

**StorageMax**  
901 Proctor

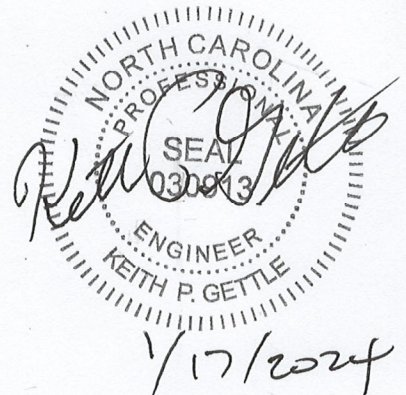
**Zebulon, NC**  
**Wake County**

## **Site Pipe (Q10) HGL Calculations**

**January 17, 2024**

**Prepared for:**

**Robert High Development, LLC**  
**324 Greenville Ave.**  
**Wilmington, NC 28403**



**Project Name:** StorageMax  
**Project Address:** 901 Proctor Ave.  
Zebulon, NC  
**Pins:** 2706217463  
**Latitude:** 35.840297  
**Longitude:** -78.315683  
**Zoning:** Heavy Commercial (HC)  
**River Basin:** Neuse  
**Watershed:** Moccasin Creek  
**HUC:** 03020203  
**Developer:** Robert High Development, LLC  
324 Greenville Ave.  
Wilmington, NC 28403  
**Telephone:** (919) 604-0505  
**Email:** Storit@AOL.com

### **Site Description**

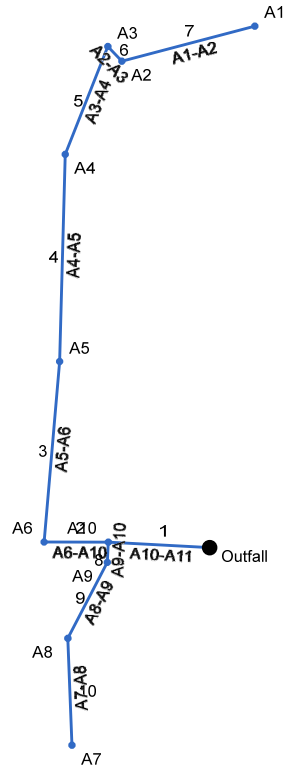
The project consists of a single parcel located at the intersection of Proctor Avenue and Shepard School Road near downtown Zebulon. The lot is approximately 6.50 acres (283,140 sq feet). The parcel is vacant with grassy vegetation and a woods along the property lines. There is 0 sq ft of existing impervious area on the site. The project will consist of a commercial building and the impervious area post development will be 3.64 acres, or approximately 56% of the gross site.

### **Pipe Summary:**

The analysis uses a "C" value of 0.95 for the pavement and 0.65 for the open areas. Time of concentration of 5 minutes is considered in the review and the drainage areas noted in the Hydrflow data and drainage map.

The pipes were reviewed using a Q10 flow and the HGL is within the pipe network system and are sized appropriately as indicated in the attached profiles.

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



# Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	90.000	-176.89	MH	0.00	0.00	0.90	5.0	311.00	0.57	311.51	24	Cir	0.013	1.00	318.00	A10-A11
2	1	57.000	-3.032	Curb	0.00	0.77	0.60	5.0	311.61	0.51	311.90	24	Cir	0.013	1.50	317.00	A6-A10
3	2	161.000	94.840	Curb	0.00	0.82	0.60	5.0	312.00	0.53	312.86	24	Cir	0.013	0.50	317.00	A5-A6
4	3	184.000	-3.373	Curb	0.00	0.70	0.60	5.0	312.96	0.50	313.88	18	Cir	0.013	0.59	317.50	A4-A5
5	4	103.000	20.000	Curb	0.00	0.09	0.85	5.0	313.98	0.50	314.50	18	Cir	0.013	1.50	319.24	A3-A4
6	5	18.000	115.000	DrGrt	0.00	0.36	0.85	5.0	314.60	0.56	314.70	15	Cir	0.013	1.35	317.80	A2-A3
7	6	122.000	-61.323	Curb	0.00	0.16	0.90	5.0	314.80	0.50	315.41	12	Cir	0.013	1.00	318.12	A1-A2
8	1	18.000	-90.176	Curb	0.00	0.18	0.90	5.0	311.61	0.56	311.71	24	Cir	0.013	0.70	317.70	A9-A10
9	8	76.000	24.470	DrGrt	0.00	0.46	0.60	5.0	311.81	0.50	312.19	24	Cir	0.013	0.82	316.60	A8-A9
10	9	95.000	-29.606	DrGrt	0.00	0.59	0.60	5.0	312.29	0.43	312.70	18	Cir	0.013	1.00	316.60	A7-A8

Project File: Zebulon StorageMax.stm

Number of lines: 10

Date: 1/12/2024

# Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	A10	Manhole	318.00	Cir	4.00	4.00	24	Cir	311.51	24 24	Cir Cir	311.61 311.61
2	A6	Curb-Horiz	317.00	Cir	4.00	4.00	24	Cir	311.90	24	Cir	312.00
3	A5	Curb-Horiz	317.00	Cir	4.00	4.00	24	Cir	312.86	18	Cir	312.96
4	A4	Curb-Horiz	317.50	Cir	4.00	4.00	18	Cir	313.88	18	Cir	313.98
5	A3	Curb-Horiz	319.24	Cir	4.00	4.00	18	Cir	314.50	15	Cir	314.60
6	A2	DropGrate	317.80	Cir	4.00	4.00	15	Cir	314.70	12	Cir	314.80
7	A1	Curb-Horiz	318.12	Cir	4.00	4.00	12	Cir	315.41			
8	A9	Curb-Horiz	317.70	Cir	4.00	4.00	24	Cir	311.71	24	Cir	311.81
9	A8	DropGrate	316.60	Cir	4.00	4.00	24	Cir	312.19	18	Cir	312.29
10	A7	DropGrate	316.60	Cir	4.00	4.00	18	Cir	312.70			

Project File: Zebulon StorageMax.stm

Number of Structures: 10

Run Date: 1/12/2024

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	A10-A11	16.51	24	Cir	90.000	311.00	311.51	0.567	312.46	313.15	0.56	313.71	End	Manhole
2	A6-A10	11.75	24	Cir	57.000	311.61	311.90	0.509	313.71	313.85	0.33	314.18	1	Curb-Horiz
3	A5-A6	9.17	24	Cir	161.000	312.00	312.86	0.534	314.18	314.40	0.10	314.50	2	Curb-Horiz
4	A4-A5	6.22	18	Cir	184.000	312.96	313.88	0.500	314.50	315.09	0.15	315.24	3	Curb-Horiz
5	A3-A4	3.57	18	Cir	103.000	313.98	314.50	0.505	315.24	315.35	0.28	315.63	4	Curb-Horiz
6	A2-A3	3.06	15	Cir	18.000	314.60	314.70	0.556	315.63	315.65	0.20	315.85	5	DropGrate
7	A1-A2	1.04	12	Cir	122.000	314.80	315.41	0.500	315.85	315.98	0.08	316.06	6	Curb-Horiz
8	A9-A10	5.30	24	Cir	18.000	311.61	311.71	0.556	313.71	313.71	0.03	313.74	1	Curb-Horiz
9	A8-A9	4.36	24	Cir	76.000	311.81	312.19	0.500	313.74	312.92	n/a	312.92	8	DropGrate
10	A7-A8	2.55	18	Cir	95.000	312.29	312.70	0.432	312.92	313.33	0.20	313.53	9	DropGrate

Project File: Zebulon StorageMax.stm

Number of lines: 10

Run Date: 1/12/2024

NOTES: Return period = 10 Yrs.

# Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	24	16.51	311.00	312.46	1.46	2.46	6.70	0.70	313.16	0.679	90.000	311.51	313.15	1.64	2.75	5.99	0.56	313.71	0.534	0.606	0.546	1.00	0.56
2	24	11.75	311.61	313.71	2.00	3.14	3.74	0.22	313.92	0.270	57.000	311.90	313.85	1.95	3.12	3.77	0.22	314.07	0.239	0.255	0.145	1.50	0.33
3	24	9.17	312.00	314.18	2.00	3.14	2.92	0.13	314.31	0.165	161.000	312.86	314.40	1.54	2.60	3.53	0.19	314.59	0.186	0.175	0.283	0.50	0.10
4	18	6.22	312.96	314.50	1.50	1.77	3.52	0.19	314.69	0.351	184.000	313.88	315.09	1.21	1.53	4.08	0.26	315.35	0.362	0.356	0.656	0.59	0.15
5	18	3.57	313.98	315.24	1.26	1.59	2.25	0.08	315.32	0.110	103.000	314.50	315.35	0.85	1.03	3.46	0.19	315.53	0.308	0.209	0.216	1.50	0.28
6	15	3.06	314.60	315.63	1.03	1.08	2.84	0.13	315.75	0.224	18.000	314.70	315.65	0.95	1.00	3.06	0.15	315.80	0.262	0.243	0.044	1.35	0.20
7	12	1.04	314.80	315.85	1.00	0.79	1.32	0.03	315.87	0.085	122.000	315.41	315.98	0.57	0.46	2.25	0.08	316.06	0.221	0.153	0.187	1.00	0.08
8	24	5.30	311.61	313.71	2.00	3.14	1.69	0.04	313.75	0.055	18.000	311.71	313.71	2.00	3.14	1.69	0.04	313.75	0.055	0.055	0.010	0.70	0.03
9	24	4.36	311.81	313.74	1.93	1.04	1.40	0.27	314.01	0.000	76.000	312.19	312.92	0.73**	1.04	4.18	0.27	313.19	0.000	0.000	n/a	0.82	n/a
10	18	2.55	312.29	312.92	0.63	0.71	3.61	0.20	313.12	0.430	95.000	312.70	313.33	0.63	0.71	3.62	0.20	313.53	0.434	0.432	0.411	1.00	0.20

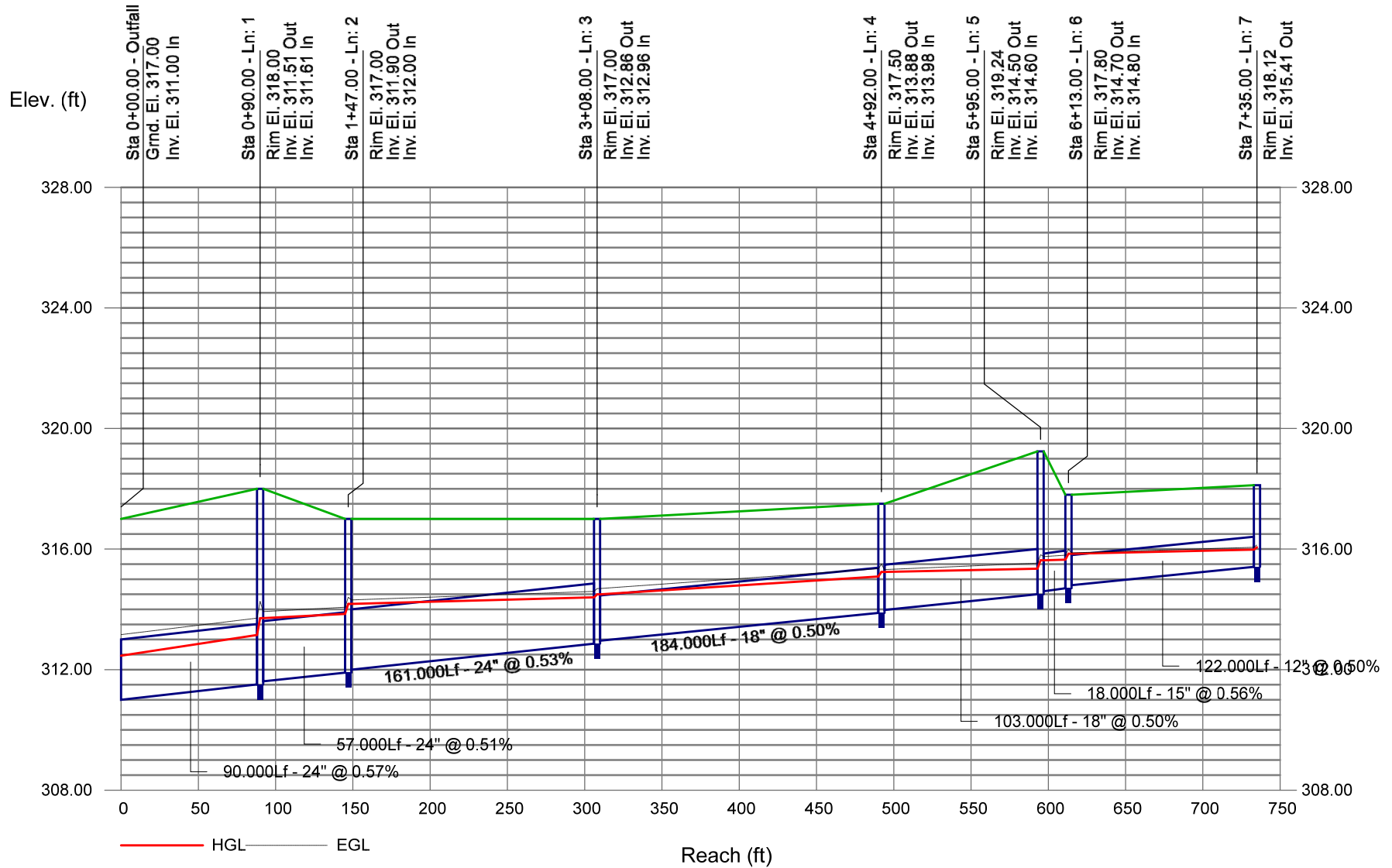
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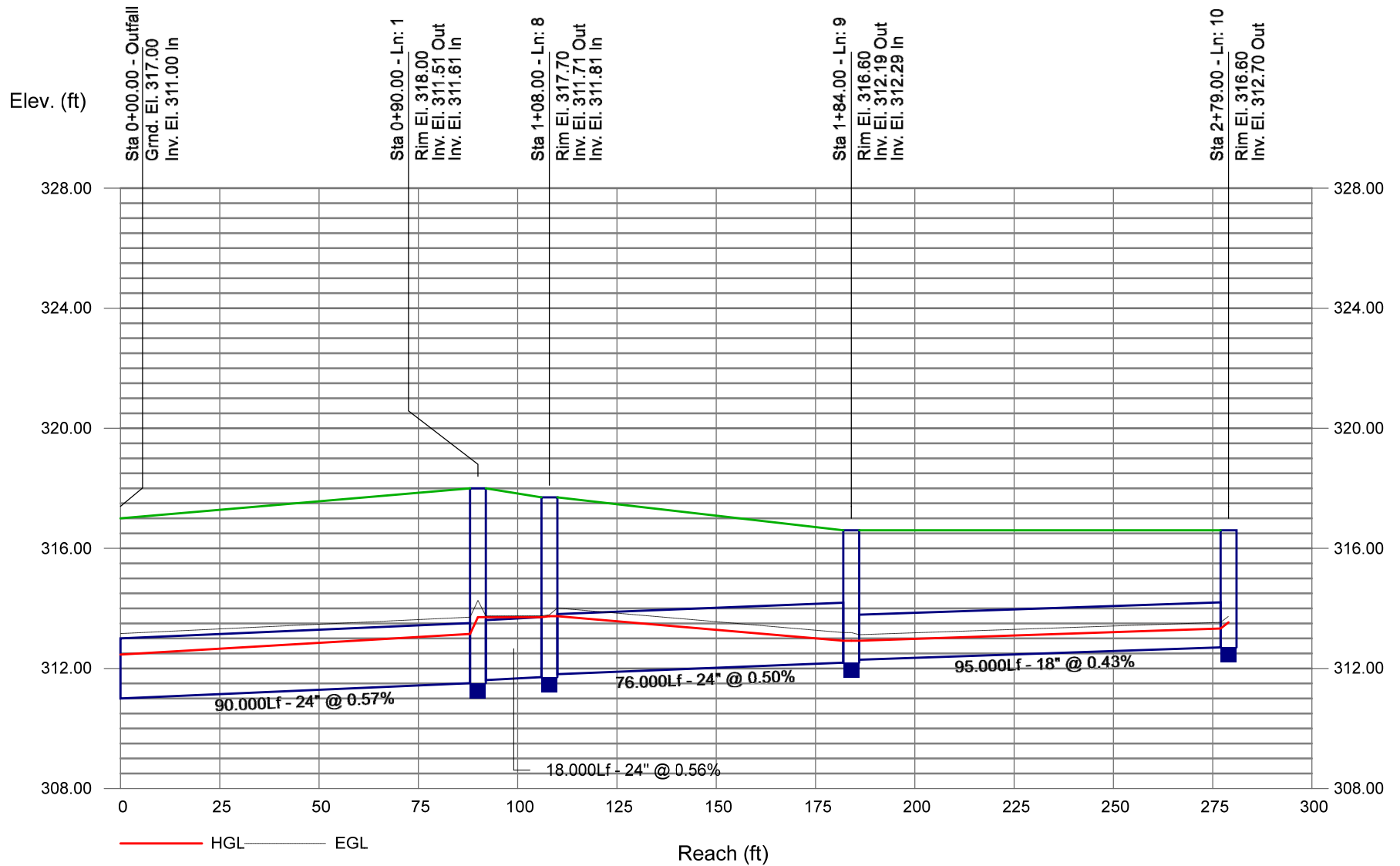
Notes: ; \*\* Critical depth. ; c = cir e = ellip b = box

# Storm Sewer Profile

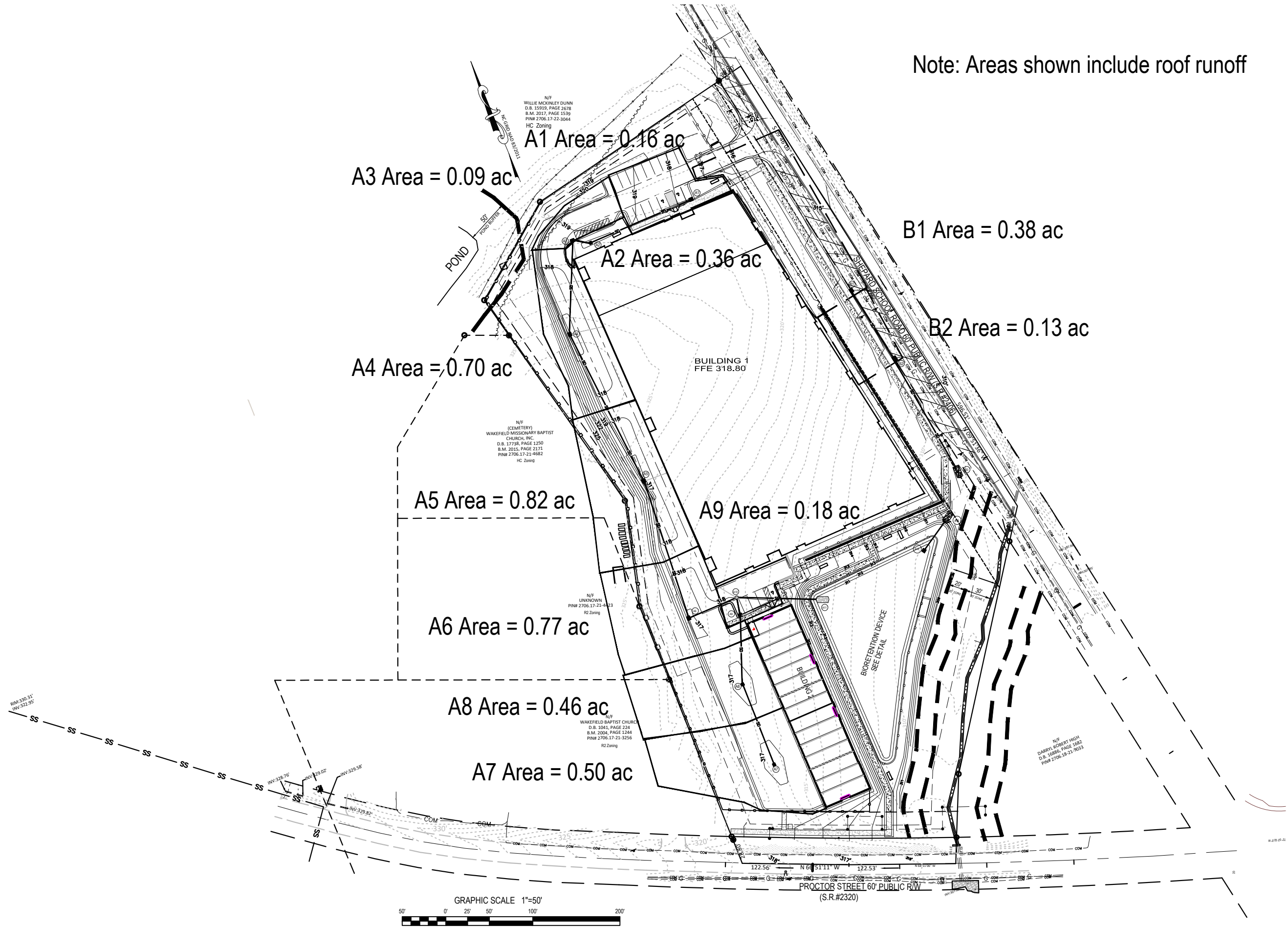




# Storm Sewer Profile



Note: Areas shown include roof runoff



Gettle Engineering and Design, PLLC  
 3616 Waxwing Court,  
 Wake Forest, North Carolina 27587  
 (919) 210-3934 Firm License P-2538

NO.	DATE	REVISION/DESCRIPTION	BY
1	11/05/2024	Per Town Comment	
2		COMMENT	
3		COMMENT	
4		COMMENT	
5		COMMENT	
6		COMMENT	
7		COMMENT	
8		COMMENT	

Drainage Storm Pipe - Site and Shepard School  
 StorageMax (1098359)  
 901 Proctor Street  
 Zebulon, Wake County, North Carolina

Project No. 23001  
 Dwg No. **EX3**