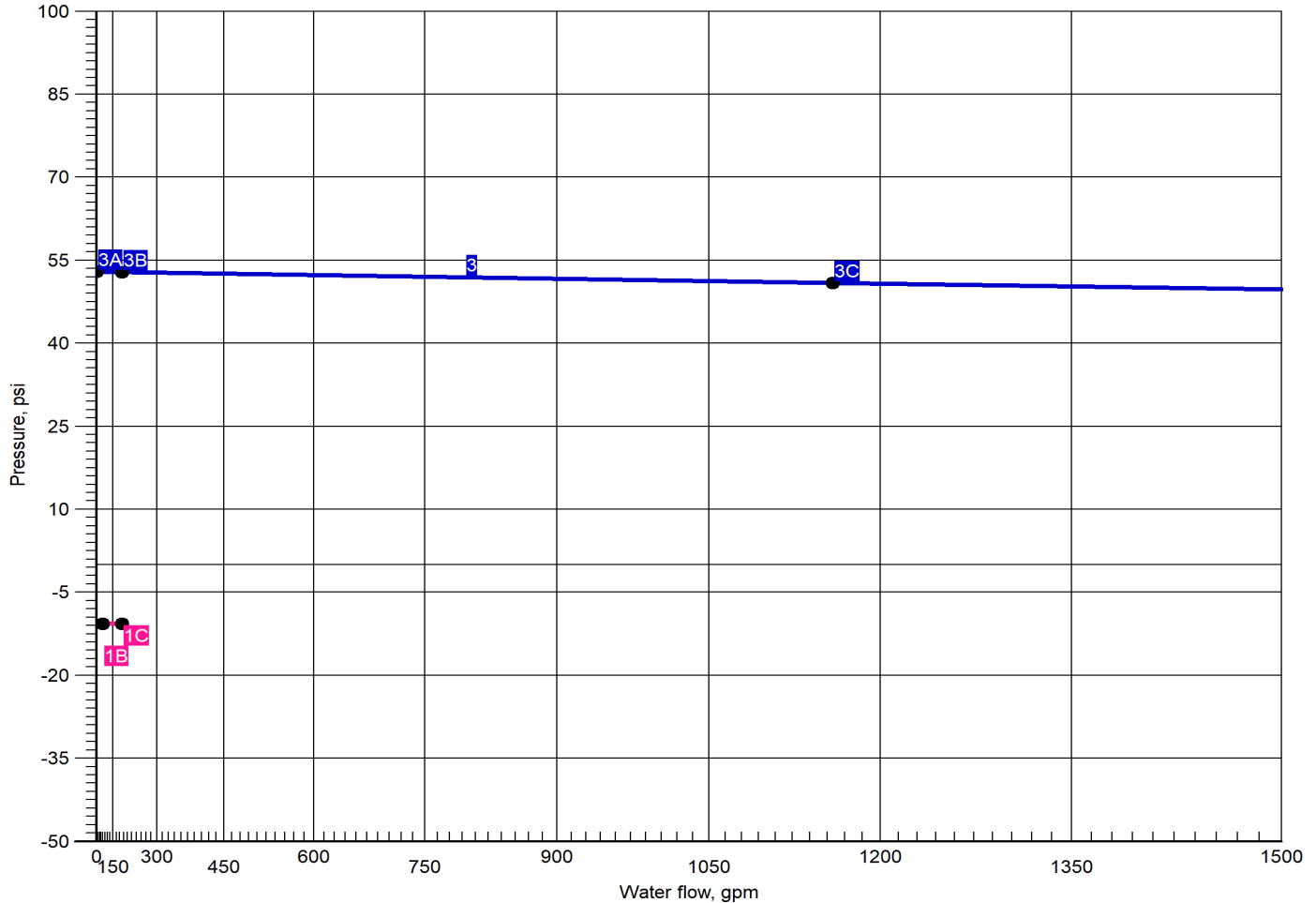
System Demand
Available Water Supply

Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Remote Area Number: Zone 4 - 4th Floor Corridor



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: -10.710 @ 87.78 Required Pressure at System Demand (Including Hose Allowance at Source): -10.710 @ 187.78	Available Flow @ 20 PSI: 5271.08 A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 53.000 Available Residual Pressure at System Demand: 52.931 @ 187.78 Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	



Pump at Node 8

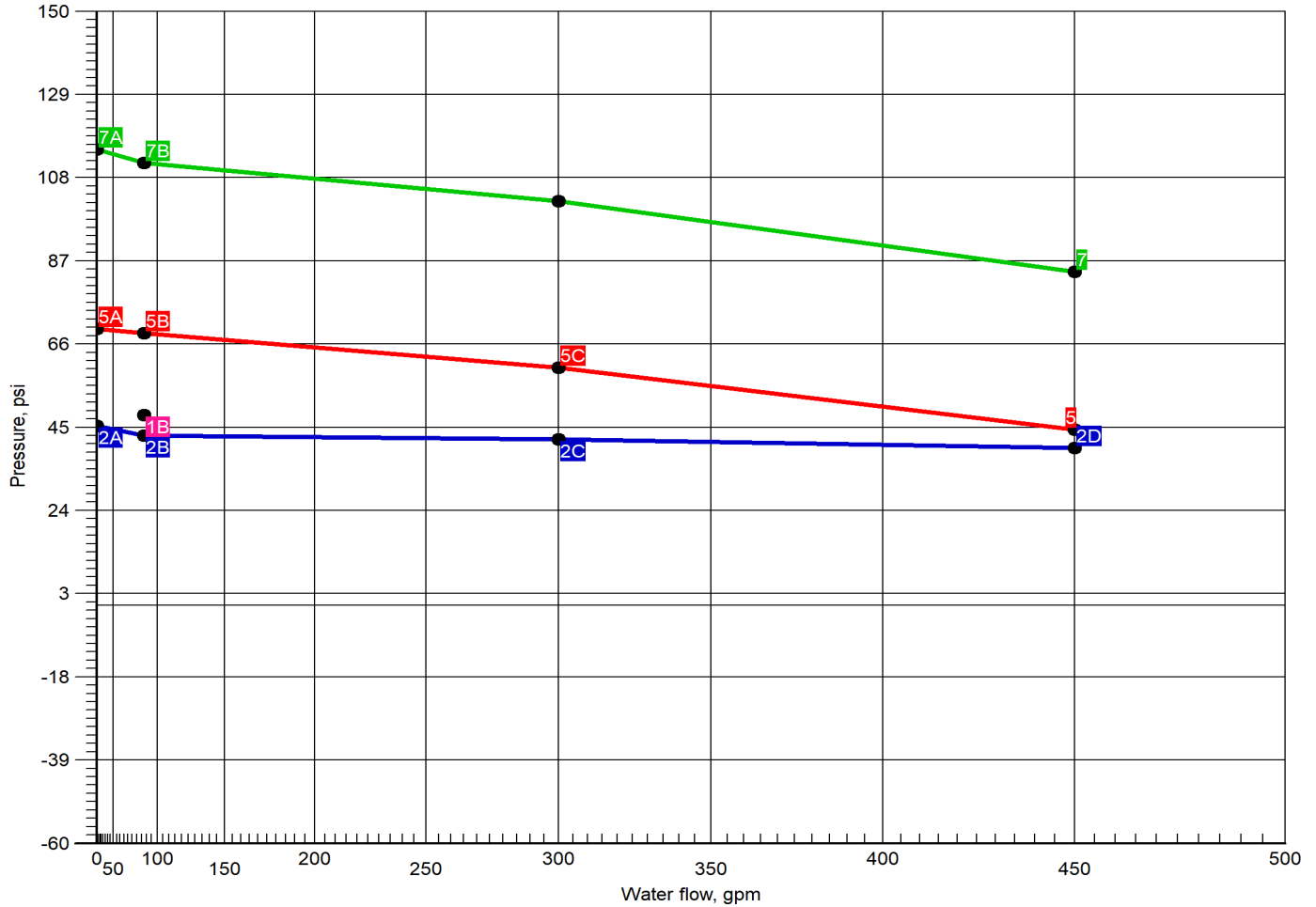
Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Remote Area Number: Zone 4 - 4th Floor Corridor

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 48.124 @ 87.78	Fire Pump Rating: 60.110 @ 300.00 A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).
2	2A	Available Static Pressure at Pump Inlet: 45.363	
	2B	Available Residual Pressure at System Demand at Pump Inlet: 42.935 @ 87.78	
	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 42.048 @ 300.00	
	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.870 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	
	5B	Available Residual Pressure at System Demand: 68.829 @ 87.78	
	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
	7B	Available Pressure at System Demand 111.765 @ 87.78	



Summary Of Outflowing Devices

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	4501	18.20	17.00	4.9	13.796			
Sprinkler	4502	17.74	17.00	4.9	13.101			
Sprinkler	4503	17.49	17.00	4.9	12.738			
Sprinkler	4504	17.36	17.00	4.9	12.550			
⇒ Sprinkler	4505	17.00	17.00	4.9	12.037			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Node	Elevation(foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-4'-6	S	-10.710	87.78
4501	44'-0½	Spr(-13.796)	13.796	18.20
4502	44'-0½	Spr(-13.101)	13.101	17.74
4503	44'-0½	Spr(-12.738)	12.738	17.49
4504	44'-0½	Spr(-12.550)	12.550	17.36
4505	44'-0½	Spr(-12.037)	12.037	17.00
2	-4'-6	T(98'-3½)	-10.712	0.00
3	-4'-6	T(47'-3½)	-10.716	0.00
5	1'-0	P-BOR	-20.440	0.00
6	1'-7		-20.705	0.00
7	1'-7	P1	-20.705	0.00
8	1'-7	P2(-68.829)	48.124	0.00
9	1'-7		48.124	0.00
10	1'-0		48.319	0.00
12	1'-0		48.253	0.00
13	12'-2½	T(26'-4)	43.355	0.00
100	8'-6	PO(12'-3½), Zone 1	43.260	0.00
200	21'-8	PO(12'-3½), Zone 2	39.087	0.00
300	32'-8	PO(12'-3½), Zone 3	34.294	0.00
400	43'-8	PO(12'-3½), Zone 4	29.501	0.00
401	44'-10		25.562	0.00
402	44'-10	E(7'-0)	13.900	0.00
403	44'-10	T(5'-0), Tr(2'-0)	14.437	0.00
404	44'-10	E(7'-0)	13.184	0.00
405	44'-10	T(5'-0), Tr(2'-0)	13.695	0.00
406	44'-10	E(7'-0)	12.810	0.00
407	44'-10	T(5'-0), Tr(2'-0)	13.308	0.00
408	44'-10	T(5'-0), Tr(2'-0)	13.108	0.00
409	44'-10	E(7'-0)	12.616	0.00
410	44'-10	E(7'-0)	12.087	0.00
411	44'-10	2b(1'-0), C(5'-0)	13.049	0.00



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.1010	17.00	5.73	150		0.050373	0'-9½"	Pf 0.392
4505	44'-0½"	17.00	4.9	12.037		Sprinkler,	7'-0"	Pe -0.342
410	44'-10"			12.087		E(7'-0")	7'-9½"	Pv
BL	1.1010	17.00	5.73	120		0.076117	1'-7½"	Pf 0.962
410	44'-10"			12.087			11'-0"	Pe
411	44'-10"			13.049		T(5'-0"), b(1'-0"), C(5'-0")	12'-7½"	Pv
CM	2.0030	17.00	1.73	150		0.002732	15'-7"	Pf 0.059
411	44'-10"			13.049			6'-0"	Pe
408	44'-10"			13.108		3Tr(2'-0")	21'-7"	Pv
CM	2.0030	34.36	3.50	150		0.010043	16'-0"	Pf 0.201
408	44'-10"	17.36		13.108		Flow (q) from Route 2	4'-0"	Pe
407	44'-10"			13.308		Cr(2'-0"), Tr(2'-0")	20'-0"	Pv
CM	2.0030	51.85	5.28	150		0.021499	14'-0"	Pf 0.387
407	44'-10"	17.49		13.308		Flow (q) from Route 3	4'-0"	Pe
405	44'-10"			13.695		Cr(2'-0"), Tr(2'-0")	18'-0"	Pv
CM	2.0030	69.58	7.08	150		0.037052	16'-0"	Pf 0.741
405	44'-10"	17.74		13.695		Flow (q) from Route 4	4'-0"	Pe
403	44'-10"			14.437		Cr(2'-0"), Tr(2'-0")	20'-0"	Pv
CM	2.0030	87.78	8.94	150		0.056950	142'-4"	Pf 11.125
403	44'-10"	18.20		14.437		Flow (q) from Route 5	53'-0"	Pe
401	44'-10"			25.562		13Tr(2'-0"), 8Cr(2'-0"), E(11'-0")	195'-4"	Pv
DY	2.1570	87.78	7.71	120		0.059995	5'-4½"	Pf 3.434
401	44'-10"			25.562			51'-10"	Pe 0.506
400	43'-8"			29.501		T(12'-3½"), E(6'-2"), CV(21'-1"), PO (12'-3½"), Zone 4	57'-3"	Pv
ST	4.2600	87.78	1.98	120		0.002181	11'-0"	Pf 0.024
400	43'-8"			29.501				Pe 4.769
300	32'-8"			34.294		Zone 3	11'-0"	Pv
ST	4.2600	87.78	1.98	120		0.002181	11'-0"	Pf 0.024
300	32'-8"			34.294				Pe 4.769
200	21'-8"			39.087		Zone 2	11'-0"	Pv
ST	4.2600	87.78	1.98	120		0.002181	10'-5"	Pf 0.172
200	21'-8"			39.087			68'-5½"	Pe 4.096
13	12'-2½"			43.355		2T(26'-4"), BV(15'-9½")	78'-10½"	Pv
ST	6.3570	87.78	0.89	120		0.000311	23'-4"	Pf 0.035
13	12'-2½"			43.355			88'-0"	Pe 4.864
12	1'-0"			48.253		5E(17'-7")	111'-4½"	Pv
UG	6.2800	87.78	0.91	140		0.000248	179'-9"	Pf 0.066
12	1'-0"			48.253			86'-8"	Pe -0.000
10	1'-0"			48.319		3LtE(14'-2"), 4EE(11'-0½")	266'-5"	Pv
FM	6.3570	87.78	0.89	120		0.000311	32'-6"	Pf 0.058
10	1'-0"			48.319			153'-4½"	Pe -0.253
9	1'-7"			48.124		5E(17'-7"), 2BV(12'-7"), sCV(40'-3")	185'-10½"	Pv
DY	3.0680	87.78	3.81	120		0.010789	0'-0"	Pf 0.000
9	1'-7"			48.124				Pe
8	1'-7"			48.124			0'-0"	Pv
Pump								
8		87.78	Velocity	48.124		Rating: 60.110 @ 300.00		
7		Q=87.78	3.81	-20.705		Fire Pump Churn Pressure: 69.830		
DY	3.0680	87.78	3.81	120		0.010789	0'-0"	Pf 0.000
7	1'-7"			-20.705				Pe
6	1'-7"			-20.705			0'-0"	Pv
DY	6.3570	87.78	0.89	120		0.000311	0'-0"	Pf 0.013
6	1'-7"			-20.705			41'-6"	Pe 0.253
5	1'-0"			-20.440		GV(3'-9½"), T(37'-8½"), P-BOR	41'-6"	Pv
UG	6.2800	87.78	0.91	140		0.000248	394'-0½"	Pf 7.339
5	1'-0"			-20.440			165'-5½"	Pe 2.384
3	-4'-6"			-10.716		LtE(14'-2"), 3Ee2(11'-0½"), 6EE(11'-0½"), BFP(-7.200), GV(4'-8½"), T(47'-3½")	559'-6"	Pv
UG	12.4600	87.78	0.23	140		0.000009	329'-2½"	Pf 0.004
3	-4'-6"			-10.716			119'-7"	Pe
2	-4'-6"			-10.712		EE(21'-3½"), T(98'-3½")	448'-9½"	Pv



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
UG	6.2800	87.78	0.91	140		0.000248	5'-10½"	Pf 0.003
2	-4'-6			-10.712			4'-8½"	Pe -0.342
1	-4'-6			-10.710		GV(4'-8½"), S	10'-7½"	Pv
		100.00				Hose Allowance At Source		
1		187.78						
Route 2								
DR	1.1010	17.36	5.85	150		0.052357	0'-9½"	Pf 0.408
4504	44'-0½"	17.36	4.9	12.550		Sprinkler,	7'-0"	Pe -0.342
409	44'-10			12.616		E(7'-0)	7'-9½"	Pv
BL	1.1010	17.36	5.85	120		0.079114	1'-2½"	Pf 0.492
409	44'-10			12.616			5'-0"	Pe
408	44'-10			13.108		T(5'-0)	6'-2½"	Pv
Route 3								
DR	1.1010	17.49	5.89	150		0.053083	0'-9½"	Pf 0.413
4503	44'-0½"	17.49	4.9	12.738		Sprinkler,	7'-0"	Pe -0.342
406	44'-10			12.810		E(7'-0)	7'-9½"	Pv
BL	1.1010	17.49	5.89	120		0.080212	1'-2½"	Pf 0.499
406	44'-10			12.810			5'-0"	Pe
407	44'-10			13.308		T(5'-0)	6'-2½"	Pv
Route 4								
DR	1.1010	17.74	5.98	150		0.054481	0'-9½"	Pf 0.424
4502	44'-0½"	17.74	4.9	13.101		Sprinkler,	7'-0"	Pe -0.342
404	44'-10			13.184		E(7'-0)	7'-9½"	Pv
BL	1.1010	17.74	5.98	120		0.082324	1'-2½"	Pf 0.512
404	44'-10			13.184			5'-0"	Pe
405	44'-10			13.695		T(5'-0)	6'-2½"	Pv
Route 5								
DR	1.1010	18.20	6.13	150		0.057150	0'-9½"	Pf 0.445
4501	44'-0½"	18.20	4.9	13.796		Sprinkler,	7'-0"	Pe -0.342
402	44'-10			13.900		E(7'-0)	7'-9½"	Pv
BL	1.1010	18.20	6.13	120		0.086357	1'-2½"	Pf 0.537
402	44'-10			13.900			5'-0"	Pe
403	44'-10			14.437		T(5'-0)	6'-2½"	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)					C Value Multiplier			
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$					Value Of C	100	130	140
					Multiplying Factor	0.713	1.16	1.33
								150
								1.51



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - 4th Floor Corridor)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend	Units Legend		Fittings Legend	
AO Arm-Over	Diameter	Inch	ALV Alarm Valve	
BL Branch Line	Elevation	Foot	AngV Angle Valve	
CM Cross Main	Flow	gpm	b Bushing	
DN Drain	Discharge	gpm	BaV Ball Valve	
DR Drop	Velocity	fps	BFP Backflow Preventer	
DY Dynamic	Pressure	psi	BV Butterfly Valve	
FM Feed Main	Length	Foot	C Cross Flow Turn 90°	
FR Feed Riser	Friction Loss	psi/Foot	cplg Coupling	
MS Miscellaneous	HWC	Hazen-Williams Constant	Cr Cross Run	
OR Outrigger	Pt	Total pressure at a point in a pipe	CV Check Valve	
RN Riser Nipple	Pn	Normal pressure at a point in a pipe	DeV Deluge Valve	
SN Swing Nipple	Pf	Pressure loss due to friction between points	DPV Dry Pipe Valve	
SP Sprig	Pe	Pressure due to elevation difference between indicated points	E 90° Elbow	
ST Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE 45° Elbow	
UG Underground			Ee1 11¼° Elbow	
			Ee2 22½° Elbow	
			f Flow Device	
			fd Flex Drop	
			FDC Fire Department Connection	
			fE 90° FireLock(TM) Elbow	
			fEE 45° FireLock(TM) Elbow	
			flg Flange	
			FN Floating Node	
			fT FireLock(TM) Tee	
			g Gauge	
			GloV Globe Valve	
			GV Gate Valve	
			Ho Hose	
			Hose Hose	
			HV Hose Valve	
			Hyd Hydrant	
			LtE Long Turn Elbow	
			mecT Mechanical Tee	
			Noz Nozzle	
			P1 Pump In	
			P2 Pump Out	
			PIV Post Indicating Valve	
			PO Pipe Outlet	
			PrV Pressure Relief Valve	
			PRV Pressure Reducing Valve	
			red Reducer/Adapter	
			S Supply	
			sCV Swing Check Valve	
			SFx Seismic Flex	
			Spr Sprinkler	
			St Strainer	
			T Tee Flow Turn 90°	
			Tr Tee Run	
			U Union	
			WirF Wirsbo	
			WMV Water Meter Valve	
			Z Cap	



Hydraulic Overview

Job Number: CF0588
Report Description: Residential (Zone 4 - King One Bedroom 429)

Job																																											
Job Number CF0588	Designer Thomas Hardin																																										
Job Name: Home2 Suites by Hilton	Phone (704) 784-4218																																										
Address 1 4-Story Hotel Construction	FAX (704) 784-4405																																										
Address 2 475 Hospitality Blvd.	State Certification/License Number NC # 36018 / SC # FSC. 1078-B																																										
Address 3 Greenwood, SC 29649	AHJ LLR / Greenwood FM																																										
	Job Site/Building New Buldling																																										
System																																											
Density 0.10gpm/ft²	Area of Application 484ft² (Actual 484ft²)																																										
Most Demanding Sprinkler Data 5.8 K-Factor 20.01 at 11.900	Hose Streams 100.00																																										
Coverage Per Sprinkler 256ft²	Number Of Sprinklers Calculated 4																																										
	Number Of Nozzles Calculated 0																																										
System Pressure Demand 36.238	System Flow Demand 86.42																																										
Total Demand 186.42 @ 36.238	Pressure Result +16.694 (31.5%)																																										
Supplies	Check Point Gauges																																										
<table><thead><tr><th>Node</th><th>Name</th><th>Flow(gpm)</th><th>Hose Flow(gpm)</th><th>Static(psi)</th><th>Residual(psi)</th></tr></thead><tbody><tr><td>1</td><td>Water Supply</td><td>1160.00</td><td>100.00</td><td>53.000</td><td>51.000</td></tr><tr><td>8</td><td>Pump</td><td>300.00</td><td></td><td>69.830</td><td>60.110</td></tr></tbody></table>	Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	1	Water Supply	1160.00	100.00	53.000	51.000	8	Pump	300.00		69.830	60.110	<table><thead><tr><th>Identifier</th><th>Pressure(psi)</th><th>K-Factor(K)</th><th>Flow(gpm)</th></tr></thead><tbody><tr><td>Zone 1 (100)</td><td>90.311</td><td>0</td><td>0.00</td></tr><tr><td>P-BOR (5)</td><td>26.575</td><td>16.76</td><td>86.42</td></tr><tr><td>Zone 2 (200)</td><td>86.140</td><td>9.31</td><td>86.42</td></tr><tr><td>Zone 3 (300)</td><td>81.348</td><td>9.58</td><td>86.42</td></tr><tr><td>Zone 4 (400)</td><td>76.556</td><td>9.88</td><td>86.42</td></tr></tbody></table>	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)	Zone 1 (100)	90.311	0	0.00	P-BOR (5)	26.575	16.76	86.42	Zone 2 (200)	86.140	9.31	86.42	Zone 3 (300)	81.348	9.58	86.42	Zone 4 (400)	76.556	9.88	86.42
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)																																						
1	Water Supply	1160.00	100.00	53.000	51.000																																						
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Zone 3 (300)	81.348	9.58	86.42																																								
Zone 4 (400)	76.556	9.88	86.42																																								
Pumps: Static = Churn (Pressure @ Zero Flow)																																											
Home2 Suites Greenwood FP (REV-0).cad	Water Supply at Node 1 (1160.00, 0.00, 53.000, 51.000)																																										



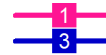
Hydraulic Summary

Job Number: CF0588
Report Description: Residential (Zone 4 - King One Bedroom 429)

Job											
Job Number CF0588					Designer Thomas Hardin						
Job Name: Home2 Suites by Hilton					State Certification/License Number NC # 36018 / SC # FSC. 1078-B						
Address 1 4-Story Hotel Construction					AHJ LLR / Greenwood FM						
Address 2 475 Hospitality Blvd.					Job Site/Building New Building						
Address 3 Greenwood, SC 29649					Drawing Name Home2 Suites Greenwood FP (REV-0).cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 5.8 K-Factor 20.01 at 11.900					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft²			Area of Application 484ft² (Actual 484ft²)			
Additional Hose Supplies NodeFlow(gpm)					Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft²		
Total Hose Streams 100.00											
System Flow Demand 86.42			Total Water Required (Including Hose Allowance) 186.42								
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 29.12 between nodes 414 and 415											
Maximum Velocity Under Ground 0.90 between nodes 3 and 5											
Volume capacity of Wet Pipes 10043.11gal			Volume capacity of Dry Pipes								
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	100.00	53.000	51.000		1160.00	52.932		186.42	36.238	16.694
8	Pump		69.830	60.110		300.00	111.862		86.42	95.167	16.694
Pumps: Static = Churn (Pressure @ Zero Flow)											
Contractor											
Contractor Number 26		Contact Name Miles Campbell					Contact Title Project Manger				
Name of Contractor: John M. Campbell Company						Phone (704) 254-3214			Extension		
Address 1 102 Winchester Avenue						FAX					
Address 2 Monroe, NC 28110						E-mail milescampbell@johnmcampbellcompany.com					
Address 3						Web-Site http://johnmcampbellcompany.com/					



Water Supply at Node 1



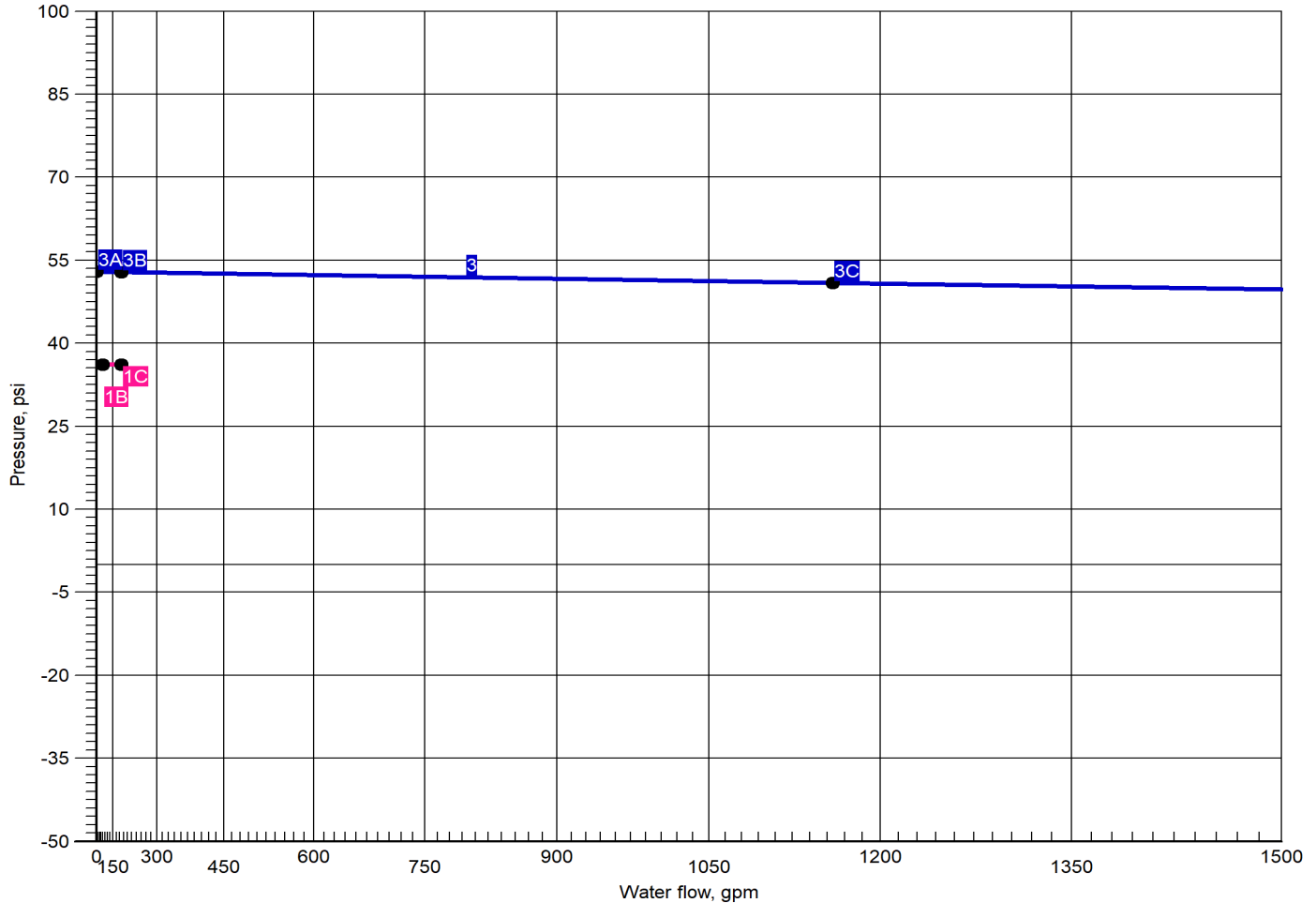
System Demand
Available Water Supply

Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Remote Area Number: Zone 4 - King One Bedroom 429



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 36.238 @ 86.42	Available Flow @ 20 PSI: 5271.08
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 36.238 @ 186.42	
3	3A	Available Static Pressure at Water Supply at Node 1: 53.000	
	3B	Available Residual Pressure at System Demand: 52.932 @ 186.42	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 51.000 @ 1160.00	



Pump at Node 8

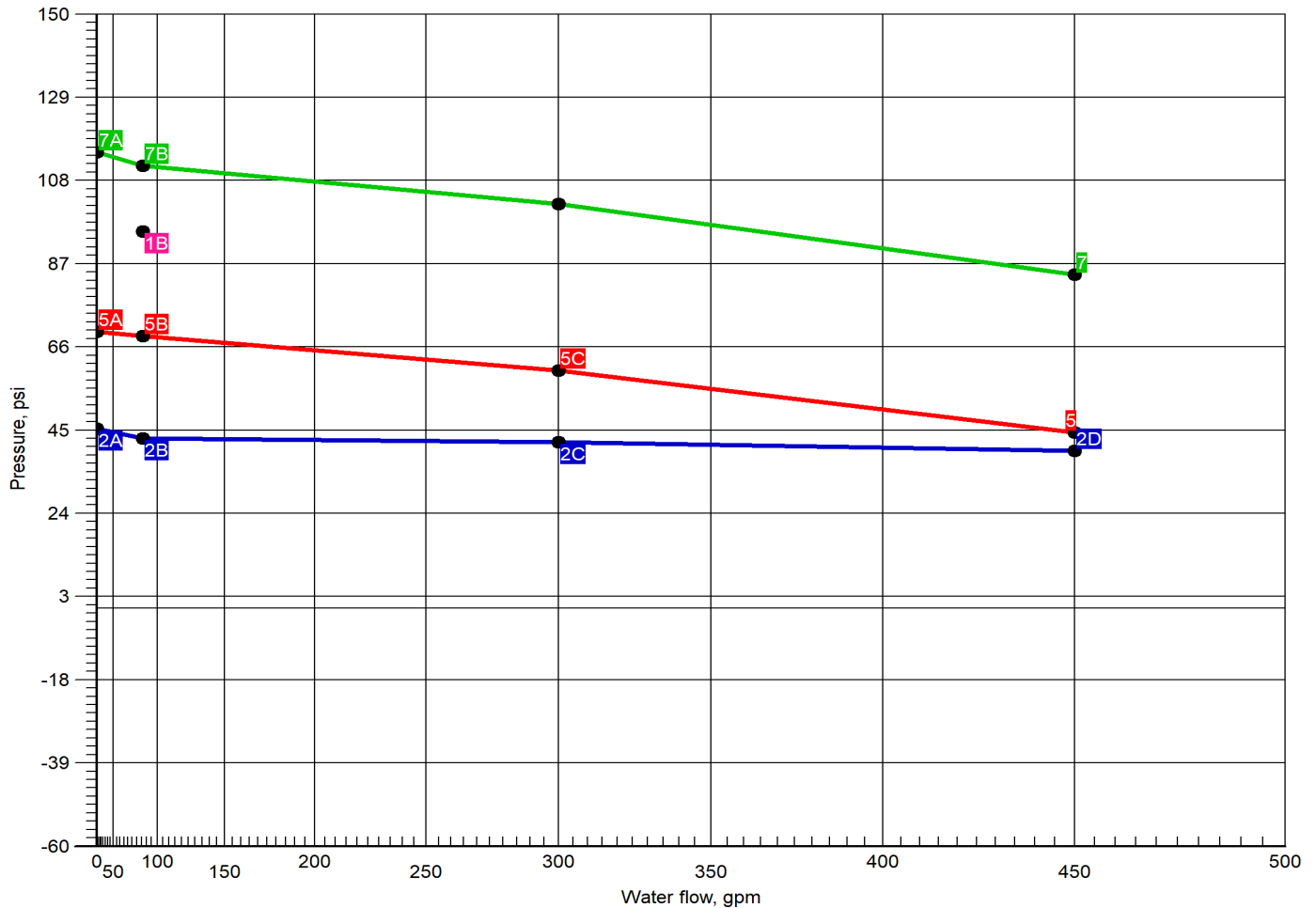
Job Name: Home2 Suites by Hilton

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Remote Area Number: Zone 4 - King One Bedroom 429

- 1 System Demand
- 2 Available Water Supply @ Pump Inlet
- 5 Fire Pump Supply
- 7 Combined Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 95.167 @ 86.42	Fire Pump Rating: 60.110 @ 300.00
2	2A	Available Static Pressure at Pump Inlet: 45.363	
	2B	Available Residual Pressure at System Demand at Pump Inlet: 43.004 @ 86.42	
	2C	Available Residual Pressure at Pump Rated Flow at Pump Inlet 42.048 @ 300.00	
	2D	Available Residual Pressure at 150% of Rated Pump Capacity at Pump Inlet: 39.870 @ 450.00	
5	5A	Fire Pump Churn Pressure: 69.830	Fire Pump Rating: 60.110 @ 300.00
	5B	Available Residual Pressure at System Demand: 68.858 @ 86.42	
	5C	Fire Pump Rating: 60.110 @ 300.00	
7	7A	Available Static Pressure: 115.193	
	7B	Available Pressure at System Demand 111.862 @ 86.42	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	4401	25.00	17.00	4.9	26.030			
Sprinkler	4402	23.44	20.01	5.8	16.335			
Sprinkler	4403	17.97	17.00	4.9	13.447			
⇒ Sprinkler	4404	20.01	20.01	5.8	11.900			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
1	-4'-6	S	36.238	86.42	
4401	43'-3½	Spr(-26.030)	26.030	25.00	
4402	43'-6	Spr(-16.335)	16.335	23.44	
4403	43'-3½	Spr(-13.447)	13.447	17.97	
4404	43'-6	Spr(-11.900)	11.900	20.01	
2	-4'-6	T(98'-3½)	36.235	0.00	
3	-4'-6	T(47'-3½)	36.231	0.00	
5	1'-0	P-BOR	26.575	0.00	
6	1'-7		26.310	0.00	
7	1'-7	P1	26.310	0.00	
8	1'-7	P2(-68.858)	95.167	0.00	
9	1'-7		95.167	0.00	
10	1'-0		95.364	0.00	
12	1'-0		95.300	0.00	
13	12'-2½	T(26'-4)	90.403	0.00	
100	8'-6	PO(12'-3½), Zone 1	90.311	0.00	
200	21'-8	PO(12'-3½), Zone 2	86.140	0.00	
300	32'-8	PO(12'-3½), Zone 3	81.348	0.00	
400	43'-8	PO(12'-3½), Zone 4	76.556	0.00	
401	44'-10		72.714	0.00	
412	44'-10	E(7'-0)	26.241	0.00	
413	43'-6	E(7'-0)	16.995	0.00	
414	44'-10	T(5'-0)	58.479	0.00	
415	44'-10	T(5'-0), Tr(1'-0)	27.173	0.00	
416	44'-10	T(5'-0), Tr(1'-0)	18.514	0.00	
417	44'-10	T(5'-0), Tr(1'-0)	13.749	0.00	
418	43'-6	E(7'-0)	12.393	0.00	
419	44'-10	E(7'-0)	13.257	0.00	



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.1010	20.01	6.74	150		0.068091	0'-3	Pf 0.493
4404	43'-6	20.01	5.8	11.900		Sprinkler,	7'-0	Pe
418	43'-6			12.393		E(7'-0)	7'-3	Pv
BL	1.1010	20.01	6.74	120		0.102890	3'-9½	Pf 1.934
418	43'-6			12.393			15'-0	Pe -0.578
417	44'-10			13.749		2E(7'-0), Tr(1'-0)	18'-9½	Pv
BL	1.1010	37.98	12.80	120		0.336708	13'-2	Pf 4.765
417	44'-10	17.97		13.749		Flow (q) from Route 2	1'-0	Pe
416	44'-10			18.514		Tr(1'-0)	14'-2	Pv
BL	1.1010	61.42	20.70	120		0.819403	2'-7	Pf 8.659
416	44'-10	23.44		18.514		Flow (q) from Route 3	8'-0	Pe
415	44'-10			27.173		E(7'-0), Tr(1'-0)	10'-7	Pv
BL	1.1010	86.42	29.12	120		1.541217	14'-4	Pf 31.306
415	44'-10	25.00		27.173		Flow (q) from Route 4	6'-0	Pe
414	44'-10			58.479		Tr(1'-0), T(5'-0)	20'-4	Pv
CM	2.0030	86.42	8.80	150		0.055322	190'-4	Pf 14.236
414	44'-10			58.479			67'-0	Pe
401	44'-10			72.714		17Tr(2'-0), 11Cr(2'-0), E(11'-0)	257'-4	Pv
DY	2.1570	86.42	7.59	120		0.058280	5'-4½	Pf 3.336
401	44'-10			72.714			51'-10	Pe 0.506
400	43'-8			76.556		T(12'-3½), E(6'-2), CV(21'-1), PO (12'-3½), Zone 4	57'-3	Pv
ST	4.2600	86.42	1.95	120		0.002119	11'-0	Pf 0.023
400	43'-8			76.556				Pe 4.769
300	32'-8			81.348		Zone 3	11'-0	Pv
ST	4.2600	86.42	1.95	120		0.002119	11'-0	Pf 0.023
300	32'-8			81.348				Pe 4.769
200	21'-8			86.140		Zone 2	11'-0	Pv
ST	4.2600	86.42	1.95	120		0.002119	10'-5	Pf 0.167
200	21'-8			86.140			68'-5½	Pe 4.096
13	12'-2½			90.403		2T(26'-4), BV(15'-9½)	78'-10½	Pv
ST	6.3570	86.42	0.87	120		0.000302	23'-4	Pf 0.034
13	12'-2½			90.403			88'-0	Pe 4.864
12	1'-0			95.300		5E(17'-7)	111'-4½	Pv
UG	6.2800	86.42	0.90	140		0.000241	179'-9	Pf 0.064
12	1'-0			95.300			86'-8	Pe -0.000
10	1'-0			95.364		3LtE(14'-2), 4EE(11'-0½)	266'-5	Pv
FM	6.3570	86.42	0.87	120		0.000302	32'-6	Pf 0.056
10	1'-0			95.364			153'-4½	Pe -0.253
9	1'-7			95.167		5E(17'-7), 2BV(12'-7), sCV(40'-3)	185'-10½	Pv
DY	3.0680	86.42	3.75	120		0.010481	0'-0	Pf 0.000
9	1'-7			95.167				Pe
8	1'-7			95.167			0'-0	Pv
Pump								
8		86.42	Velocity	95.167		Rating: 60.110 @ 300.00		
7		Q=86.42	3.75	26.310		Fire Pump Churn Pressure: 69.830		
DY	3.0680	86.42	3.75	120		0.010481	0'-0	Pf 0.000
7	1'-7			26.310				Pe
6	1'-7			26.310			0'-0	Pv
DY	6.3570	86.42	0.87	120		0.000302	0'-0	Pf 0.013
6	1'-7			26.310			41'-6	Pe 0.253
5	1'-0			26.575		GV(3'-9½), T(37'-8½), P-BOR	41'-6	Pv
UG	6.2800	86.42	0.90	140		0.000241	394'-0½	Pf 7.272
5	1'-0			26.575			165'-5½	Pe 2.384
3	-4'-6			36.231		LtE(14'-2), 3Ee2(11'-0½), 6EE(11'-0½), BFP(-7.137), GV(4'-8½), T (47'-3½)	559'-6	Pv
UG	12.4600	86.42	0.23	140		0.000009	329'-2½	Pf 0.004
3	-4'-6			36.231			119'-7	Pe
2	-4'-6			36.235		EE(21'-3½), T(98'-3½)	448'-9½	Pv
UG	6.2800	86.42	0.90	140		0.000241	5'-10½	Pf 0.003
2	-4'-6			36.235			4'-8½	Pe
1	-4'-6			36.238		GV(4'-8½), S	10'-7½	Pv



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	
		100.00				Hose Allowance At Source		
1		186.42						
Route 2								
DR	1.1010	17.97	6.06	150		0.055811	1'-6½"	Pf 0.477
4403	43'-3½"	17.97	4.9	13.447		Sprinkler,	7'-0"	Pe -0.667
419	44'-10"			13.257		E(7'-0)	8'-6½"	Pv
BL	1.1010	17.97	6.06	120		0.084334	0'-10"	Pf 0.492
419	44'-10"			13.257			5'-0"	Pe
417	44'-10"			13.749		T(5'-0)	5'-10"	Pv
Route 3								
DR	1.1010	23.44	7.90	150		0.091273	0'-3"	Pf 0.661
4402	43'-6"	23.44	5.8	16.335		Sprinkler,	7'-0"	Pe
413	43'-6"			16.995		E(7'-0)	7'-3"	Pv
BL	1.1010	23.44	7.90	120		0.137919	3'-2½"	Pf 2.096
413	43'-6"			16.995			12'-0"	Pe -0.578
416	44'-10"			18.514		E(7'-0), T(5'-0)	15'-2½"	Pv
Route 4								
DR	1.1010	25.00	8.42	150		0.102811	1'-6½"	Pf 0.878
4401	43'-3½"	25.00	4.9	26.030		Sprinkler,	7'-0"	Pe -0.667
412	44'-10"			26.241		E(7'-0)	8'-6½"	Pv
BL	1.1010	25.00	8.42	120		0.155354	1'-0"	Pf 0.932
412	44'-10"			26.241			5'-0"	Pe
415	44'-10"			27.173		T(5'-0)	6'-0"	Pv

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multipling Factor	0.713	1.16	1.33	1.51



Hydraulic Analysis

Job Number: CF0588

Report Description: Residential (Zone 4 - King One Bedroom 429)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaIV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DeIV	Deluge Valve
SN	Swing Nipple	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
SP	Sprig	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
UG	Underground			Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LtE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV	Pressure Reducing Valve
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap



Hydraulic Overview

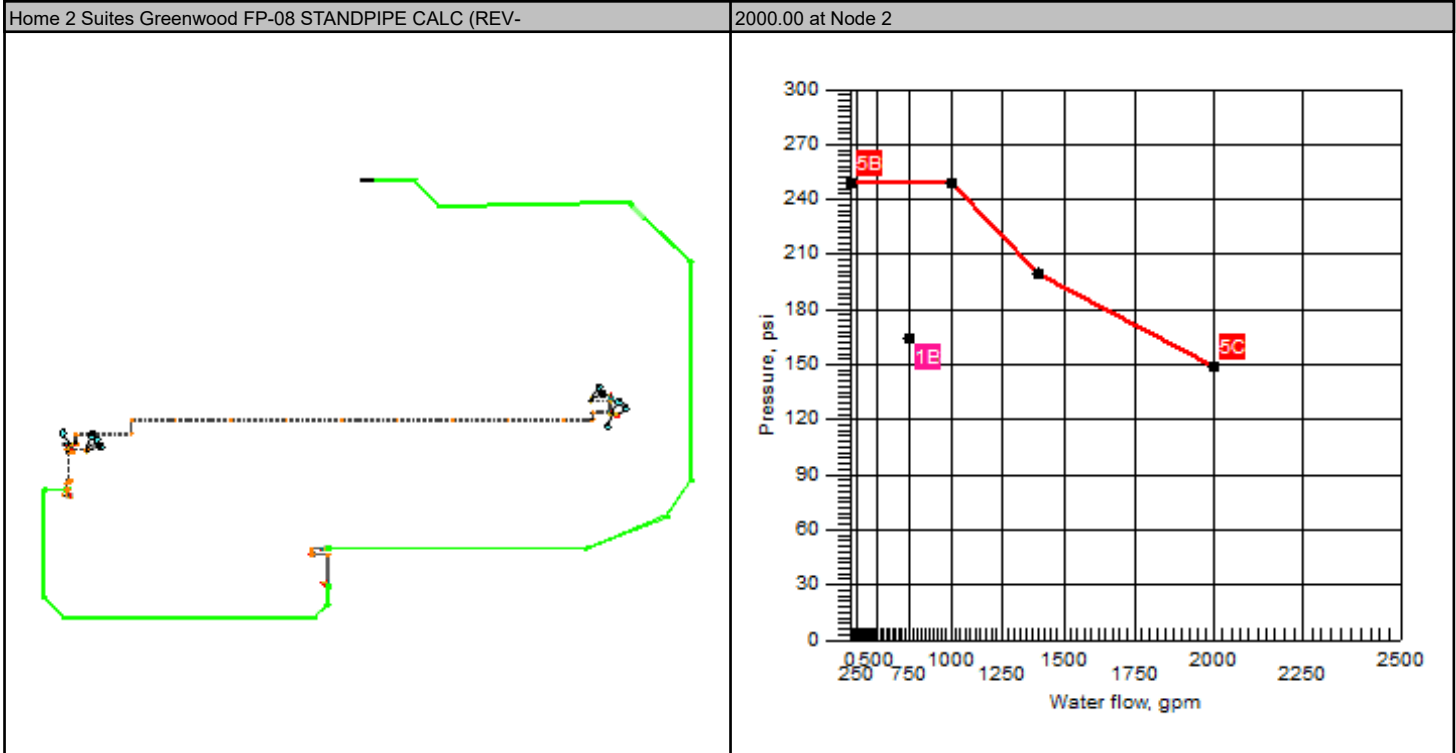
Job Number: CF0588

Report Description:

Job		
Job Number	CF0588	
Designer	Thomas Hardin	
Job Name:	Home 2 Suites	
Phone	(704) 784-4218	FAX (704) 784-4405
Address 1	475 Hospitality Blvd.	
State Certification/License Number	NC # 36018 / SC # FSC. 1078-B	
Address 2	Greenwood, SC 29649	
AHJ	LLR / Greenwood FM	
Address 3	Job Site/Building	
	New Buldling	

System		
Density	NA	
Area of Application	NA	
Most Demanding Sprinkler Data	Hose Streams	
K-Factor at	750.00	
Coverage Per Sprinkler	Number Of Sprinklers Calculated	Number Of Nozzles Calculated
NA	0	0
System Pressure Demand	System Flow Demand	
165.038	750.00	
Total Demand	Pressure Result	
750.00 @ 165.038	+84.962 (34.0%)	

Supplies						Check Point Gauges			
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)	Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
2	Pump	2000.00		250.000	150.000				
Pumps: Static = Churn (Pressure @ Zero Flow)									





Hydraulic Summary

Job Number: CF0588

Report Description:

Job																			
Job Number CF0588					Designer Thomas Hardin														
Job Name: Home 2 Suites					State Certification/License Number NC # 36018 / SC # FSC. 1078-B														
Address 1 475 Hospitality Blvd.					AHJ LLR / Greenwood FM														
Address 2 Greenwood, SC 29649					Job Site/Building New Building														
Address 3					Drawing Name Home 2 Suites Greenwood FP-08 STANDPIPE CALC (REV-														
System					Remote Area(s)														
Most Demanding Sprinkler Data K-Factor at					Occupancy NA			Job Suffix Manually Flowing											
Hose Allowance At Source 0.00					Density NA			Area of Application NA											
Additional Hose Supplies					Number Of Sprinklers Calculated 0			Number Of Nozzles Calculated 0		Coverage Per Sprinkler NA									
<table><thead><tr><th>Node</th><th>Flow(gpm)</th></tr></thead><tbody><tr><td>Hose At Node 503</td><td>250.00</td></tr><tr><td>Hose At Node 501</td><td>250.00</td></tr><tr><td>Hose At Node 502</td><td>250.00</td></tr></tbody></table>					Node	Flow(gpm)	Hose At Node 503	250.00	Hose At Node 501	250.00	Hose At Node 502	250.00							
Node	Flow(gpm)																		
Hose At Node 503	250.00																		
Hose At Node 501	250.00																		
Hose At Node 502	250.00																		
Total Hose Streams 750.00																			
System Flow Demand 750.00			Total Water Required (Including Hose Allowance) 750.00																
Maximum Pressure Unbalance In Loops 0.000																			
Maximum Velocity Above Ground 16.88 between nodes 2 and 3																			
Maximum Velocity Under Ground																			
Volume capacity of Wet Pipes 1430.23gal			Volume capacity of Dry Pipes																
Supplies																			
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)								
2	Pump		250.000	150.000		2000.00	250.000		750.00	165.038	84.962								
Pumps: Static = Churn (Pressure @ Zero Flow)																			
Contractor																			
Contractor Number 26		Contact Name Miles Campbell					Contact Title Project Manger												
Name of Contractor: John M. Campbell Company						Phone (704) 254-3214			Extension										
Address 1 102 Winchester Avenue						FAX													
Address 2 Monroe, NC 28110						E-mail milescampbell@johnmcampbellcompany.com													
Address 3						Web-Site http://johnmcampbellcompany.com/													



Pump at Node 2

Job Name: Home 2 Suites

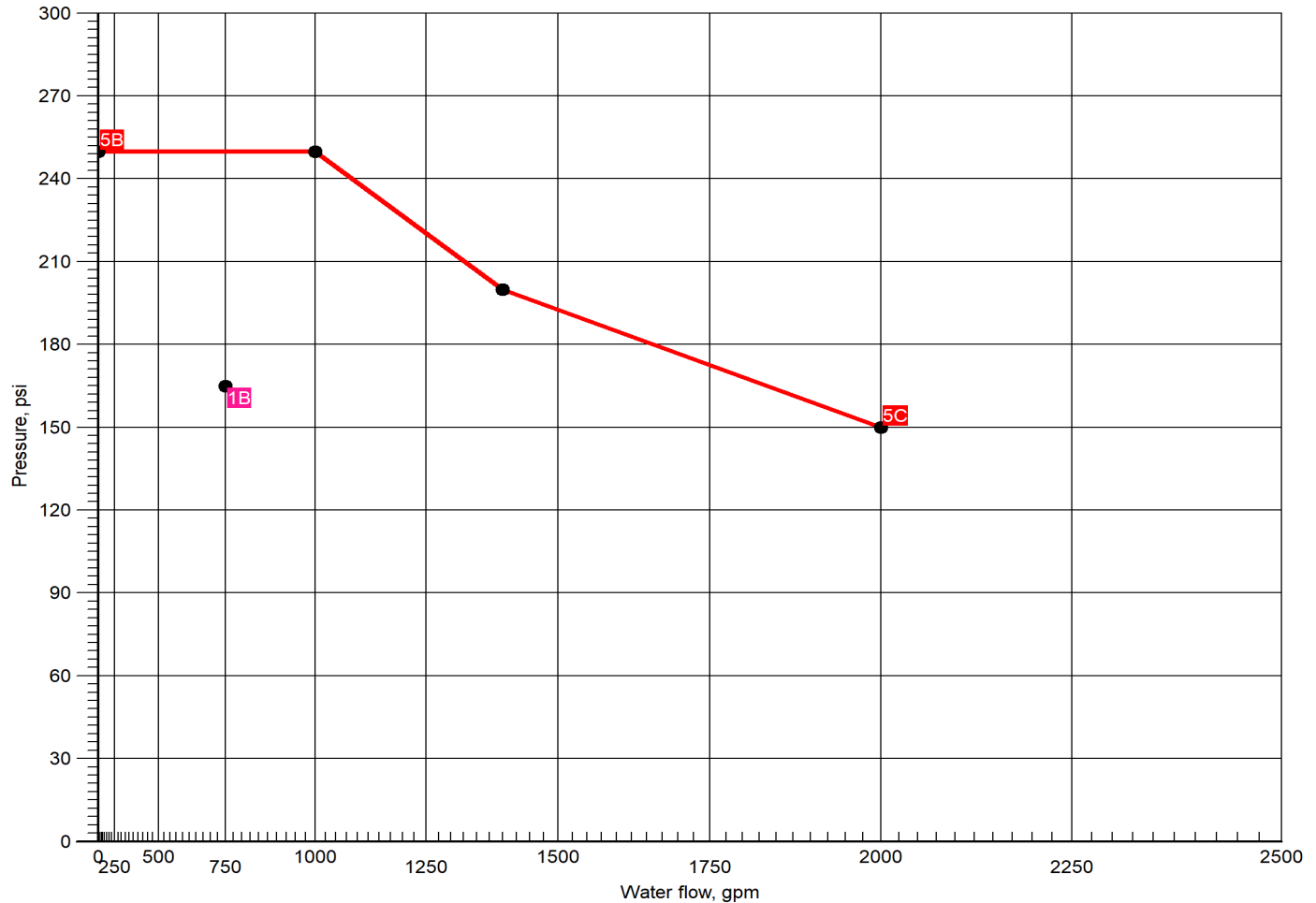
Job Number: CF0588

Report Description:

Remote Area Number: Manually Flowing



System Demand
Fire Pump Supply



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 165.038 @ 750.00	Fire Pump Rating: 150.000 @ 2000.00
5	5A	Fire Pump Churn Pressure: 250.000	
	5B	Available Residual Pressure at System Demand: 250.000 @ 750.00	
	5C	Fire Pump Rating: 150.000 @ 2000.00	



Summary Of Outflowing Devices

Job Number: CF0588

Report Description:

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	501	250.00	250.00	25	100.000			
Hose	502	250.00	250.00	25	100.000			
Hose	503	250.00	250.00	25	124.318			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: CF0588

Report Description:

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
501	49'-10	Hose(-100.000)(31'-0)	100.000	250.00	
502	49'-10	Hose(-100.000)(31'-0)	100.000	250.00	
503	49'-10	Hose(-100.000)(31'-0)	124.318	250.00	
2	3'-6	P2(-250.000)	165.038	0.00	
3	9'-7	T(26'-4)	153.743	0.00	
13	12'-2½	T(37'-8½)	134.196	0.00	
5001	49'-10	PO(12'-0), f(-0.000)	109.263	0.00	
5002	49'-10	PO(12'-0), f(-0.000)	133.580	0.00	



Hydraulic Analysis

Job Number: CF0588

Report Description:

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream					Fittings	Total Length	
Route 1							
DY	2.4690	250.00	16.75	120	0.215409	0'-0	Pf 9.263
501	49'-10	250.00		100.000	Hose(-100.000)(31'-0)	43'-0	Pe
5001	49'-10			109.263	PO(12'-0), f(-0.000)	43'-0	Pv
ST	4.2600	500.00	11.25	120	0.054516	47'-8½	Pf 8.629
5001	49'-10	250.00		109.263	Flow (q) from Route 2	110'-7	Pe 16.304
13	12'-2½			134.196	2E(13'-2), 2T(26'-4), 2BV(15'-9½)	158'-3½	Pv
ST	4.2600	500.00	11.25	120	0.054516	219'-1	Pf 18.405
13	12'-2½			134.196		118'-6	Pe 1.142
3	9'-7			153.743	7E(13'-2), T(26'-4)	337'-7½	Pv
ST	4.2600	750.00	16.88	120	0.115423	6'-6½	Pf 8.658
3	9'-7	250.00		153.743	Flow (q) from Route 3	68'-5½	Pe 2.637
2	3'-6			165.038	E(13'-2), sCV(28'-11½), T(26'-4)	75'-0	Pv
Pump		Velocity					
2		750.00		165.038	Rating: 150.000 @ 2000.00		
1		Q=750.00	8.33	-84.962	Avl.Pressure @ Pump Disch.: 250.000		
		0.00			Hose Allowance At Source		
2		750.00					
Route 2							
DY	2.4690	250.00	16.75	120	0.215409	0'-0	Pf 9.263
502	49'-10	250.00		100.000	Hose(-100.000)(31'-0)	43'-0	Pe
5001	49'-10			109.263	PO(12'-0), f(-0.000)	43'-0	Pv
Route 3							
DY	2.4690	250.00	16.75	120	0.215409	0'-0	Pf 9.263
503	49'-10	250.00		124.318	Hose(-100.000)(31'-0)	43'-0	Pe
5002	49'-10			133.580	PO(12'-0), f(-0.000)	43'-0	Pv
ST	4.2600	250.00	5.63	120	0.015122	55'-10½	Pf 2.717
5002	49'-10			133.580		123'-9	Pe 17.446
3	9'-7			153.743	3E(13'-2), 2T(26'-4), 2BV(15'-9½)	179'-7½	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)							
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$				C Value Multiplier			
				Value Of C	100	130	140
				Multiplying Factor	0.713	1.16	1.33
							150
							1.51



Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DeV	Deluge Valve
SN	Swing Nipple	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
SP	Sprig	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
UG	Underground			Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LtE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV In	Pressure Reducing Valve In
				PRV O	Pressure Reducing Valve Out
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap