



MILTON E. REINOSO - PE 91359

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BROTHERS FIRE PROTECTION INC
3781 NE 11 AVENUE
POMPANO BEACH, FL 33064
954-419-9377

Job Name : MIAMI LAKES GARAGE EV calcs
Drawing :
Location : 16200 NW 57 AVE, MIAMI LAKES, FL 33014
Remote Area : 1
Contract :
Data File : MIAMI LAKES GARAGE EV calcs Area 1.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME MIAMI LAKES GARAGE
Location 16200 NW 57 AVE, MIAMI LAKES, FL 33014
Drawing #
Contract #
Date 9/16/25

DESIGN

Remote area # 1
Remote area location 6TH FLOOR PARKING
Occupancy classification EXTRA HAZ 2
Density 0.2 - Gpm/SqFt
Area of application 2000* - SqFt
Coverage/sprinkler 98 - SqFt
Type of sprinkler calculated QR PENDENT
Sprinklers calculated 16
In-rack demand - GPM
Hose streams 250 - GPM
Total water required (including hose streams) 1331.95 - GPM @ 104.64 - Psi
Type of system WET
Volume of system (dry or pre-action) - Gal

WATER SUPPLY INFORMATION

Test date 3-19-26
Location SITE
Source of info MIAMI-DADE FIRE

CONTRACTOR INFO BROTHERS FIRE PROTECTION INC
Address 3781 NE 11 AVENUE / POMPANO BEACH, FL 33064
Phone # 954-419-9377
Name of designer DAVID SENGSOURLHO
Authority having jurisdiction MIAMI-DADE FIRE

NOTES: 11.09 PSI SAFETY

* AREA REDUCED PER NFPA 13 19.3.3.1.1

text1(35) - invisible

Water Supply Curve

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City Water Supply:

C1 - Static Pressure : 55
C2 - Residual Pressure: 53
C2 - Residual Flow : 1356

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

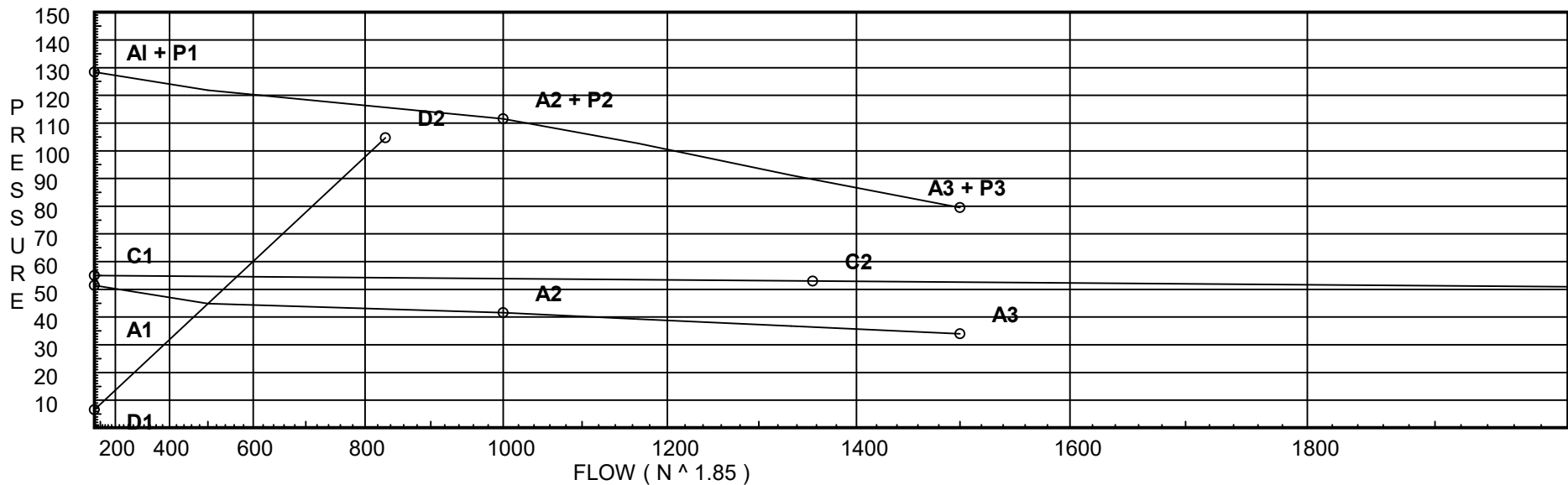
A1 - Adjusted Static: 51.468
A2 - Adj Resid : 41.563 @ 1000
A3 - Adj Resid : 33.995 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 77
P2 - Pump Rated Pressure : 70
P2 - Pump Rated Flow : 1000
P3 - Pump Pressure @ Max Flow : 45.5
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 8133.50
City Residual Flow @ 20 = 6370.48
City Water @ 150% of Pump = 52.59

Demand:

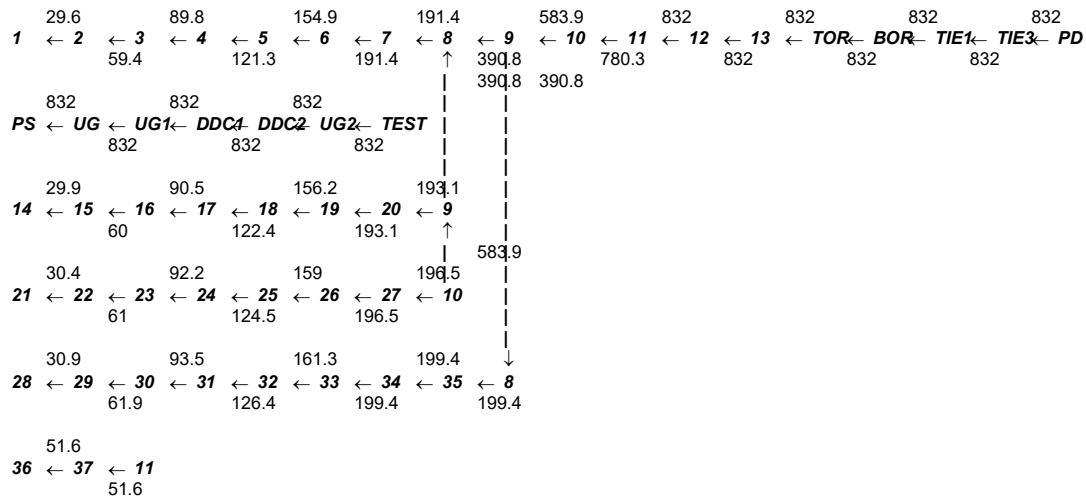
D1 - Elevation : 6.570
D2 - System Flow : 831.95
D2 - System Pressure : 104.640
Hose (Demand) :
D3 - System Demand : 831.95
Hose (Adj City) : 500
Safety Margin : 11.095



Flow Diagram

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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
E	NFPA 13 90' Standard Elbow	0	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
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
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
Zic	Wilkins 350ADA	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

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

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

Flow Summary - NFPA

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
PD	See Information on Pump Curve			115.735	831.95	104.64
TEST	55.0	53	1356.0	53.065	1331.95	53.065

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
1	16.67	11.2	7.0	29.63	0.4	9.83
2	16.67	11.2	7.08	29.8	0.4	9.83
3	16.67	11.2	7.33	30.33	0.4	9.83
4	16.67	11.2	7.93	31.54	0.4	9.83
5	16.67	11.2	8.98	33.57	0.4	9.83
6	16.67	11.2	10.64	36.54	0.4	9.83
7	16.67		16.56			
8	16.0		20.14			
9	16.0		20.47			
10	16.0		21.16			
11	16.0		22.34			
12	16.0		23.46			
13	16.0		60.79			
TOR	16.0		85.0			
BOR	12.0		87.12			
TIE1	12.0		90.6			
TIE3	12.0		97.0			
PD	2.0		104.64			
PS	2.0		42.94			
UG	-3.0		47.09			
UG1	-3.0		47.62			
DDC1	1.5		45.82			
DDC2	1.5		52.44			
UG2	-3.0		54.54			
TEST	1.5		53.06	500.0		
14	16.67	11.2	7.12	29.89	0.4	9.83
15	16.67	11.2	7.2	30.06	0.4	9.83
16	16.67	11.2	7.46	30.59	0.4	9.83
17	16.67	11.2	8.07	31.81	0.4	9.83
18	16.67	11.2	9.14	33.86	0.4	9.83
19	16.67	11.2	10.82	36.85	0.4	9.83
20	16.67		16.83			
21	16.67	11.2	7.38	30.43	0.4	9.83
22	16.67	11.2	7.46	30.6	0.4	9.83
23	16.67	11.2	7.73	31.14	0.4	9.83
24	16.67	11.2	8.36	32.38	0.4	9.83

Flow Summary - NFPA

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NODE ANALYSIS (cont.)

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
25	16.67	11.2	9.46	34.46	0.4	9.83
26	16.67	11.2	11.2	37.49	0.4	9.83
27	16.67		17.41			
28	16.67	11.2	7.6	30.88	0.4	9.83
29	16.67	11.2	7.69	31.05	0.4	9.83
30	16.67	11.2	7.96	31.6	0.4	9.83
31	16.67	11.2	8.6	32.85	0.4	9.83
32	16.67	11.2	9.74	34.96	0.4	9.83
33	16.67	11.2	11.53	38.03	0.4	9.83
34	16.67		17.91			
35	16.0		20.07			
36	16.67	11.2	21.23	51.61	0.4	9.83
37	16.67		21.76			

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
1 to 2	16.67 16.67	11.20	29.63 29.63	2 2.157			10.000 10.000	120 0.0080	7.000 0.0 0.080		Vel = 2.60	
2 to 3	16.67 16.67	11.20	29.81 59.44	2 2.157			8.650 8.650	120 0.0292	7.080 0.0 0.253		Vel = 5.22	
3 to 4	16.67 16.67	11.20	30.32 89.76	2 2.157			9.550 9.550	120 0.0625	7.333 0.0 0.597		Vel = 7.88	
4 to 5	16.67 16.67	11.20	31.54 121.3	2 2.157			9.670 9.670	120 0.1091	7.930 0.0 1.055		Vel = 10.65	
5 to 6	16.67 16.67	11.20	33.57 154.87	2 2.157			9.670 9.670	120 0.1716	8.985 0.0 1.659		Vel = 13.60	
6 to 7	16.67 16.67	11.20	36.54 191.41	2 2.157	T	12.307	10.990 12.307 23.297	120 0.2538	10.644 0.0 5.912		Vel = 16.81	
7 to 8	16.67 16		0.0 191.41	2 2.157	T	12.307	0.670 12.307 12.977	120 0.2538	16.556 0.290 3.293		Vel = 16.81	
8 to 9	16 16		199.38 390.79	4 4.26			9.500 9.500	120 0.0346	20.139 0.0 0.329		Vel = 8.80	
9 to 10	16 16		193.07 583.86	4 4.26			9.500 9.500	120 0.0725	20.468 0.0 0.689		Vel = 13.14	
10 to 11	16 16		196.48 780.34	4 4.26			9.500 9.500	120 0.1242	21.157 0.0 1.180		Vel = 17.57	
11 to 12	16 16		51.61 831.95	4 4.26			8.010 8.010	120 0.1400	22.337 0.0 1.121		Vel = 18.73	
12 to 13	16 16		0.0 831.95	4 4.26			267.000 267.000	120 0.1398	23.458 0.0 37.335		Vel = 18.73	
13 to TOR	16 16		0.0 831.95	4 4.26	2T 2E	52.668 26.334	94.080 79.002 173.082	120 0.1398	60.793 0.0 24.202		Vel = 18.73	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
TOR to BOR	16 12		0.0 831.95	6 6.357	E B	17.603 12.573	2.000 17.603 19.603	120 0.0199	84.995 1.732 0.391			
BOR to TIE1	12 12		0.0 831.95	6 6.357	3E B T	52.808 12.573 37.72	71.583 103.101 174.684	120 0.0199	87.118 0.0 3.477	Vel = 8.41		
TIE1 to TIE3	12 12		0.0 831.95	6 6.357	E T	17.603 37.72	266.583 55.323 321.906	120 0.0199	90.595 0.0 6.408	Vel = 8.41		
TIE3 to PD	12 2		0.0 831.95	6 6.357	2E B S T	35.205 12.573 40.235 37.72	40.333 125.733 166.066	120 0.0199	97.003 4.331 3.306	Vel = 8.41		
PD			0.0 831.95						104.640		K Factor = 81.33	
System Demand Pressure									104.640			
Safety Margin									11.095			
Continuation Pressure									115.735			
Pressure @ Pump Outlet									115.735			
Pressure From Pump Curve									-72.790			
Pressure @ Pump Inlet									42.945			
PS to UG	2 -3		0.0 831.95	8 8.249	8E G T	169.129 4.698 41.108	138.083 214.935 353.018	120 0.0056	42.945 2.166 1.975	Vel = 4.99		
UG to UG1	-3 -3		0.0 831.95	8 7.68	E	22.555 22.555	80.000 102.555	150 0.0052	47.086 0.0 0.538	Vel = 5.76		
UG1 to DDC1	-3 1.500		0.0 831.95	8 8.27	E	28.468 28.468	6.000 28.468 34.468	140 0.0041	47.624 -1.949 0.143	Vel = 4.97		
DDC1 to DDC2	1.500 1.500		0.0 831.95	8 8.27	Zic E	0.0 28.468	6.000 28.468 34.468	140 0.0041	45.818 6.482 0.143	* * Fixed Loss = 6.482 Vel = 4.97		
DDC2 to UG2	1.500 -3		0.0 831.95	8 8.27	E	28.468 28.468	6.000 28.468 34.468	140 0.0041	52.443 1.949 0.143	Vel = 4.97		
UG2 to TEST	-3 1.500		0.0 831.95	8 8.27	E G T	28.468 6.326 55.354	25.000 90.148 115.148	140 0.0042	54.535 -1.949 0.479	Vel = 4.97		

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
TEST										500.00 1331.95	Qa = 500.00 K Factor = 182.85	
14 to 15	16.67 16.67	11.20	29.89	2			10.000	120	7.122 0.0			
15 to 16	16.67 16.67	11.20	29.89	2.157			10.000	0.0082	0.082		Vel = 2.62	
15 to 16	16.67 16.67	11.20	30.06	2			8.650	120	7.204 0.0			
16 to 17	16.67 16.67	11.20	59.95	2.157			8.650	0.0296	0.256		Vel = 5.26	
16 to 17	16.67 16.67	11.20	30.59	2			9.550	120	7.460 0.0			
17 to 18	16.67 16.67	11.20	90.54	2.157			9.550	0.0636	0.607		Vel = 7.95	
17 to 18	16.67 16.67	11.20	31.81	2			9.670	120	8.067 0.0			
18 to 19	16.67 16.67	11.20	122.35	2.157			9.670	0.1110	1.073		Vel = 10.74	
18 to 19	16.67 16.67	11.20	33.86	2			9.670	120	9.140 0.0			
19 to 20	16.67 16.67	11.20	156.21	2.157			9.670	0.1741	1.684		Vel = 13.72	
19 to 20	16.67 16.67	11.20	36.85	2	T	12.307	10.990 12.307	120	10.824 0.0			
20 to 9	16.67 16		193.06	2.157			23.297	0.2578	6.007		Vel = 16.95	
20 to 9	16.67 16		0.0	2	T	12.307	0.670 12.307	120	16.831 0.290			
9			193.06	2.157			12.977	0.2579	3.347		Vel = 16.95	
9			0.0 193.06						20.468		K Factor = 42.67	
21 to 22	16.67 16.67	11.20	30.43	2			10.000	120	7.380 0.0			
22 to 23	16.67 16.67	11.20	30.43	2.157			10.000	0.0084	0.084		Vel = 2.67	
22 to 23	16.67 16.67	11.20	30.60	2			8.650	120	7.464 0.0			
23 to 24	16.67 16.67	11.20	61.03	2.157			8.650	0.0306	0.265		Vel = 5.36	
23 to 24	16.67 16.67	11.20	31.13	2			9.550	120	7.729 0.0			
24 to 25	16.67 16.67	11.20	92.16	2.157			9.550	0.0657	0.627		Vel = 8.09	
24 to 25	16.67 16.67	11.20	32.38	2			9.670	120	8.356 0.0			
25 to 26	16.67 16.67	11.20	124.54	2.157			9.670	0.1146	1.108		Vel = 10.93	
25 to 26	16.67 16.67	11.20	34.46	2			9.670	120	9.464 0.0			
26	16.67		159.0	2.157			9.670	0.1800	1.741		Vel = 13.96	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
26 to 27	16.67 16.67	11.20	37.49 196.49	2 2.157	T	12.307	10.990 12.307 23.297	120 0.2664	11.205 0.0 6.206		Vel = 17.25	
27 to 10	16.67 16		0.0 196.49	2 2.157	T	12.307	0.670 12.307 12.977	120 0.2663	17.411 0.290 3.456		Vel = 17.25	
10			0.0 196.49						21.157		K Factor = 42.72	
28 to 29	16.67 16.67	11.20	30.88 30.88	2 2.157			10.000 10.000	120 0.0087	7.601 0.0 0.087		Vel = 2.71	
29 to 30	16.67 16.67	11.20	31.05 61.93	2 2.157			8.650 8.650	120 0.0314	7.688 0.0 0.272		Vel = 5.44	
30 to 31	16.67 16.67	11.20	31.60 93.53	2 2.157			9.550 9.550	120 0.0675	7.960 0.0 0.645		Vel = 8.21	
31 to 32	16.67 16.67	11.20	32.86 126.39	2 2.157			9.670 9.670	120 0.1177	8.605 0.0 1.138		Vel = 11.10	
32 to 33	16.67 16.67	11.20	34.96 161.35	2 2.157			9.670 9.670	120 0.1850	9.743 0.0 1.789		Vel = 14.17	
33 to 34	16.67 16.67	11.20	38.03 199.38	2 2.157	T	12.307	10.990 12.307 23.297	120 0.2737	11.532 0.0 6.376		Vel = 17.51	
34 to 35	16.67 16		0.0 199.38	2 2.157	E	6.153	0.670 6.153 6.823	120 0.2736	17.908 0.290 1.867		Vel = 17.51	
35 to 8	16 16		0.0 199.38	4 4.26			7.470 7.470	120 0.0099	20.065 0.0 0.074		Vel = 4.49	
8			0.0 199.38						20.139		K Factor = 44.43	
36 to 37	16.67 16.67	11.20	51.61 51.61	2 2.157	T	12.307	10.990 12.307 23.297	120 0.0224	21.233 0.0 0.523		Vel = 4.53	
37 to 11	16.67 16		0.0 51.61	2 2.157	T	12.307	0.670 12.307 12.977	120 0.0224	21.756 0.290 0.291		Vel = 4.53	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
11			0.0 51.61						22.337		K Factor = 10.92	