



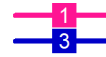
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (APT 101)

Job											
Job Number NC 1471					Designer Andrew Clifford						
Job Name: WILSHIRE HILLS III					State Certification/License Number						
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE						
Address 2					Job Site/Building						
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 4.9 K-Factor 12.96 at 7.000					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 403ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 3		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft ²		
					AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area						
					5-23-25						
Total Hose Streams 100.00											
System Flow Demand 46.30		Total Water Required (Including Hose Allowance) 146.30									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 14.54 between nodes 1136 and 1883											
Maximum Velocity Under Ground 0.48 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.929		146.30	55.552	28.377
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



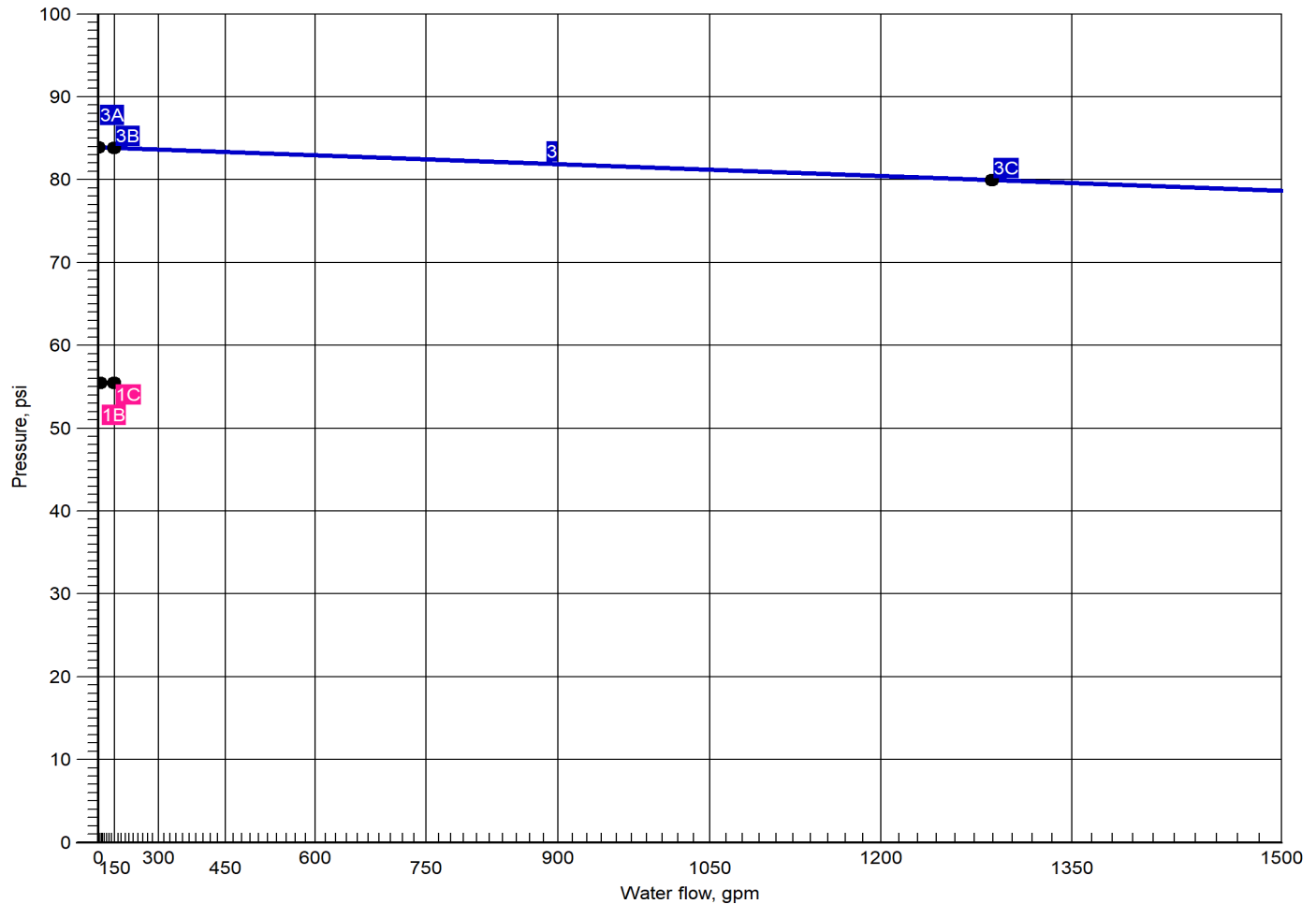
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (APT 101)

Remote Area Number: APT 101



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 55.552 @ 46.30 Required Pressure at System Demand (Including Hose Allowance at Source): 55.552 @ 146.30	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.929 @ 146.30 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Job Number: NC 1471
Report Description: Residential (APT 101)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1889	19.11	12.96	4.9	15.215			
Sprinkler	1900	14.23	12.96	4.9	8.431			
➡ Sprinkler	1907	12.96	12.96	4.9	7.000			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (APT 101)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	55.552	46.30
1889	10'-6"	Spr(-15.215)	15.215	19.11
1900	10'-6"	Spr(-8.431)	8.431	14.23
1907	10'-6"	Spr(-7.000)	7.000	12.96
11	-5'-0"	T(47'-3½")	55.550	0.00
1136	10'-6"	C(3'-0")	21.763	0.00
1137	10'-6"	C(3'-0"), Tr(1'-0")	22.242	0.00
1182	3'-3½"	PO(27'-10½")	46.917	0.00
1200	9'-2"	T(6'-0"), Tr(1'-0")	44.016	0.00
1229	3'-3½"	PO(18'-8½")	46.898	0.00
1234	1'-2"		47.864	0.00
1883	10'-6"	T(3'-0"), Tr(1'-0")	9.256	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (APT 101)

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								
BL	0.8740	12.96	6.93	150		0.093926	16'-0"	Pf 2.256
1907	10'-6"	12.96	4.9	7.000		Sprinkler,	8'-0"	Pe
1883	10'-6"			9.256		E(7'-0"), Tr(1'-0")	24'-0"	Pv
BL	0.8740	27.19	14.54	150		0.369764	29'-10"	Pf 12.507
1883	10'-6"	14.23		9.256		Flow (q) from Route 2	4'-0"	Pe
1136	10'-6"			21.763		Tr(1'-0"), C(3'-0")	33'-10"	Pv
CM	1.3940	27.19	5.72	150		0.038065	11'-7½"	Pf 0.480
1136	10'-6"			21.763			1'-0"	Pe
1137	10'-6"			22.242		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	46.30	9.73	150		0.101910	162'-11½"	Pf 21.195
1137	10'-6"	19.11		22.242		Flow (q) from Route 3	45'-0"	Pe 0.578
1200	9'-2"			44.016		11Tr(1'-0"), 4cplg(1'-0"), T(6'-0"), 3E(8'-0")	207'-11½"	Pv
FR	2.7050	46.30	2.59	120		0.006101	5'-8½"	Pf 0.330
1200	9'-2"			44.016			48'-4½"	Pe 2.552
1229	3'-3½"			46.898		2E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	54'-1"	Pv
CM	4.3100	46.30	1.02	120		0.000631	2'-2½"	Pf 0.019
1229	3'-3½"			46.898			27'-10½"	Pe
1182	3'-3½"			46.917		PO(27'-10½")	30'-0½"	Pv
CM	4.2600	46.30	1.04	120		0.000668	1'-2½"	Pf 0.031
1182	3'-3½"			46.917			44'-9"	Pe 0.916
1234	1'-2"			47.864		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	46.30	0.48	140		0.000076	98'-1"	Pf 5.013
1234	1'-2"			47.864			69'-4"	Pe 2.673
11	-5'-0"			55.550		E(22'-1"), BFP(-5.000), T(47'-3½")	167'-5½"	Pv
UG	7.9800	46.30	0.30	150		0.000021	94'-10½"	Pf 0.002
11	-5'-0"			55.550				Pe
1	-5'-0"			55.552		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		146.30						
Route 2								
BL	0.8740	14.23	7.61	150		0.111562	4'-4½"	Pf 0.825
1900	10'-6"	14.23	4.9	8.431		Sprinkler,	3'-0"	Pe
1883	10'-6"			9.256		T(3'-0")	7'-4½"	Pv
Route 3								
BL	0.8740	19.11	10.22	150		0.192602	30'-6"	Pf 7.028
1889	10'-6"	19.11	4.9	15.215		Sprinkler,	6'-0"	Pe
1137	10'-6"			22.242		3Tr(1'-0"), C(3'-0")	36'-6"	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: NC 1471
Report Description: Residential (APT 101)

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





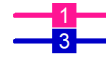
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (1ST FLOOR HALLWAY)

Job											
Job Number NC 1471				Designer Andrew Clifford							
Job Name: WILSHIRE HILLS III				State Certification/License Number							
Address 1 NE WILSHIRE DR.				AHJ LEES SUMMIT, MO BLDG CODE							
Address 2				Job Site/Building							
Address 3 LEES SUMMIT, MO				Drawing Name Wilshire FP.cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 4.9 K-Factor 12.96 at 7.000				Occupancy Residential			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 309ft ²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 84ft ²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
				5-23-25							
Total Hose Streams 100.00											
System Flow Demand 55.43		Total Water Required (Including Hose Allowance) 155.43									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 11.65 between nodes 1200 and 1138											
Maximum Velocity Under Ground 0.57 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.920		155.43	53.670	30.251
Contractor											
Contractor Number 22		Contact Name Andrew Clifford				Contact Title Designer					
Name of Contractor: Alliance Fire Protection LLC				Phone 913-888-0647				Extension			
Address 1 130 W. 9th Ave.				FAX							
Address 2 # 101				E-mail AClifford@afpsprink.com							
Address 3 Kansas City, MO 64116				Web-Site							



Water Supply at Node 1



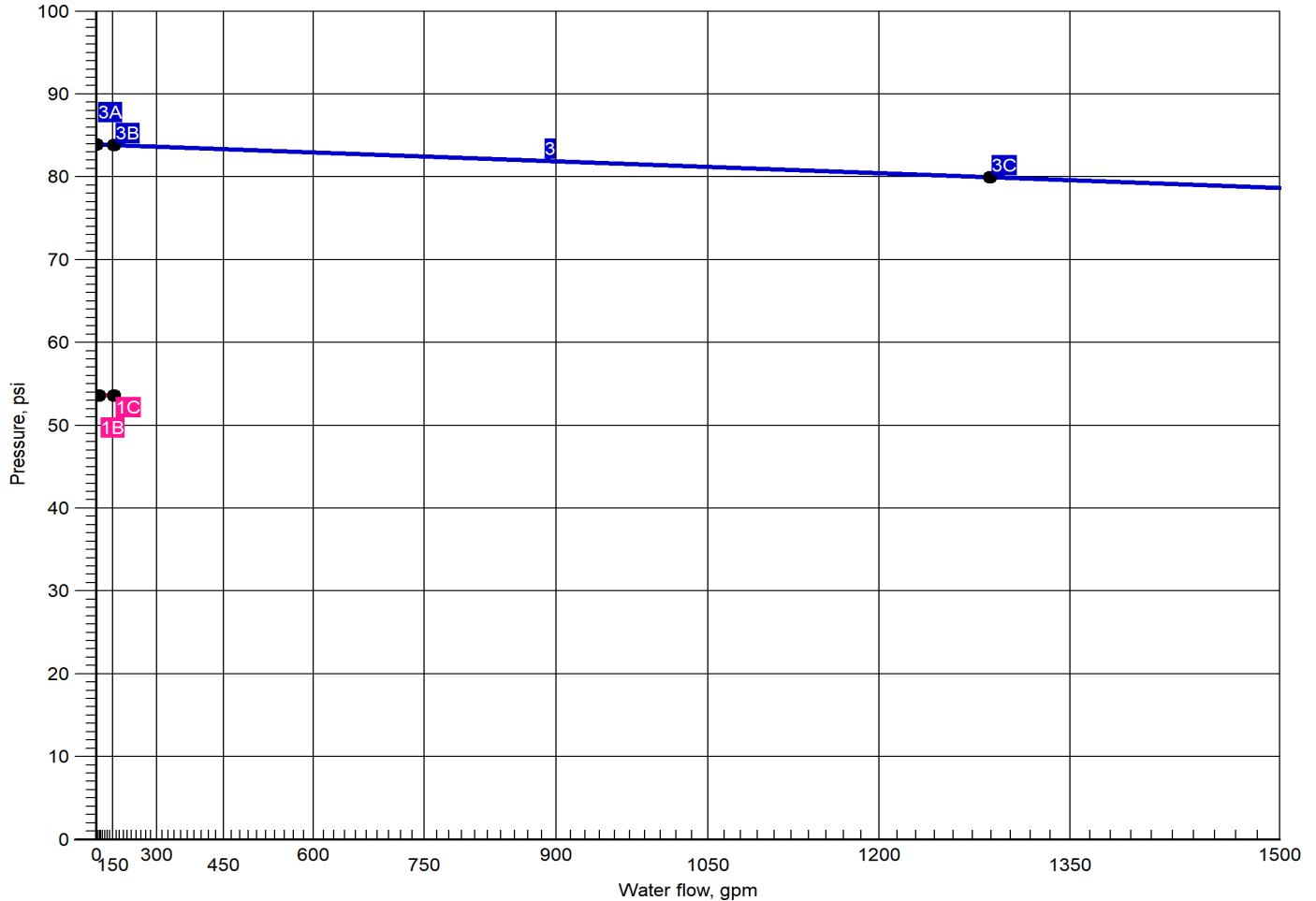
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (1ST FLOOR HALLWAY)

Remote Area Number: 1ST FLOOR HALLWAY



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 53.670 @ 55.43	Available Flow @ 20 PSI: 5760.73
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 53.670 @ 155.43	
3	3A	Available Static Pressure at Water Supply at Node 1: 84.000	
	3B	Available Residual Pressure at System Demand: 83.920 @ 155.43	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Job Number: NC 1471

Report Description: Residential (1ST FLOOR HALLWAY)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
➡ Sprinkler	1861	12.96	12.96	4.9	7.000			
Sprinkler	1863	13.84	12.96	4.9	7.976			
Sprinkler	1864	13.97	12.96	4.9	8.134			
Sprinkler	1865	14.66	12.96	4.9	8.946			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (1ST FLOOR HALLWAY)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	53.670	55.43
1861	9'-0"	Spr(-7.000), fd(37'-0")	7.000	12.96
1863	9'-0"	Spr(-7.976), fd(37'-0")	7.976	13.84
1864	9'-0"	Spr(-8.134), fd(37'-0")	8.134	13.97
1865	9'-0"	Spr(-8.946), fd(37'-0")	8.946	14.66
11	-5'-0"	T(47'-3½")	53.667	0.00
1135	10'-6"	E(7'-0")	12.404	0.00
1136	10'-6"	C(3'-0"), Tr(1'-0")	12.461	0.00
1137	10'-6"	C(3'-0"), Tr(1'-0")	12.928	0.00
1138	10'-6"	T(3'-0"), Tr(1'-0")	14.360	0.00
1182	3'-3½"	PO(27'-10½")	45.016	0.00
1200	9'-2"	T(6'-0"), Tr(1'-0")	41.978	0.00
1229	3'-3½"	PO(18'-8½")	44.990	0.00
1234	1'-2"		45.976	0.00
1255	10'-6"		8.509	0.00
1258	10'-6"		9.762	0.00
1259	10'-6"		9.964	0.00
1260	10'-6"		11.005	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (1ST FLOOR HALLWAY)

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								
DY	1.0490	12.96	4.81	120		0.058352	0'-0"	Pf 2.159
1861	9'-0"	12.96	4.9	7.000		Sprinkler,	37'-0"	Pe -0.650
1255	10'-6"			8.509		, fd(37'-0")	37'-0"	Pv
BL	0.8740	12.96	6.93	150		0.093926	26'-5½"	Pf 3.895
1255	10'-6"			8.509			15'-0"	Pe
1135	10'-6"			12.404		Tr(1'-0"), 2E(7'-0")	41'-5½"	Pv
CM	1.3940	12.96	2.73	150		0.009669	4'-11"	Pf 0.057
1135	10'-6"			12.404			1'-0"	Pe
1136	10'-6"			12.461		Tr(1'-0")	5'-11"	Pv
CM	1.3940	26.80	5.63	150		0.037063	11'-7½"	Pf 0.467
1136	10'-6"	13.84		12.461		Flow (q) from Route 2	1'-0"	Pe
1137	10'-6"			12.928		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	40.78	8.57	150		0.080553	16'-9"	Pf 1.431
1137	10'-6"	13.97		12.928		Flow (q) from Route 3	1'-0"	Pe
1138	10'-6"			14.360		Tr(1'-0")	17'-9"	Pv
CM	1.3940	55.43	11.65	150		0.142161	146'-2½"	Pf 27.040
1138	10'-6"	14.66		14.360		Flow (q) from Route 4	44'-0"	Pe 0.578
1200	9'-2"			41.978		10Tr(1'-0"), 4cplg(1'-0"), T(6'-0"), 3E(8'-0")	190'-2½"	Pv
FR	2.7050	55.43	3.09	120		0.008511	5'-8½"	Pf 0.460
1200	9'-2"			41.978			48'-4½"	Pe 2.552
1229	3'-3½"			44.990		2E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	54'-1"	Pv
CM	4.3100	55.43	1.22	120		0.000880	2'-2½"	Pf 0.026
1229	3'-3½"			44.990			27'-10½"	Pe
1182	3'-3½"			45.016		PO(27'-10½")	30'-0½"	Pv
CM	4.2600	55.43	1.25	120		0.000932	1'-2½"	Pf 0.043
1182	3'-3½"			45.016			44'-9"	Pe 0.916
1234	1'-2"			45.976		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	55.43	0.57	140		0.000106	98'-1"	Pf 5.018
1234	1'-2"			45.976			69'-4"	Pe 2.673
11	-5'-0"			53.667		E(22'-1"), BFP(-5.000), T(47'-3½")	167'-5½"	Pv
UG	7.9800	55.43	0.36	150		0.000029	94'-10½"	Pf 0.003
11	-5'-0"			53.667				Pe
1	-5'-0"			53.670		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		155.43						
Route 2								
DY	1.0490	13.84	5.14	120		0.065840	0'-0"	Pf 2.436
1863	9'-0"	13.84	4.9	7.976		Sprinkler,	37'-0"	Pe -0.650
1258	10'-6"			9.762		, fd(37'-0")	37'-0"	Pv
BL	0.8740	13.84	7.40	150		0.105980	21'-5½"	Pf 2.699
1258	10'-6"			9.762			4'-0"	Pe
1136	10'-6"			12.461		Tr(1'-0"), C(3'-0")	25'-5½"	Pv
Route 3								
DY	1.0490	13.97	5.19	120		0.067042	0'-0"	Pf 2.481
1864	9'-0"	13.97	4.9	8.134		Sprinkler,	37'-0"	Pe -0.650
1259	10'-6"			9.964		, fd(37'-0")	37'-0"	Pv
BL	0.8740	13.97	7.47	150		0.107915	21'-5½"	Pf 2.964
1259	10'-6"			9.964			6'-0"	Pe
1137	10'-6"			12.928		3Tr(1'-0"), C(3'-0")	27'-5½"	Pv
Route 4								
DY	1.0490	14.66	5.44	120		0.073214	0'-0"	Pf 2.709
1865	9'-0"	14.66	4.9	8.946		Sprinkler,	37'-0"	Pe -0.650
1260	10'-6"			11.005		, fd(37'-0")	37'-0"	Pv
BL	0.8740	14.66	7.84	150		0.117849	21'-5½"	Pf 3.355
1260	10'-6"			11.005			7'-0"	Pe
1138	10'-6"			14.360		4Tr(1'-0"), T(3'-0")	28'-5½"	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: NC 1471

Report Description: Residential (1ST FLOOR HALLWAY)

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	



Flow Diagram (Top View)

Job Number: NC 1471

Report Description: Residential (1ST FLOOR HALLWAY)





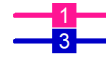
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (APT 201)

Job											
Job Number NC 1471				Designer Andrew Clifford							
Job Name: WILSHIRE HILLS III				State Certification/License Number							
Address 1 NE WILSHIRE DR.				AHJ LEES SUMMIT, MO BLDG CODE							
Address 2				Job Site/Building							
Address 3 LEES SUMMIT, MO				Drawing Name Wilshire FP.cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 4.9 K-Factor 12.96 at 7.000				Occupancy Residential			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 403ft ²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 3		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft ²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
				5-23-25							
Total Hose Streams 100.00											
System Flow Demand 46.39		Total Water Required (Including Hose Allowance) 146.39									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 14.56 between nodes 569 and 809											
Maximum Velocity Under Ground 0.48 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.929		146.39	59.794	24.135
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



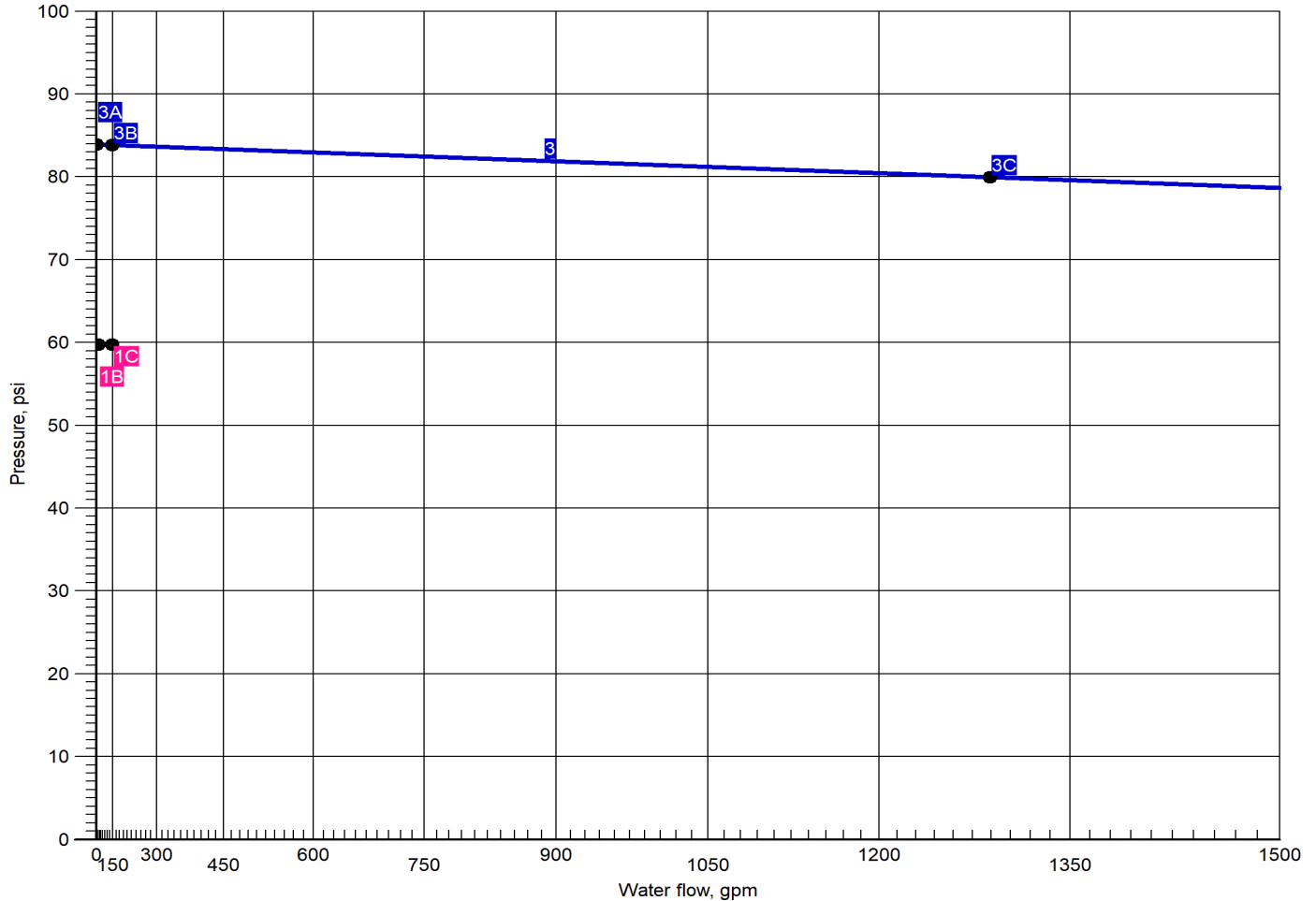
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (APT 201)

Remote Area Number: APT 201



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 59.794 @ 46.39 Required Pressure at System Demand (Including Hose Allowance at Source): 59.794 @ 146.39	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.929 @ 146.39 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1709	19.17	12.96	4.9	15.300			
Sprinkler	1724	14.25	12.96	4.9	8.463			
➡ Sprinkler	1729	12.96	12.96	4.9	7.000			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (APT 201)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	59.794	46.39
1709	20'-0"	Spr(-15.300)	15.300	19.17
1724	20'-0"	Spr(-8.463)	8.463	14.25
1729	20'-0"	Spr(-7.000)	7.000	12.96
11	-5'-0"	T(47'-3½")	59.792	0.00
569	21'-6"	C(3'-0")	22.492	0.00
571	21'-6"	C(3'-0"), Tr(1'-0")	22.973	0.00
739	21'-6"	T(6'-0")	42.494	0.00
809	21'-6"	T(3'-0"), Tr(1'-0")	9.592	0.00
1182	3'-3½"	PO(27'-10½")	51.158	0.00
1192	3'-3½"	PO(18'-8½")	51.140	0.00
1234	1'-2"		52.106	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (APT 201)

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	0.8740	12.96	6.93	150		0.093926	17'-6"	Pf 3.242
1729	20'-0"	12.96	4.9	7.000		Sprinkler,	17'-0"	Pe -0.650
809	21'-6"			9.592		2E(7'-0"), 3Tr(1'-0")	34'-6"	Pv
BL	0.8740	27.22	14.56	150		0.370438	29'-10"	Pf 12.900
809	21'-6"	14.25		9.592		Flow (q) from Route 2	5'-0"	Pe
569	21'-6"			22.492		2Tr(1'-0"), C(3'-0")	34'-10"	Pv
CM	1.3940	27.22	5.72	150		0.038134	11'-7½"	Pf 0.481
569	21'-6"			22.492			1'-0"	Pe
571	21'-6"			22.973		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	46.39	9.75	150		0.102238	153'-11½"	Pf 19.521
571	21'-6"	19.17		22.973		Flow (q) from Route 3	37'-0"	Pe
739	21'-6"			42.494		14Tr(1'-0"), 3cplg(1'-0"), 2T(6'-0") , E(8'-0")	190'-11½"	Pv
FM	2.7050	46.39	2.59	120		0.006121	55'-1"	Pf 0.748
739	21'-6"			42.494			67'-1"	Pe 7.899
1192	3'-3½"			51.140		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv
CM	4.3100	46.39	1.02	120		0.000633	1'-2½"	Pf 0.018
1192	3'-3½"			51.140			27'-10½"	Pe
1182	3'-3½"			51.158		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	46.39	1.04	120		0.000670	1'-2½"	Pf 0.031
1182	3'-3½"			51.158			44'-9"	Pe 0.916
1234	1'-2"			52.106		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	46.39	0.48	140		0.000076	98'-1"	Pf 5.013
1234	1'-2"			52.106			69'-4"	Pe 2.673
11	-5'-0"			59.792		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	46.39	0.30	150		0.000021	94'-10½"	Pf 0.002
11	-5'-0"			59.792				Pe
1	-5'-0"			59.794		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		146.39						
Route 2								
DR	0.8740	14.25	7.62	150		0.111950	5'-10½"	Pf 1.780
1724	20'-0"	14.25	4.9	8.463		Sprinkler,	10'-0"	Pe -0.650
809	21'-6"			9.592		E(7'-0"), T(3'-0")	15'-10½"	Pv
Route 3								
DR	0.8740	19.17	10.25	150		0.193602	32'-0"	Pf 8.323
1709	20'-0"	19.17	4.9	15.300		Sprinkler,	11'-0"	Pe -0.650
571	21'-6"			22.973		T(3'-0"), cplg(1'-0"), 4Tr(1'-0"), C (3'-0")	43'-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

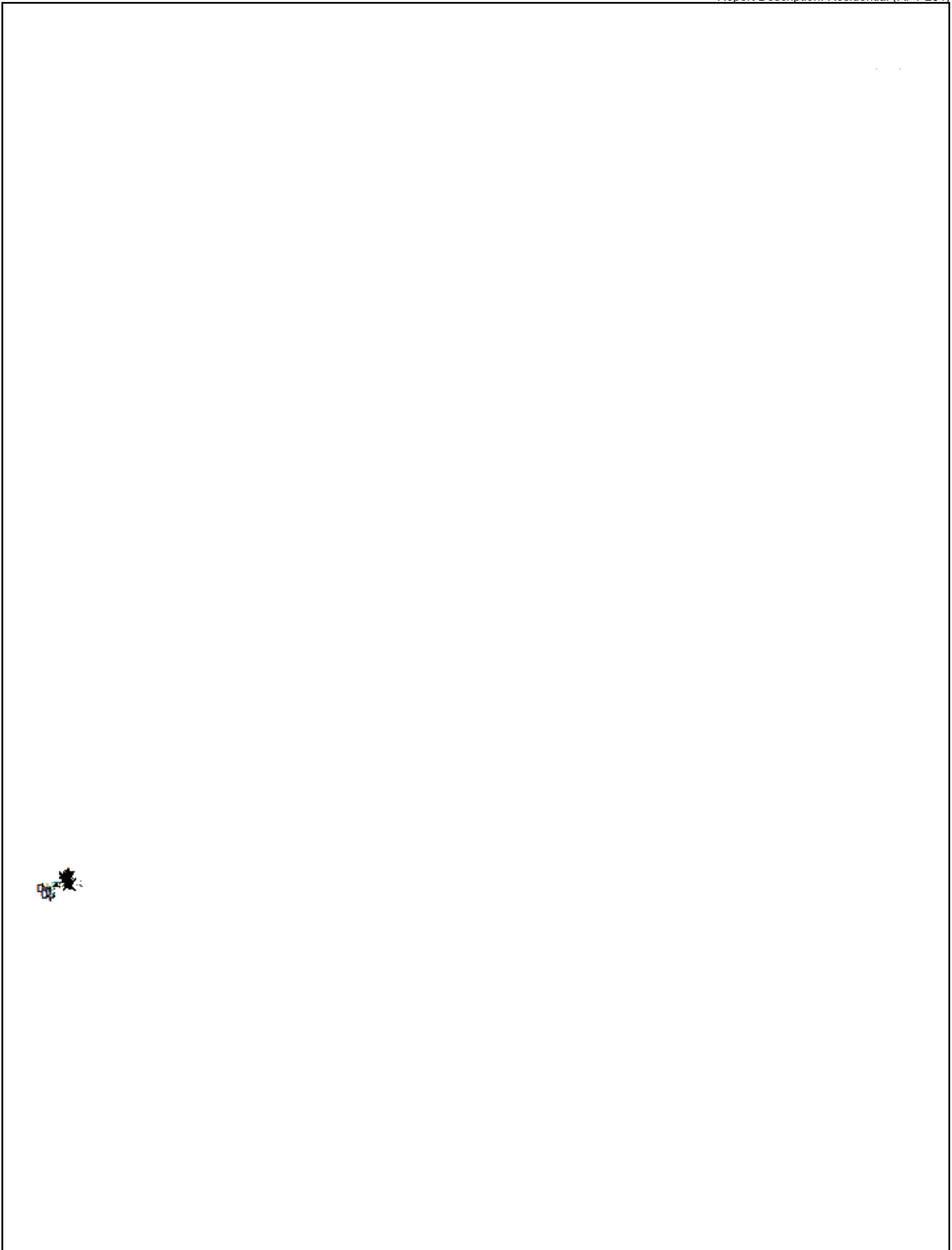


Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (APT 201)

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	





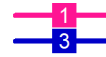
Hydraulic Summary

Job Number: NC 1471
Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)

Job											
Job Number NC 1471				Designer Andrew Clifford							
Job Name: WILSHIRE HILLS III				State Certification/License Number							
Address 1 NE WILSHIRE DR.				AHJ LEES SUMMIT, MO BLDG CODE							
Address 2				Job Site/Building							
Address 3 LEES SUMMIT, MO				Drawing Name Wilshire FP.cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.6 K-Factor 19.60 at 12.250				Occupancy Light Hazard			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft²			Area of Application 1500ft² (Actual 1166ft²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 8		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 196ft²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
				5-23-25							
Total Hose Streams 100.00											
System Flow Demand 187.31		Total Water Required (Including Hose Allowance) 287.31									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 26.00 between nodes 740 and 767											
Maximum Velocity Under Ground 1.94 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.751		287.31	61.195	22.556
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



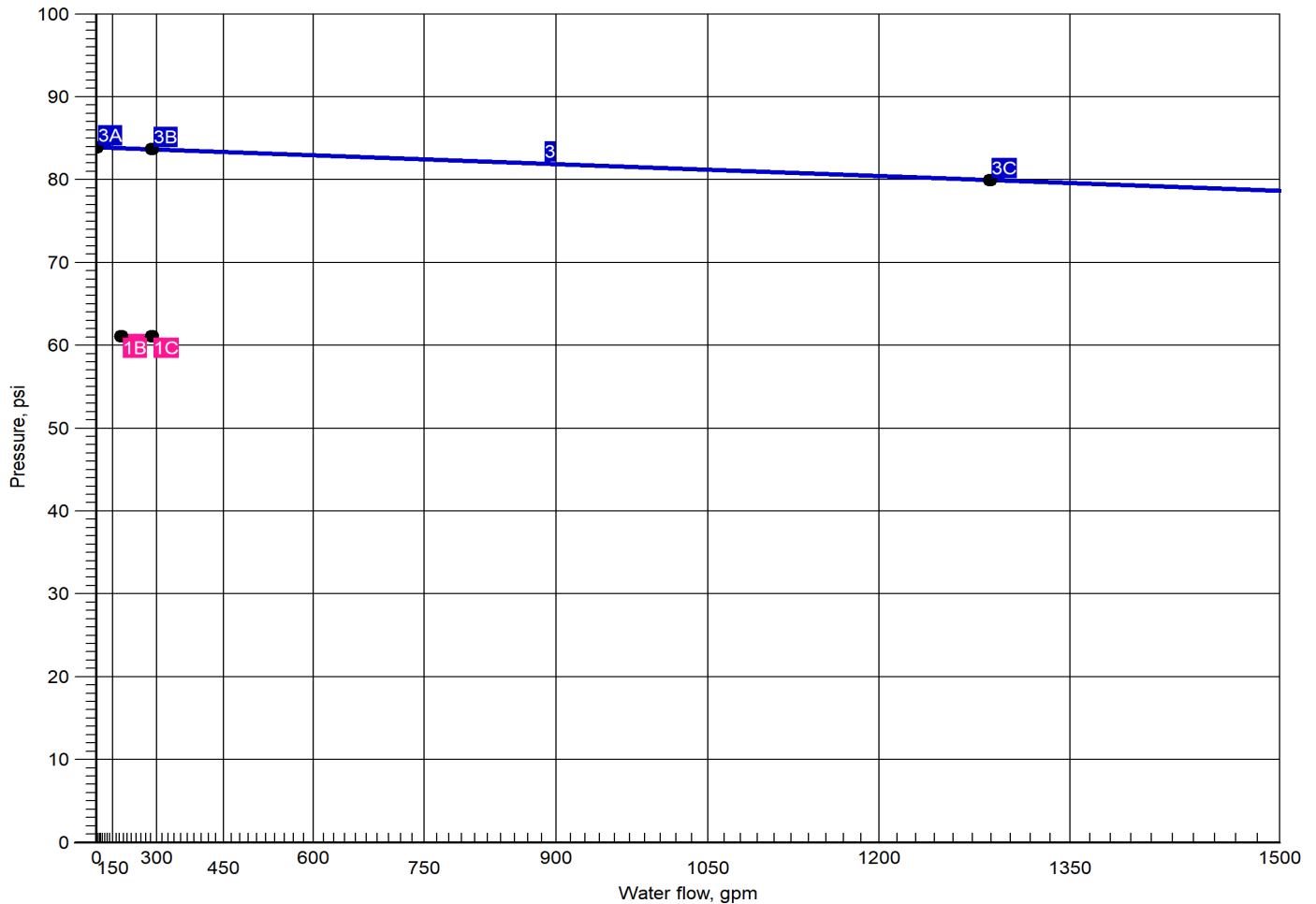
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)

Remote Area Number: 2ND FLOOR MULTI-PURPOSE



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 61.195 @ 187.31 Required Pressure at System Demand (Including Hose Allowance at Source): 61.195 @ 287.31	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.751 @ 287.31 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1681	28.78	19.60	5.6	26.416			
Sprinkler	1684	25.65	19.60	5.6	20.972			
Sprinkler	1697	25.46	19.60	5.6	20.663			
Sprinkler	1700	22.25	19.60	5.6	15.790			
Sprinkler	1701	22.55	19.60	5.6	16.211			
Sprinkler	1714	23.16	19.60	5.6	17.105			
➡ Sprinkler	1727	19.60	19.60	5.6	12.250			
Sprinkler	1728	19.86	19.60	5.6	12.581			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	61.195	187.31
1681	19'-0"	Spr(-26.416)	26.416	28.78
1684	19'-0"	Spr(-20.972)	20.972	25.65
1697	19'-0"	Spr(-20.663)	20.663	25.46
1700	19'-0"	Spr(-15.790)	15.790	22.25
1701	19'-0"	Spr(-16.211)	16.211	22.55
1714	19'-0"	Spr(-17.105)	17.105	23.16
1727	19'-0"	Spr(-12.250)	12.250	19.60
1728	19'-0"	Spr(-12.581)	12.581	19.86
11	-5'-0"	T(47'-3½")	61.169	0.00
728	21'-6"	T(3'-0")	24.646	0.00
730	21'-6"	T(3'-0"), Tr(1'-0")	26.154	0.00
737	21'-6"	T(3'-0"), Tr(1'-0")	25.745	0.00
739	21'-6"	T(6'-0")	33.971	0.00
740	21'-6"	T(3'-0")	30.940	0.00
761	21'-6"	T(3'-0"), Tr(1'-0")	16.110	0.00
762	21'-6"	T(3'-0"), Tr(1'-0")	16.565	0.00
767	21'-6"	T(3'-0"), Tr(1'-0")	21.379	0.00
1182	3'-3½"	PO(27'-10½")	52.003	0.00
1192	3'-3½"	PO(18'-8½")	51.759	0.00
1234	1'-2"		53.327	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)

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	0.8740	19.60	10.48	150		0.201782	16'-6"	Pf 4.944
1727	19'-0"	19.60	5.6	12.250		Sprinkler,	8'-0"	Pe -1.084
761	21'-6"			16.110		E(7'-0"), Tr(1'-0")	24'-6"	Pv
BL	0.8740	41.85	22.38	150		0.821099	7'-5"	Pf 8.536
761	21'-6"	22.25		16.110		Flow (q) from Route 3	3'-0"	Pe
728	21'-6"			24.646		T(3'-0")	10'-4½"	Pv
CM	1.3940	41.85	8.80	150		0.084527	12'-0"	Pf 1.099
728	21'-6"			24.646			1'-0"	Pe
737	21'-6"			25.745		Tr(1'-0")	13'-0"	Pv
CM	1.3940	67.50	14.19	150		0.204644	1'-0"	Pf 0.409
737	21'-6"	25.65		25.745		Flow (q) from Route 7	1'-0"	Pe
730	21'-6"			26.154		Tr(1'-0")	2'-0"	Pv
CM	1.3940	109.91	23.10	150		0.504332	8'-6"	Pf 7.817
730	21'-6"	42.41		26.154		Flow (q) from Route 2	7'-0"	Pe
739	21'-6"			33.971		Tr(1'-0"), T(6'-0")	15'-6"	Pv
FM	2.7050	187.31	10.46	120		0.080951	55'-1"	Pf 9.890
739	21'-6"	77.40		33.971		Flow (q) from Route 5	67'-1"	Pe 7.899
1192	3'-3½"			51.759		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv
CM	4.3100	187.31	4.12	120		0.008375	1'-2½"	Pf 0.243
1192	3'-3½"			51.759			27'-10½"	Pe
1182	3'-3½"			52.003		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	187.31	4.22	120		0.008864	1'-2½"	Pf 0.408
1182	3'-3½"			52.003			44'-9"	Pe 0.916
1234	1'-2"			53.327		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	187.31	1.94	140		0.001007	98'-1"	Pf 5.169
1234	1'-2"			53.327			69'-4"	Pe 2.673
11	-5'-0"			61.169		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	187.31	1.20	150		0.000276	94'-10½"	Pf 0.026
11	-5'-0"			61.169				Pe
1	-5'-0"			61.195		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		287.31						
Route 2								
DR	0.8740	19.86	10.62	150		0.206827	16'-6"	Pf 5.067
1728	19'-0"	19.86	5.6	12.581		Sprinkler,	8'-0"	Pe -1.084
762	21'-6"			16.565		E(7'-0"), Tr(1'-0")	24'-6"	Pv
BL	0.8740	42.41	22.68	150		0.841457	7'-5"	Pf 9.589
762	21'-6"	22.55		16.565		Flow (q) from Route 4	4'-0"	Pe
730	21'-6"			26.154		Tr(1'-0"), T(3'-0")	11'-5"	Pv
Route 3								
DR	0.8740	22.25	11.90	150		0.255190	2'-6"	Pf 1.404
1700	19'-0"	22.25	5.6	15.790		Sprinkler,	3'-0"	Pe -1.084
761	21'-6"			16.110		T(3'-0")	5'-6"	Pv
Route 4								
DR	0.8740	22.55	12.06	150		0.261470	2'-6"	Pf 1.438
1701	19'-0"	22.55	5.6	16.211		Sprinkler,	3'-0"	Pe -1.084
762	21'-6"			16.565		T(3'-0")	5'-6"	Pv
Route 5								
DR	0.8740	23.16	12.39	150		0.274784	10'-6"	Pf 5.358
1714	19'-0"	23.16	5.6	17.105		Sprinkler,	9'-0"	Pe -1.084
767	21'-6"			21.379		E(7'-0"), 2Tr(1'-0")	19'-6"	Pv
BL	0.8740	48.62	26.00	150		1.083314	5'-10"	Pf 9.560
767	21'-6"	25.46		21.379		Flow (q) from Route 6	3'-0"	Pe
740	21'-6"			30.940		T(3'-0")	8'-10"	Pv
CM	1.3940	77.40	16.27	150		0.263612	5'-6"	Pf 3.032
740	21'-6"	28.78		30.940		Flow (q) from Route 8	6'-0"	Pe
739	21'-6"			33.971		T(6'-0")	11'-6"	Pv
Route 6								
DR	0.8740	25.46	13.61	150		0.327275	2'-6"	Pf 1.800
1697	19'-0"	25.46	5.6	20.663		Sprinkler,	3'-0"	Pe -1.084
767	21'-6"			21.379		T(3'-0")	5'-6"	Pv
Route 7								



Hydraulic Analysis

Job Number: NC 1471
Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)

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	0.8740	25.65	13.71	150		0.331801	7'-8"	Pf 5.856
1684	19'-0"	25.65	5.6	20.972		Sprinkler,	10'-0"	Pe -1.084
737	21'-6"			25.745		E(7'-0"), T(3'-0")	17'-8"	Pv
Route 8								
DR	0.8740	28.78	15.39	150		0.410763	7'-8"	Pf 5.607
1681	19'-0"	28.78	5.6	26.416		Sprinkler,	6'-0"	Pe -1.084
740	21'-6"			30.940		2T(3'-0")	13'-8"	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

Pipe Type Legend

AO	Arm-Over
BL	Branch Line
CM	Cross Main
DN	Drain
DR	Drop
DY	Dynamic
FM	Feed Main
FR	Feed Riser
MS	Miscellaneous
OR	Outrigger
RN	Riser Nipple
SN	Swing Nipple
SP	Sprig
ST	Stand Pipe
UG	Underground

Units Legend

Diameter	Inch
Elevation	Foot
Flow	gpm
Discharge	gpm
Velocity	fps
Pressure	psi
Length	Foot
Friction Loss	psi/Foot
HWC	Hazen-Williams Constant
Pt	Total pressure at a point in a pipe
Pn	Normal pressure at a point in a pipe
Pf	Pressure loss due to friction between points
Pe	Pressure due to elevation difference between indicated points
Pv	Velocity pressure at a point in a pipe

Fittings Legend

ALV	Alarm Valve
AngV	Angle Valve
b	Bushing
BaIV	Ball Valve
BFP	Backflow Preventer
BV	Butterfly Valve
C	Cross Flow Turn 90°
cplg	Coupling
Cr	Cross Run
CV	Check Valve
DelV	Deluge Valve
DPV	Dry Pipe Valve
E	90° Elbow
EE	45° Elbow
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



Flow Diagram (Top View)

Job Number: NC 1471
Report Description: Light Hazard (2ND FLOOR MULTI-PURPOSE)





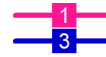
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (2ND FLOOR HALLWAY)

Job											
Job Number NC 1471					Designer Andrew Clifford						
Job Name: WILSHIRE HILLS III					State Certification/License Number						
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE						
Address 2					Job Site/Building						
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 4.9 K-Factor 12.96 at 7.000					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 314ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 96ft ²		
					AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area						
					5-23-25						
Total Hose Streams 100.00											
System Flow Demand 54.03		Total Water Required (Including Hose Allowance) 154.03									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 11.36 between nodes 739 and 572											
Maximum Velocity Under Ground 0.56 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.921		154.03	54.579	29.342
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



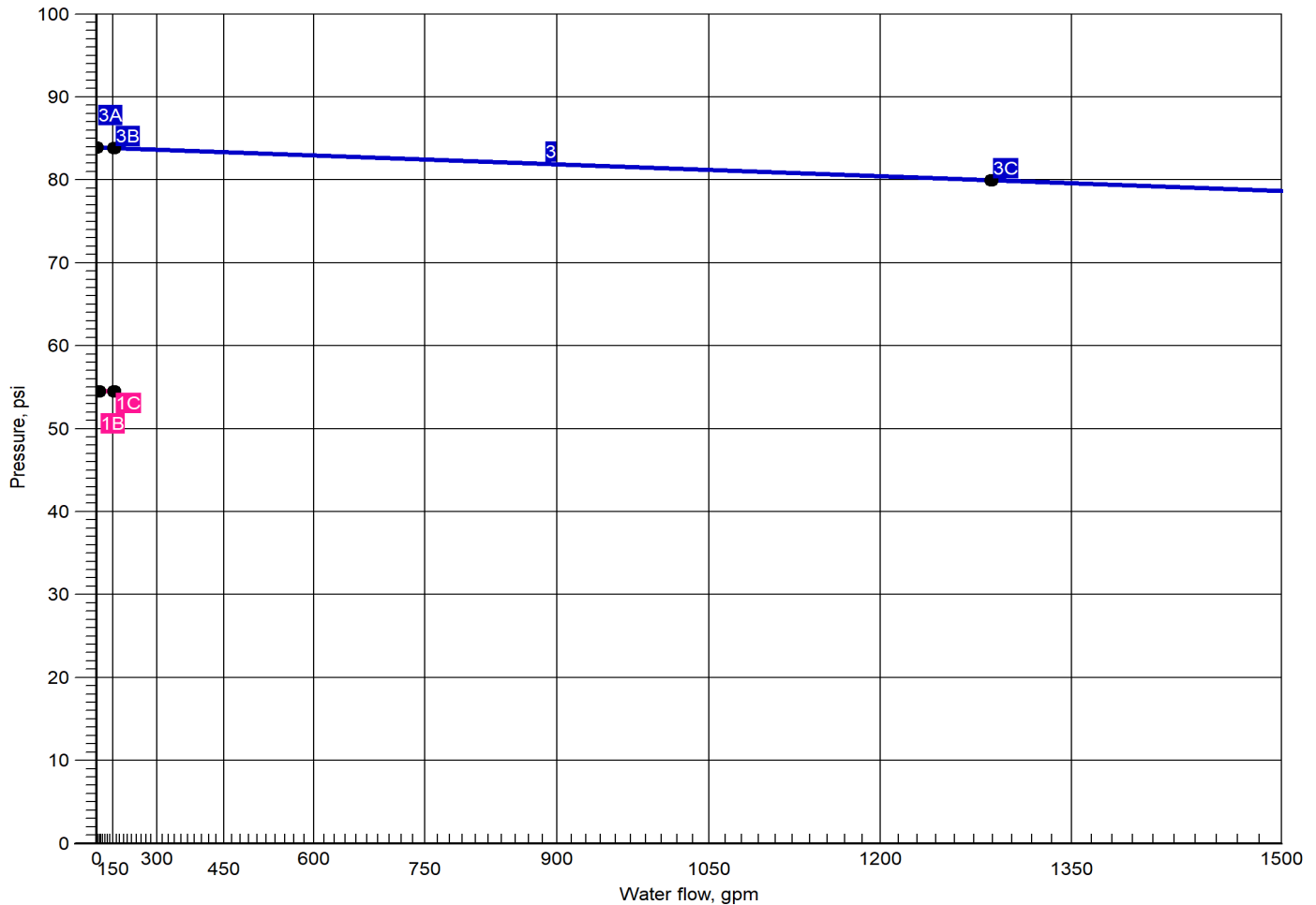
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (2ND FLOOR HALLWAY)

Remote Area Number: 2ND FLOOR HALLWAY



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 54.579 @ 54.03	Available Flow @ 20 PSI: 5760.73
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 54.579 @ 154.03	
3	3A	Available Static Pressure at Water Supply at Node 1: 84.000	
	3B	Available Residual Pressure at System Demand: 83.921 @ 154.03	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
➡ Sprinkler	1686	12.96	12.96	4.9	7.000			
Sprinkler	1687	13.37	12.96	4.9	7.447			
Sprinkler	1689	14.18	12.96	4.9	8.375			
Sprinkler	1692	13.51	12.96	4.9	7.602			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (2ND FLOOR HALLWAY)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	54.579	54.03
1686	20'-0"	Spr(-7.000), fd(37'-0")	7.000	12.96
1687	20'-0"	Spr(-7.447), fd(37'-0")	7.447	13.37
1689	20'-0"	Spr(-8.375), fd(37'-0")	8.375	14.18
1692	20'-0"	Spr(-7.602), fd(37'-0")	7.602	13.51
11	-5'-0"	T(47'-3½")	54.577	0.00
564	21'-6"	E(7'-0")	11.633	0.00
569	21'-6"	C(3'-0"), Tr(1'-0")	11.716	0.00
571	21'-6"	C(3'-0"), Tr(1'-0")	12.168	0.00
572	21'-6"	T(3'-0"), Tr(1'-0")	13.540	0.00
739	21'-6"	T(6'-0")	37.015	0.00
752	21'-6"		8.509	0.00
754	21'-6"		9.083	0.00
755	21'-6"		9.282	0.00
756	21'-6"		10.273	0.00
1182	3'-3½"	PO(27'-10½")	45.929	0.00
1192	3'-3½"	PO(18'-8½")	45.905	0.00
1234	1'-2"		46.887	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (2ND FLOOR HALLWAY)

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								
DY	1.0490	12.96	4.81	120		0.058352	0'-0"	Pf 2.159
1686	20'-0"	12.96	4.9	7.000		Sprinkler,	37'-0"	Pe -0.650
752	21'-6"			8.509		, fd(37'-0")	37'-0"	Pv
BL	0.8740	12.96	6.93	150		0.093926	23'-3"	Pf 3.124
752	21'-6"			8.509			10'-0"	Pe
564	21'-6"			11.633		T(3'-0"), E(7'-0")	33'-3"	Pv
CM	1.3940	12.96	2.73	150		0.009669	7'-7½"	Pf 0.083
564	21'-6"			11.633			1'-0"	Pe
569	21'-6"			11.716		Tr(1'-0")	8'-7½"	Pv
CM	1.3940	26.34	5.54	150		0.035878	11'-7½"	Pf 0.452
569	21'-6"	13.37		11.716		Flow (q) from Route 2	1'-0"	Pe
571	21'-6"			12.168		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	39.85	8.38	150		0.077185	16'-9"	Pf 1.372
571	21'-6"	13.51		12.168		Flow (q) from Route 3	1'-0"	Pe
572	21'-6"			13.540		Tr(1'-0")	17'-9"	Pv
CM	1.3940	54.03	11.36	150		0.135561	137'-2"	Pf 23.475
572	21'-6"	14.18		13.540		Flow (q) from Route 4	36'-0"	Pe
739	21'-6"			37.015		13Tr(1'-0"), 3cplg(1'-0"), 2T(6'-0") , E(8'-0")	173'-2"	Pv
FM	2.7050	54.03	3.02	120		0.008116	55'-1"	Pf 0.991
739	21'-6"			37.015			67'-1"	Pe 7.899
1192	3'-3½"			45.905		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv
CM	4.3100	54.03	1.19	120		0.000840	1'-2½"	Pf 0.024
1192	3'-3½"			45.905			27'-10½"	Pe
1182	3'-3½"			45.929		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	54.03	1.22	120		0.000889	1'-2½"	Pf 0.041
1182	3'-3½"			45.929			44'-9"	Pe 0.916
1234	1'-2"			46.887		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	54.03	0.56	140		0.000101	98'-1"	Pf 5.017
1234	1'-2"			46.887			69'-4"	Pe 2.673
11	-5'-0"			54.577		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	54.03	0.35	150		0.000028	94'-10½"	Pf 0.003
11	-5'-0"			54.577				Pe
1	-5'-0"			54.579		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		154.03						
Route 2								
DY	1.0490	13.37	4.96	120		0.061793	0'-0"	Pf 2.286
1687	20'-0"	13.37	4.9	7.447		Sprinkler,	37'-0"	Pe -0.650
754	21'-6"			9.083		, fd(37'-0")	37'-0"	Pv
BL	0.8740	13.37	7.15	150		0.099466	21'-5½"	Pf 2.633
754	21'-6"			9.083			5'-0"	Pe
569	21'-6"			11.716		2Tr(1'-0"), C(3'-0")	26'-5½"	Pv
Route 3								
DY	1.0490	13.51	5.02	120		0.062981	0'-0"	Pf 2.330
1692	20'-0"	13.51	4.9	7.602		Sprinkler,	37'-0"	Pe -0.650
755	21'-6"			9.282		, fd(37'-0")	37'-0"	Pv
BL	0.8740	13.51	7.22	150		0.101378	21'-5½"	Pf 2.886
755	21'-6"			9.282			7'-0"	Pe
571	21'-6"			12.168		4Tr(1'-0"), C(3'-0")	28'-5½"	Pv
Route 4								
DY	1.0490	14.18	5.26	120		0.068878	0'-0"	Pf 2.548
1689	20'-0"	14.18	4.9	8.375		Sprinkler,	37'-0"	Pe -0.650
756	21'-6"			10.273		, fd(37'-0")	37'-0"	Pv
BL	0.8740	14.18	7.58	150		0.110870	21'-5½"	Pf 3.267
756	21'-6"			10.273			8'-0"	Pe
572	21'-6"			13.540		4Tr(1'-0"), cplg(1'-0"), T(3'-0")	29'-5½"	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: NC 1471

Report Description: Residential (2ND FLOOR HALLWAY)

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



Flow Diagram (Top View)

Job Number: NC 1471
Report Description: Residential (2ND FLOOR HALLWAY)





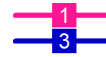
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (APT 301)

Job											
Job Number NC 1471					Designer Andrew Clifford						
Job Name: WILSHIRE HILLS III					State Certification/License Number						
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE						
Address 2					Job Site/Building						
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 4 K-Factor 14.00 at 12.250					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 403ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 3		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft ²		
					AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area						
					5-23-25						
Total Hose Streams 100.00											
System Flow Demand 42.98		Total Water Required (Including Hose Allowance) 142.98									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 9.03 between nodes 739 and 571											
Maximum Velocity Under Ground 0.45 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.932		142.98	58.400	25.532
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



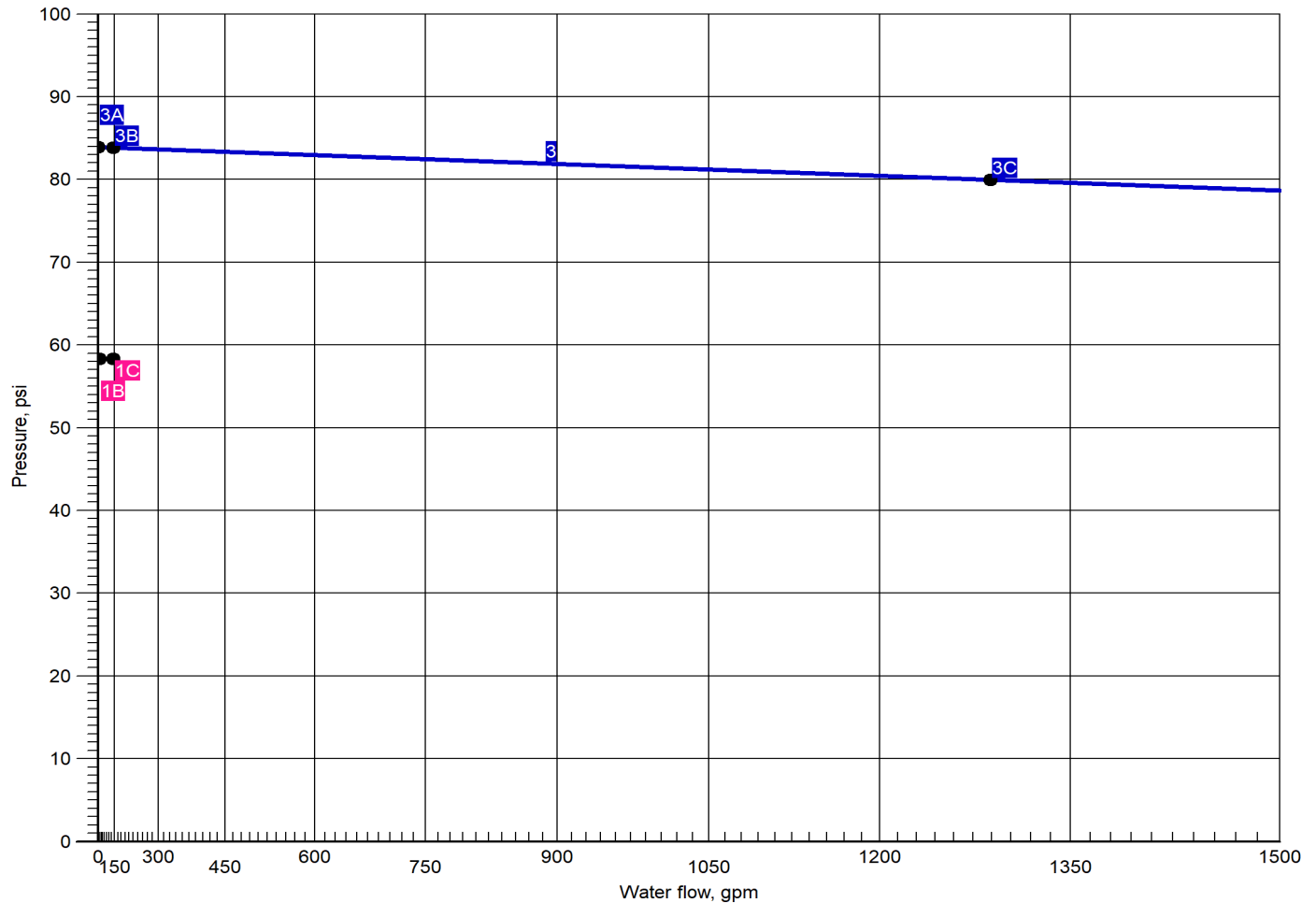
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (APT 301)

Remote Area Number: APT 301



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 58.400 @ 42.98	Available Flow @ 20 PSI: 5760.73
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 58.400 @ 142.98	
3	3A	Available Static Pressure at Water Supply at Node 1: 84.000	
	3B	Available Residual Pressure at System Demand: 83.932 @ 142.98	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Job Number: NC 1471
Report Description: Residential (APT 301)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1537	14.55	14.00	4	13.236			
Sprinkler	1547	14.43	14.00	4	13.008			
➡ Sprinkler	1555	14.00	14.00	4	12.250			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (APT 301)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	58.400	42.98
1537	30'-6"	Spr(-13.236)	13.236	14.55
1547	30'-6"	Spr(-13.008)	13.008	14.43
1555	30'-6"	Spr(-12.250)	12.250	14.00
11	-5'-0"	T(47'-3½")	58.398	0.00
564	21'-6"	E(7'-0")	23.626	0.00
569	21'-6"	C(3'-0"), Tr(1'-0")	23.729	0.00
571	21'-6"	C(3'-0"), Tr(1'-0")	24.254	0.00
739	21'-6"	T(6'-0")	41.206	0.00
1182	3'-3½"	PO(27'-10½")	49.771	0.00
1192	3'-3½"	PO(18'-8½")	49.755	0.00
1234	1'-2"		50.714	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (APT 301)

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								
BL	0.8740	14.00	7.49	150		0.108279	57'-11½"	Pf 7.577
1555	30'-6"	14.00	4	12.250		Sprinkler,	12'-0"	Pe 3.902
569	21'-6"			23.729		2T(3'-0"), 3Tr(1'-0"), C(3'-0")	69'-11½"	Pv
CM	1.3940	28.55	6.00	150		0.041663	11'-7½"	Pf 0.525
569	21'-6"	14.55		23.729		Flow (q) from Route 3	1'-0"	Pe
571	21'-6"			24.254		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	42.98	9.03	150		0.088784	153'-11½"	Pf 16.952
571	21'-6"	14.43		24.254		Flow (q) from Route 2	37'-0"	Pe
739	21'-6"			41.206		14Tr(1'-0"), 3cplg(1'-0"), 2T(6'-0") , E(8'-0")	190'-11½"	Pv
FM	2.7050	42.98	2.40	120		0.005315	55'-1"	Pf 0.649
739	21'-6"			41.206			67'-1"	Pe 7.899
1192	3'-3½"			49.755		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv
CM	4.3100	42.98	0.95	120		0.000550	1'-2½"	Pf 0.016
1192	3'-3½"			49.755			27'-10½"	Pe
1182	3'-3½"			49.771		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	42.98	0.97	120		0.000582	1'-2½"	Pf 0.027
1182	3'-3½"			49.771			44'-9"	Pe 0.916
1234	1'-2"			50.714		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	42.98	0.45	140		0.000066	98'-1"	Pf 5.011
1234	1'-2"			50.714			69'-4"	Pe 2.673
11	-5'-0"			58.398		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	42.98	0.28	150		0.000018	94'-10½"	Pf 0.002
11	-5'-0"			58.398				Pe
1	-5'-0"			58.400		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		142.98						
Route 2								
AO	0.8740	14.43	7.71	150		0.114461	45'-2"	Pf 7.345
1547	30'-6"	14.43	4	13.008		Sprinkler,	19'-0"	Pe 3.902
571	21'-6"			24.254		E(7'-0"), 2C(3'-0"), 5Tr(1'-0"), cplg(1'-0")	64'-2"	Pv
Route 3								
BL	0.8740	14.55	7.78	150		0.116319	37'-9½"	Pf 6.488
1537	30'-6"	14.55	4	13.236		Sprinkler,	18'-0"	Pe 3.902
564	21'-6"			23.626		2T(3'-0"), C(3'-0"), 2Tr(1'-0"), E(7 '-0")	55'-9½"	Pv
CM	1.3940	14.55	3.06	150		0.011974	7'-7½"	Pf 0.103
564	21'-6"			23.626			1'-0"	Pe
569	21'-6"			23.729		Tr(1'-0")	8'-7½"	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

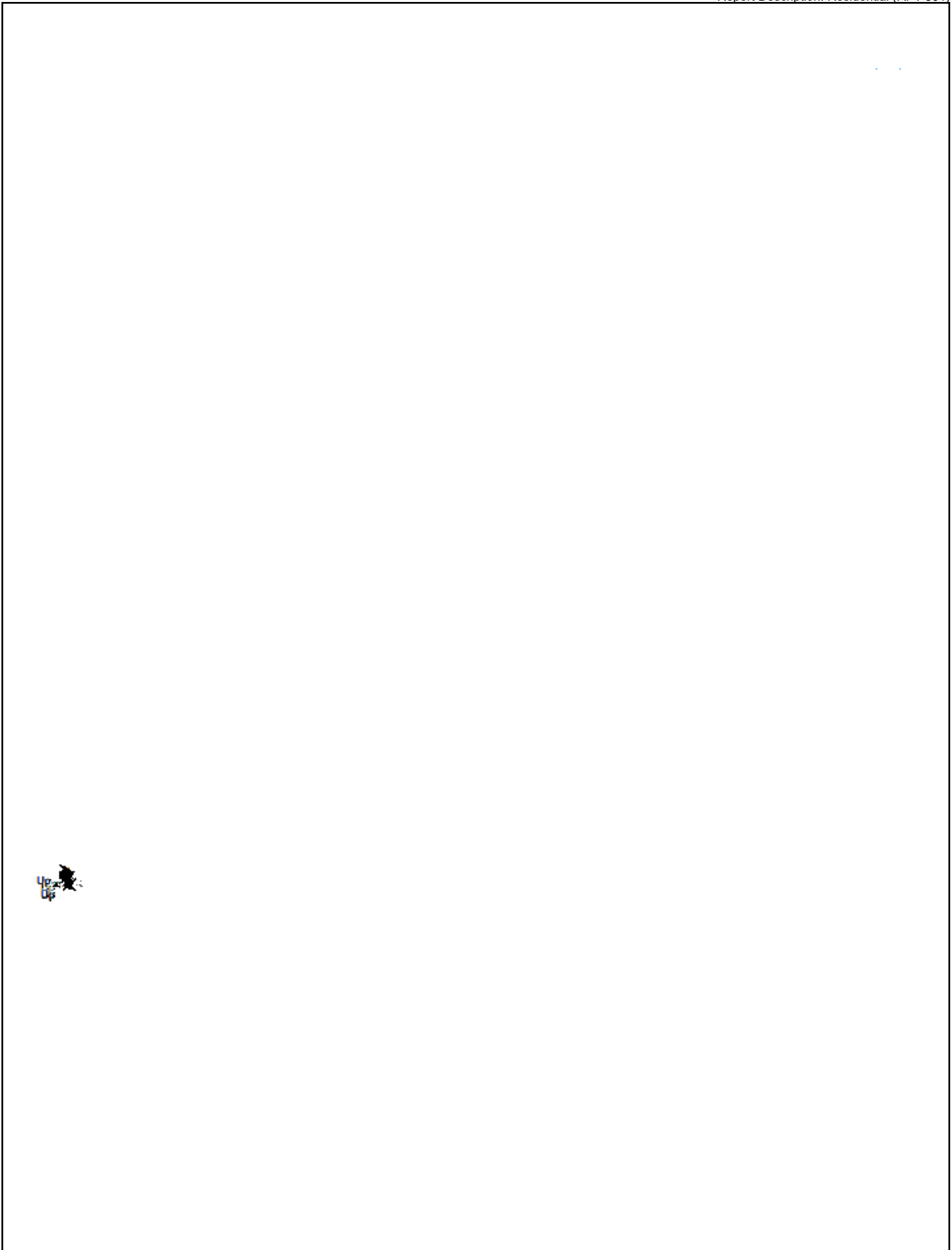


Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (APT 301)

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





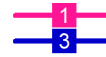
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (3RD FLOOR #316)

Job											
Job Number NC 1471				Designer Andrew Clifford							
Job Name: WILSHIRE HILLS III				State Certification/License Number							
Address 1 NE WILSHIRE DR.				AHJ LEES SUMMIT, MO BLDG CODE							
Address 2				Job Site/Building							
Address 3 LEES SUMMIT, MO				Drawing Name Wilshire FP.cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 4 K-Factor 13.00 at 10.563				Occupancy Residential			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 378ft ²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 256ft ²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
				5-23-25							
Total Hose Streams 100.00											
System Flow Demand 54.91		Total Water Required (Including Hose Allowance) 154.91									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 14.04 between nodes 307 and 327											
Maximum Velocity Under Ground 0.57 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.921		154.91	69.827	14.093
Contractor											
Contractor Number 22		Contact Name Andrew Clifford				Contact Title Designer					
Name of Contractor: Alliance Fire Protection LLC				Phone 913-888-0647				Extension			
Address 1 130 W. 9th Ave.				FAX							
Address 2 # 101				E-mail AClifford@afpsprink.com							
Address 3 Kansas City, MO 64116				Web-Site							



Water Supply at Node 1



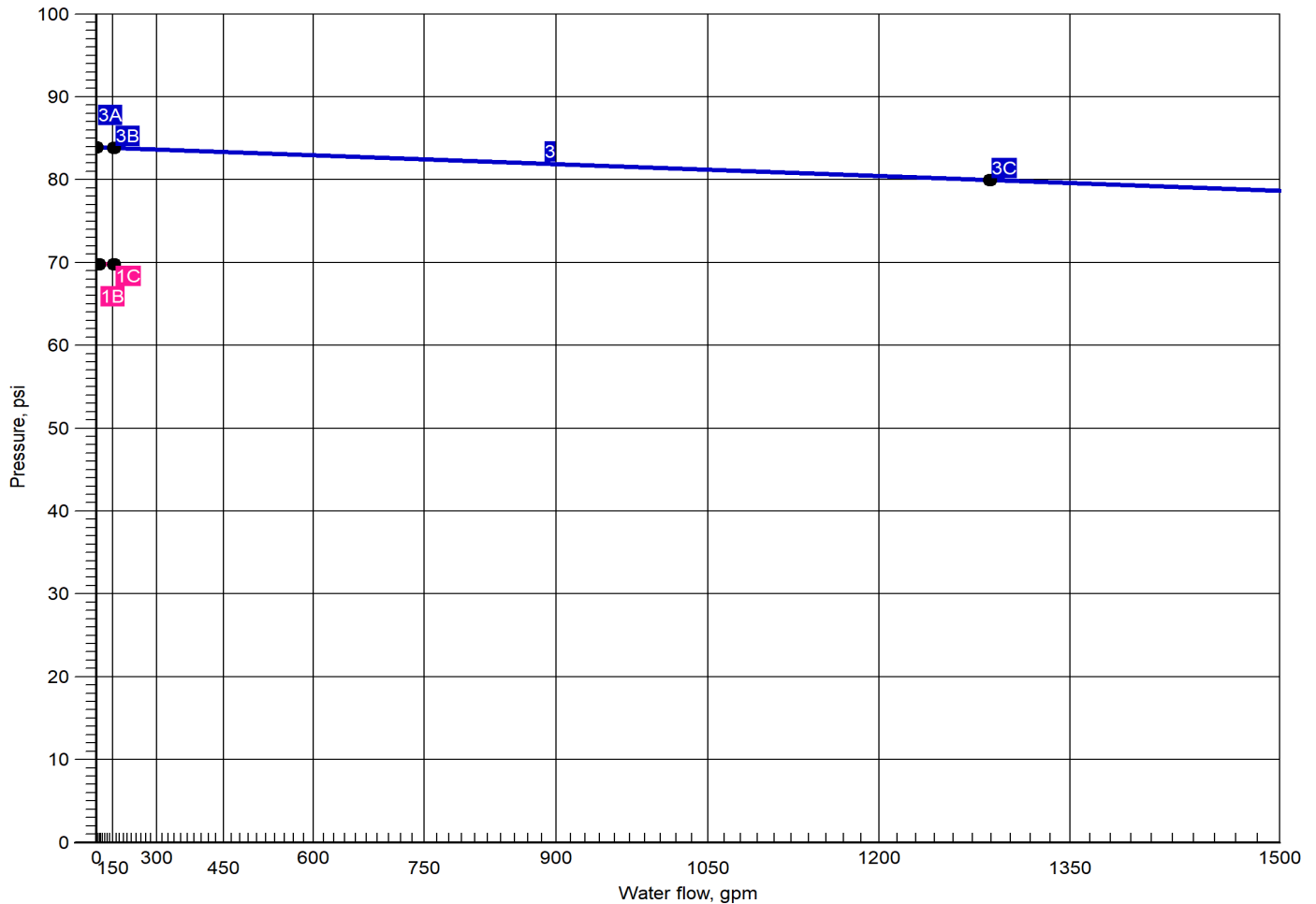
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (3RD FLOOR #316)

Remote Area Number: 3RD FLOOR #316



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 69.827 @ 54.91 Required Pressure at System Demand (Including Hose Allowance at Source): 69.827 @ 154.91	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.921 @ 154.91 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1406	13.93	11.00	4	12.132			
Sprinkler	1412	14.73	13.00	4	13.565			
➡ Sprinkler	1414	13.00	13.00	4	10.563			
Sprinkler	1417	13.25	13.00	4	10.971			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (3RD FLOOR #316)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
1	-5'-0"	S	69.827	54.91	
1406	30'-6"	Spr(-12.132)	12.132	13.93	
1412	30'-6"	Spr(-13.565)	13.565	14.73	
1414	30'-6"	Spr(-10.563)	10.563	13.00	
1417	30'-6"	Spr(-10.971)	10.971	13.25	
11	-5'-0"	T(47'-3½")	69.825	0.00	
286	21'-6"	T(3'-0")	20.338	0.00	
307	21'-6"	C(3'-0"), Tr(1'-0")	20.385	0.00	
327	21'-6"	T(3'-0"), Tr(1'-0")	16.704	0.00	
739	21'-6"	T(6'-0")	52.230	0.00	
1182	3'-3½"	PO(27'-10½")	61.175	0.00	
1192	3'-3½"	PO(18'-8½")	61.150	0.00	
1234	1'-2"		62.134	0.00	



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (3RD FLOOR #316)

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									
BL	0.8740	13.00	6.95	150		0.094407	16'-8½"	Pf	2.240
1414	30'-6"	13.00	4	10.563		Sprinkler,	7'-0"	Pe	3.902
327	21'-6"			16.704		2T(3'-0"), Tr(1'-0")	23'-8½"	Pv	
BL	0.8740	26.25	14.04	150		0.346396	7'-7½"	Pf	3.680
327	21'-6"	13.25		16.704		Flow (q) from Route 2	3'-0"	Pe	
307	21'-6"			20.385		C(3'-0")	10'-7½"	Pv	
CM	1.3940	54.91	11.54	150		0.139709	189'-11"	Pf	31.845
307	21'-6"	14.73 + 13.93		20.385		Flow (q) from Route 3 and 4	38'-0"	Pe	0.000
739	21'-6"			52.230		22Tr(1'-0"), 2cplg(1'-0"), E(8'-0"), T(6'-0")	227'-11"	Pv	
FM	2.7050	54.91	3.07	120		0.008364	55'-1"	Pf	1.022
739	21'-6"			52.230			67'-1"	Pe	7.899
1192	3'-3½"			61.150		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv	
CM	4.3100	54.91	1.21	120		0.000865	1'-2½"	Pf	0.025
1192	3'-3½"			61.150			27'-10½"	Pe	
1182	3'-3½"			61.175		PO(27'-10½")	29'-0½"	Pv	
CM	4.2600	54.91	1.24	120		0.000916	1'-2½"	Pf	0.042
1182	3'-3½"			61.175			44'-9"	Pe	0.916
1234	1'-2"			62.134		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv	
UG	6.2800	54.91	0.57	140		0.000104	98'-1"	Pf	5.017
1234	1'-2"			62.134			69'-4"	Pe	2.673
11	-5'-0"			69.825		E(22'-1"), BFP(-5.000), T(47'-3½")	167'-5½"	Pv	
UG	7.9800	54.91	0.35	150		0.000029	94'-10½"	Pf	0.003
11	-5'-0"			69.825				Pe	
1	-5'-0"			69.827		Water Supply	94'-10½"	Pv	
		100.00				Hose Allowance At Source			
1		154.91							
Route 2									
BL	0.8740	13.25	7.09	150		0.097782	8'-9"	Pf	1.831
1417	30'-6"	13.25	4	10.971		Sprinkler,	10'-0"	Pe	3.902
327	21'-6"			16.704		E(7'-0"), T(3'-0")	18'-9"	Pv	
Route 3									
BL	0.8740	14.73	7.88	150		0.118989	11'-6½"	Pf	2.918
1412	30'-6"	14.73	4	13.565		Sprinkler,	13'-0"	Pe	3.902
307	21'-6"			20.385		T(3'-0"), E(7'-0"), C(3'-0")	24'-6½"	Pv	
Route 4									
BL	0.8740	13.93	7.45	150		0.107318	24'-1½"	Pf	4.304
1406	30'-6"	13.93	4	12.132		Sprinkler,	16'-0"	Pe	3.902
286	21'-6"			20.338		4T(3'-0"), 3Tr(1'-0"), cplg(1'-0")	40'-1½"	Pv	
CM	1.3940	13.93	2.93	150		0.011048	3'-3"	Pf	0.047
286	21'-6"			20.338			1'-0"	Pe	-0.000
307	21'-6"			20.385		Tr(1'-0")	4'-3"	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: NC 1471
Report Description: Residential (3RD FLOOR #316)

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	



Flow Diagram (Top View)

Job Number: NC 1471
Report Description: Residential (3RD FLOOR #316)





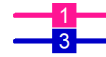
Hydraulic Summary

Job Number: NC 1471
Report Description: Light Hazard (3RD FLOOR MEETING)

Job											
Job Number NC 1471				Designer Andrew Clifford							
Job Name: WILSHIRE HILLS III				State Certification/License Number							
Address 1 NE WILSHIRE DR.				AHJ LEES SUMMIT, MO BLDG CODE							
Address 2				Job Site/Building							
Address 3 LEES SUMMIT, MO				Drawing Name Wilshire FP.cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.6 K-Factor 19.60 at 12.250				Occupancy Light Hazard			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10gpm/ft ²			Area of Application 1500ft ² (Actual 1012ft ²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 7		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 196ft ²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
				5-23-25							
Total Hose Streams 100.00											
System Flow Demand 166.20		Total Water Required (Including Hose Allowance) 266.20									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 21.25 between nodes 740 and 1532											
Maximum Velocity Under Ground 1.72 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1562.90gal		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	84.000	80.000		1289.00	83.784		266.20	63.109	20.675
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



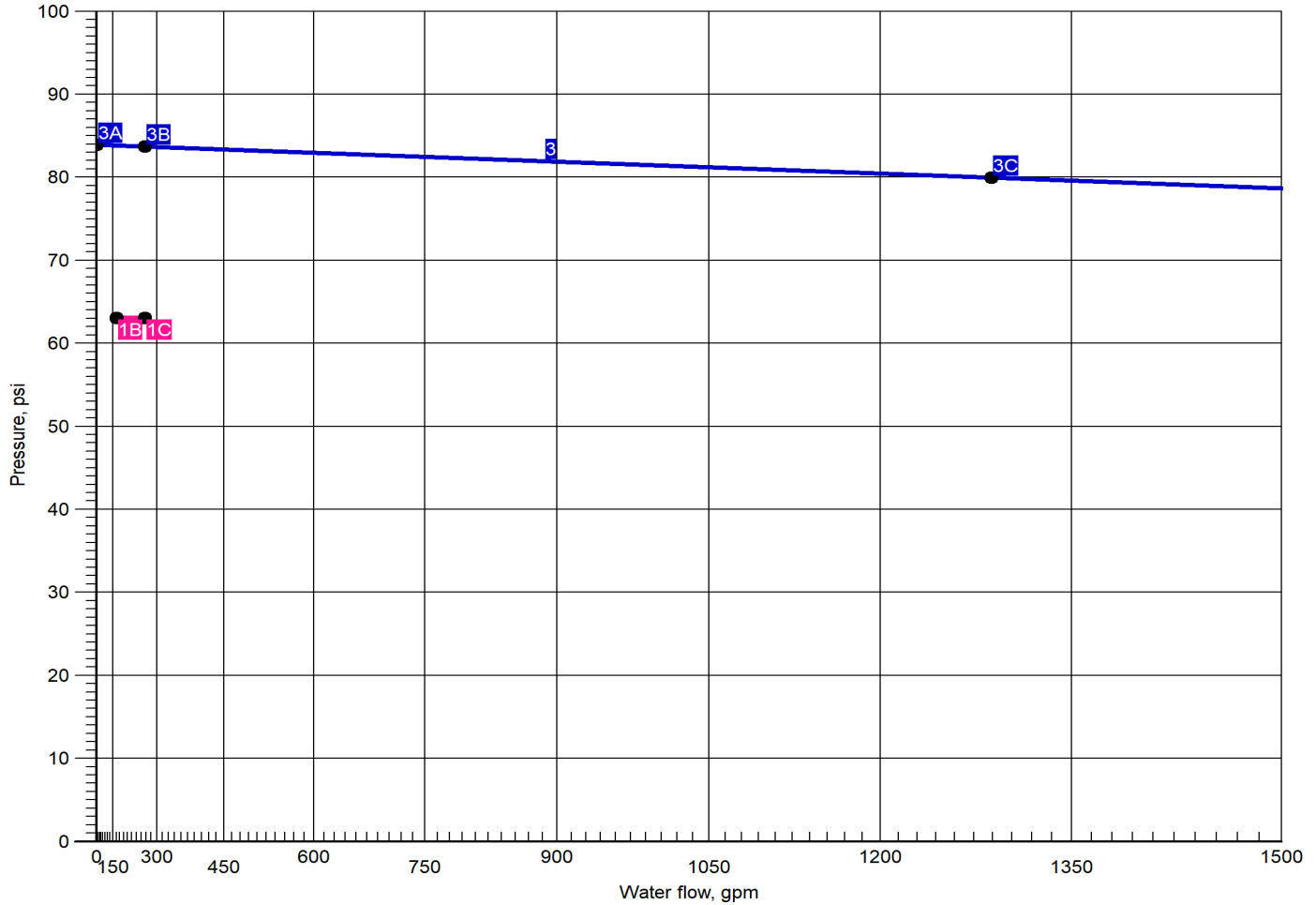
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Light Hazard (3RD FLOOR MEETING)

Remote Area Number: 3RD FLOOR MEETING



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 63.109 @ 166.20 Required Pressure at System Demand (Including Hose Allowance at Source): 63.109 @ 266.20	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.784 @ 266.20 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Job Number: NC 1471

Report Description: Light Hazard (3RD FLOOR MEETING)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1502	26.91	19.60	5.6	23.086			
Sprinkler	1503	24.96	19.60	5.6	19.867			
Sprinkler	1530	27.72	19.60	5.6	24.509			
Sprinkler	1532	20.14	19.60	5.6	12.935			
⇒ Sprinkler	1534	19.60	19.60	5.6	12.250			
Sprinkler	1546	24.23	19.60	5.6	18.720			
Sprinkler	1670	22.64	14.82	5.6	16.350			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Light Hazard (3RD FLOOR MEETING)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	63.109	166.20
1502	30'-6"	Spr(-23.086)	23.086	26.91
1503	30'-6"	Spr(-19.867)	19.867	24.96
1530	30'-6"	Spr(-24.509)	24.509	27.72
1532	30'-6"	Spr(-12.935), T(3'-0")	12.935	20.14
1534	30'-6"	Spr(-12.250)	12.250	19.60
1546	30'-6"	Spr(-18.720)	18.720	24.23
1670	30'-6"	Spr(-16.350)	16.350	22.64
11	-5'-0"	T(47'-3½")	63.088	0.00
729	21'-6"	T(3'-0")	33.779	0.00
731	21'-6"	C(3'-0"), Tr(1'-0")	34.814	0.00
739	21'-6"	T(6'-0")	38.015	0.00
740	21'-6"	C(3'-0"), Tr(1'-0")	34.223	0.00
1182	3'-3½"	PO(27'-10½")	54.036	0.00
1192	3'-3½"	PO(18'-8½")	53.841	0.00
1234	1'-2"		55.279	0.00



Hydraulic Analysis

Job Number: NC 1471

Report Description: Light Hazard (3RD FLOOR MEETING)

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								
BL	0.8740	19.60	10.48	150		0.201782	0'-5"	Pf 0.685
1534	30'-6"	19.60	5.6	12.250		Sprinkler,	3'-0"	Pe
1532	30'-6"			12.935		T(3'-0")	3'-5"	Pv
DR	0.8740	39.74	21.25	150		0.746096	16'-3½"	Pf 17.386
1532	30'-6"	20.14	5.6	12.935		Sprinkler,	7'-0"	Pe 3.902
740	21'-6"			34.223		2C(3'-0"), Tr(1'-0")	23'-3½"	Pv
CM	1.3940	87.35	18.36	150		0.329688	5'-6"	Pf 3.791
740	21'-6"	24.96 + 22.64		34.223		Flow (q) from Route 3 and 4	6'-0"	Pe
739	21'-6"			38.015		T(6'-0")	11'-6"	Pv
FM	2.7050	166.20	9.28	120		0.064892	55'-1"	Pf 7.928
739	21'-6"	78.86		38.015		Flow (q) from Route 2	67'-1"	Pe 7.899
1192	3'-3½"			53.841		4E(9'-4½"), f, BV(10'-11"), PO(1	122'-2"	Pv
						8'-8½")		
CM	4.3100	166.20	3.65	120		0.006713	1'-2½"	Pf 0.195
1192	3'-3½"			53.841			27'-10½"	Pe
1182	3'-3½"			54.036		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	166.20	3.74	120		0.007106	1'-2½"	Pf 0.327
1182	3'-3½"			54.036			44'-9"	Pe 0.916
1234	1'-2"			55.279		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	166.20	1.72	140		0.000807	98'-1"	Pf 5.135
1234	1'-2"			55.279			69'-4"	Pe 2.673
11	-5'-0"			63.088		E(22'-1"), BFP(-5.000), T(47'-3½	167'-5½"	Pv
						")		
UG	7.9800	166.20	1.07	150		0.000221	94'-10½"	Pf 0.021
11	-5'-0"			63.088				Pe
1	-5'-0"			63.109		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		266.20						
Route 2								
DR	0.8740	24.23	12.96	150		0.298702	28'-4½"	Pf 11.158
1546	30'-6"	24.23	5.6	18.720		Sprinkler,	9'-0"	Pe 3.902
729	21'-6"			33.779		3Tr(1'-0"), C(3'-0"), T(3'-0")	37'-4½"	Pv
CM	1.3940	24.23	5.09	150		0.030750	28'-7½"	Pf 1.035
729	21'-6"			33.779			5'-0"	Pe
731	21'-6"			34.814		5Tr(1'-0")	33'-7½"	Pv
CM	1.3940	78.86	16.58	150		0.272891	5'-9"	Pf 3.201
731	21'-6"	26.91 + 27.72		34.814		Flow (q) from Route 5 and 6	6'-0"	Pe
739	21'-6"			38.015		T(6'-0")	11'-9"	Pv
Route 3								
DR	0.8740	24.96	13.35	150		0.315600	20'-1½"	Pf 10.454
1503	30'-6"	24.96	5.6	19.867		Sprinkler,	13'-0"	Pe 3.902
740	21'-6"			34.223		E(7'-0"), T(3'-0"), C(3'-0")	33'-1½"	Pv
Route 4								
BL	0.8740	22.64	12.11	150		0.263550	38'-0"	Pf 13.972
1670	30'-6"	22.64	5.6	16.350		Sprinkler,	15'-0"	Pe 3.902
740	21'-6"			34.223		2E(7'-0"), Tr(1'-0")	53'-0"	Pv
Route 5								
DR	0.8740	26.91	14.39	150		0.362618	18'-7"	Pf 7.827
1502	30'-6"	26.91	5.6	23.086		Sprinkler,	3'-0"	Pe 3.902
731	21'-6"			34.814		C(3'-0")	21'-7"	Pv
Route 6								
DR	0.8740	27.72	14.83	150		0.383248	13'-8½"	Pf 6.403
1530	30'-6"	27.72	5.6	24.509		Sprinkler,	3'-0"	Pe 3.902
731	21'-6"			34.814		C(3'-0")	16'-8½"	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: NC 1471

Report Description: Light Hazard (3RD FLOOR MEETING)

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

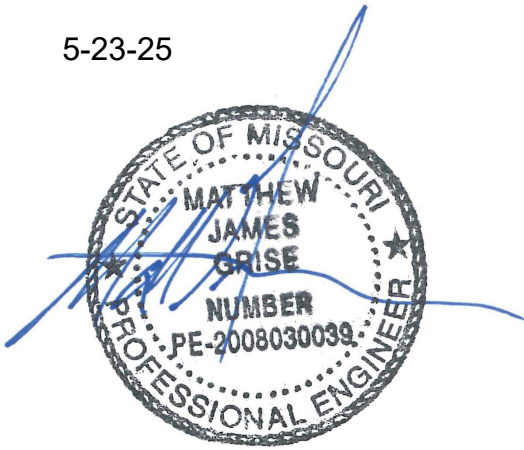
Pipe Type Legend	Units Legend		Fittings Legend	
AO Arm-Over	Diameter	Inch	ALV Alarm Valve	
BL Branch Line	Elevation	Foot	AngV Angle Valve	
CM Cross Main	Flow	gpm	b Bushing	
DN Drain	Discharge	gpm	BaV Ball Valve	
DR Drop	Velocity	fps	BFP Backflow Preventer	
DY Dynamic	Pressure	psi	BV Butterfly Valve	
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	





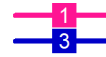
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (3RD FLOOR HALLWAY)

Job											
Job Number NC 1471					Designer Andrew Clifford						
Job Name: WILSHIRE HILLS III					State Certification/License Number						
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE						
Address 2					Job Site/Building						
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 4 K-Factor 13.00 at 10.563					Occupancy Residential			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 300ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 4		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 84ft ²		
					AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area						
					5-23-25 						
Total Hose Streams 100.00											
System Flow Demand 56.13		Total Water Required (Including Hose Allowance) 156.13									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 11.80 between nodes 739 and 572											
Maximum Velocity Under Ground 0.58 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal		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	84.000	80.000		1289.00	83.919		156.13	65.461	18.458
Contractor											
Contractor Number 22		Contact Name Andrew Clifford					Contact Title Designer				
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



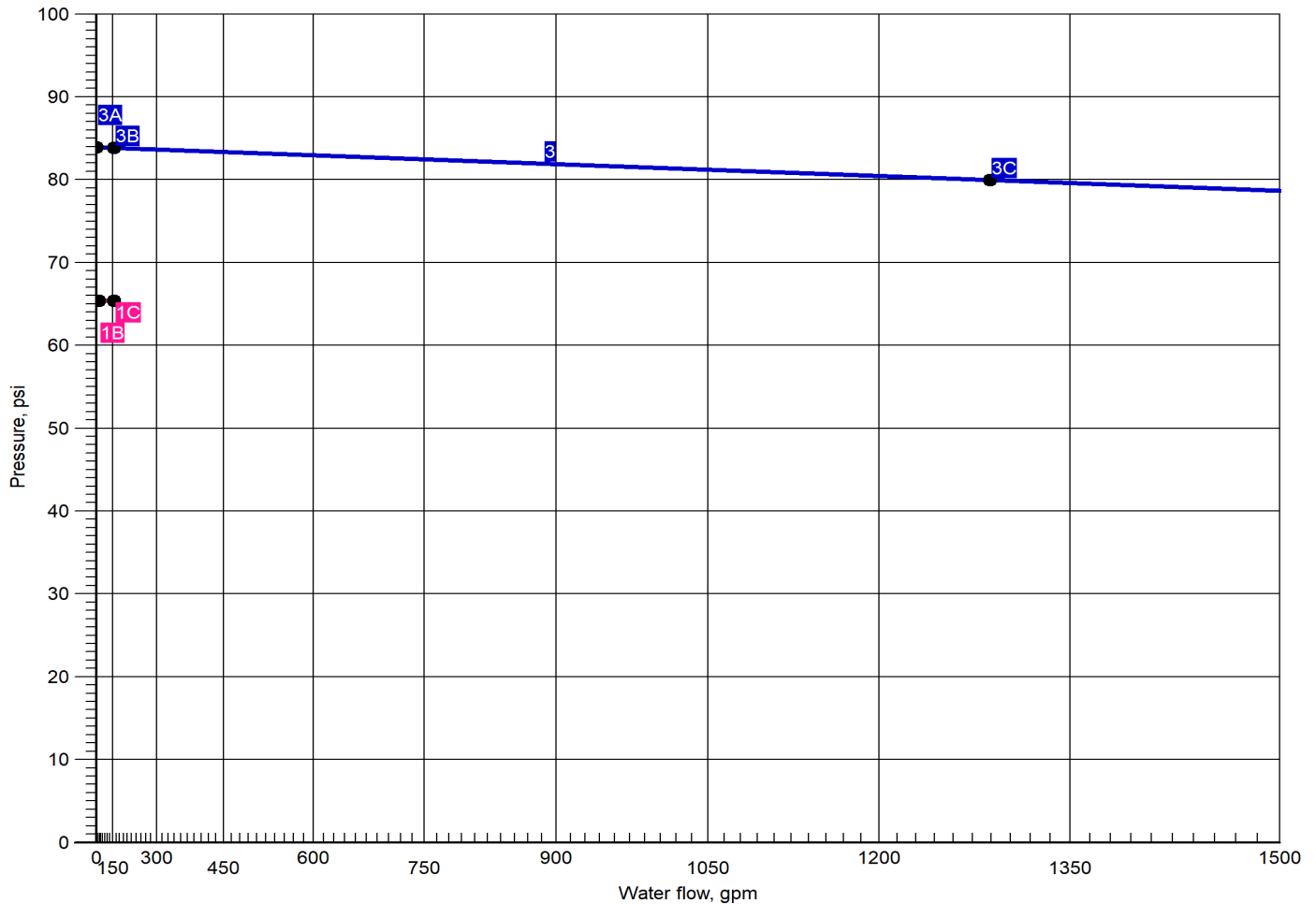
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (3RD FLOOR HALLWAY)

Remote Area Number: 3RD FLOOR HALLWAY



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 65.461 @ 56.13	Available Flow @ 20 PSI: 5760.73
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 65.461 @ 156.13	
3	3A	Available Static Pressure at Water Supply at Node 1: 84.000	
	3B	Available Residual Pressure at System Demand: 83.919 @ 156.13	
	3C	Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
➡ Sprinkler	1518	13.00	13.00	4	10.563			
Sprinkler	1525	14.40	13.00	4	12.957			
Sprinkler	1526	14.05	13.00	4	12.337			
Sprinkler	1527	14.68	13.00	4	13.472			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (3RD FLOOR HALLWAY)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	65.461	56.13
1518	30'-6"	Spr(-10.563)	10.563	13.00
1525	30'-6"	Spr(-12.957)	12.957	14.40
1526	30'-6"	Spr(-12.337)	12.337	14.05
1527	30'-6"	Spr(-13.472)	13.472	14.68
11	-5'-0"	T(47'-3½")	65.458	0.00
564	21'-6"	E(7'-0")	20.579	0.00
569	21'-6"	C(3'-0"), Tr(1'-0")	20.663	0.00
571	21'-6"	C(3'-0"), Tr(1'-0")	21.150	0.00
572	21'-6"	T(3'-0"), Tr(1'-0")	22.625	0.00
739	21'-6"	T(6'-0")	47.818	0.00
1182	3'-3½"	PO(27'-10½")	56.807	0.00
1192	3'-3½"	PO(18'-8½")	56.780	0.00
1234	1'-2"		57.767	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (3RD FLOOR HALLWAY)

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								
BL	0.8740	13.00	6.95	150		0.094407	39'-9½"	Pf 6.115
1518	30'-6"	13.00	4	10.563		Sprinkler,	25'-0"	Pe 3.902
564	21'-6"			20.579		3E(7'-0"), Tr(1'-0"), T(3'-0")	64'-9½"	Pv
CM	1.3940	13.00	2.73	150		0.009719	7'-7½"	Pf 0.084
564	21'-6"			20.579			1'-0"	Pe
569	21'-6"			20.663		Tr(1'-0")	8'-7½"	Pv
CM	1.3940	27.40	5.76	150		0.038601	11'-7½"	Pf 0.487
569	21'-6"	14.40		20.663		Flow (q) from Route 3	1'-0"	Pe
571	21'-6"			21.150		Tr(1'-0")	12'-7½"	Pv
CM	1.3940	41.45	8.71	150		0.083021	16'-9"	Pf 1.475
571	21'-6"	14.05		21.150		Flow (q) from Route 2	1'-0"	Pe
572	21'-6"			22.625		Tr(1'-0")	17'-9"	Pv
CM	1.3940	56.13	11.80	150		0.145483	137'-2"	Pf 25.193
572	21'-6"	14.68		22.625		Flow (q) from Route 4	36'-0"	Pe
739	21'-6"			47.818		13Tr(1'-0"), 3cplg(1'-0"), 2T(6'-0") , E(8'-0")	173'-2"	Pv
FM	2.7050	56.13	3.13	120		0.008710	55'-1"	Pf 1.064
739	21'-6"			47.818			67'-1"	Pe 7.899
1192	3'-3½"			56.780		4E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	122'-2"	Pv
CM	4.3100	56.13	1.23	120		0.000901	1'-2½"	Pf 0.026
1192	3'-3½"			56.780			27'-10½"	Pe
1182	3'-3½"			56.807		PO(27'-10½")	29'-0½"	Pv
CM	4.2600	56.13	1.26	120		0.000954	1'-2½"	Pf 0.044
1182	3'-3½"			56.807			44'-9"	Pe 0.916
1234	1'-2"			57.767		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	56.13	0.58	140		0.000108	98'-1"	Pf 5.018
1234	1'-2"			57.767			69'-4"	Pe 2.673
11	-5'-0"			65.458		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	56.13	0.36	150		0.000030	94'-10½"	Pf 0.003
11	-5'-0"			65.458				Pe
1	-5'-0"			65.461		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		156.13						
Route 2								
DR	0.8740	14.05	7.51	150		0.108987	29'-0½"	Pf 4.911
1526	30'-6"	14.05	4	12.337		Sprinkler,	16'-0"	Pe 3.902
571	21'-6"			21.150		E(7'-0"), T(3'-0"), 3Tr(1'-0"), C(3'- 0")	45'-0½"	Pv
Route 3								
DR	0.8740	14.40	7.70	150		0.114049	26'-4"	Pf 3.804
1525	30'-6"	14.40	4	12.957		Sprinkler,	7'-0"	Pe 3.902
569	21'-6"			20.663		2C(3'-0"), Tr(1'-0")	33'-4"	Pv
Route 4								
DR	0.8740	14.68	7.85	150		0.118232	27'-5"	Pf 5.251
1527	30'-6"	14.68	4	13.472		Sprinkler,	17'-0"	Pe 3.902
572	21'-6"			22.625		E(7'-0"), 2T(3'-0"), 3Tr(1'-0"), cplg(1'-0")	44'-5"	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: NC 1471
Report Description: Residential (3RD FLOOR HALLWAY)

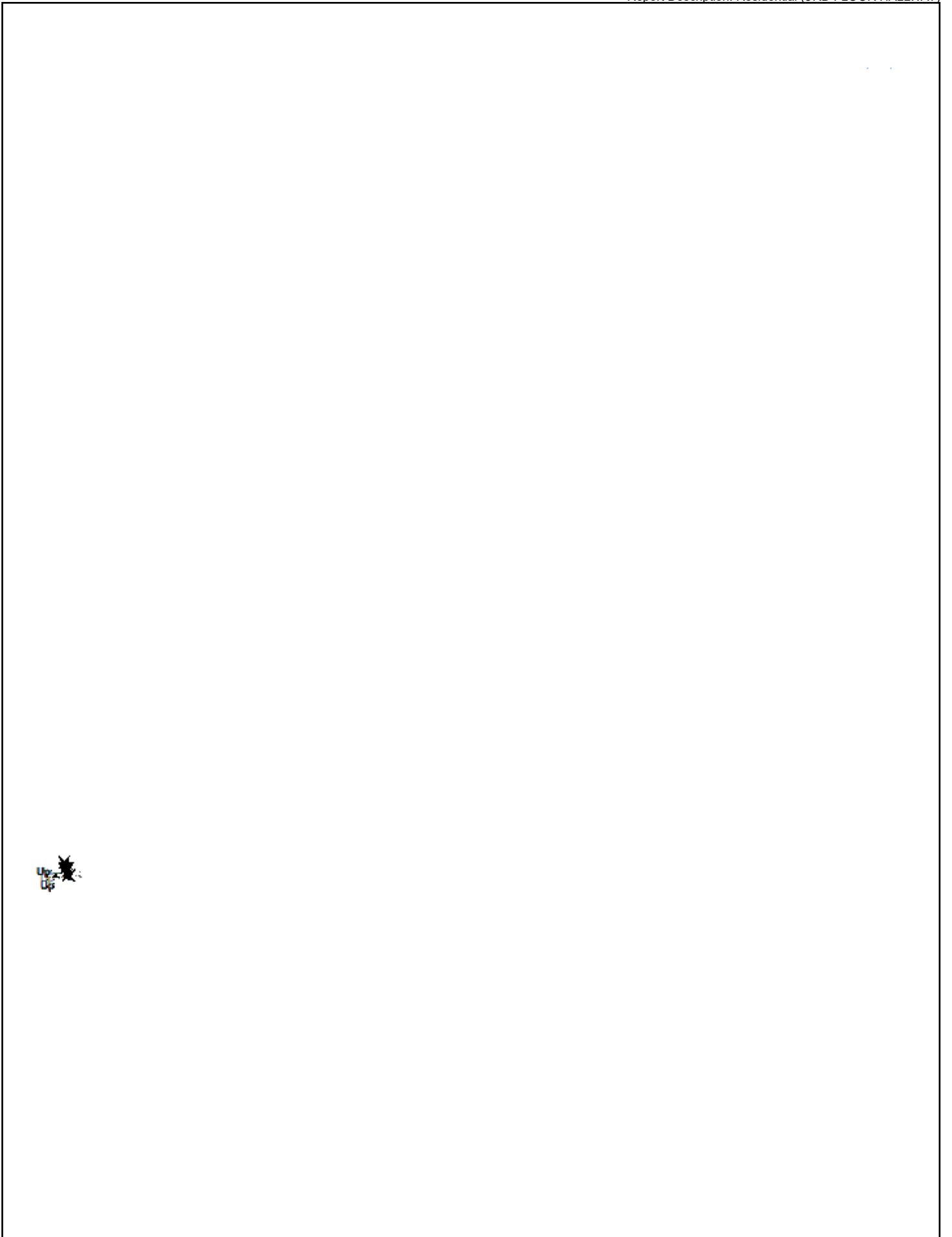
Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

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



Flow Diagram (Top View)

Job Number: NC 1471
Report Description: Residential (3RD FLOOR HALLWAY)





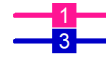
Hydraulic Summary

Job Number: NC 1471
Report Description: Light Hazard (LOBBY)

Job											
Job Number NC 1471					Designer Andrew Clifford						
Job Name: WILSHIRE HILLS III					State Certification/License Number						
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE						
Address 2					Job Site/Building						
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad						
System					Remote Area(s)						
Most Demanding Sprinkler Data 5.6 K-Factor 14.82 at 7.000					Occupancy Light Hazard			Job Suffix			
Hose Allowance At Source 100.00					Density 0.10gpm/ft ²			Area of Application 1500ft ² (Actual 1185ft ²)			
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>					Number Of Sprinklers Calculated 12		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 140ft ²		
					AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area						
					5-23-25						
Total Hose Streams 100.00											
System Flow Demand 232.27			Total Water Required (Including Hose Allowance) 332.27								
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 48.83 between nodes 1200 and 1217											
Maximum Velocity Under Ground 2.41 between nodes 11 and 1234											
Volume capacity of Wet Pipes 1560.47gal			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	84.000	80.000		1289.00	83.674		332.27	68.154	15.521
Contractor											
		Contractor Number 22				Contact Name Andrew Clifford			Contact Title Designer		
Name of Contractor: Alliance Fire Protection LLC						Phone 913-888-0647			Extension		
Address 1 130 W. 9th Ave.						FAX					
Address 2 # 101						E-mail AClifford@afpsprink.com					
Address 3 Kansas City, MO 64116						Web-Site					



Water Supply at Node 1



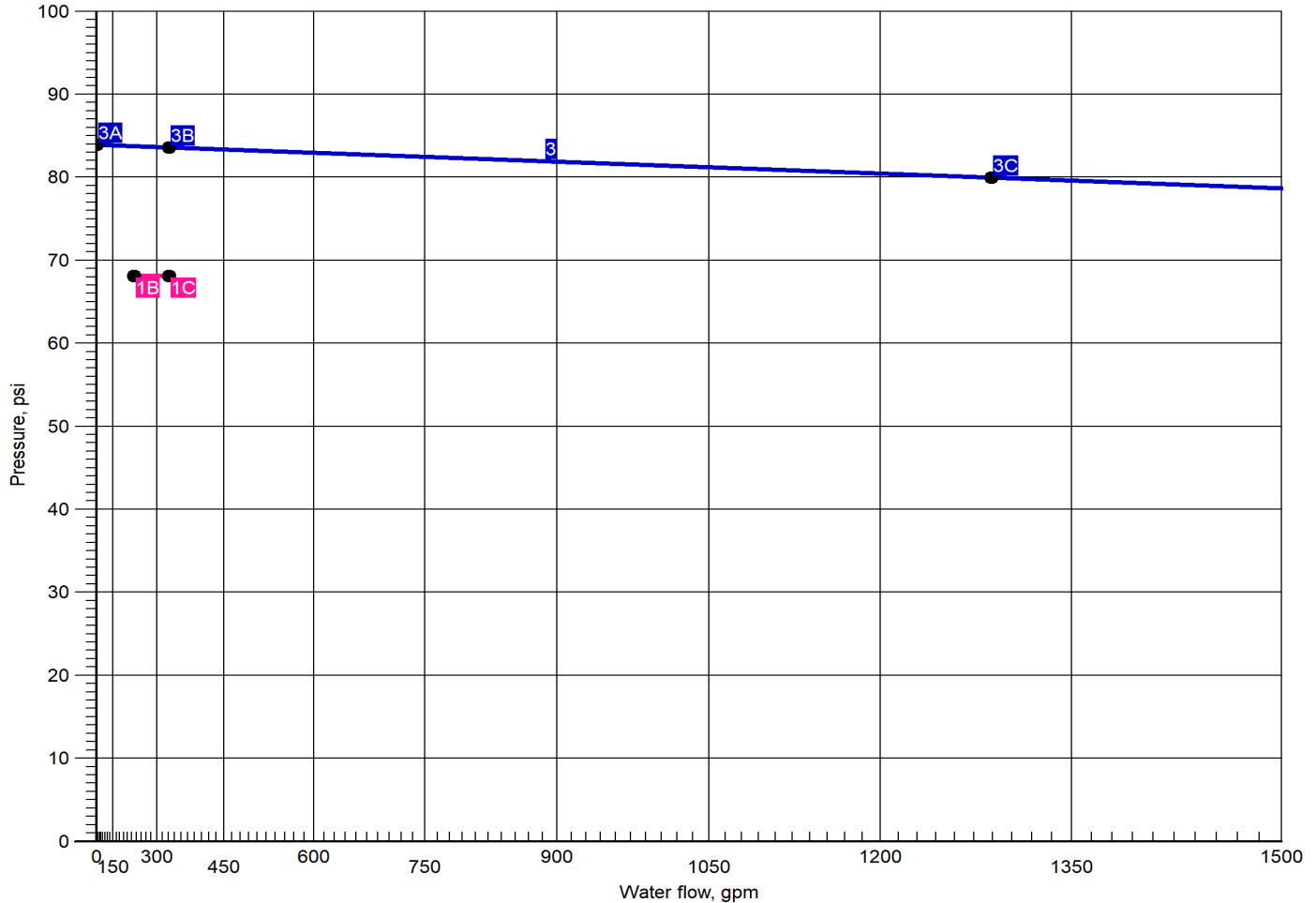
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Light Hazard (LOBBY)

Remote Area Number: LOBBY



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 68.154 @ 232.27 Required Pressure at System Demand (Including Hose Allowance at Source): 68.154 @ 332.27	Available Flow @ 20 PSI: 5760.73
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 1: 84.000 Available Residual Pressure at System Demand: 83.674 @ 332.27 Available Residual Pressure & Flow at Water Supply at Node 1: 80.000 @ 1289.00	



Summary Of Outflowing Devices

Job Number: NC 1471
Report Description: Light Hazard (LOBBY)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	1833	29.51	14.82	5.6	27.775			
Sprinkler	1846	20.37	14.82	5.6	13.238			
Sprinkler	1851	29.69	14.82	5.6	28.100			
Sprinkler	1852	16.09	14.82	5.6	8.257			
Sprinkler	1862	21.23	14.82	5.6	14.368			
➡ Sprinkler	1867	14.82	14.82	5.6	7.000			
Sprinkler	1868	21.14	14.82	5.6	14.254			
Sprinkler	1881	16.79	14.82	5.6	8.987			
Sprinkler	1882	15.39	14.82	5.6	7.551			
Sprinkler	1886	16.72	14.82	5.6	8.912			
Sprinkler	1892	15.35	14.82	5.6	7.509			
Sprinkler	1893	15.19	14.82	5.6	7.353			

➡ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471
Report Description: Light Hazard (LOBBY)

Node	Elevation(foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-5'-0"	S	68.154	232.27
1833	8'-0"	Spr(-27.775)	27.775	29.51
1846	8'-0"	Spr(-13.238)	13.238	20.37
1851	8'-0"	Spr(-28.100)	28.100	29.69
1852	8'-0"	Spr(-8.257)	8.257	16.09
1862	8'-0"	Spr(-14.368)	14.368	21.23
1867	8'-0"	Spr(-7.000)	7.000	14.82
1868	8'-0"	Spr(-14.254)	14.254	21.14
1881	8'-0"	Spr(-8.987)	8.987	16.79
1882	8'-0"	Spr(-7.551)	7.551	15.39
1886	8'-0"	Spr(-8.912)	8.912	16.72
1892	8'-0"	Spr(-7.509)	7.509	15.35
1893	8'-0"	Spr(-7.353)	7.353	15.19
11	-5'-0"	T(47'-3½")	68.115	0.00
1182	3'-3½"	PO(27'-10½")	58.667	0.00
1200	9'-2"	T(6'-0")	49.222	0.00
1209	9'-2"	E(7'-0")	30.783	0.00
1217	9'-2"	C(6'-0"), Tr(1'-0")	31.542	0.00
1228	9'-2"	E(7'-0")	14.502	0.00
1229	3'-3½"	PO(18'-8½")	58.292	0.00
1234	1'-2"		60.190	0.00
1239	9'-2"	T(3'-0"), Tr(1'-0")	14.837	0.00
1254	9'-2"	C(6'-0"), Tr(1'-0")	15.856	0.00
1273	9'-2"	T(3'-0"), Tr(1'-0")	9.112	0.00
1276	9'-2"	T(3'-0"), Tr(1'-0")	7.582	0.00
1277	9'-2"	C(6'-0"), Tr(1'-0")	9.771	0.00
1282	9'-2"	E(7'-0")	31.146	0.00
1283	9'-2"	E(7'-0")	8.896	0.00
1309	9'-2"	E(7'-0")	7.476	0.00
1310	9'-2"	E(7'-0")	15.645	0.00
1311	9'-2"	C(6'-0"), Tr(1'-0")	8.279	0.00
1339	9'-2"	E(7'-0")	9.634	0.00
1354	9'-2"	E(7'-0")	8.051	0.00



Hydraulic Analysis

Job Number: NC 1471
Report Description: Light Hazard (LOBBY)

Pipe Type	Diameter	Flow	Velocity	HWC	Pn	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt		Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	0.8740	14.82	7.92	150		0.120247	1'-2"	Pf 0.982
1867	8'-0"	14.82	5.6	7.000		Sprinkler,	7'-0"	Pe -0.506
1309	9'-2"			7.476		E(7'-0")	8'-2"	Pv
BL	1.3940	14.82	3.11	150		0.012379	7'-7"	Pf 0.106
1309	9'-2"			7.476			1'-0"	Pe
1276	9'-2"			7.582		Tr(1'-0")	8'-7"	Pv
BL	1.3940	30.20	6.35	150		0.046231	9'-1"	Pf 0.697
1276	9'-2"	15.39		7.582		Flow (q) from Route 4	6'-0"	Pe
1311	9'-2"			8.279		C(6'-0")	15'-1"	Pv
CM	1.3940	60.73	12.77	150		0.168333	7'-10½"	Pf 1.492
1311	9'-2"	15.19 + 15.35		8.279		Flow (q) from Route 2 and 3	1'-0"	Pe
1277	9'-2"			9.771		Tr(1'-0")	8'-10½"	Pv
CM	1.3940	110.33	23.19	150		0.507936	11'-0"	Pf 6.085
1277	9'-2"	32.88 + 16.72		9.771		Flow (q) from Route 5 and 6	1'-0"	Pe
1254	9'-2"			15.856		Tr(1'-0")	12'-0"	Pv
CM	1.3940	173.08	36.38	150		1.168294	12'-5"	Pf 15.686
1254	9'-2"	41.60 + 21.14		15.856		Flow (q) from Route 8 and 9	1'-0"	Pe
1217	9'-2"			31.542		Tr(1'-0")	13'-5"	Pv
CM	1.3940	232.27	48.83	150		2.013326	2'-9½"	Pf 17.680
1217	9'-2"	29.51 + 29.69		31.542		Flow (q) from Route 11 and 12	6'-0"	Pe -0.000
1200	9'-2"			49.222		T(6'-0")	8'-9½"	Pv
FR	2.7050	232.27	12.97	120		0.120532	5'-8½"	Pf 6.518
1200	9'-2"			49.222			48'-4½"	Pe 2.552
1229	3'-3½"			58.292		2E(9'-4½"), f, BV(10'-11"), PO(1 8'-8½")	54'-1"	Pv
CM	4.3100	232.27	5.11	120		0.012470	2'-2½"	Pf 0.375
1229	3'-3½"			58.292			27'-10½"	Pe
1182	3'-3½"			58.667		PO(27'-10½")	30'-0½"	Pv
CM	4.2600	232.27	5.23	120		0.013199	1'-2½"	Pf 0.607
1182	3'-3½"			58.667			44'-9"	Pe 0.916
1234	1'-2"			60.190		sCV(28'-11½"), BV(15'-9½")	46'-0"	Pv
UG	6.2800	232.27	2.41	140		0.001499	98'-1"	Pf 5.251
1234	1'-2"			60.190			69'-4"	Pe 2.673
11	-5'-0"			68.115		E(22'-1"), BFP(-5.000), T(47'-3½ ")	167'-5½"	Pv
UG	7.9800	232.27	1.49	150		0.000411	94'-10½"	Pf 0.039
11	-5'-0"			68.115				Pe
1	-5'-0"			68.154		Water Supply	94'-10½"	Pv
		100.00				Hose Allowance At Source		
1		332.27						
Route 2								
DR	0.8740	15.19	8.12	150		0.125844	1'-4½"	Pf 1.432
1893	8'-0"	15.19	5.6	7.353		Sprinkler,	10'-0"	Pe -0.506
1311	9'-2"			8.279		E(7'-0"), C(3'-0")	11'-4½"	Pv
Route 3								
DR	0.8740	15.35	8.21	150		0.128313	1'-2"	Pf 1.048
1892	8'-0"	15.35	5.6	7.509		Sprinkler,	7'-0"	Pe -0.506
1354	9'-2"			8.051		E(7'-0")	8'-2"	Pv
BL	1.3940	15.35	3.23	150		0.013209	8'-3½"	Pf 0.228
1354	9'-2"			8.051			9'-0"	Pe
1311	9'-2"			8.279		E(8'-0"), Tr(1'-0")	17'-3½"	Pv
Route 4								
DR	0.8740	15.39	8.23	150		0.128974	1'-2"	Pf 0.537
1882	8'-0"	15.39	5.6	7.551		Sprinkler,	3'-0"	Pe -0.506
1276	9'-2"			7.582		T(3'-0")	4'-2"	Pv
Route 5								
DR	0.8740	16.09	8.61	150		0.140098	1'-2"	Pf 1.144
1852	8'-0"	16.09	5.6	8.257		Sprinkler,	7'-0"	Pe -0.506
1283	9'-2"			8.896		E(7'-0")	8'-2"	Pv
BL	1.3940	16.09	3.38	150		0.014422	14'-0"	Pf 0.216
1283	9'-2"			8.896			1'-0"	Pe
1273	9'-2"			9.112		Tr(1'-0")	15'-0"	Pv
BL	1.3940	32.88	6.91	150		0.054090	6'-2½"	Pf 0.659
1273	9'-2"	16.79		9.112		Flow (q) from Route 7	6'-0"	Pe
1277	9'-2"			9.771		C(6'-0")	12'-2½"	Pv
Route 6								



Hydraulic Analysis

Job Number: NC 1471
Report Description: Light Hazard (LOBBY)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream					Fittings	Total Length	
DR	0.8740	16.72	8.94	150	0.150349	1'-2"	Pf 1.228
1886	8'-0"	16.72	5.6	8.912	Sprinkler,	7'-0"	Pe -0.506
1339	9'-2"			9.634	E(7'-0")	8'-2"	Pv
BL	1.3940	16.72	3.51	150	0.015477	2'-10"	Pf 0.137
1339	9'-2"			9.634		6'-0"	Pe
1277	9'-2"			9.771	C(6'-0")	8'-10"	Pv
Route 7							
DR	0.8740	16.79	8.98	150	0.151506	1'-2"	Pf 0.631
1881	8'-0"	16.79	5.6	8.987	Sprinkler,	3'-0"	Pe -0.506
1273	9'-2"			9.112	T(3'-0")	4'-2"	Pv
Route 8							
DR	0.8740	20.37	10.90	150	0.216786	1'-2"	Pf 1.770
1846	8'-0"	20.37	5.6	13.238	Sprinkler,	7'-0"	Pe -0.506
1228	9'-2"			14.502	E(7'-0")	8'-2"	Pv
BL	1.3940	20.37	4.28	150	0.022317	14'-0"	Pf 0.335
1228	9'-2"			14.502		1'-0"	Pe
1239	9'-2"			14.837	Tr(1'-0")	15'-0"	Pv
BL	1.3940	41.60	8.75	150	0.083593	6'-2½"	Pf 1.019
1239	9'-2"	21.23		14.837	Flow (q) from Route 10	6'-0"	Pe
1254	9'-2"			15.856	C(6'-0")	12'-2½"	Pv
Route 9							
DR	0.8740	21.14	11.31	150	0.232146	1'-2"	Pf 1.896
1868	8'-0"	21.14	5.6	14.254	Sprinkler,	7'-0"	Pe -0.506
1310	9'-2"			15.645	E(7'-0")	8'-2"	Pv
BL	1.3940	21.14	4.44	150	0.023898	2'-10"	Pf 0.212
1310	9'-2"			15.645		6'-0"	Pe
1254	9'-2"			15.856	C(6'-0")	8'-10"	Pv
Route 10							
DR	0.8740	21.23	11.35	150	0.233861	1'-2"	Pf 0.974
1862	8'-0"	21.23	5.6	14.368	Sprinkler,	3'-0"	Pe -0.506
1239	9'-2"			14.837	T(3'-0")	4'-2"	Pv
Route 11							
DR	0.8740	29.51	15.78	150	0.430260	1'-2"	Pf 3.514
1833	8'-0"	29.51	5.6	27.775	Sprinkler,	7'-0"	Pe -0.506
1209	9'-2"			30.783	E(7'-0")	8'-2"	Pv
BL	1.3940	29.51	6.20	150	0.044293	11'-2"	Pf 0.759
1209	9'-2"			30.783		6'-0"	Pe
1217	9'-2"			31.542	C(6'-0")	17'-2"	Pv
Route 12							
DR	0.8740	29.69	15.87	150	0.434917	1'-2"	Pf 3.552
1851	8'-0"	29.69	5.6	28.100	Sprinkler,	7'-0"	Pe -0.506
1282	9'-2"			31.146	E(7'-0")	8'-2"	Pv
BL	1.3940	29.69	6.24	150	0.044772	2'-10"	Pf 0.396
1282	9'-2"			31.146		6'-0"	Pe
1217	9'-2"			31.542	C(6'-0")	8'-10"	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: NC 1471
Report Description: Light Hazard (LOBBY)

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





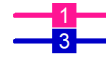
Hydraulic Summary

Job Number: NC 1471
Report Description: Residential (STANDPIPE)

Job																				
Job Number NC 1471					Designer Andrew Clifford															
Job Name: WILSHIRE HILLS III					State Certification/License Number															
Address 1 NE WILSHIRE DR.					AHJ LEES SUMMIT, MO BLDG CODE															
Address 2					Job Site/Building															
Address 3 LEES SUMMIT, MO					Drawing Name Wilshire FP.cad															
System					Remote Area(s)															
Most Demanding Sprinkler Data K-Factor at					Occupancy Residential			Job Suffix												
Hose Allowance At Source 0.00					Density 0.10gpm/ft ²			Area of Application 900ft ² (Actual 7ft ²)												
Additional Hose Supplies					Number Of Sprinklers Calculated 0			Number Of Nozzles Calculated 0		Coverage Per Sprinkler 130ft ²										
<table><tr><th>Node</th><th>Flow(gpm)</th></tr><tr><td>Hose At Node 18</td><td>250.00</td></tr><tr><td>Hose At Node 191</td><td>250.00</td></tr><tr><td>Hose At Node 274</td><td>250.00</td></tr></table>					Node	Flow(gpm)	Hose At Node 18	250.00	Hose At Node 191	250.00	Hose At Node 274	250.00	AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area							
Node	Flow(gpm)																			
Hose At Node 18	250.00																			
Hose At Node 191	250.00																			
Hose At Node 274	250.00																			
Total Hose Streams 750.00					5-23-25															
System Flow Demand 750.00		Total Water Required (Including Hose Allowance) 750.00																		
Maximum Pressure Unbalance In Loops 0.000																				
Maximum Velocity Above Ground 18.90 between nodes 2 and 1269																				
Maximum Velocity Under Ground																				
Volume capacity of Wet Pipes 1556.58gal		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	Water Supply		174.000	173.000		1200.00	173.581		750.00	148.530	25.051									
Contractor																				
Contractor Number 22		Contact Name Andrew Clifford				Contact Title Designer														
Name of Contractor: Alliance Fire Protection LLC				Phone 913-888-0647				Extension												
Address 1 130 W. 9th Ave.				FAX																
Address 2 # 101				E-mail AClifford@afpsprink.com																
Address 3 Kansas City, MO 64116				Web-Site																



Water Supply at Node 2



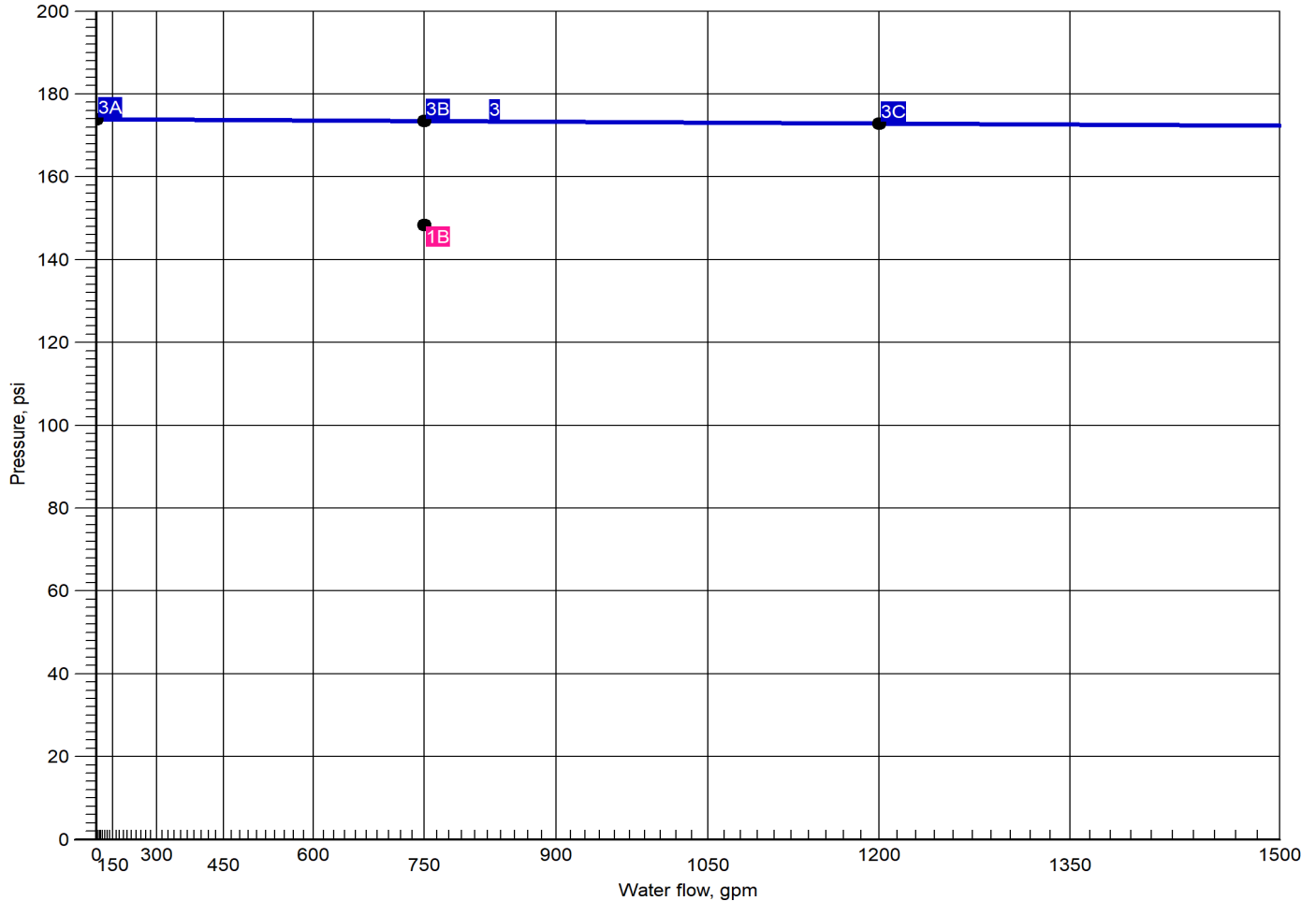
System Demand
Available Water Supply

Job Name: WILSHIRE HILLS III

Job Number: NC 1471

Report Description: Residential (STANDPIPE)

Remote Area Number: STANDPIPE



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B 1C	Required Pressure at System Demand: 148.530 @ 750.00 Required Pressure at System Demand (Including Hose Allowance at Source): 148.530 @ 750.00	Available Flow @ 20 PSI: 18215.56
3	3A 3B 3C	Available Static Pressure at Water Supply at Node 2: 174.000 Available Residual Pressure at System Demand: 173.581 @ 750.00 Available Residual Pressure & Flow at Water Supply at Node 2: 173.000 @ 1200.00	



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	18	250.00	250.00	25	100.000			
Hose	191	250.00	250.00	0	109.473			
Hose	274	250.00	250.00	0	104.935			

⇒ Most Demanding Sprinkler Data



Node Analysis

Job Number: NC 1471

Report Description: Residential (STANDPIPE)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
2	4'-0½"	S	148.530	750.00	
18	25'-0"	Hose(-100.000)(31'-0")	100.000	250.00	
191	25'-0"	Hose(31'-0")	109.473	250.00	
274	14'-0"	Hose(31'-0")	104.935	250.00	
20	25'-0"	PO(12'-0")	109.263	0.00	
193	25'-0"	PO(12'-0")	118.736	0.00	
276	14'-0"	PO(12'-0")	114.198	0.00	
1178	9'-6"	T(26'-4")	129.161	0.00	
1182	3'-3½"	PO(26'-4")	140.233	0.00	
1269	3'-3½"	sCV(30'-8")	143.870	0.00	



Hydraulic Analysis

Job Number: NC 1471
Report Description: Residential (STANDPIPE)

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									
DY	2.4690	250.00	16.75	120		0.215409	0'-0"	Pf	9.263
18	25'-0"	250.00		100.000		Hose(-100.000)(31'-0")	43'-0"	Pe	
20	25'-0"			109.263		PO(12'-0")	43'-0"	Pv	
ST	4.2600	250.00	5.63	120		0.015122	11'-0"	Pf	0.166
20	25'-0"			109.263				Pe	4.769
276	14'-0"			114.198			11'-0"	Pv	
ST	4.2600	500.00	11.25	120		0.054516	172'-9½"	Pf	13.010
276	14'-0"	250.00		114.198		Flow (q) from Route 2	65'-10"	Pe	1.953
1178	9'-6"			129.161		PO(26'-4"), E(13'-2"), T(26'-4")	238'-7½"	Pv	
ST	4.2600	750.00	16.88	120		0.115423	33'-1½"	Pf	8.380
1178	9'-6"	250.00		129.161		Flow (q) from Route 3	39'-6"	Pe	2.692
1182	3'-3½"			140.233		E(13'-2"), f(-0.000), PO(26'-4")	72'-7½"	Pv	
CM	4.3100	750.00	16.49	120		0.109047	2'-8½"	Pf	3.637
1182	3'-3½"			140.233			30'-8"	Pe	
1269	3'-3½"			143.870		sCV(30'-8")	33'-4"	Pv	
MS	4.0260	750.00	18.90	120		0.151978	2'-9½"	Pf	4.986
1269	3'-3½"			143.870			30'-0"	Pe	-0.325
2	4'-0½"			148.530		T(20'-0"), E(10'-0"), S	32'-9½"	Pv	
		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
274	14'-0"	250.00		104.935		Hose(31'-0")	43'-0"	Pe	
276	14'-0"			114.198		PO(12'-0")	43'-0"	Pv	
Route 3									
DY	2.4690	250.00	16.75	120		0.215409	0'-0"	Pf	9.263
191	25'-0"	250.00		109.473		Hose(31'-0")	43'-0"	Pe	
193	25'-0"			118.736		PO(12'-0")	43'-0"	Pv	
ST	4.2600	250.00	5.63	120		0.015122	165'-10"	Pf	3.703
193	25'-0"			118.736			79'-0"	Pe	6.722
1178	9'-6"			129.161		PO(26'-4"), 2E(13'-2"), T(26'-4")	244'-10"	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: NC 1471
Report Description: Residential (STANDPIPE)

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

