



10/17/25

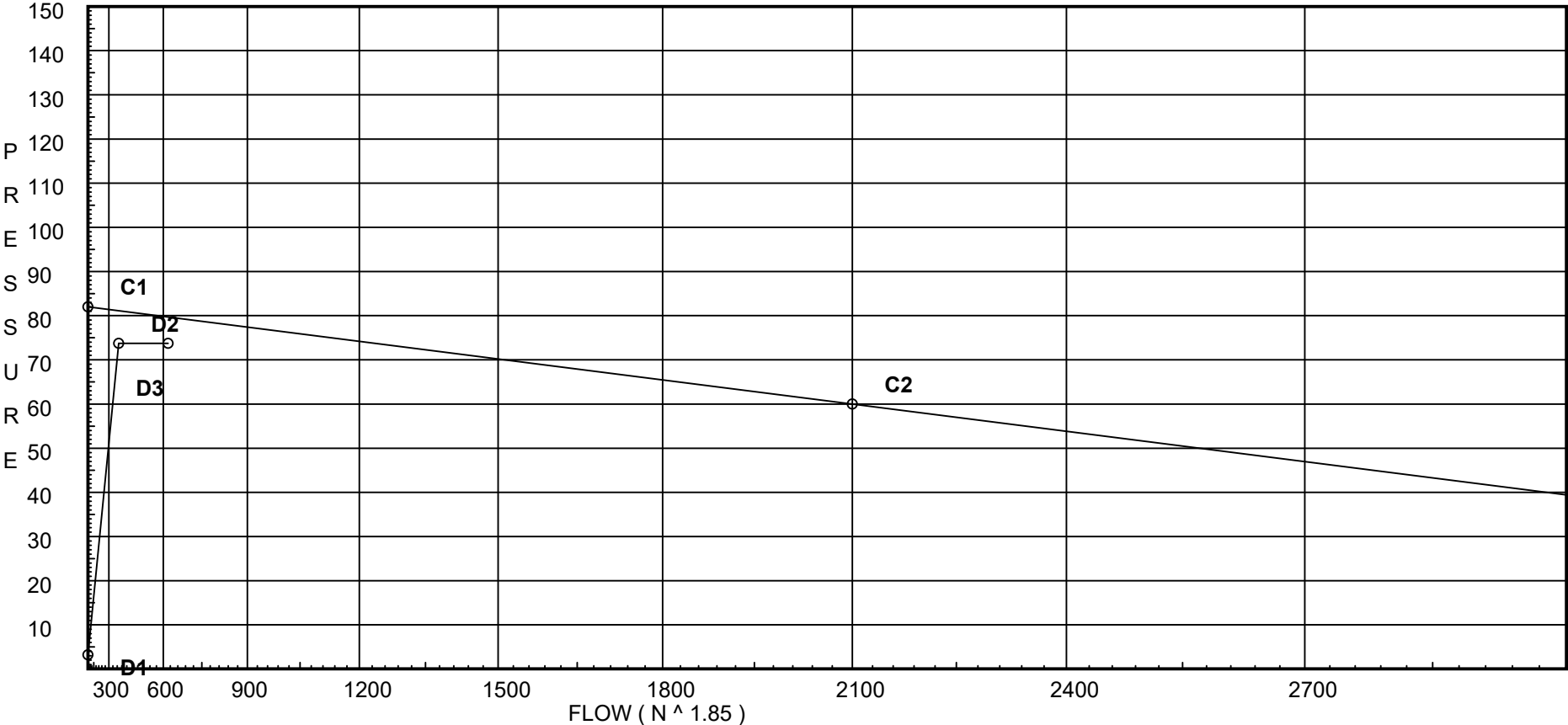
AEGIS FIRE PROTECTION, LLC
11937 W. 119th St. #263
Overland Park, KS 66213
913-825-0343

Job Name: MODULAR INTERIM KITCHEN COMPLEX | HCA - LEE'S SUMMIT MEDICAL CENTER
Location: 2100 SE BLUE PKWY, LEE'S SUMMIT, MO 64063
Remote Area: KITCHEN
Contract: 19547
Date: 10/16/25

Water Supply Curve

City Water Supply:
C1 - Static Pressure : 82
C2 - Residual Pressure: 60
C2 - Residual Flow : 2100

Demand:
D1 - Elevation : 3.216
D2 - System Flow : 370.493
D2 - System Pressure : 73.730
Hose (Demand) : 250
D3 - System Demand : 620.493
Safety Margin : 8.270



Fittings Used Summary

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
CONN	82.0	60	2100.0	79.694	620.49	73.73

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
D001	0.0	5.6	7.0	14.82	0.15	77.667
D002	0.0	5.6	7.0	14.82	0.15	77.667
D003	0.0	5.6	7.0	14.82	0.15	82.503
D004	0.0	5.6	7.0	14.82	0.15	82.503
D005	0.0	5.6	7.0	14.82	0.15	74.662
D006	0.0	5.6	7.0	14.82	0.15	74.662
D007	0.0	5.6	7.0	14.82	0.15	82.503
D008	0.0	5.6	7.0	14.82	0.15	82.503
D009	0.0	5.6	7.0	14.82	0.15	82.503
D010	0.0	5.6	7.0	14.82	0.15	82.503
D011	0.0	5.6	10.47	18.12	0.15	120.825
D012	0.0	5.6	7.0	14.82	0.15	75
D013	0.0	5.6	7.0	14.82	0.1	141.996
D014	0.0	5.6	10.05	17.75	0.1	177.495
D015	0.0	5.6	10.05	17.75	0.1	177.495
D016	0.0	5.6	10.05	17.75	0.1	177.495
D017	0.0	5.6	7.0	14.82	0.1	141.996
D018	0.0	5.6	10.05	17.75	0.1	177.495
D019	0.0	5.6	10.05	17.75	0.1	177.495
D020	0.0	5.6	10.05	17.75	0.1	177.495
H1	111.667	5.02	10.71	16.42	K=K @ EQ01	
H2	111.667	5.02	10.92	16.58	K=K @ EQ02	
H3	111.667	5.02	11.35	16.91	K=K @ EQ03	
H4	111.667	5.02	11.97	17.36	K=K @ EQ04	
H5	111.667	5.02	12.72	17.9	K=K @ EQ05	
H6	111.667	5.02	13.8	18.64	K=K @ EQ06	
B1	101.0		28.99			
H7	111.667	5.02	10.98	16.62	K=K @ EQ07	
H8	111.667	5.02	11.19	16.78	K=K @ EQ08	
H9	111.667	5.02	11.63	17.11	K=K @ EQ09	
H10	111.667	5.02	12.26	17.57	K=K @ EQ10	
H11	111.667	5.03	13.04	18.18	K=K @ EQ11	
H12	111.667	5.02	14.32	18.99	K=K @ EQ12	
B2	101.0		28.82			
H13	111.667	5.02	9.77	15.69	K=K @ EQ13	
H14	111.667	5.03	12.45	17.75	K=K @ EQ14	
H15	111.667	5.03	20.39	22.72	K=K @ EQ15	
H16	111.667	5.03	23.18	24.22	K=K @ EQ16	
B3.3	111.667		30.3			
B3.2	111.667		30.44			
B3	101.0		36.01			
H17	111.667	5.02	9.74	15.66	K=K @ EQ17	

NODE ANALYSIS (cont.)

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H18	111.667	5.03	12.76	17.97	K=K @ EQ18
H19	111.667	5.03	20.82	22.96	K=K @ EQ19
H20	111.667	5.03	23.67	24.48	K=K @ EQ20
B3.1	111.667		30.23		
M3	101.0		37.11		
M1	101.0		36.69		
M2	101.0		36.8		
M4	96.0		39.68		
M5	96.0		40.64		
M6	109.0		49.63		
M7	109.0		51.06		
M8	109.0		63.71		
M9	109.0		64.63		
M10	110.083		66.8		
M11	110.083		67.7		
M12	109.5		68.43		
TOR	101.0		72.96		
UNG1	96.0		75.85		
BFP	96.0		76.01		
CONN	105.0		73.73	250.0	

Final Calculations : Darcy-Weisbach

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Darcy Weisbach Summary Info

Fluid Density = 69.4 lbs/ft³

Fluid Viscosity = 55 centipoise

Abbreviation Summary

E = Absolute Roughness = In.

Re = Reynolds Number

E/D = Relative Roughness

Ff = Friction Factor

1E+3 = 1 x 10³ = 1000

Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	*****	Notes	*****
D001 to EQ01	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D002 to EQ02	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D003 to EQ03	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D004 to EQ04	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D005 to EQ05	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D006 to EQ06	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D007 to EQ07	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		
	0.0 14.82				8.718		K Factor = 5.02		
D008 to EQ08	14.82 14.82	1.049 0.0 0.0747	0.0 0.0 0.0	23.000 0.0 23.000	7.000 0.000000 1.718	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 5.50		

Final Calculations : Darcy-Weisbach

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Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	*****	Notes	*****
	0.0 14.82				8.718			K Factor = 5.02	
D009 to EQ09	14.82	1.049 0.0	0.0 0.0	23.000 0.0	7.000 0.000000	0E+-101 0.0		K Factor = 5.60	
	14.82	0.0747	0.0	23.000	1.718	0.0		Vel = 5.50	
	0.0 14.82				8.718			K Factor = 5.02	
D010 to EQ10	14.82	1.049 0.0	0.0 0.0	23.000 0.0	7.000 0.000000	0E+-101 0.0		K Factor = 5.60	
	14.82	0.0747	0.0	23.000	1.718	0.0		Vel = 5.50	
	0.0 14.82				8.718			K Factor = 5.02	
D011 to EQ11	18.12	1.049 0.0	0.0 0.0	23.000 0.0	10.474 0.000000	0E+-101 0.0		K Factor = 5.60	
	18.12	0.1085	0.0	23.000	2.495	0.0		Vel = 6.73	
	0.0 18.12				12.969			K Factor = 5.03	
D012 to EQ12	14.82	1.049 0.0	0.0 0.0	23.000 0.0	7.000 0.000000	0E+-101 0.0		K Factor = 5.60	
	14.82	0.0747	0.0	23.000	1.718	0.0		Vel = 5.50	
	0.0 14.82				8.718			K Factor = 5.02	
D013 to EQ13	14.82	1.049 0.0	0.0 0.0	23.000 0.0	7.000 0.000000	0E+-101 0.0		K Factor = 5.60	
	14.82	0.0747	0.0	23.000	1.718	0.0		Vel = 5.50	
	0.0 14.82				8.718			K Factor = 5.02	
D014 to EQ14	17.75	1.049 0.0	0.0 0.0	23.000 0.0	10.046 0.000000	0E+-101 0.0		K Factor = 5.60	
	17.75	0.1043	0.0	23.000	2.400	0.0		Vel = 6.59	
	0.0 17.75				12.446			K Factor = 5.03	
D015 to EQ15	17.75	1.049 0.0	0.0 0.0	23.000 0.0	10.046 0.000000	0E+-101 0.0		K Factor = 5.60	
	17.75	0.1043	0.0	23.000	2.400	0.0		Vel = 6.59	
	0.0 17.75				12.446			K Factor = 5.03	
D016 to EQ16	17.75	1.049 0.0	0.0 0.0	23.000 0.0	10.046 0.000000	0E+-101 0.0		K Factor = 5.60	
	17.75	0.1043	0.0	23.000	2.400	0.0		Vel = 6.59	
	0.0 17.75				12.446			K Factor = 5.03	
D017 to EQ17	14.82	1.049 0.0	0.0 0.0	23.000 0.0	7.000 0.000000	0E+-101 0.0		K Factor = 5.60	
	14.82	0.0747	0.0	23.000	1.718	0.0		Vel = 5.50	
	0.0 14.82				8.718			K Factor = 5.02	

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Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	***** Notes *****
D018 to EQ18	17.75 17.75	1.049 0.0 0.1043		0.0 0.0 0.0	23.000 0.0 23.000	10.046 0.000000 2.400	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 6.59
	0.0 17.75					12.446		K Factor = 5.03
D019 to EQ19	17.75 17.75	1.049 0.0 0.1043		0.0 0.0 0.0	23.000 0.0 23.000	10.046 0.000000 2.400	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 6.59
	0.0 17.75					12.446		K Factor = 5.03
D020 to EQ20	17.75 17.75	1.049 0.0 0.1043		0.0 0.0 0.0	23.000 0.0 23.000	10.046 0.000000 2.400	0E+-101 0.0 0.0	K Factor = 5.60 Vel = 6.59
	0.0 17.75					12.446		K Factor = 5.03
H1 to H2	16.42 16.42	2.157 0.0 0.0114	T	8.783 0.0 0.0	9.667 8.783 18.450	10.707 0.000000 0.210	4.86E+2 0.0 0.13160	K Factor @ node EQ01 Vel = 1.44
H2 to H3	16.58 33.0	2.157 0.0 0.0229	T	8.783 0.0 0.0	10.250 8.783 19.033	10.917 0.000000 0.436	9.768E+2 0.0 0.06548	K Factor @ node EQ02 Vel = 2.90
H3 to H4	16.91 49.91	2.157 0.0 0.0346	T	8.783 0.0 0.0	9.083 8.783 17.866	11.353 0.000000 0.618	1.477E+3 0.0 0.04328	K Factor @ node EQ03 Vel = 4.38
H4 to H5	17.36 67.27	2.157 0.0 0.0467	T	8.783 0.0 0.0	7.333 8.783 16.116	11.971 0.000000 0.753	1.991E+3 0.0 0.03216	K Factor @ node EQ04 Vel = 5.91
H5 to H6	17.90 85.17	2.157 0.0 0.0843	T	8.783 0.0 0.0	4.000 8.783 12.783	12.724 0.000000 1.078	2.521E+3 0.0 0.03623	K Factor @ node EQ05 Vel = 7.48
H6 to B1	18.64 103.81	2.157 0.0 0.1395	T 4L	8.783 10.54 0.0	52.667 19.322 71.989	13.802 5.145 10.044	3.073E+3 0.0 0.04033	K Factor @ node EQ06 Vel = 9.11
B1 to M1	0.0 103.81	1.682 0.0 0.5731	L	1.766 0.0 0.0	11.667 1.766 13.433	28.991 0.000000 7.698	3.941E+3 0.0 0.04776	 Vel = 14.99
	0.0 103.81					36.689		K Factor = 17.14
H7 to H8	16.62 16.62	2.157 0.0 0.0115	T	8.783 0.0 0.0	9.667 8.783 18.450	10.976 0.000000 0.212	4.921E+2 0.0 0.12998	K Factor @ node EQ07 Vel = 1.46
H8 to H9	16.79 33.41	2.157 0.0 0.0232	T	8.783 0.0 0.0	10.250 8.783 19.033	11.188 0.000000 0.441	9.889E+2 0.0 0.06468	K Factor @ node EQ08 Vel = 2.93
H9 to H10	17.11 50.52	2.157 0.0 0.0350	T	8.783 0.0 0.0	9.083 8.783 17.866	11.629 0.000000 0.626	1.495E+3 0.0 0.04276	K Factor @ node EQ09 Vel = 4.44
H10 to H11	17.57 68.09	2.157 0.0 0.0478	T	8.783 0.0 0.0	7.667 8.783 16.450	12.255 0.000000 0.787	2.015E+3 0.0 0.03214	K Factor @ node EQ10 Vel = 5.98

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Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	*****	Notes	*****
H11 to H12	18.17 86.26	2.157 0.0 0.0872	T	8.783 0.0 0.0	5.833 8.783 14.616	13.042 0.000000 1.274	2.553E+3 0.0 0.03648		K Factor @ node EQ11	
H12 to B2	18.99 105.25	2.157 0.0 0.1445	T 2L	8.783 5.27 0.0	50.750 14.053 64.803	14.316 5.145 9.363	3.115E+3 0.0 0.04063		K Factor @ node EQ12	
B2 to M2	0.0 105.25	1.682 0.0 0.5940	L	1.766 0.0 0.0	11.667 1.766 13.433	28.824 0.000000 7.979	3.995E+3 0.0 0.04816		Vel = 9.24	
	0.0 105.25					36.803			K Factor = 17.35	
H13 to H14	15.69 15.69	1.097 0.0 0.1626	T	4.437 0.0 0.0	12.000 4.437 16.437	9.773 0.000000 2.673	9.13E+2 0.0 0.07003		K Factor @ node EQ13	
H14 to H15	17.75 33.44	1.049 0.0 0.4278	T	3.568 0.0 0.0	15.000 3.568 18.568	12.446 0.000000 7.943	2.035E+3 0.0 0.03242		K Factor @ node EQ14	
H15 to H16	22.71 56.15	1.61 0.0 0.1491	T	5.71 0.0 0.0	13.000 5.710 18.710	20.389 0.000000 2.790	2.227E+3 0.0 0.03412		K Factor @ node EQ15	
H16 to B3.3	24.23 80.38	1.61 0.0 0.3791	T	5.71 0.0 0.0	13.083 5.710 18.793	23.179 0.000000 7.124	3.188E+3 0.0 0.04234		K Factor @ node EQ16	
B3.3 to B3.2	0.0 80.38	3.26 0.0 0.0106	L	4.796 0.0 0.0	8.000 4.795 12.795	30.303 0.000000 0.136	1.574E+3 0.0 0.04063		Vel = 12.67	
B3.2 to B3	81.06 161.44	3.26 0.0 0.0422	L	4.796 0.0 0.0	5.333 4.795 10.128	30.439 5.145 0.427	3.162E+3 0.0 0.03971		Vel = 3.09	
B3 to M3	0.0 161.44	3.26 0.0 0.0421	T	14.388 0.0 0.0	11.667 14.387 26.054	36.011 0.000000 1.098	3.162E+3 0.0 0.03971		Vel = 6.21	
	0.0 161.44					37.109			K Factor = 26.50	
H17 to H18	15.66 15.66	1.049 0.0 0.1941	T	3.568 0.0 0.0	12.000 3.568 15.568	9.735 0.000000 3.022	9.529E+2 0.0 0.06710		K Factor @ node EQ17	
H18 to H19	17.97 33.63	1.049 0.0 0.4342	T	3.568 0.0 0.0	15.000 3.568 18.568	12.757 0.000000 8.063	2.047E+3 0.0 0.03254		K Factor @ node EQ18	
H19 to H20	22.95 56.58	1.61 0.0 0.1521	T	5.71 0.0 0.0	13.000 5.710 18.710	20.820 0.000000 2.846	2.244E+3 0.0 0.03428		K Factor @ node EQ19	
H20 to B3.1	24.48 81.06	1.61 0.0 0.3875	2L	2.855 0.0 0.0	14.083 2.855 16.938	23.666 0.000000 6.563	3.215E+3 0.0 0.04256		K Factor @ node EQ20	
B3.1 to B3.2	0.0 81.06	3.068 0.0 0.0137	T	10.705 0.0 0.0	4.583 10.705 15.288	30.229 0.000000 0.210	1.687E+3 0.0 0.03791		Vel = 12.77	
									Vel = 3.52	

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Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	*****	Notes	*****
	0.0 81.06					30.439			K Factor = 14.69	
M3 to M4	161.44	4.26 0.0 0.0096	L	5.638 0.0 0.0	11.083 5.638 16.721	37.109 2.412 0.161	2.42E+3 0.0 0.03479		Vel = 3.63	
	0.0 161.44					39.682			K Factor = 25.63	
M1 to M2	103.81	4.26 0.0 0.0047	T	18.795 0.0 0.0	5.250 18.795 24.045	36.689 0.000000 0.114	1.556E+3 0.0 0.04110		Vel = 2.34	
M2 to M4	105.25	4.26 0.0 0.0182	T	18.795 0.0 0.0	6.917 18.795 25.712	36.803 2.412 0.467	3.133E+3 0.0 0.03896		Vel = 4.71	
	0.0 209.06					39.682			K Factor = 33.19	
M4 to M5	370.49	4.26 0.0 0.0590	2L	11.277 0.0 0.0	5.000 11.276 16.276	39.682 0.000000 0.960	5.553E+3 0.0 0.04019		Vel = 8.34	
M5 to M6	0.0	4.26 0.0 0.0589	L	5.638 0.0 0.0	253.250 5.638 258.888	40.642 -6.270 15.259	5.553E+3 0.0 0.04019		Vel = 8.34	
M6 to M7	0.0	4.26 0.0 0.0589	2L	11.277 0.0 0.0	13.000 11.276 24.276	49.631 0.000000 1.430	5.553E+3 0.0 0.04019		Vel = 8.34	
	0.0 370.49					51.061			K Factor = 51.85	
M7 to M8	370.49	4.26 0.0 0.0589	5L S	28.192 20.674 0.0	46.917 48.866 95.783	51.061 7.000 5.646	5.553E+3 0.0 0.04019		* * Fixed Loss = 7 Vel = 8.34	
M8 to M9	0.0	4.26 0.0 0.0548	2L	15.8 0.0 0.0	1.083 15.800 16.883	63.707 0.000000 0.925	5.553E+3 0.0 0.03737		Vel = 8.34	
M9 to M10	0.0	4.26 0.0 0.0548	3L	23.701 0.0 0.0	25.333 23.701 49.034	64.632 -0.522 2.687	5.553E+3 0.0 0.03737		Vel = 8.34	
M10 to M11	0.0	4.26 0.0 0.0548	2L	15.8 0.0 0.0	0.583 15.800 16.383	66.797 0.000000 0.898	5.553E+3 0.0 0.03737		Vel = 8.34	
M11 to M12	0.0	4.26 0.0 0.0549		0.0 0.0 0.0	8.250 0.0 8.250	67.695 0.281 0.453	5.553E+3 0.0 0.03737		Vel = 8.34	
M12 to TOR	0.0	6.357 0.0 0.0078	T L	37.72 11.316 0.0	5.500 49.036 54.536	68.429 4.100 0.427	3.721E+3 0.0 0.03957		Vel = 3.75	
TOR to UNG1	0.0	6.357 0.0 0.0078	S B	40.235 12.573 0.0	8.500 52.808 61.308	72.956 2.412 0.481	3.721E+3 0.0 0.03957		Vel = 3.75	
UNG1 to BFP	0.0	8.27 0.0 0.0019	L	20.56 0.0 0.0	64.167 20.560 84.727	75.849 0.000000 0.162	2.86E+3 0.0 0.03597		Vel = 2.21	

Final Calculations : Darcy-Weisbach

AEGIS FIRE PROTECTION, LLC

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Hyd. Ref. Point	Qa Qt	Dia. "E" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Re E/D Ff	*****	Notes	*****
BFP to CONN	0.0 370.49	8.27 0.0 0.0019	2G	12.652 0.0 0.0	18.750 12.652 31.402	76.011 -2.341 0.060	2.86E+3 0.0 0.03597		** Fixed Loss = 2 Vel = 2.21	
	250.00 620.49					73.730			Qa = 250.00 K Factor = 72.26	