



## Hydraulic Calculations by HydraCALC

CAROLINA FIRE PROTECTION  
4055 HODGES CHAPEL ROAD  
DUNN, NC 28334  
910-892-1700

Job Name : BAUCOM BUSINESS PLAZA STORAGE  
Drawing : FP-101  
Location : 11132 US 401 N FUQUAY VARINA, NC 27526  
Remote Area : 1  
Contract :  
Data File : BAUCOM BUSINESS PLAZA STORAGE Area 1.WXF

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**HYDRAULIC CALCULATIONS**  
*for*

**JOB NAME** BAUCOM BUSINESS PLAZA STORAGE  
**Location** 11132 US 401 N FUQUAY VARINA, NC 27526  
**Drawing #** FP-101  
**Contract #**  
**Date** 10-02-24

**DESIGN**

**Remote area #** 1  
**Remote area location** LOWER LEVEL  
**Occupancy classification** OH-2 (STORAGE)  
**Density** 0.2 - Gpm/SqFt  
**Area of application** 900 - SqFt  
**Coverage/sprinkler** 125 - SqFt  
**Type of sprinkler calculated** VICTAULIC (V2704) 1/2" 155 QR BR UPR  
**# Sprinklers calculated** 10  
**In-rack demand** N/A - GPM  
**Hose streams** 250 - GPM  
**Total water required (including hose streams)** 553.08 - GPM @ 91.57 - Psi  
**Type of system** WET  
**Volume of system (dry or pre-action)** - Gal

**WATER SUPPLY INFORMATION**

**Test date** 10-05-23  
**Location** 11132 US 401 N, FUQUAY-VARINA, NC  
**Source of info** ENGINEERING PLANNING AND MANAGEMENT

**CONTRACTOR INFO** CAROLINA FIRE PROTECTION  
**Address** 4055 HODGES CHAPEL ROAD / DUNN, NC 28334  
**Phone #** 910-892-1700  
**Name of designer** IFPDC-GB  
**Authority having jurisdiction**

**NOTES:**

SAFETY MARGIN 15.16 PSI

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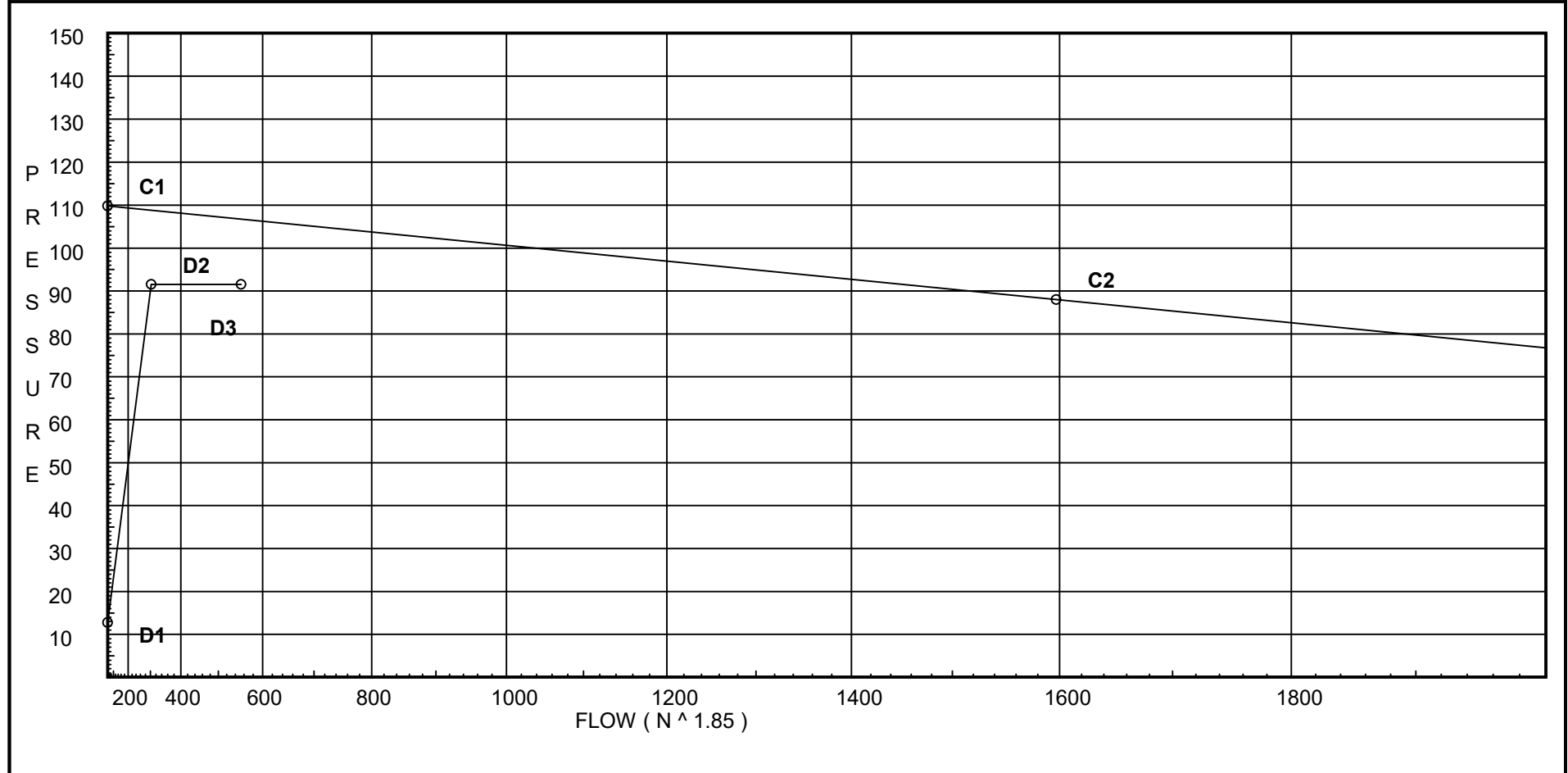
# Water Supply Curve

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City Water Supply:  
C1 - Static Pressure : 109.8  
C2 - Residual Pressure: 88  
C2 - Residual Flow : 1597

Demand:  
D1 - Elevation : 12.794  
D2 - System Flow : 303.083  
D2 - System Pressure : 91.570  
Hose ( Demand ) : 250  
D3 - System Demand : 553.083  
Safety Margin : 15.164



# 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	
Bvca	B Fly Vic 705						6	6	7		8	12	14	16	18	19						
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28	
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
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	
Zcj	Colt C500 Horz OSY	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**

<b>Node at Source</b>	<b>Static Pressure</b>	<b>Residual Pressure</b>	<b>Flow</b>	<b>Available Pressure</b>	<b>Total Demand</b>	<b>Required Pressure</b>
TEST	109.8	88	1597.0	106.734	553.08	91.57

**NODE ANALYSIS**

<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
100	8.54	5.6	19.93	25.0	0.2 125
101	8.08		22.49		
102	8.08		29.73		
103	8.08		51.57		
104	8.08		51.57		
105	8.08		51.7		
106	8.08		51.8		
107	8.08		52.17		
108	8.08		52.79		
109	8.08		57.94		
110	23.17		58.0		
TSR	23.17		58.88		
BSR	11.0		65.28		
RE	7.0		67.08		
UG1	-1.0		70.87	250.0	
PIT	-1.0		73.62		
CON	-1.0		82.71		
TEST	-21.0		91.57		
112	8.54	5.6	21.15	25.76	0.2 125
113	8.54	5.6	28.05	29.66	0.2 125
114	8.54	5.6	19.98	25.03	0.2 125
115	8.08		22.55		
116	8.08		29.81		
117	8.54	5.6	21.21	25.79	0.2 125
118	8.54	5.6	28.13	29.7	0.2 125
119	8.54	5.6	32.42	31.89	0.2 125
120	8.08		37.37		
121	8.54	5.6	35.34	33.29	0.2 125
122	8.54	5.6	47.11	38.44	0.1 132
123	8.54	5.6	47.32	38.52	0.1 132
124	8.08		57.75		

# 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	*****
100 to 101	8.54 8.08	5.60	25.00 25.0	1 1.049	E	2.0	10.000 2.000 12.000	120 0.1967	19.930 0.199 2.360			Vel = 9.28
101 to 102	8.08 8.08		25.76 50.76	1 1.049			9.930 9.930	120 0.7288	22.489 0.0 7.237			Vel = 18.84
102 to 103	8.08 8.08		29.66 80.42	1 1.049	T	5.0	7.790 5.000 12.790	120 1.7076	29.726 0.0 21.840			Vel = 29.85
103 to 104	8.08 8.08		0.0 80.42	3 3.26			0.320 0.320	120 0.0062	51.566 0.0 0.002			Vel = 3.09
104 to 105	8.08 8.08		38.44 118.86	3 3.26			9.390 9.390	120 0.0141	51.568 0.0 0.132			Vel = 4.57
105 to 106	8.08 8.08		80.52 199.38	3 3.26			2.610 2.610	120 0.0368	51.700 0.0 0.096			Vel = 7.66
106 to 107	8.08 8.08		38.52 237.9	3 3.26			7.390 7.390	120 0.0507	51.796 0.0 0.375			Vel = 9.14
107 to 108	8.08 8.08		65.18 303.08	3 3.26			7.760 7.760	120 0.0795	52.171 0.0 0.617			Vel = 11.65
108 to 109	8.08 8.08		-158.58 144.5	3 3.26	3T	60.478	194.540 60.478 255.018	120 0.0202	52.788 0.0 5.148			Vel = 5.55
109 to 110	8.08 23.17		158.58 303.08	3 3.26	2E T	18.815 20.159	44.080 38.974 83.054	120 0.0795	57.936 -6.535 6.599			Vel = 11.65
110 to TSR	23.17 23.17		0.0 303.08	3 3.26	E	9.408	1.670 9.408 11.078	120 0.0794	58.000 0.0 0.880			Vel = 11.65
TSR to BSR	23.17 11		0.0 303.08	4 4.26	Bvca S	10.534 28.968	12.625 39.502 52.127	120 0.0216	58.880 5.271 1.126			Vel = 6.82
BSR to RE	11 7		0.0 303.08	6 6.357	E	17.603	4.000 17.603 21.603	120 0.0031	65.277 1.732 0.066			Vel = 3.06
RE to UG1	7 -1		0.0 303.08	6 6.28	E T G	22.063 47.277 4.728	60.000 74.068 134.068	140 0.0025	67.075 3.465 0.329			Vel = 3.14
UG1 to PIT	-1 -1	H250	250.00 553.08	6 6.09	E 2F	21.583 21.583	317.000 43.166 360.166	150 0.0076	70.869 0.0 2.748			Vel = 6.09
PIT to CON	-1 -1		0.0 553.08	6 6.28	2E T 2G	44.125 47.277 9.455	100.000 100.857 200.857	140 0.0075	73.617 7.596 1.498		** Fixed Loss = 7.596	Vel = 5.73

# Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Zcj	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
						0.0						
CON to TEST	-1 -21		0.0 553.08	12	T 3F	98.292 63.89	580.000 162.182 742.182	140	82.711 8.662			Vel = 1.46
TEST			0.0 553.08						91.570		K Factor = 57.80	
112 to 101	8.54 8.08	5.60	25.76	1	T	5.0	0.460 5.000 5.460	120	21.155 0.199 1.135			Vel = 9.56
101			0.0 25.76						22.489		K Factor = 5.43	
113 to 102	8.54 8.08	5.60	29.66	1	T	5.0	0.460 5.000 5.460	120	28.054 0.199 1.473			Vel = 11.01
102			0.0 29.66						29.726		K Factor = 5.44	
114 to 115	8.54 8.08	5.60	25.03	1	E	2.0	10.000 2.000 12.000	120	19.985 0.199 2.366			Vel = 9.29
115 to 116	8.08 8.08		25.80	1			9.930 9.930	120	22.550 0.0 7.256			Vel = 18.87
116 to 105	8.08 8.08		29.70	1	T	5.0	7.790 5.000 12.790	120	29.806 0.0 21.894			Vel = 29.89
105			0.0 80.53						51.700		K Factor = 11.20	
117 to 115	8.54 8.08	5.60	25.79	1	T	5.0	0.460 5.000 5.460	120	21.213 0.199 1.138			Vel = 9.57
115			0.0 25.79						22.550		K Factor = 5.43	
118 to 116	8.54 8.08	5.60	29.70	1	T	5.0	0.460 5.000 5.460	120	28.130 0.199 1.477			Vel = 11.03
116			0.0 29.70						29.806		K Factor = 5.44	
119 to 120	8.54 8.08	5.60	31.89	1	T	5.0	10.390 5.000 15.390	120	32.420 0.199 4.747			Vel = 11.84
120 to 107	8.08 8.08		33.29	1	T	5.0	7.790 5.000 12.790	120	37.366 0.0 14.805			Vel = 24.20
107			0.0 65.18						52.171		K Factor = 9.02	
121 to 120	8.54 8.08	5.60	33.29	1	T	5.0	0.460 5.000 5.460	120	35.342 0.199 1.825			Vel = 12.36

# 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	*****
120			0.0 33.29					37.366		K Factor = 5.45	
122 to 104	8.54 8.08	5.60	38.44	1	E T 2.0 5.0	2.770 7.000 9.770	120	47.112 0.199		Vel = 14.27	
104			0.0 38.44					51.568		K Factor = 5.35	
123 to 106	8.54 8.08	5.60	38.52	1	E T 2.0 5.0	2.770 7.000 9.770	120	47.322 0.199		Vel = 14.30	
106			0.0 38.52					51.796		K Factor = 5.35	
108 to 124	8.08 8.08		158.58	3	T 20.159	186.770 20.159 206.929	120	52.788 0.0		Vel = 6.10	
124 to 109	8.08 8.08		0.0	3		7.790	120	57.749 0.0		Vel = 6.10	
109			0.0 158.58					57.936		K Factor = 20.83	