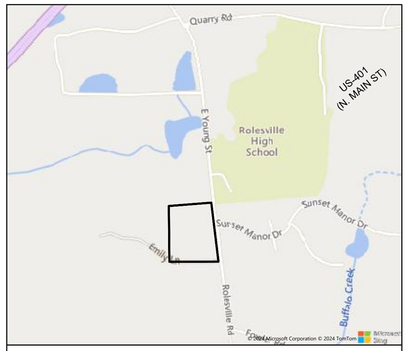

VICINITY MAP
1" = 1000'

CONSTRUCTION DRAWINGS FOR ROLESVILLE RD MIXED USE CID-25-XX

1216 ROLESVILLE ROAD
ROLESVILLE, NORTH CAROLINA
PIN: 1768-33-7689

ORIGINAL SUBMITTAL DATE: 8/1/2025

SITE DATA TABLE

DEVELOPMENT NAME: ROLESVILLE ROAD MIXED USE

SITE ADDRESS: 1216 ROLESVILLE RD

PIN NUMBER(S): 1768-33-7689

TOTAL AREA: 11.78 AC
LESS ROLESVILLE RD R/W DEDICATION AREA: 0.24 AC
NET AREA: 11.54 AC

EXISTING USE: VACANT
PROPOSED USE: MIXED USE

JURISDICTION: TOWN OF ROLESVILLE
CURRENT ZONING DISTRICT: NEIGHBORHOOD CENTER CONDITIONAL ZONING, NC CZ (MA 22-05)

USE BREAKDOWN:
NON-RESIDENTIAL: 1.74 AC (15.1%)
RESIDENTIAL: 9.80 AC (84.9%)

PROPOSED SINGLE FAMILY, ATTACHED LOTS: 68
NC MAX. DENSITY: 8 UNITS/AC
PROPOSED DENSITY: 6.9 UNITS/AC

NC MAX. BLDG. HEIGHT: 35' (TWO STORIES)

NC BUILDING SETBACKS (MIN/MAX):
FRONT: 15'/100'
SIDE: 10'/50' (MIN. 30' BETWEEN STRUCTURES)
REAR: 10'/50'

BICYLCE PARKING REQUIREMENTS:
DWELLING MULTIPLE FAMILY PARKING:
1.0 SPACES PER EVERY 5 UNITS (MAXIMUM OF 30 SPACES)
BICYCLE PARKING REQUIRED:
1 SPACES * 68 UNITS = 13.6 SPACES (ROUND TO 14 SPACES)
BICYCLE PARKING PROVIDED:
14 SPACES

VEHICULAR PARKING REQUIREMENTS:
DWELLING MULTIPLE FAMILY PARKING:
2.0 SPACES PER UNIT PLUS 0.25 GUEST SPACE PER UNIT
PARKING REQUIRED:
2.0 SPACES * 68 UNITS + 0.25 SPACES * 68 UNITS = 153 SPACES
PARKING PROVIDED:
2 SPACES PER DRIVEWAY + 17 GUEST = 153 SPACES
MAIL KIOSK PARKING PROVIDED:
2 SPACES FOR MAIL KIOSK (1 IS ADA ACCESSIBLE)
TOTAL PARKING PROVIDED:
153 SPACES + 2 MAIL KIOSK SPACES = 155 SPACES (1 IS ADA ACCESSIBLE)

REQUIRED OPEN SPACE: 1.73 AC (15%)
PROPOSED OPEN SPACE: 3.31 AC (28.7%); (1) LINEAR PARK/GREENWAY AND (1) GREEN

CALL 48 HOURS BEFORE YOU DIG
North Carolina 811
www.nc811.org
NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

MA-22-05

1216 Rolesville Road

Conditions of Approval

Revised November 14, 2023

1. To the extent compliant with the further requirements of the LDO and TRC, the subject property shall be developed in accordance with that certain plan titled "Sketch Plan" most recently dated 02/27/2023 and prepared by FLM Engineering, Inc. Notwithstanding the foregoing:
   a. The illustrated location of the Two-Story Non-Residential Building shall not be binding but shall instead be determined as part of the Preliminary Subdivision Plat and/or Site Development Plan submittal, review, and approval process.
   b. The minimum heated square footage for the proposed Two-Story Non-Residential Building shall be 20,000 square feet.
   c. In addition to the illustrated northern and southern connectivity, at the time of the Preliminary Subdivision Plat submittal, review, and approval process, a public right-of-way street stub shall be constructed to the western property line adjoining PIN 1768-23-6815. The right-of-way width and construction details of this public street shall be warranted by a Traffic Impact Analysis, the Community Transportation Plan, and Land Development Ordinance based on the expected traffic volumes of this public street.

2. The Single-Family Attached dwelling Units (townhomes) shall adhere to the following architectural conditions:
   a. All elevations of the dwelling units visible to public rights-of-way shall have trim around the windows.
   b. Front elevations of dwelling units visible from public rights-of-way, shall contain at least three of the following:
      - Bay Window
      - Recessed Window
      - Decorative Window
      - Decorative Shake
      - Porch or Stoop
   c. Eaves, front, and rear shall project at least 12 inches from the wall of the structure. Side eaves shall be a minimum of 4-inches. Eaves will be allowed to encroach setbacks as allowed in the LDO.
   d. A varied color palette shall be utilized on residential dwelling unit buildings throughout the development. Each building to include a minimum of three-color families for siding and shall include varied trim, shutter, and accent colors complimenting the siding color.
   e. Poured concrete foundations, monolithic slabs, concrete block foundations, or smooth-faced concrete masonry unit foundations shall be covered by decks, stoops, or be clad in face brick, stone, or some other masonry material imitating these materials visible from the public right-of-way.
   f. Roof lines to match architectural building style. Building rooflines cannot be a single mass; it must be broken up horizontally and vertically. The maximum number of continuous dwelling units within a building without a roof-line break is two. The main roofline will provide a minimum 6:12 pitch and a maximum of 12:12.
   g. Front stoops or porches, if provided, shall be a minimum of 4' in depth.

3. The developer shall construct offsite road improvements as recommended by NCDOT in their *1216 Rolesville Road Traffic Impact Analysis Review Report* dated March 21, 2023.

4. No fewer than one (1) townhome dwelling unit(s) shall be designated on the preliminary subdivision plat and conveyed without consideration to a charitable non-profit organization that provides homes to veterans, public school teachers, and/or persons with specialized training as first responders (e.g. law enforcement officers, firefighters, paramedics, and emergency medical technicians). A townhome dwelling unit conveyed as provided by this paragraph shall entitle the subdivision to a credit equal to the following Town fees: Recreation Development Fee, Transportation Development Fee, and Residential Permit processing fees. Wake County and/or City of Raleigh Utility fees shall not be waived, reimbursed, credited, etc. by the Town of Rolesville.

ATTENTION CONTRACTORS

THE CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER, AND/OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES INSPECTOR AT 919-996-3245 OR HTTPS://CITYWORKS.RALEIGHNC.GOV/PUCONTRACTORS/NEW AND SCHEDULE A PRE-CONSTRUCTION MEETING PRIOR TO BEGINNING ANY CONSTRUCTION. RALEIGH WATER MUST BE CONTACTED AT (919) 996-4540 AT LEAST TWENTY-FOUR HOURS PRIOR TO BEGINNING ANY WORK ACTIVITY AROUND CRITICAL WATER AND SEWER INFRASTRUCTURE.

FAILURE TO NOTIFY THE CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION, WILL RESULT IN THE ISSUANCE OF MONETARY FINES, AND REQUIRE RE-INSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOBSITE, OR ANY OTHER VIOLATION OF RALEIGH WATER WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

SHEET	TITLE
C-1	COVER
C-2 & C-3	STORMWATER CALCULATIONS
C-4	EROSION CONTROL CALCULATIONS
C-5	EXISTING CONDITIONS PLAN
C-6	SITE PLAN
C-7	UTILITY PLAN
C-8	GRADING AND DRAINAGE PLAN
C-9	STORMWATER WETLAND DETAILS
C-10	EROSION & SEDIMENT CONTROL PLAN - PHASE 1
C-11	EROSION & SEDIMENT CONTROL PLAN - PHASE 2
C-12	EROSION & SEDIMENT CONTROL PLAN - PHASE 3
C-13	EROSION & SEDIMENT CONTROL BASIN DETAIL
C-14	ROAD 1 PLAN & PROFILE
C-15	ROAD 2 PLAN & PROFILE
C-16	ROAD 3 PLAN & PROFILE
C-17	ROAD 4 PLAN & PROFILE
C-18	LANDSCAPE PLAN
C-19	ROAD WIDENING PLANS FOR ROLESVILLE ROAD
C-20	ROAD WIDENING DETAILS FOR ROLESVILLE ROAD
C-21 & C-22	SITE DETAILS
C-23	STORM DRAINAGE DETAILS
C-24 & C-25	EROSION & SEDIMENT CONTROL DETAILS
C-26	WATER DETAILS
C-27	SEWER DETAILS
C-28	SELF-INSPECTION RECORDKEEPING & REPORTING
C-29	GROUND STABILIZATION & MATERIALS HANDLING
25-0322A	DUKE ENERGY LIGHTING PLAN

EROSION AND SEDIMENT CONTROL

APPROVED PLAN
DATE_____
PERMIT NO. SEC-_____
Wake County Environmental Services
Sedimentation & Erosion Control
919-856-7400

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 06/23/15

ENVIRONMENTAL CONSULTANT SIGNATURE

PUBLIC
WATER DISTRIBUTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # W-_____

PUBLIC
SEWER COLLECTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # S-_____

OWNER/DEVELOPER:

OPTIMAL DEVELOPMENT LLC
CONTACT: ROBERT SHAAR
924 EVENING SNOW ST
WAKE FOREST, NC 27587
610.295.3699
SHAAR@MYOPTIMALEQUITY.COM

ENGINEER OF RECORD:

FLM ENGINEERING, INC
CONTACT: T. CHASE MASSEY, PE
PO BOX 91727
RALEIGH, NC 27675
919.423.8975
CMASSEY@FLMENGINEERING.COM

SPACE RESERVED FOR TOWN OF ROLESVILLE SIGNATURE BLOCK

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH AND WAKE COUNTY STANDARDS AND SPECIFICATIONS

FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY
7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

COVER

C-1
SHEET 1 OF 30

© 2025 THIS DRAWING SHALL NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF FLM ENGINEERING, INC.

1216 ROLESVILLE ROAD - STORM DRAINAGE CALCULATIONS

FROM	TO	DRAINAGE AREA (sf)	DRAINAGE AREA (ac)	TIME OF CONCENTRATION (min)	10-YEAR RAINFALL INTENSITY (in/hr)	RUNOFF COEFFICIENT	Q DRAINAGE AREA (cfs)	Q TOTAL FLOW (cfs)	SLOPE (ft/ft)	Dtheo (in)	SIZE (in)	Vfull (ft\sec)	LENGTH* (ft)	INLET ELEVATION (ft)	UPPER INVERT (ft)	LOWER INVERT (ft)	PIPE MATERIAL**
RW-1	RW-2	6186	0.14	5.0	7.20	0.90	0.92	0.92	0.0141	6.6	15	6.8	71.00	397.10	392.00	391.00	HPPP
RW-2	CB-100	3128	0.07	5.0	7.20	0.90	0.47	0.47	0.0313	4.4	15	10.1	48.00	396.00	391.00	389.50	HPPP
DI-LOT 62	CB-101	13830	0.32	5.0	7.20	0.60	1.37	1.37	0.0217	7.0	15	8.4	46.00	394.00	390.50	389.50	HPPP
CB-100	CB-101	3176	0.07	5.0	7.20	0.90	0.47	2.31	0.0184	8.8	15	7.7	95.00	394.35	389.50	387.75	HPPP
DI-LOT 61	CB-101	3836	0.09	5.0	7.20	0.60	0.38	0.38	0.0104	5.0	15	5.8	24.00	393.00	387.75	387.50	HPPP
CB-101	CB-102	2927	0.07	5.0	7.20	0.90	0.44	3.13	0.0104	11.0	18	6.6	24.00	393.40	388.00	387.75	HPPP
CB-102	CB-104	24321	0.56	5.0	7.20	0.90	3.62	6.74	0.0116	14.4	24	8.4	86.00	393.40	387.75	386.75	HPPP
DI-LOT 65	CB-302	3159	0.07	5.0	7.20	0.70	0.37	0.37	0.0104	4.9	15	5.8	24.00	394.00	389.50	389.25	HPPP
CB-302	CB-303	5072	0.12	5.0	7.20	0.90	0.75	1.12	0.0104	7.5	15	5.8	24.00	393.80	389.25	389.00	HPPP
CB-303	CB-301	5026	0.12	5.0	7.20	0.90	0.75	1.87	0.0096	9.2	15	5.6	104.00	393.81	389.00	388.00	HPPP
CB-300	CB-301	4417	0.10	5.0	7.20	0.90	0.66	0.66	0.0104	6.1	15	5.8	24.00	393.00	388.50	388.25	HPPP
CB-301	CB-103	6317	0.15	5.0	7.20	0.90	0.94	3.46	0.0682	8.0	15	14.9	44.00	393.00	389.00	386.00	HPPP
CB-103	CB-104	3779	0.09	5.0	7.20	0.90	0.56	4.03	0.0227	10.4	15	8.6	44.00	392.54	389.00	388.00	HPPP
CB-104	CB-106	33104	0.76	5.0	7.20	0.90	4.92	15.69	0.0097	20.4	30	8.9	154.00	392.54	386.75	385.25	HPPP
CB-105	CB-106	5329	0.12	5.0	7.20	0.60	0.53	0.53	0.0104	5.6	15	5.8	24.00	391.04	386.50	386.25	HPPP
CB-106	CB-107	17505	0.40	5.0	7.20	0.90	2.60	18.83	0.0102	21.6	30	9.1	49.00	391.04	385.25	384.75	HPPP
CB-107	CB-108	11147	0.26	5.0	7.20	0.90	1.66	21.01	0.0069	24.2	30	7.5	36.00	390.87	384.75	384.50	HPPP
CB-PARK S	CB-112	2985	0.07	5.0	7.20	0.90	0.44	0.44	0.0078	5.6	15	5.0	32.00	392.71	387.00	386.75	HPPP
DI-LOT 40	CB-112	8660	0.20	5.0	7.20	0.90	1.29	1.29	0.0096	8.0	15	5.6	26.00	391.50	387.00	386.75	HPPP
CB-112	CB-111	2122	0.05	5.0	7.20	0.90	0.32	2.05	0.0071	10.1	15	4.8	35.00	392.51	386.75	386.50	HPPP
CB-110	CB-111	5282	0.12	5.0	7.20	0.90	0.79	0.79	0.0156	6.1	15	7.1	32.00	391.63	387.00	386.50	HPPP
CB-111	CB-108	2850	0.07	5.0	7.20	0.60	0.28	3.12	0.0101	11.0	15	5.7	74.00	391.87	386.50	385.75	HPPP
CB-108	CB-109	3191	0.07	5.0	7.20	0.70	0.37	24.50	0.0104	23.8	30	9.2	24.00	390.99	384.50	384.25	HPPP
CB-109	CB-401	3561	0.08	5.0	7.20	0.90	0.53	25.03	0.0170	21.9	30	11.8	44.00	390.95	384.25	383.50	HPPP
DI-LOT 45	CB-400	3244	0.07	5.0	7.20	0.60	0.32	0.32	0.0114	4.6	15	6.1	22.00	391.00	385.75	385.50	HPPP
CB-400	CB-401	1484	0.03	5.0	7.20	0.90	0.22	0.54	0.0104	5.7	15	5.8	24.00	389.93	385.50	385.25	HPPP
CB-401	CB-403	1790	0.04	5.0	7.20	0.90	0.27	25.84	0.0115	23.8	30	9.7	87.00	389.93	383.50	382.50	HPPP
DI-LOT 48	CB-402	17997	0.41	5.0	7.20	0.60	1.78	1.78	0.0074	9.5	15	4.9	34.00	388.00	383.75	383.50	HPPP
CB-402	CB-403	3396	0.08	5.0	7.20	0.90	0.51	2.29	0.0104	9.8	15	5.8	24.00	388.02	383.50	383.25	HPPP
CB-403	FES-POND 1A	3104	0.07	5.0	7.20	0.60	0.31	28.44	0.0273	21.0	30	14.9	55.00	388.02	382.50	381.00	HPPP
CB-200	CB-201	3455	0.08	5.0	7.20	0.90	0.51	0.51	0.0104	5.6	15	5.8	24.00	395.89	391.75	391.50	HPPP
CB-201	CB-304	3820	0.09	5.0	7.20	0.90	0.57	1.08	0.0284	6.1	15	9.6	44.00	395.91	391.50	390.25	HPPP
CB-304	CB-305	2729	0.06	5.0	7.20	0.60	0.27	1.35	0.0104	8.0	15	5.8	24.00	394.48	390.25	390.00	HPPP
CB-305	CB-203	1435	0.03	5.0	7.20	0.90	0.21	1.57	0.0227	7.3	15	8.6	44.00	394.47	390.00	389.00	HPPP
CB-202	CB-203	1308	0.03	5.0	7.20	0.90	0.19	0.19	0.0100	3.9	15	5.7	25.00	393.59	389.25	389.00	HPPP
CB-203	CB-205	724	0.02	5.0	7.20	0.90	0.11	1.87	0.0345	7.2	15	10.6	87.00	393.83	389.00	386.00	HPPP
CB-204	CB-205	6344	0.15	5.0	7.20	0.60	0.63	0.63	0.0521	4.5	15	13.0	24.00	390.77	386.50	385.25	HPPP
CB-205	CB-207	3487	0.08	5.0	7.20	0.60	0.35	2.84	0.0390	8.3	15	11.2	77.00	390.77	386.00	383.00	HPPP
CB-LOT 22	CB-206	4688	0.11	5.0	7.20	0.60	0.46	0.46	0.0100	5.4	15	5.7	25.00	386.00	383.75	383.50	HPPP
CB-206	CB-207	1817	0.04	5.0	7.20	0.90	0.27	0.74	0.0096	6.5	15	5.6	26.00	387.71	383.50	383.25	HPPP
CB-LOT 52	CB-207	6781	0.16	5.0	7.20	0.60	0.67	0.67	0.0179	5.6	15	7.6	28.00	387.50	383.50	383.00	HPPP
CB-207	CB-404	1832	0.04	5.0	7.20	0.90	0.27	4.52	0.0139	12.0	15	6.7	36.00	387.72	383.00	382.50	HPPP
CB-404	CB-405	3328	0.08	5.0	7.20	0.70	0.39	4.91	0.0104	13.0	18	6.6	24.00	387.45	382.50	382.25	HPPP
CB-405	FES-POND 1B	3392	0.08	5.0	7.20	0.90	0.50	5.41	0.0245	11.5	18	10.1	51.00	387.45	382.25	381.00	HPPP
DI-LOT 1	CB-306	2808	0.06	5.0	7.20	0.60	0.28	0.28	0.0096	4.5	15	5.6	26.00	394.00	390.25	390.00	HPPP
CB-306	CB-307	2389	0.05	5.0	7.20	0.60	0.24	0.52	0.0104	5.6	15	5.8	24.00	394.19	390.00	389.75	HPPP
CB-307	CB-309	1617	0.04	5.0	7.20	0.90	0.24	0.76	0.0138	6.1	15	6.7	109.00	394.17	389.75	388.25	HPPP
DI-LOT 4	CB-308	13352	0.31	5.0	7.20	0.60	1.32	2.08	0.0096	9.6	15	5.6	26.00	393.00	390.25	390.00	HPPP
CB-308	CB-309	4926	0.11	5.0	7.20	0.60	0.49	0.49	0.0104	5.5	15	5.8	24.00	392.70	388.50	388.25	HPPP
DI-NE OS	JB-LOT 10	13767	0.32	5.0	7.20	0.60	1.37	1.37	0.0096	8.2	15	5.6	104.00	391.00	387.75	386.75	HPPP
JB-LOT 10	CB-310	3218	0.07	5.0	7.20	0.60	0.32	1.68	0.0132	8.3	15	6.5	19.00	391.00	386.75	386.50	HPPP
CB-310	CB-311	9515	0.22	5.0	7.20	0.90	1.42	3.10	0.0208	9.6	15	8.2	24.00	390.62	386.50	386.00	HPPP
CB-311	CB-309	12665	0.29	5.0	7.20	0.60	1.26	4.36	0.0066	13.6	18	5.2	151.00	390.62	385.00	384.00	HPPP
CB-309	DI LOT 16	6508	0.15	5.0	7.20	0.90	0.97	6.57	0.0078	15.3	24	6.9	96.00	392.73	384.00	383.25	HPPP
DI-LOT 17	DI-LOT 26	7053	0.16	5.0	7.20	0.60	0.70	7.27	0.0078	15.9	24	6.9	58.00	392.00	383.25	382.80	HPPP
DI-LOT 26	CB-409	13120	0.30	5.0	7.20	0.60	1.30	8.57	0.0078	16.9	24	6.9	64.00	386.90	382.80	382.30	HPPP
CB-409	CB-410	2863	0.07	5.0	7.20	0.90	0.43	9.00	0.0083	17.0	24	7.1	24.00	387.07	382.30	382.10	HPPP
CB-PARK N	CB-413	1362	0.03	5.0	7.20	0.90	0.20	0.20	0.0100	4.0	15	5.7	25.00	385.70	383.25	383.00	HPPP
CB-413	CB-412	7713	0.18	5.0	7.20	0.90	1.15	1.35	0.0071	8.6	15	4.8	70.00	386.54	383.00	382.50	HPPP
CB-411	CB-412	2897	0.07	5.0	7.20	0.90	0.43	0.43	0.0122	5.1	15	6.3	41.00	387.40	383.00	382.50	HPPP
CB-412	CB-410	307	0.01	5.0	7.20	0.90	0.05	1.83	0.0121	8.7	15	6.3	33.00	387.21	382.50	382.10	HPPP
CB-410	CB-408	1015	0.02	5.0	7.20	0.90	0.15	10.97	0.0070	19.0	24	6.5	50.00	387.07	382.10	381.75	HPPP
CB-408	CB-407	1568	0.04	5.0	7.20	0.90	0.23	11.21	0.0070	19.1	24	6.5	50.00	386.87	381.75	381.40	HPPP
CB-406	CB-407	5818	0.13	5.0	7.20	0.60	0.58	0.58	0.0104	5.8	15	5.8	24.00	386.68	382.50	382.25	HPPP
CB-407	FES-POND 1C	1539	0.04	5.0	7.20	0.90	0.23	12.01	0.0077	19.3	24	6.8	52.00	386.68	381.40	381.00	HPPP

*LENGTHS ARE OF THE PIPE ONLY. DOES NOT INCLUDE FLARED END SECTIONS OR OTHER END TREATMENT.

**ADS "HP STORM" DUAL WALL POLYPROPYLENE PIPE.

***INLET ELEVATION FOR CURB INLETS TAKEN AT THE LOW POINT OF VALLEY OF CURB.

CALL 48 HOURS BEFORE YOU DIG

NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH AND WAKE COUNTY STANDARDS AND SPECIFICATIONS

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FLM ENGINEERING

POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

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CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

STORMWATER CALCULATIONS

C-2

SPREAD CALCULATIONS

CATCH BASINS		INLET AREA (sf)*	INLET AREA (ac)	Tc TIME OF CONCENTRATION (min)	2 YR - 5 MIN INTENSITY (in/hr)	Cc RUNOFF COEFFICIENT	Q FLOW (cfs)	Q BYPASS FROM UPSTREAM (cfs)	Q TOTAL (cfs)	Q BYPASS (cfs)	S SLOPE OF ROAD (%)	T SPREAD FROM HYDRAFLOW (ft)
CB #	DOWNSTREAM CB#											
RW-1	RW-2	6186	0.14	5.0	5.62	0.90	0.718	0.000	0.718	0.170	1.56%	5.9
RW-2	CB-100	3128	0.07	5.0	5.62	0.90	0.363	0.170	0.533	0.100	1.56%	5.3
CB-100	CB-101	3176	0.07	5.0	5.62	0.90	0.369	0.100	0.469	0.090	1.00%	5.5
CB-101	CB-103	2927	0.07	5.0	5.62	0.90	0.340	0.090	0.430	0.090	1.00%	5.6
CB-102	CB-104	2879	0.07	5.0	5.62	0.90	0.334	0.000	0.334	0.040	1.00%	4.8
CB-103	CB-105	3779	0.09	5.0	5.62	0.90	0.439	0.090	0.529	0.100	1.00%	5.7
CB-104	CB-106	2407	0.06	5.0	5.62	0.90	0.279	0.040	0.319	0.040	1.00%	4.7
CB-105	CB-400	5329	0.12	5.0	5.62	0.60	0.413	0.100	0.513	0.100	1.00%	5.7
CB-106	CB-107	4198	0.10	5.0	5.62	0.90	0.487	0.040	0.527	0.100	0.75%	6.0
CB-112	CB-111	2122	0.05	5.0	5.62	0.90	0.246	0.000	0.246	0.020	1.00%	4.3
CB-111	CB-108	2850	0.07	5.0	5.62	0.60	0.221	0.020	0.241	0.020	1.00%	4.2
CB-110	CB-109	5282	0.12	5.0	5.62	0.90	0.613	0.000	0.613	0.130	1.00%	6.0
CB-109	CB-401	3561	0.08	5.0	5.62	0.90	0.413	0.130	0.543	0.100	1.00%	5.7
CB-108	CB-107	3191	0.07	5.0	5.62	0.70	0.288	0.020	0.308	0.040	0.75%	4.9
CB-107	SAG	3509	0.08	5.0	5.62	0.90	0.407	0.140	0.547	0.000	SAG	5.4
CB-200	CB-202	3455	0.08	5.0	5.62	0.90	0.401	0.000	0.401	0.060	1.87%	4.6
CB-201	CB-203	3820	0.09	5.0	5.62	0.90	0.444	0.000	0.444	0.070	1.87%	4.8
CB-202	CB-204	1308	0.03	5.0	5.62	0.90	0.152	0.060	0.212	0.010	4.87%	3.0
CB-203	CB-205	724	0.02	5.0	5.62	0.90	0.084	0.070	0.154	0.000	4.87%	2.7
CB-204	CB-206	6344	0.15	5.0	5.62	0.60	0.491	0.010	0.501	0.070	4.87%	4.2
CB-205	CB-207	3487	0.08	5.0	5.62	0.60	0.270	0.000	0.270	0.020	4.87%	3.3
CB-206	CB-406	1817	0.04	5.0	5.62	0.90	0.211	0.070	0.281	0.020	4.87%	3.4
CB-207	CB-404	1832	0.04	5.0	5.62	0.90	0.213	0.020	0.233	0.010	4.87%	3.1
CB-304	CB-302	2729	0.06	5.0	5.62	0.60	0.211	0.000	0.211	0.020	0.80%	4.3
CB-305	CB-303	1435	0.03	5.0	5.62	0.90	0.167	0.000	0.167	0.010	0.80%	3.9
CB-302	CB-300	3832	0.09	5.0	5.62	0.90	0.445	0.020	0.465	0.080	0.80%	5.7
CB-303	CB-301	3802	0.09	5.0	5.62	0.90	0.441	0.010	0.451	0.080	0.80%	5.6
CB-300	SAG	4417	0.10	5.0	5.62	0.90	0.513	0.080	0.593	0.000	SAG	5.6
CB-301	CB-103	3873	0.09	5.0	5.62	0.90	0.450	0.080	0.530	0.110	0.78%	6.0
CB-306	CB-308	2389	0.05	5.0	5.62	0.60	0.185	0.000	0.185	0.010	1.38%	3.6
CB-307	CB-309	1617	0.04	5.0	5.62	0.90	0.188	0.000	0.188	0.010	1.38%	3.6
CB-308	CB-310	4926	0.11	5.0	5.62	0.60	0.381	0.010	0.391	0.060	1.38%	4.8
CB-309	CB-311	4401	0.10	5.0	5.62	0.90	0.511	0.010	0.521	0.100	1.38%	5.3
CB-310	N/A	6296	0.14	5.0	5.62	0.90	0.731	0.060	0.791	0.190	1.38%	6.2
CB-311	N/A	6837	0.16	5.0	5.62	0.60	0.529	0.100	0.629	0.140	1.38%	5.7
CB-400	CB-402	1484	0.03	5.0	5.62	0.90	0.172	0.100	0.272	0.030	1.44%	4.2
CB-401	CB-403	1790	0.04	5.0	5.62	0.90	0.208	0.100	0.308	0.020	1.44%	4.1
CB-402	CB-404	3396	0.08	5.0	5.62	0.90	0.394	0.030	0.424	0.070	1.44%	4.9
CB-403	CB-405	3104	0.07	5.0	5.62	0.60	0.240	0.020	0.260	0.030	1.44%	4.1
CB-404	SAG	3328	0.08	5.0	5.62	0.70	0.301	0.010	0.311	0.000	**SAG**	4.1
CB-405	CB-407	3392	0.08	5.0	5.62	0.90	0.394	0.030	0.424	0.070	1.44%	4.9
CB-413	SAG	7713	0.18	5.0	5.62	0.90	0.896	0.000	0.896	0.000	SAG	5.8
CB-412	CB-410	307	0.01	5.0	5.62	0.90	0.036	0.000	0.036	0.000	0.50%	2.4
CB-411	CB-409	2897	0.07	5.0	5.62	0.90	0.336	0.000	0.336	0.010	0.50%	5.5
CB-410	CB-408	1015	0.02	5.0	5.62	0.90	0.118	0.000	0.118	0.000	0.50%	3.7
CB-409	CB-406	2863	0.07	5.0	5.62	0.90	0.332	0.000	0.332	0.040	0.50%	2.5
CB-408	CB-407	1568	0.04	5.0	5.62	0.90	0.182	0.000	0.182	0.000	0.50%	4.3
CB-406	SAG	5818	0.13	5.0	5.62	0.60	0.450	0.020	0.470	0.000	**SAG**	4.1
CB-407	SAG	1539	0.04	5.0	5.62	0.90	0.179	0.070	0.249	0.000	**SAG**	3.1

*INLET AREA SIZED TO ACCOUNT FOR ROAD DRAINAGE ONLY. PIPES ARE SIZED FOR IMPERVIOUS AREA ASSOCIATED WITH FUTURE COMMERCIAL OUTPARCEL

BOUYANCY CALCULATIONS
STORMWATER WETLAND

TOP OF OUTLET STRUCTURE =	383.50	ft	
BOTTOM =	379.00	ft	
HEIGHT OF RISER =	4.50	ft	
ASSUME 6" WALL THICKNESS			
WEIGHT CALCULATIONS			
Vbase =	0' x 0' x 0' =	0.00	cf
Wbase =	0 cf x 150 lb/cf =	0.00	lbs
Vsump =	4' x 4' x 3.5' =	32.00	cf
Wsump =	56 cf x 150 lb/cf =	4800.00	lbs
Wstruc =	[(5 x 5 x 9.5)-(4 x 4 x 10)] x 150 lb/cf =	7275.00	lbs
TOTAL WEIGHT =		12075.00	lbs
BOUYANCY CALCULATIONS			
Bbase =	0 cf x 62.4 lb/cf =	0.00	lbs
Bstruc =	(5 x 5 x 10.5) x 62.4 lb/cf	7020.00	lbs
TOTAL BOUYANCY =		7020.00	lbs
FACTOR OF SAFETY =		**1.72**	

STORMWATER WETLAND
EMERGENCY SPILLWAY DESIGN AND LINING

UPPER INVERT (ft)	384.00
LOWER INVERT (ft)	383.00
LENGTH (ft)	3.00
CHANNEL SLOPE (ft/ft)	0.333
CHANNEL SECTION	TRAPEZOIDAL
AVG SIDE SLOPE (Z:1)	3.00
BOTTOM WIDTH (ft)	60.00
TOTAL DEPTH (ft)	1.00
WETTED PERIMETER (ft)	60.89
CROSS SECTIONAL AREA (sf)	8.46
100-YEAR/24-HOUR DESIGN FLOW (cfs)	46.94
NORMAL DEPTH (ft)	0.14
AVG VELOCITY (ft/sec)	5.55
SHEAR STRESS (lb/ft2)	2.91
LINER	NAG SC250
PERMISSIBLE SHEAR STRESS (lb/ft2)	10.00
MANNING COEFFICIENT (n)	0.040

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FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
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SCALE ADJUSTMENT

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0 — 1"
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CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

STORMWATER CALCULATIONS

C-3

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WAKE COUNTY CONSTRUCTION SEQUENCE

1. SCHEDULE A PRECONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL CONSULTANT. OBTAIN A LAND-DISTURBING PERMIT.

PHASE 1

2. INSTALL GRAVEL CONSTRUCTION PAD, TEMPORARY DIVERSIONS, SILT FENCE, SKIMMER SEDIMENT BASIN, OR OTHER MEASURES AS SHOWN ON THE APPROVED PLAN. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES. SEED TEMPORARY DIVERSIONS AND BASINS IMMEDIATELY AFTER CONSTRUCTION.
3. CALL WAKE COUNTY FOR AN ONSITE INSPECTION BY THE ENVIRONMENTAL CONSULTANT TO OBTAIN A CERTIFICATE OF COMPLIANCE.
4. BEGIN CLEARING AND GRUBBING. MAINTAIN DEVICES AS NEEDED.
5. BEGIN ROUGH GRADING.

PHASE 2

6. INSTALL STORM SEWER AND PROTECT INLETS WITH INLET PROTECTION, OR OTHER APPROVED MEASURES AS SHOWN ON THE PLAN.
7. ONCE STORM SEWER IS INSTALLED AND DIRECTING RUNOFF TO BASINS.
8. INSTALL WATER AND SEWER UTILITIES.
9. EXCAVATE TRENCH, INSTALL SECTION(S) OF PIPE, BACKFILL AND STABILIZE GROUND DISTURBANCE WITHIN A WORKING DAY.

PHASE 3

10. STABILIZE SITE AS AREAS ARE BROUGHT UP TO FINISH GRADE WITH VEGETATION, PAVING, ETC. SEED AND MULCH DENUDED AREAS PER GROUND STABILIZATION TIME FRAMES.
11. WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL WAKE COUNTY FOR AN INSPECTION BY THE ENVIRONMENTAL CONSULTANT.
12. IF SITE IS APPROVED, REMOVE SILT FENCE, ETC., AND SEED OR STABILIZE ANY RESULTING BARE AREAS. ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS, SHOULD NOW BE INSTALLED.
13. UPON STABILIZATION OF THE ENTIRE DISTURBED AREA, CONVERT SKIMMER BASINS TO STORMWATER WETLANDS AS SHOWN ON THE APPROVED PLANS AND PER THE SEQUENCE ON THIS SHEET.
14. WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE ENVIRONMENTAL CONSULTANT. OBTAIN A CERTIFICATE OF COMPLETION.

BASIN CONVERSION SEQUENCE:

1. SCHEDULE A SITE MEETING WITH THE ENVIRONMENTAL ENGINEER / CONSULTANT TO DETERMINE IF A BASIN CAN BE CONVERTED. INSTALL SILT FENCING OR OTHER TEMPORARY EROSION CONTROL MEASURES AS NEEDED PRIOR TO CONVERSION OF THE BASIN.
2. DEWATER BASIN(S) VIA SILT BAG. REMOVE ACCUMULATED SEDIMENT. FINE GRADE WETLAND IN PREPARATION FOR PLANTING.
3. PERFORM PLANTING PREPARATION, PLANT/SEED, MULCH AND ASPHALT TACK ANY RESULTING BARE AREAS IMMEDIATELY.
4. INSTALL VELOCITY DISSIPATORS AS REQUIRED ON THE EROSION CONTROL PLAN.
5. WHEN SITE IS FULLY STABILIZED, CALL ENVIRONMENTAL ENGINEER / CONSULTANT FOR APPROVAL OF REMOVING REMAINING TEMPORARY EROSION CONTROL MEASURES AND ADVISE ON WHEN SITE CAN BE ISSUED A CERTIFICATE OF COMPLETION.

1216 ROLESVILLE ROAD - SKIMMER SEDIMENT BASIN DESIGN CALCULATIONS

SKIMMER SEDIMENT BASIN DESIGN								SKIMMER SEDIMENT BASIN EFFICIENCY					SKIMMER***		
BASIN NUMBER	DRAINAGE AREA (ac)	DISTURBED AREA (ac)	REQUIRED VOLUME 1800 CF/AC (cf)	DEPTH* (ft)	WIDTH** (ft)	LENGTH** (ft)	VOLUME PROVIDED (cf)**	WEIGHTED RUNOFF COEFFICIENT	10-YEAR RAINFALL INTENSITY (in/hr)	FLOW Q (cfs)	REQUIRED SURFACE AREA 325 SF/CFS (sf)	AREA PROVIDED (sf)	SIZE (in)	ORIFICE RADIUS (in)	ORIFICE DIAMETER (in)
1	7.81	7.81	14,058	-	-	-	17,493	0.5	7.24	28.27	9,188	14,820	2.5	1.2	2.4

*DEPTH FROM BOTTOM OF SKIMMER BASIN TO SPILLWAY ELEVATION

**DIMENSIONS ARE IRREGULAR AND THUS, NOT LISTED; VOLUME AND SURFACE AREA PER HYDROCAD MODEL

**SKIMMER SIZED PER SIZING CALCULATOR AT WWW.FAIRCLOTHSKIMMER.COM AT A DRAWDOWN RATE OF 72 HOURS (3 DAYS) USING REQUIRED VOLUME PER NCDEQ.

TEMPORARY DIVERSION DITCH DESIGN

DITCH NUMBER	RUNOFF COEFFICIENT	10-YEAR RAINFALL INTENSITY (in/hr)	DRAINAGE AREA (acres)	Q (cfs)	LENGTH (ft)	CHANNEL SECTION	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE, Z:1 (ft)	RIGHT SIDE SLOPE, Z:1 (ft)	CHANNEL DEPTH (ft)	CHANNEL SLOPE (ft/ft)	NORMAL DEPTH (ft)	FREEBOARD (ft)	SHEAR STRESS (lb/ft2)	VELOCITY (fps)	MANNING' S n VALUE	TEMPORARY LINER
TD-1	0.50	7.24	3.60	13.03	312.00	TRIANGULAR	1.50	2.00	2.00	2.00	0.003	1.37	0.63	0.26	2.24	0.030	STRAW WITH NET
TD-2	0.50	7.24	1.63	5.90	221.00	TRIANGULAR	-	2.00	2.00	1.50	0.018	0.91	0.59	1.02	3.56	0.030	STRAW WITH NET

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REVISION HISTORY

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SCALE ADJUSTMENT

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0 — 1"

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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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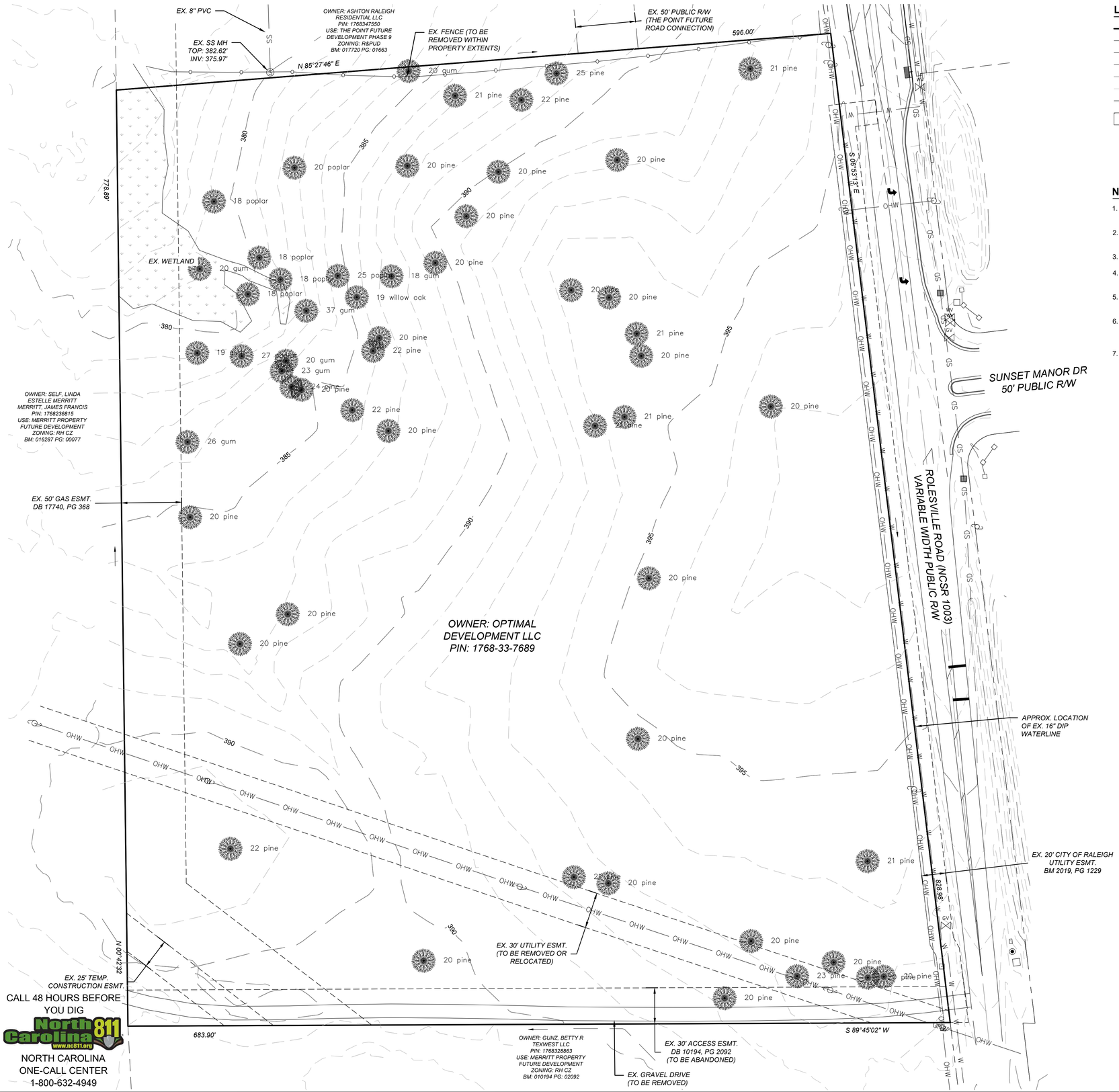
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION CONTROL CALCULATIONS

C-4



LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- 325 EX. MAJOR CONTOUR (5')
- 324 EX. MINOR CONTOUR (1')
- EX. FENCE
- EX. WETLAND
- EX. QUALIFYING EVERGREEN/DECIDUOUS TREE

NOTES

1. SURVEY, BOUNDARY AND EXISTING UTILITY DATA PROVIDED BY CAWTHORNE, MOSS & PANCIERA, P.C. ON NOVEMBER 5, 2024.
2. WETLAND AND STREAM DELINEATION PROVIDED BY PILOT ENVIRONMENTAL ON APRIL 28, 2021.
3. TREE SURVEY PROVIDED BY S&EC ONOCTOBER 29, 2024.
4. THE UTILITIES SHOWN ARE NOT GUARANTEED TO BE A REPRESENTATION OF ALL UTILITIES WITHIN THE PROJECT EXTENT.
5. THE CONTRACTOR SHALL CALL THE NORTH CAROLINA ONE-CALL-CENTER AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
6. THE CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF ALL UTILITIES PRIOR TO BEGINNING WORK AND SHALL USE CARE WHEN OPERATING AROUND EXISTING UTILITIES.
7. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR THE REPAIR OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.

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REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

40 20 0 40
SCALE: 1 INCH = 40 FEET

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
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EXISTING CONDITIONS PLAN

C-5

SHEET 5 OF 30

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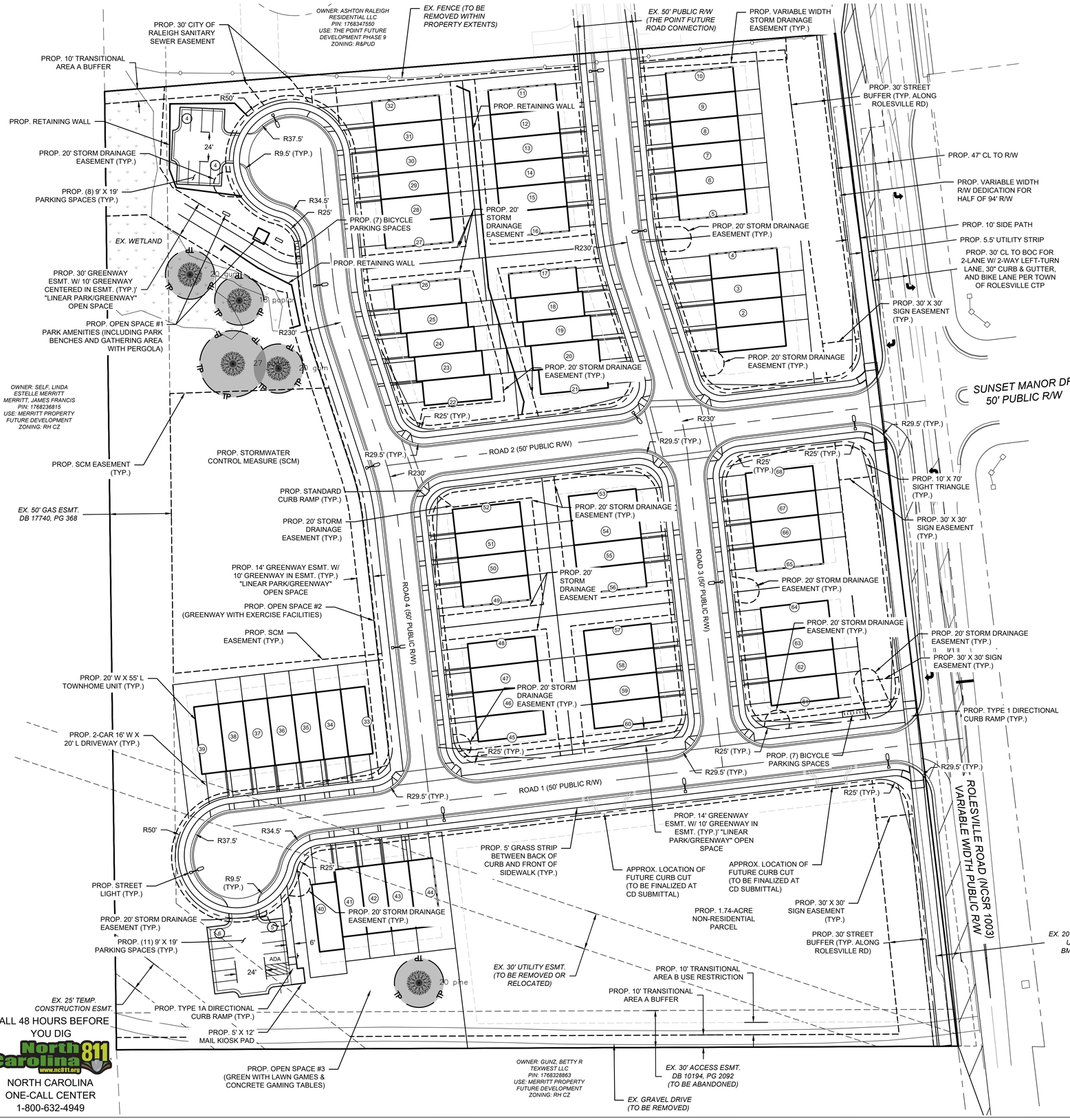

SITE DATA TABLE

DEVELOPMENT NAME: ROLESVILLE ROAD MIXED USE

SITE ADDRESS: 1216 ROLESVILLE RD

PIN NUMBER(S): 1768-33-7689

TOTAL AREA: 11.78 AC
LESS ROLESVILLE RD R/W DEDICATION AREA: 0.24 AC
NET AREA: 11.54 AC

EXISTING USE: VACANT
PROPOSED USE: MIXED USE

JURISDICTION: TOWN OF ROLESVILLE
CURRENT ZONING DISTRICT: NEIGHBORHOOD CENTER CONDITIONAL ZONING, NC CZ (MA 22-05)

USE BREAKDOWN:
NON-RESIDENTIAL: 1.74 AC (15.1%)
RESIDENTIAL: 9.80 AC (84.9%)

PROPOSED SINGLE FAMILY, ATTACHED LOTS: 68
NC MAX. DENSITY: 8 UNITS/AC
PROPOSED DENSITY: 6.9 UNITS/AC

NC MAX. BLDG. HEIGHT: 35' (TWO STORIES)

NC BUILDING SETBACKS (MIN/MAX):
FRONT: 15'/100'
SIDE: 10'/50' (MIN. 30' BETWEEN STRUCTURES)
REAR: 10'/50'

BICYLCE PARKING REQUIREMENTS:
DWELLING MULTIPLE FAMILY PARKING:
1.0 SPACES PER EVERY 5 UNITS (MAXIMUM OF 30 SPACES)
BICYCLE PARKING REQUIRED:
1 SPACES * 68 UNITS = 13.6 SPACES (ROUND TO 14 SPACES)
BICYCLE PARKING PROVIDED:
14 SPACES

VEHICULAR PARKING REQUIREMENTS:
DWELLING MULTIPLE FAMILY PARKING:
2.0 SPACES PER UNIT PLUS 0.25 GUEST SPACE PER UNIT
PARKING REQUIRED:
2.0 SPACES * 68 UNITS + 0.25 SPACES * 68 UNITS = 153 SPACES
PARKING PROVIDED:
2 SPACES PER DRIVEWAY + 17 GUEST = 153 SPACES
MAIL KIOSK PARKING PROVIDED:
2 SPACES FOR MAIL KIOSK (1 IS ADA ACCESSIBLE)
TOTAL PARKING PROVIDED:
153 SPACES + 2 MAIL KIOSK SPACES = 155 SPACES (1 IS ADA ACCESSIBLE)

REQUIRED OPEN SPACE: 1.73 AC (15%)
PROPOSED OPEN SPACE: 2.89 AC (25%); (1) LINEAR PARK/GREENWAY AND (2) GREEN

REQUIRED ACTIVE OPEN SPACE: 0.865 AC
PROPOSED ACTIVE OPEN SPACE: 0.87 AC (SEE TABLE BELOW FOR BREAKDOWN)

ACTIVE OPEN SPACE SUMMARY

NAME	TYPE PER LDO SECTION 6.2.1	SIZE CLASSIFICATION PER LDO SECTION 6.2.1	AREA (AC)
ACTIVE OPEN SPACE #1	GREEN	SMALL	0.37
ACTIVE OPEN SPACE #2	GREENWAY WITH EXERCISE FACILITIES	LARGE	0.38
ACTIVE OPEN SPACE #3	GREEN	SMALL	0.12

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. FENCE
- EX. WETLAND
- PROP. RIGHT-OF-WAY
- PROP. LOT LINES
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. TREE PROTECTION FENCE
- EX. QUALIFYING EVERGREEN/DECIDUOUS TREE TO REMAIN
- PROP. STREET LIGHT

NOTES

1. PROPOSED ADA STALLS AND AISLES SHALL HAVE SLOPES NO STEEPER THAN 1:48 (2%) IN ALL DIRECTIONS.
2. PROPOSED ACCESSIBLE ROUTES SHALL HAVE RUNNING SLOPES NO STEEPER THAN 1:20 (5%) AND CROSS SLOPES NO STEEPER THAN 1:48 (2%).
3. ACCESSIBLE PARKING SPACES ARE THOSE DENOTED BY "ADA" AND ACCESSIBLE AISLES ARE REPRESENTED BY CROSS HATCHING.
4. DIMENSIONS SHOWN ARE TO BACK OF CURB.
5. RADII ARE 4.5' (BACK OF CURB) UNLESS OTHERWISE NOTED.

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY
7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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SITE PLAN

C-6
SHEET 6 OF 30

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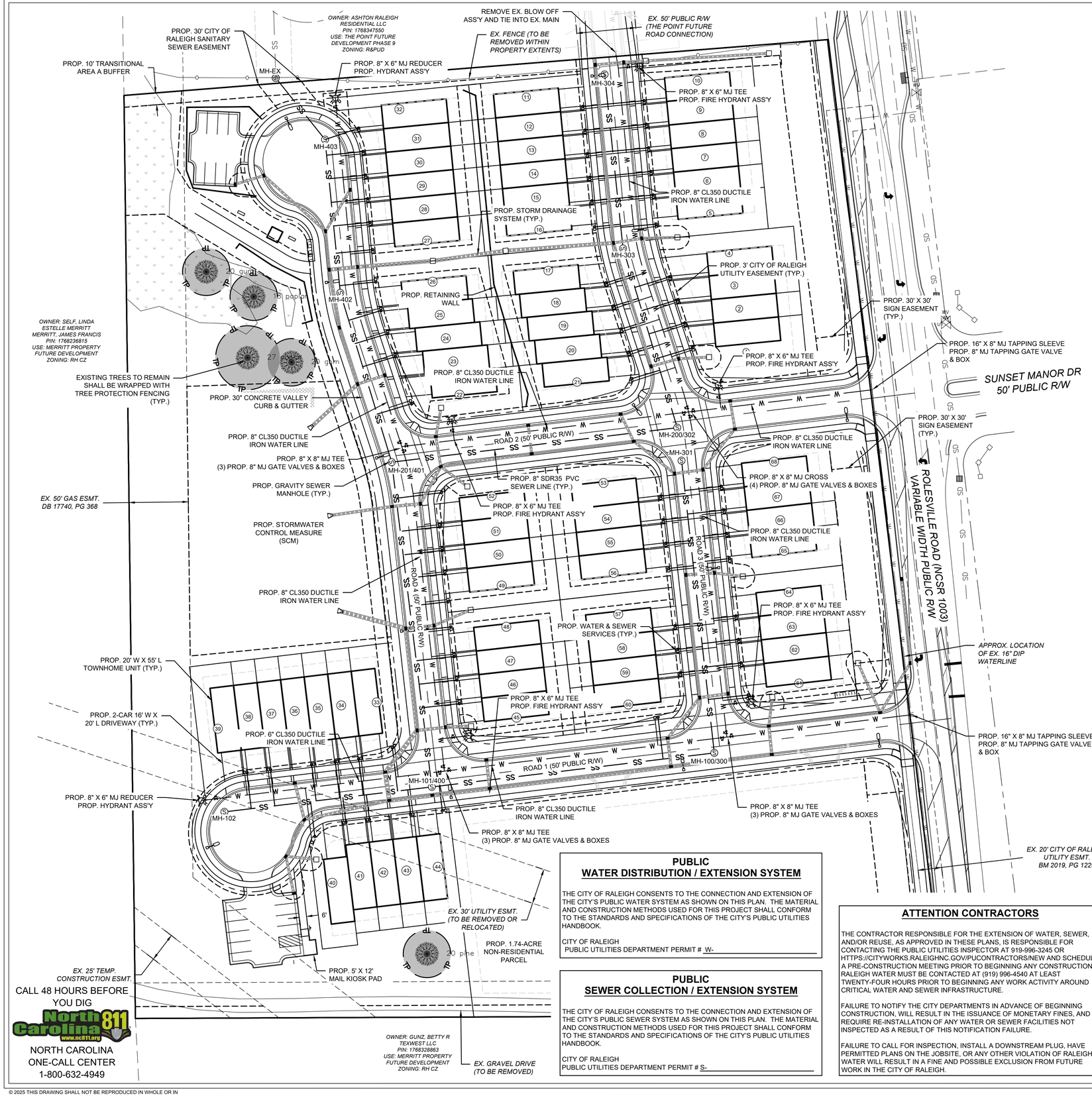

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PUBLIC WATER DISTRIBUTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # W-_____

PUBLIC SEWER COLLECTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # S-_____

ATTENTION CONTRACTORS

THE CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER, AND/OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES INSPECTOR AT 919-996-3245 OR HTTPS://CITYWORKS.RALEIGHNC.GOV/PUCONTRACTORS/NEW AND SCHEDULE A PRE-CONSTRUCTION MEETING PRIOR TO BEGINNING ANY CONSTRUCTION. RALEIGH WATER MUST BE CONTACTED AT (919) 996-4540 AT LEAST TWENTY-FOUR HOURS PRIOR TO BEGINNING ANY WORK ACTIVITY AROUND CRITICAL WATER AND SEWER INFRASTRUCTURE.

FAILURE TO NOTIFY THE CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION, WILL RESULT IN THE ISSUANCE OF MONETARY FINES, AND REQUIRE RE-INSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOBSITE, OR ANY OTHER VIOLATION OF RALEIGH WATER WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. FENCE
- EX. WETLAND
- PROP. RIGHT-OF-WAY
- PROP. LOT LINES
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- EX. QUALIFYING EVERGREEN/DECIDUOUS TREE
- PROP. STREET LIGHT

CITY OF RALEIGH UTILITY NOTES

1. ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: CORPUD HANDBOOK, CURRENT EDITION)
2. UTILITY SEPARATION REQUIREMENTS:
   a. A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
   b. WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE PUBLIC UTILITIES DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
   c. WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
   d. 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER .
   e. MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 24" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER CORPUD DETAILS W-41 & S-49)
   f. ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
3. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE PRECEDED BY A 24 HOUR ADVANCE NOTICE TO THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.
5. 3.0' MINIMUM COVER IS REQUIRED ON ALL WATER MAINS & SEWER FORCEMAINS. 4.0' MINIMUM COVER IS REQUIRED ON ALL REUSE MAINS.
6. IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN REDEVELOPMENT OF A SITE UNLESS OTHERWISE DIRECTED BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT. THIS INCLUDES ABANDONING TAP AT MAIN & REMOVAL OF SERVICE FROM ROW OR EASEMENT PER CORPUD HANDBOOK PROCEDURE.
7. INSTALL COPPER WATER SERVICES WITH METERS LOCATED AT ROW OR WITHIN A 2'X2' WATERLINE EASEMENT IMMEDIATELY ADJACENT. NOTE: IT IS THE APPLICANT'S RESPONSIBILITY TO PROPERLY SIZE THE WATER SERVICE FOR EACH CONNECTION TO PROVIDE ADEQUATE FLOW & PRESSURE.
8. INSTALL PVC SEWER SERVICES @ 1.0% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75 LINEAR FEET MAXIMUM.
9. PRESSURE REDUCING VALVES ARE REQUIRED ON ALL WATER SERVICES EXCEEDING 80 PSI; BACKWATER VALVES ARE REQUIRED ON ALL SANITARY SEWER SERVICES HAVING BUILDING DRAINS LOWER THAN 1.0' ABOVE THE NEXT UPSTREAM MANHOLE.
10. ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDWR, USACE &/OR FEMA FOR ANY RIPARIAN BUFFER, WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION.
11. NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION.
12. GREASE INTERCEPTOR / OIL WATER SEPARATOR SIZING CALCULATIONS & INSTALLATION SPECIFICATIONS SHALL BE APPROVED BY THE CORPUD FOG PROGRAM COORDINATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT TIM BEASLEY AT (919) 996-2334 OR timothy.beasley@raleighnc.gov FOR MORE INFORMATION.
13. CROSS-CONNECTION CONTROL PROTECTION DEVICES ARE REQUIRED BASED ON DEGREE OF HEALTH HAZARD INVOLVED AS LISTED IN APPENDIX-B OF THE RULES GOVERNING PUBLIC WATER SYSTEMS IN NORTH CAROLINA. THESE GUIDELINES ARE THE MINIMUM REQUIREMENTS. THE DEVICES SHALL MEET AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) STANDARDS OR BE ON THE UNIVERSITY OF SOUTHERN CALIFORNIA APPROVAL LIST. THE DEVICES SHALL BE INSTALLED AND TESTED (BOTH INITIAL AND PERIODIC TESTING THEREAFTER) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR THE LOCAL CROSS-CONNECTION CONTROL PROGRAM, WHICHEVER IS MORE STRINGENT. CONTACT JOANIE HARTLEY AT (919) 996-5923 OR joanie.hartley@raleighnc.goc FOR MORE INFORMATION

GENERAL UTILITY NOTES

1. WATER AND SANITARY SEWER SERVICES TO BE COORDINATED WITH HOUSE PLUMBING PLANS.
2. THERE SHALL BE NO INTERCONNECTION BETWEEN CITY SUPPLIED WATER AND WATER FROM OTHER SOURCES INCLUDING WELLS.
5. THE UTILITIES SHOWN ARE NOT GUARANTEED TO BE A REPRESENTATION OF ALL UTILITIES WITHIN THE PROJECT EXTENT.
6. THE CONTRACTOR SHALL CALL THE NORTH CAROLINA ONE-CALL-CENTER AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
7. THE CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF ALL UTILITIES PRIOR TO BEGINNING WORK AND SHALL USE CARE WHEN OPERATING AROUND EXISTING UTILITIES.
8. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR THE REPAIR OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
9. WATER AND SEWER SERVICES SHALL BE CONTAINED WITHIN THE PORTION OF THE PARCEL UNDER TOWN OF ROLESVILLE JURISDICTION. THERE SHALL BE NO INTERCONNECTION WITH THE EXISTING OFF-SITE WELLS.

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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OPTIMAL DEVELOPMENT LLC

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UTILITY PLAN

C-7

SHEET 7 OF 30

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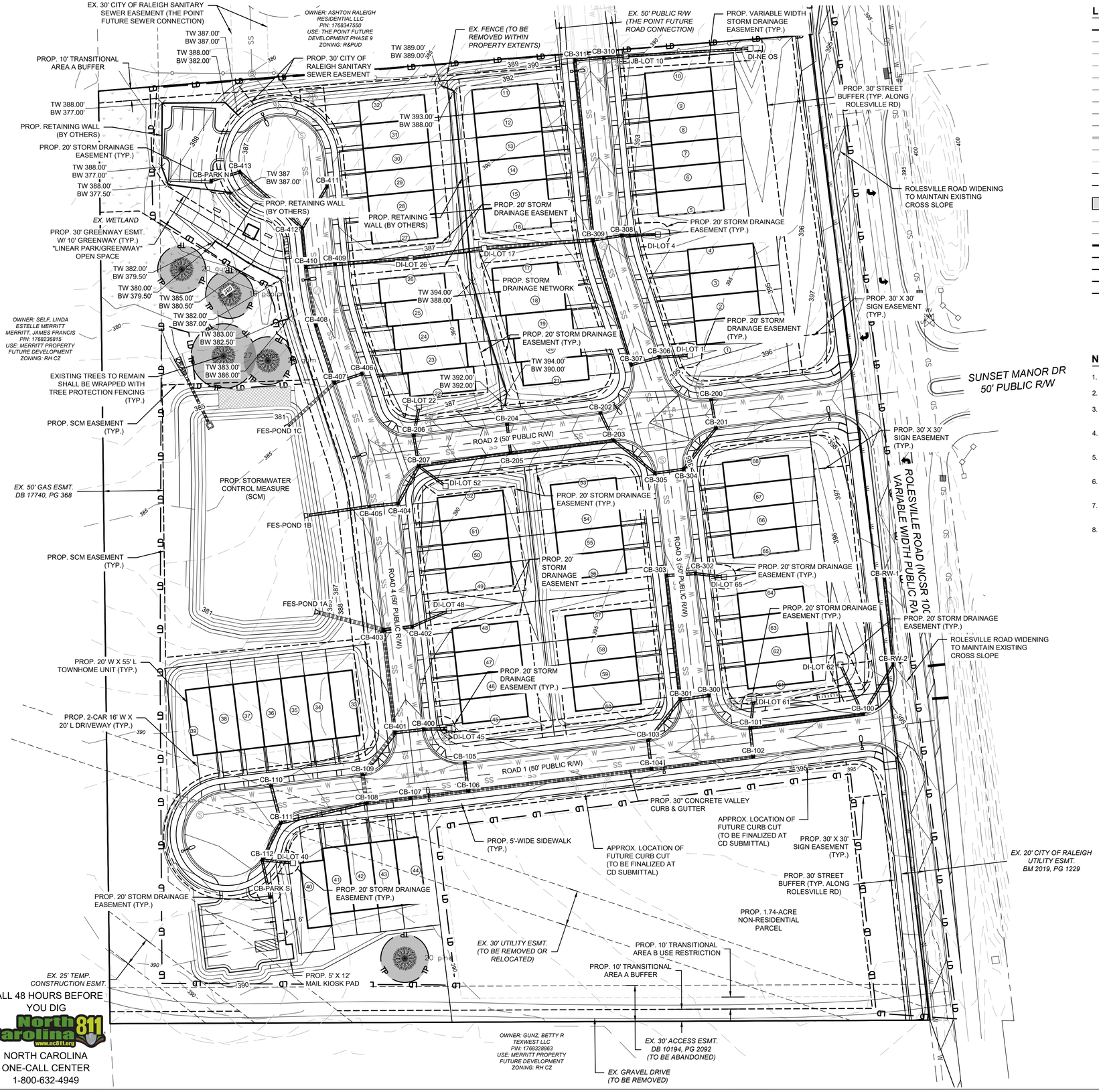

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. CONCRETE
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. MAJOR CONTOUR (5')
- PROP. MINOR CONTOUR (1')
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE PROTECTION FENCE
- EX. QUALIFYING EVERGREEN/DECIDUOUS TREE TO REMAIN
- PROP. STREET LIGHT

KEY

FES = FLARED END SECTION

JB = JUNCTION BOX

YI = YARD INLET

TC = TOP OF CURB

BC = BOTTOM OF CURB

NOTES

1. PROPOSED CONTOURS REPRESENT FINISHED GRADE ELEVATIONS.
2. CUT AND FILL SLOPES ARE 3H:1V UNLESS OTHERWISE NOTED.
3. PROPOSED ADA STALLS AND AISLES SHALL HAVE SLOPES NO STEEPER THAN 1:48 (2%) IN ALL DIRECTIONS.
4. PROPOSED ACCESSIBLE ROUTES SHALL HAVE RUNNING SLOPES NO STEEPER THAN 1:20 (5%) AND CROSS SLOPES NO STEEPER THAN 1:48 (2%).
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GRADING AND DRAINAGE PLAN

C-8

SHEET 8 OF 30

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NOTES

1. THE WETLAND MUST BE STABILIZED WITHIN 14 DAYS OF CONSTRUCTION. CONSTRUCTION SHALL BE SEQUENCED SO THAT VEGETATION CAN BE PLANTED AND THE WETLAND BROUGHT ONLINE WITHIN 14 DAYS. PLANTS MAY NEED TO BE WATERED DURING THIS TIME IF THE DEVICE IS NOT BROUGHT ONLINE THE SAME DAY. STABILIZATION MAY BE IN THE FORM OF FINAL VEGETATION PLANTINGS OR A TEMPORARY MEANS UNTIL THE VEGETATION BECOMES ESTABLISHED. IF USING A TEMPORARY MEANS, CONTRACTOR SHALL PROVIDE A WET HYDROSEED MIX. CONTRACTOR SHALL SCARIFY THE SOIL TO A HALF-INCH PRIOR TO HYDROSEEDING.

2. INLET AND OUTLET CHANNELS SHALL BE PROTECTED FROM SCOUR THAT MAY OCCUR DURING PERIODS OF HIGH FLOW. STANDARD EROSION CONTROL MEASURES SHOULD BE USED.

3. THE STORMWATER WETLAND SHOULD BE STAKED AT THE ONSET OF THE PLANTING SEASON. WATER DEPTHS IN THE WETLAND SHOULD BE MEASURED TO CONFIRM THE ORIGINAL PLANTING ZONES. AT THIS TIME, IT MAY BE NECESSARY TO MODIFY THE PLANTING PLAN TO REFLECT ALTERED DEPTHS OR THE AVAILABILITY OF WETLAND PLANT STOCK. CONTRACTOR SHALL COORDINATE PLANTINGS, PLANTING ZONES AND WATER DEPTHS WITH THE ENGINEER. SURVEYED PLANTING ZONES SHOULD BE MARKED ON AN "AS-BUILT" OR RECORD DESIGN PLAN AND LOCATED IN THE FIELD USING STAKES OR FLAGS.

4. THE WETLAND DRAIN SHOULD BE FULLY OPENED FOR NO MORE THAN 3 DAYS PRIOR TO THE PLANTING DATE (WHICH SHOULD COINCIDE WITH THE DELIVERY DATE FOR THE WETLAND PLANT STOCK) TO PRESERVE SOIL MOISTURE AND WORKABILITY.

5. NURSERY STOCK SHALL BE TRANSPLANTED FROM LOCAL AQUATIC PLANT NURSERIES. THE OPTIMAL PERIOD FOR TRANSPLANTING EXTENDS FROM EARLY APRIL TO MID-JUNE SO THAT THE WETLAND PLANTS WILL HAVE A FULL GROWING SEASON TO BUILD THE ROOT RESERVES NEEDED TO SURVIVE THE WINTER. HOWEVER, SOME SPECIES MAY BE PLANTED SUCCESSFULLY IN EARLY FALL. CONTRACTOR SHALL CONTACT NURSERY WELL IN ADVANCE OF CONSTRUCTION TO ENSURE THAT THEY WILL HAVE THE DESIRED SPECIES AVAILABLE.

6. POST-NURSERY CARE OF WETLAND PLANTS IS VERY IMPORTANT IN THE INTERVAL BETWEEN DELIVERY OF THE PLANTS AND THEIR SUBSEQUENT INSTALLATION BECAUSE THEY ARE PRONE TO DESICCATION. STOCK SHOULD BE FREQUENTLY WATERED AND SHADED.

7. SHWT TO BE EVALUATED PRIOR TO CONSTRUCTION. IF SHWT IS WITHIN 6" OF PPE ELEVATION, A CLAY LINER WILL NOT BE REQUIRED. OTHERWISE, INSTALLATION OF A 6" CLAY LINER WILL BE REQUIRED. CLAY LINER SHALL HAVE A MINIMUM 15% PASSING THE #200 SIEVE AND A MAX PERMEABILITY OF 1 X 10^{-5} CM/SEC. ACCEPTABLE ALTERNATIVES INCLUDE A 30 MIL POLY-LINER OR A BENTONITE LINER.

8. GRADES SHOWN REPRESENT FINISH GRADE ELEVATIONS. TO ACHIEVE FINISH GRADE ELEVATIONS, INSTALL 4" OF TOPSOIL.

9. PROVIDE PLANTS PER TABLE ON THIS SHEET. DAM STRUCTURE AND PERIMETER FILL SLOPES SHALL BE PLANTED WITH NON-CLUMPING TURF GRASS. TREES AND WOODY SHRUBS NOT ALLOWED.

10. CATTAILS SHALL NOT BE PLANTED IN WETLAND.

OUTLET STRUCTURE NOTES & SPECIFICATIONS

1. WATERTIGHT SEAL SHALL BE PROVIDED AT RISER/BARREL INTERFACE. PERVIOUS MATERIAL SUCH AS SAND, GRAVEL, OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE PIPE OR ANTI-SEEP COLLAR. FILL MATERIAL AROUND THE RISER/BARREL STRUCTURE SHALL BE PLACED IN 4" LAYERS AND COMPACTED TO THE SAME DENSITY AS THE ADJACENT EMBANKMENT.

2. OUTLET STRUCTURE SHALL BE PROVIDED WITH STEPS 1'-2" ON CENTER. STEPS SHALL BE IN ACCORDANCE WITH NCDOT STD. 840.66.

3. ALL POURED CONCRETE SHALL BE A MINIMUM 3,000 PSI (28 DAY) UNLESS OTHERWISE NOTED.

4. NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED AROUND EACH JOINT OF THE CMP OUTLET BARREL IN 2' WIDE STRIPS CENTERED ON JOINT. FABRIC SHALL BE AMOCO STYLE 4553 POLYPROPYLENE NON-WOVEN NEEDLE PUNCHED OR APPROVED EQUAL (NON-WOVEN FABRIC).

5. INSTALL ANTI-SEEP COLLAR AT MIDPOINT OF OUTLET PIPE. CONCRETE SHALL BE 3,000 PSI (28 DAYS), EXTENDING A MINIMUM OF 8" AROUND ALL SIDES OF PIPE, AND REINFORCED WITH #4 REBAR 12" O.C. EACH WAY. MINIMUM BEARING CAPACITY BENEATH COLLAR SHALL BE 2,000 PSF.

STORMWATER WETLAND MAINTENANCE NOTES

1. THE LANDSCAPE PROFESSIONAL MANAGING THE WETLAND MUST UNDERSTAND THE BIOLOGICAL REQUIREMENTS OF THE PLANTS AND MANAGE WATER LEVELS APPROPRIATELY TO PROVIDE FOR THEIR NEEDS.

2. ALTHOUGH WETLAND PLANTS REQUIRE WATER FOR GROWTH AND REPRODUCTION, THEY CAN BE KILLED BY DROWNING IN EXCESSIVELY DEEP WATER. USUALLY, INITIAL GROWTH IS BEST WITH TRANSPLANTED PLANTS IN WET, WELL-AERATED SOIL. OCCASIONAL INUNDATION FOLLOWED BY EXPOSURE TO AIR OF THE MAJORITY OF THE VEGETATION ENABLES THE PLANTS TO OBTAIN OXYGEN AND GROW OPTIMALLY. CONVERSELY, FREQUENT SOIL SATURATION IS IMPORTANT FOR WETLAND PLANT SURVIVAL.

3. DRAMATIC SHIFTS CAN OCCUR AS PLANT SUCCESSION PROCEEDS. THE PLANT COMMUNITY REFLECTS MANAGEMENT AND CAN INDICATE PROBLEMS OR THE RESULTS OF IMPROVEMENTS. FOR EXAMPLE, A REQUIREMENT OF SUBMERGED AQUATIC PLANTS, SUCH AS PONDWEED (POTAMOGETON SPP.), IS LIGHT PENETRATION INTO THE WATER COLUMN. THE DISAPPEARANCE OF THESE PLANTS MAY INDICATE INADEQUATE WATER CLARITY. THE APPEARANCE OF INVASIVE SPECIES OR DEVELOPMENT OF A MONOCULTURE IS ALSO A SIGN OF A PROBLEM WITH THE AQUATIC/SOIL/VEGETATIVE REQUIREMENTS. FOR INSTANCE, MANY INVASIVE SPECIES CAN QUICKLY SPREAD AND TAKE OVER A WETLAND. IF CATTAILS BECOME INVASIVE, THEY CAN BE REMOVED BY A LICENSED AQUATIC PESTICIDE APPLICATOR BY WIPING AQUATIC GLYPHOSATE, A SYSTEMIC HERBICIDE, ON THE CATTAILS.

4. UNLIKE MAINTENANCE REQUIREMENTS FOR WET OR DRY STORMWATER PONDS, SEDIMENT SHOULD ONLY BE SELECTIVELY REMOVED FROM STORMWATER WETLANDS, PRIMARILY FROM THE FOREBAY. SEDIMENT REMOVAL DISTURBS STABLE VEGETATION COVER AND DISRUPTS FLOWPATHS THROUGH THE WETLAND. THE TOP FEW INCHES OF SEDIMENT SHOULD BE STOCKPILED SO THAT IT CAN BE REPLACED OVER THE SURFACE OF THE WETLAND AFTER THE COMPLETION OF SEDIMENT REMOVAL TO RE-ESTABLISH THE VEGETATIVE COVER USING ITS OWN SEED BANK. ACCUMULATED SEDIMENT SHOULD BE REMOVED FROM AROUND INLET AND OUTLET STRUCTURES.

STORMWATER WETLAND PLANTING TABLE

QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
SHALLOW WATER PLANTINGS (AREA = 6,176 SQ. FT.; 50 HERBACEOUS PLANTS PER 200 SQ. FT.; 1,544 TOTAL PLANTS REQ.)				
308	ACORUS SUBCORDATUM	SWEETFLAG	4 CU. IN.	2' O.C.
309	HYDROLEA QUADRIVALVIS	WATERPOD	4 CU. IN.	2' O.C.
309	IRIS VIRGINICA	BLUE FLAG IRIS	4 CU. IN.	2' O.C.
309	SAGITTARIA LATIFOLIA	DUCK POTATO	4 CU. IN.	2' O.C.
309	SAURURUS CERNUUS	LIZARD'S TAIL	4 CU. IN.	2' O.C.
SHALLOW LAND PLANTINGS (AREA = 6,762 SQ. FT.; 50 HERBACEOUS PLANTS PER 200 SQ. FT.; 1,690 TOTAL PLANTS REQ.)				
563	CAREX TENERA	QUILL SEDGE	4 CU. IN.	2' O.C.
563	HIBISCUS COCCINEUS	SCARLET ROSE MALLOW	4 CU. IN.	2' O.C.
564	LOBELIA ELONGATA	LONGLEAF LOBELIA	4 CU. IN.	2' O.C.
DEEP POOL				
50	ELEOCHARIS ACICULARIS	NEEDLE SPIKERUSH	BARE ROOT	N/A
50	NUPHAR LUTEA SSP. ADVENA	YELLOW POND-LILY	BARE ROOT	N/A

CALL 48 HOURS BEFORE YOU DIG

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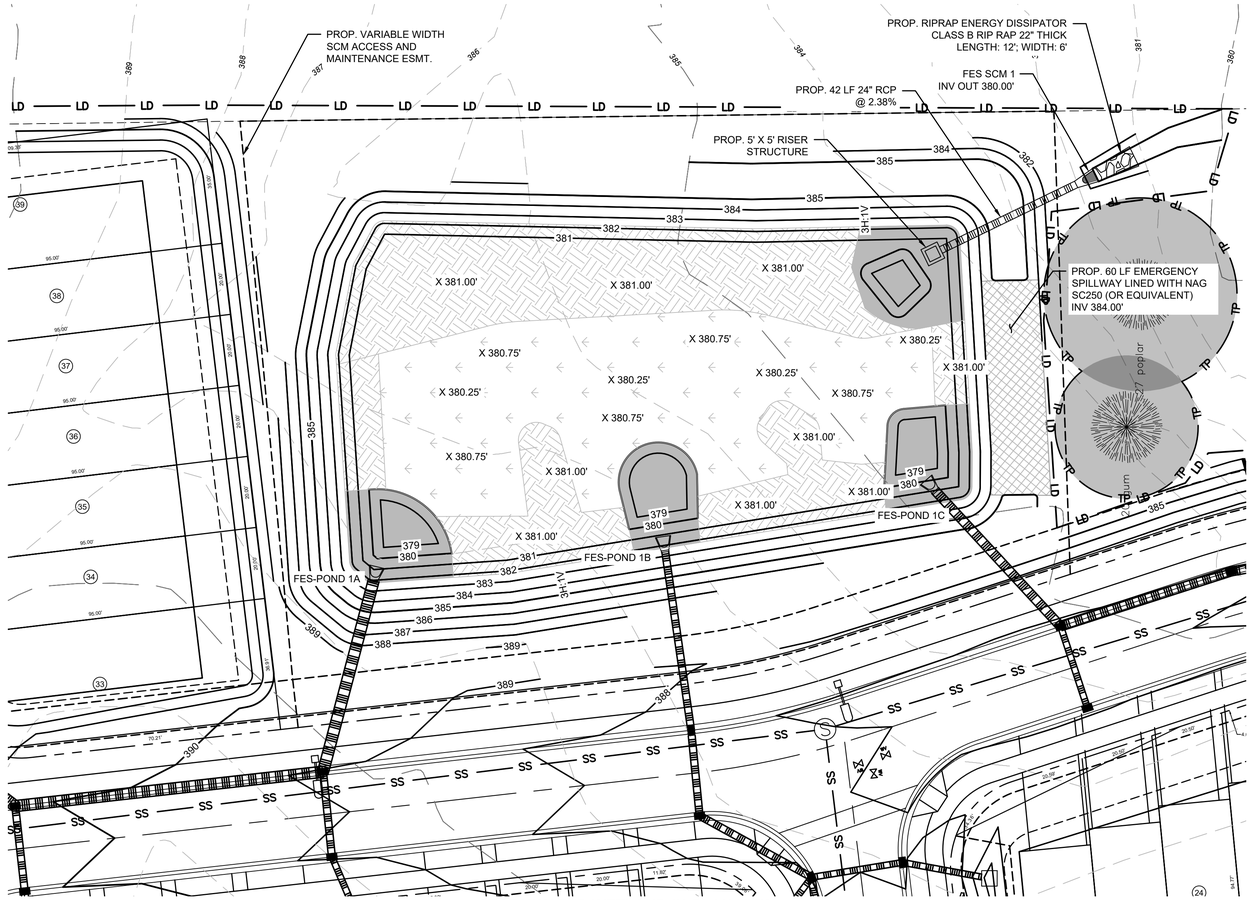
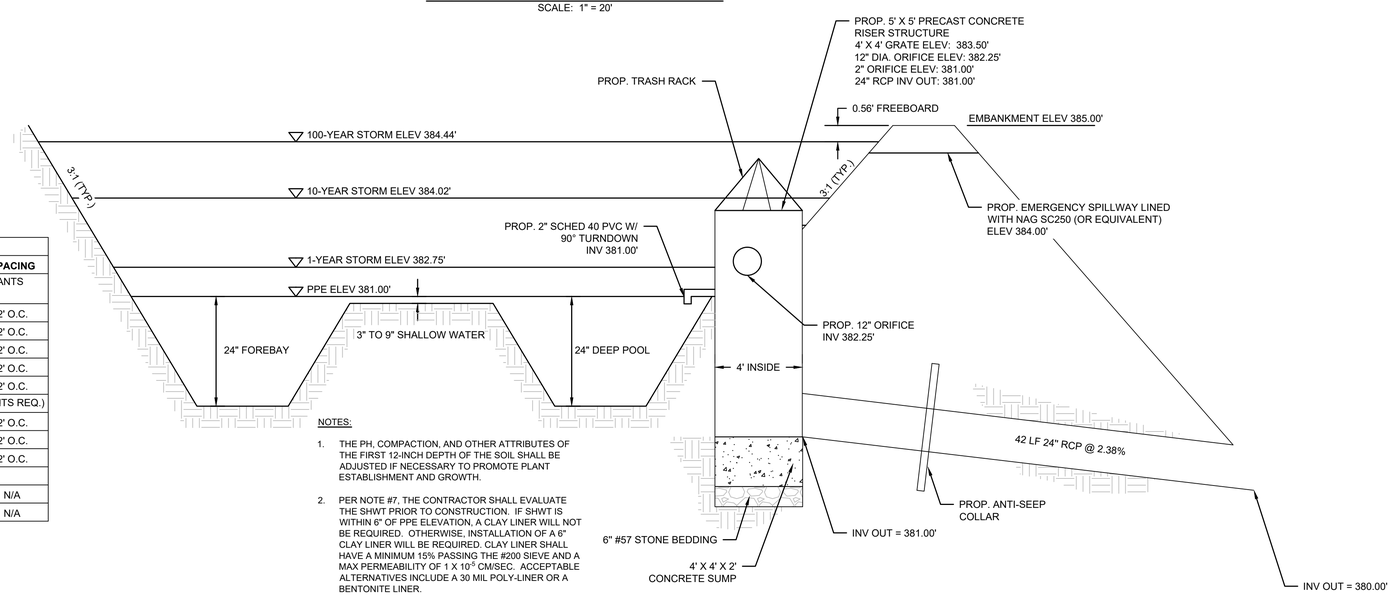


STORMWATER WETLAND #1 PLAN VIEW
SCALE: 1" = 20'



NOTES:

1. THE PH, COMPACTION, AND OTHER ATTRIBUTES OF THE FIRST 12-INCH DEPTH OF THE SOIL SHALL BE ADJUSTED IF NECESSARY TO PROMOTE PLANT ESTABLISHMENT AND GROWTH.

2. PER NOTE #7, THE CONTRACTOR SHALL EVALUATE THE SHWT PRIOR TO CONSTRUCTION. IF SHWT IS WITHIN 6" OF PPE ELEVATION, A CLAY LINER WILL NOT BE REQUIRED. OTHERWISE, INSTALLATION OF A 6" CLAY LINER WILL BE REQUIRED. CLAY LINER SHALL HAVE A MINIMUM 15% PASSING THE #200 SIEVE AND A MAX PERMEABILITY OF 1 X 10^{-5} CM/SEC. ACCEPTABLE ALTERNATIVES INCLUDE A 30 MIL POLY-LINER OR A BENTONITE LINER.

STORMWATER WETLAND #1 CROSS-SECTION
NOT TO SCALE

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- 400 EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- EX. FEMA FLOODPLAIN BOUNDARY
- EX. CHANNEL/STREAM
- EX. CHANNEL / STREAM BUFFER
- FHS EX. FLOOD HAZARD SOILS
- EX. WETLAND
- EX. SUITABLE SOILS
- PROP. RIGHT-OF-WAY
- PROP. LOT LINES
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. STORM SEWER
- 400 PROP. MAJOR CONTOUR (5')
- 399 PROP. MINOR CONTOUR (1')
- LD LD PROP. LIMIT OF DISTURBANCE
- SHALLOW LAND AREA
- SHALLOW WATER AREA
- DEEP POOL AREA

FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

40 20 0 40
SCALE: 1 INCH = 40 FEET

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

STORMWATER WETLAND DETAILS

C-9

SHEET 9 OF 30

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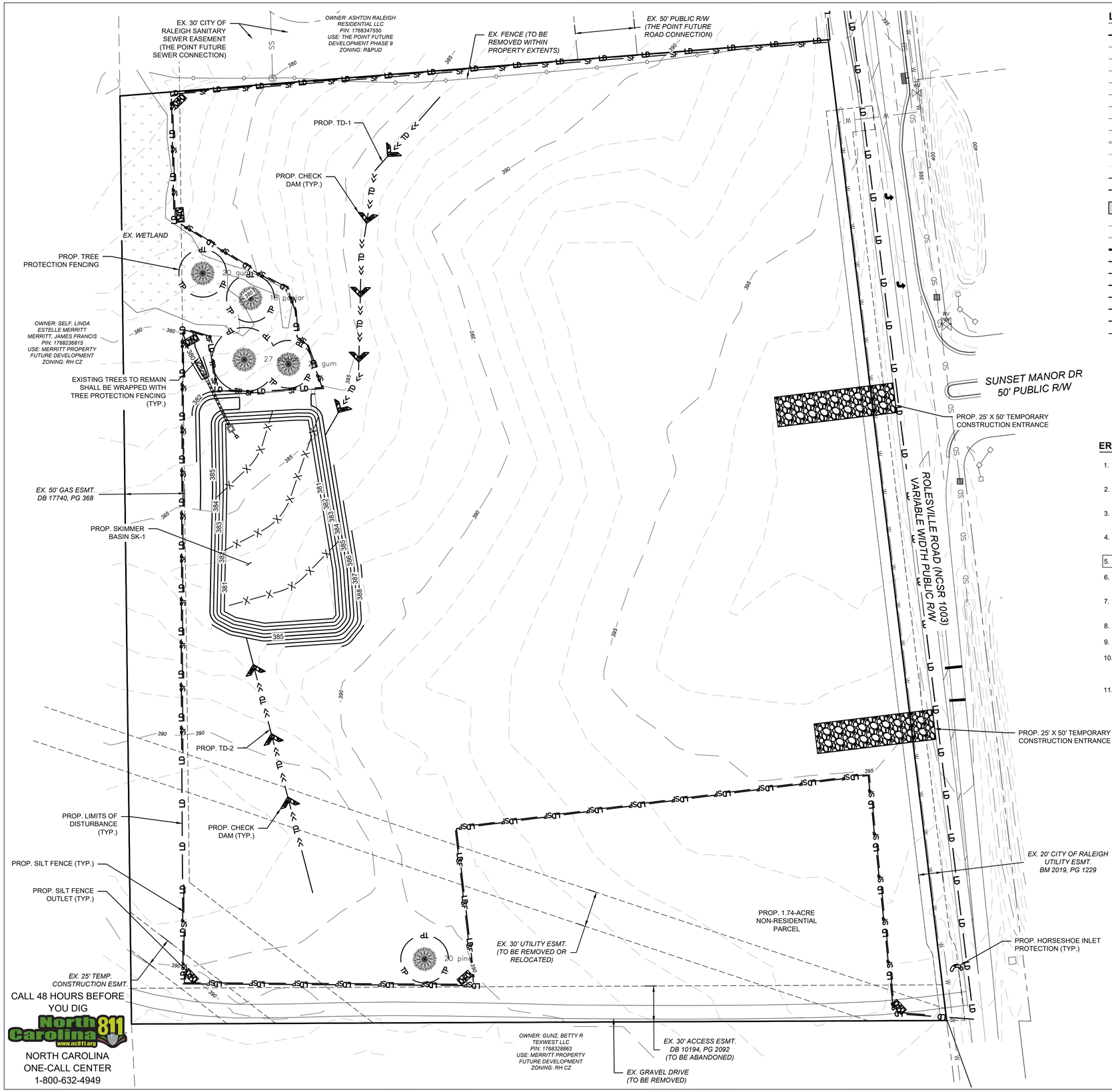

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LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. CONCRETE
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. MAJOR CONTOUR (5')
- PROP. MINOR CONTOUR (1')
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE PROTECTION FENCE
- PROP. TEMPORARY DIVERSION DITCH
- PROP. SILT FENCE
- PROP. BAFFLE
- PROP. FAIRCLOTH SKIMMER
- PROP. CONSTRUCTION ENTRANCE
- PROP. HORSESHOE INLET PROTECTION
- PROP. SILT FENCE OUTLET
- PROP. LOCATION OF SILT BAG
- PROP. TEMPORARY ROCK CHECK DAM

KEY

FES = FLARED END SECTION

JB = JUNCTION BOX

YI = YARD INLET

TC = TOP OF CURB

BC = BOTTOM OF CURB

EROSION CONTROL NOTES

1. ALL LAND DISTURBING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH WAKE COUNTY STANDARDS.
2. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE MAINTAINED IN PROPER WORKING CONDITION DURING THE PERIOD OF CONSTRUCTION.
3. ADDITIONAL EROSION CONTROL MEASURES AND/OR MODIFICATIONS TO PROPOSED MEASURES MAY BE NECESSARY DEPENDING ON ACTUAL SITE CONDITIONS.
4. WAKE COUNTY CONSTRUCTION SEQUENCE AND BASIN CONVERSION SEQUENCES ON SHEET C-#.
5. THE TOTAL DISTURBED AREA IS 9.5 ACRES.
6. SILT FENCE OUTLETS TO BE PLACED AS SHOWN AND AT LOW POINTS ALONG SILT FENCE AS NECESSARY.
7. TEMPORARY DIVERSIONS TO BE UTILIZED AS DIVERSION DITCHES DURING CONSTRUCTION PER CALCULATIONS ON SHEET C-4.
8. SEE EROSION CONTROL CALCULATIONS AND SKIMMER BASIN SIZING ON SHEET C-4.
9. SKIMMER BASIN GRADES SHOWN ARE 3H:1V UNLESS OTHERWISE NOTED.
10. CONTRACTOR SHALL ESTABLISH GROUND COVER IMMEDIATELY AFTER DISTURBANCE DURING CONSTRUCTION OF PERMANENT SWALES AND OTHER IMPROVEMENTS ON THE LOW SIDES OF THE SITE.
11. PROVIDE STABLE TRANSITION AT ENTRANCES TO SKIMMER BASIN 1 - LINE THE SLOPE AT EACH ENTRANCE WITH NAG SC250 OR APPROVED EQUAL.

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

40 20 0 40
SCALE: 1 INCH = 40 FEET

N

SCALE ADJUSTMENT
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0 1"
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CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

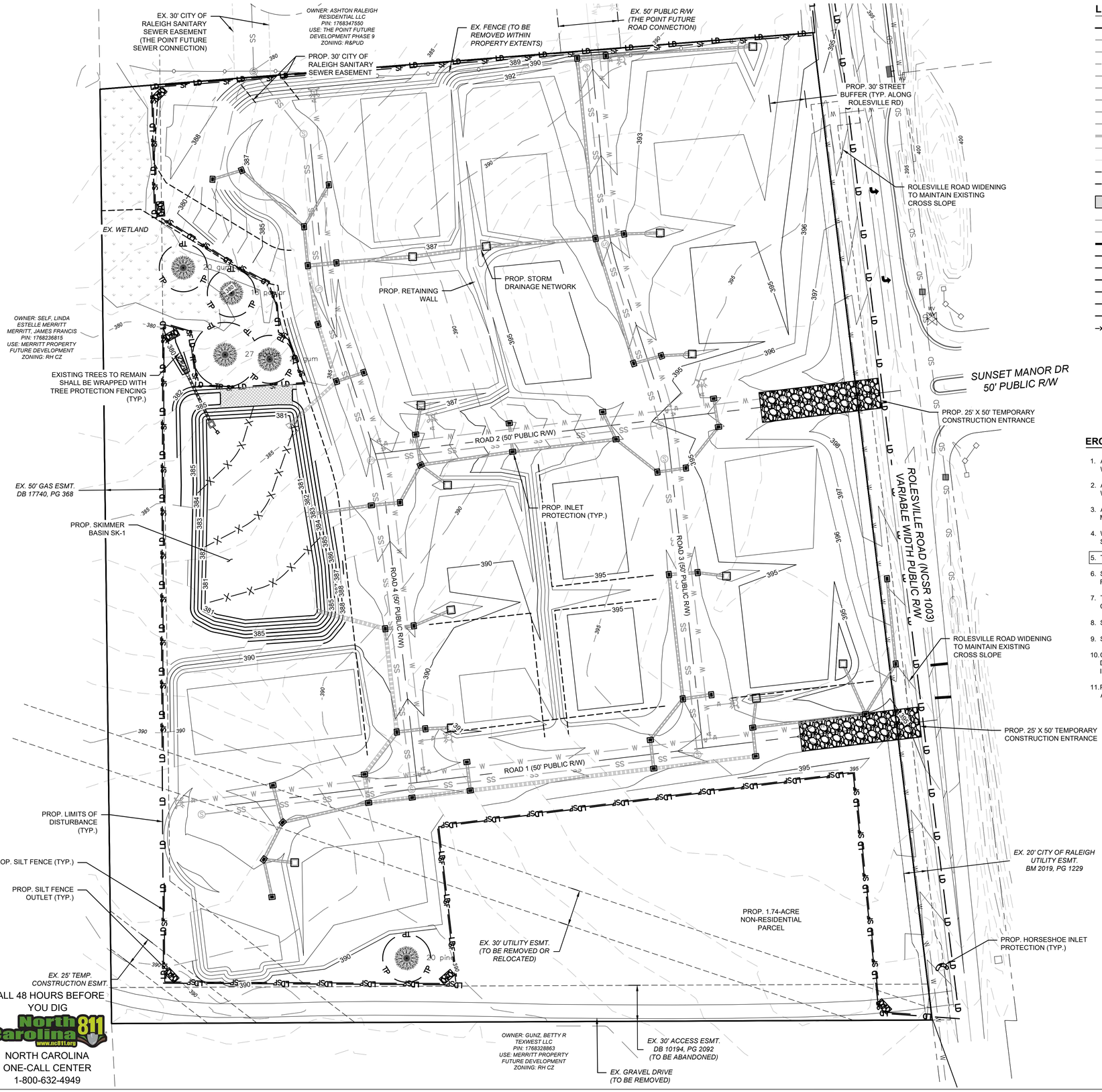
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION & SEDIMENT CONTROL PLAN - PHASE 1

C-10

SHEET 10 OF 30



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1-800-632-4949

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. CONCRETE
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. MAJOR CONTOUR (5')
- PROP. MINOR CONTOUR (1')
- PROP. LIMIT OF DISTURBANCE
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- PROP. CONSTRUCTION ENTRANCE
- PROP. HORSESHOE INLET PROTECTION
- PROP. SILT FENCE OUTLET
- PROP. LOCATION OF SILT BAG
- PROP. TEMPORARY ROCK CHECK DAM

KEY

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11. PROVIDE STABLE TRANSITION AT ENTRANCES TO SKIMMER BASIN 1 - LINE THE SLOPE AT EACH ENTRANCE WITH NAG SC250 OR APPROVED EQUAL.

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NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION & SEDIMENT CONTROL PLAN - PHASE 2

C-11

SHEET 11 OF 30

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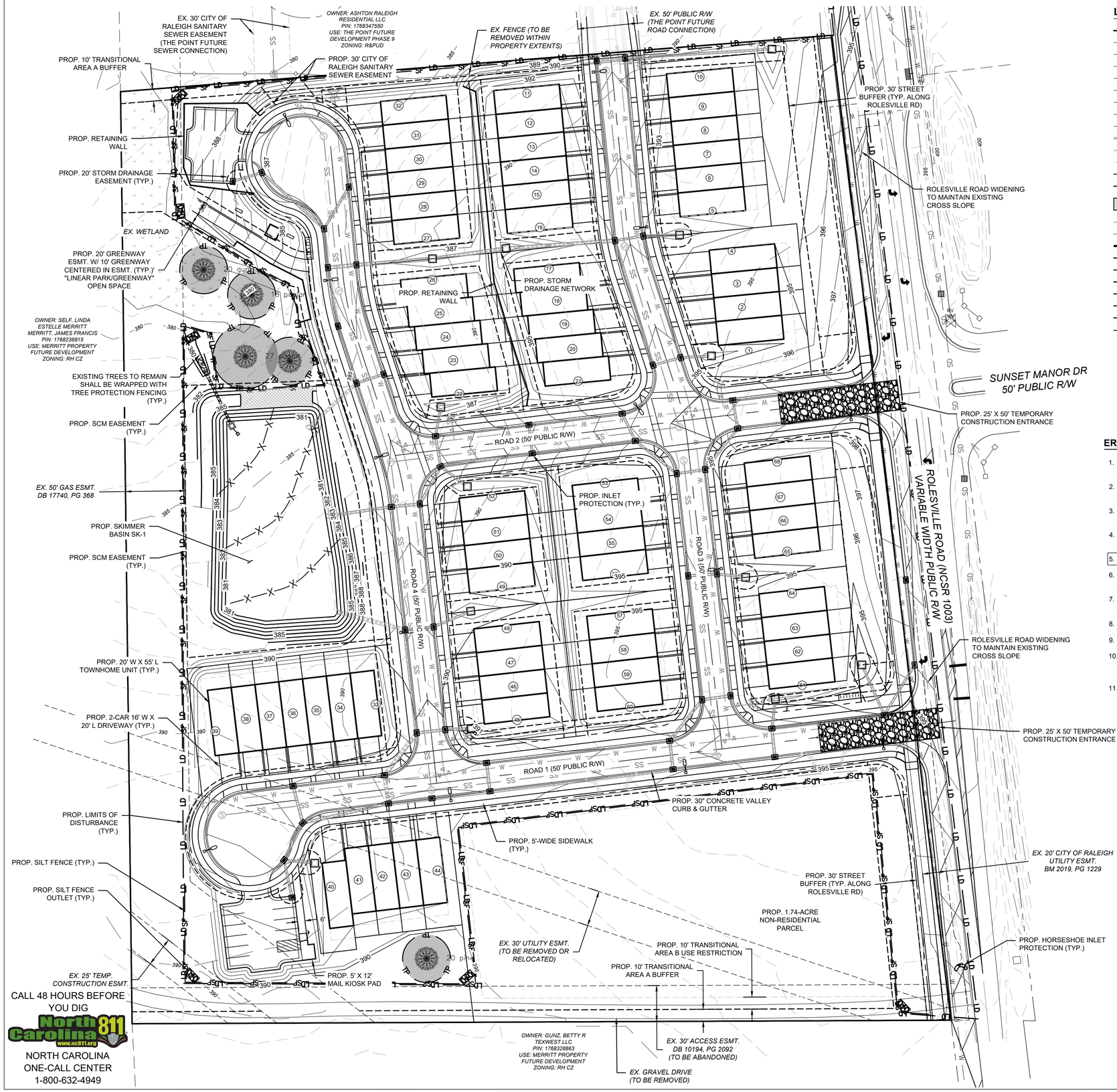

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LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
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- PROP. SANITARY SEWER
- PROP. STORM SEWER
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KEY

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

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40 20 0 40
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N

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0 1"
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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION & SEDIMENT CONTROL PLAN - PHASE 3

C-12

SHEET 12 OF 30

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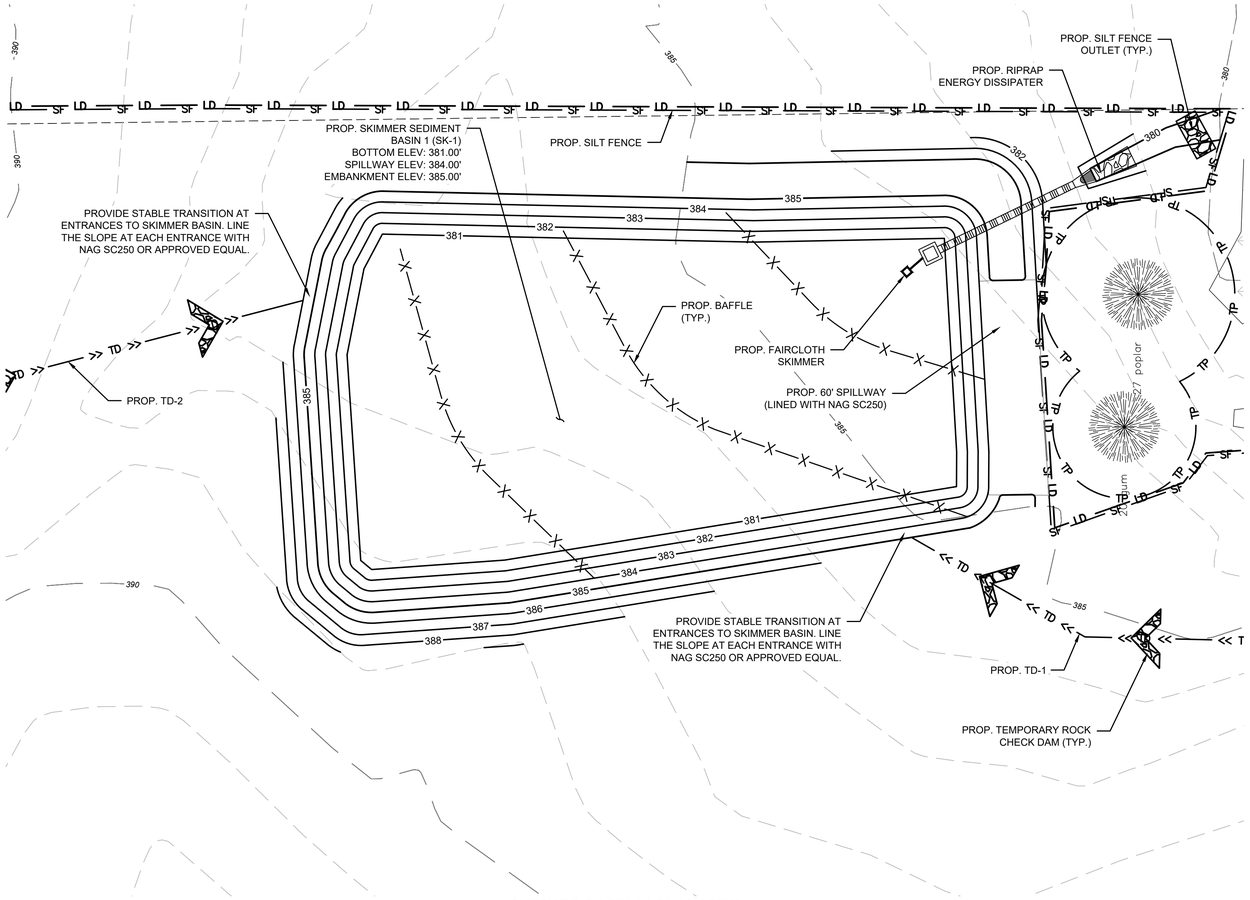

SKIMMER BASIN #1 PLAN VIEW
SCALE: 1" = 20'

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
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- PROP. CONCRETE
- PROP. WATER LINE
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1-800-632-4949

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NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

40 20 0 40
SCALE: 1 INCH = 40 FEET

N

SCALE ADJUSTMENT
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0 1"
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CONSTRUCTION INFRASTRUCTURE DRAWINGS

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OPTIMAL DEVELOPMENT LLC

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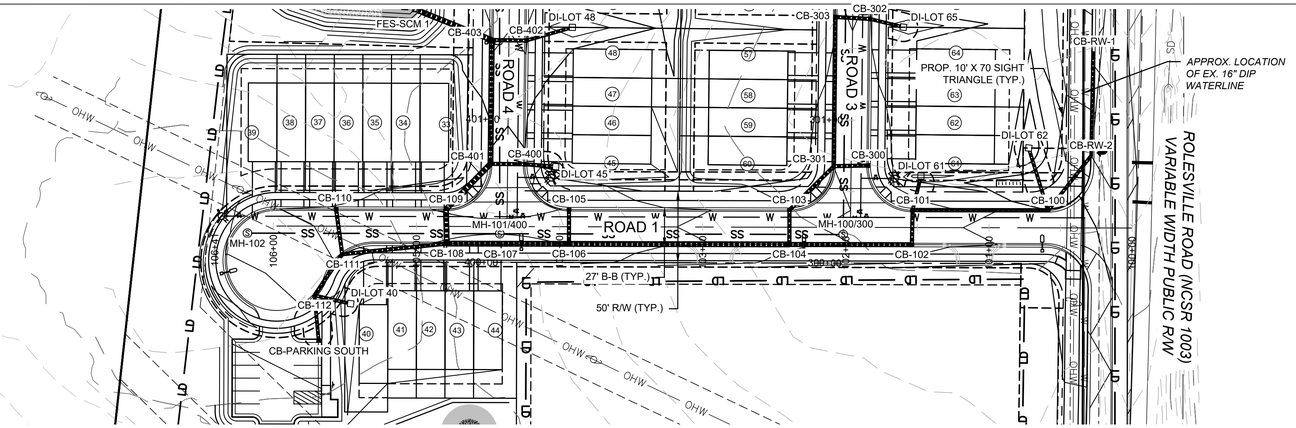
APPROVED BY:	FLM
PROJECT NO.:	21029

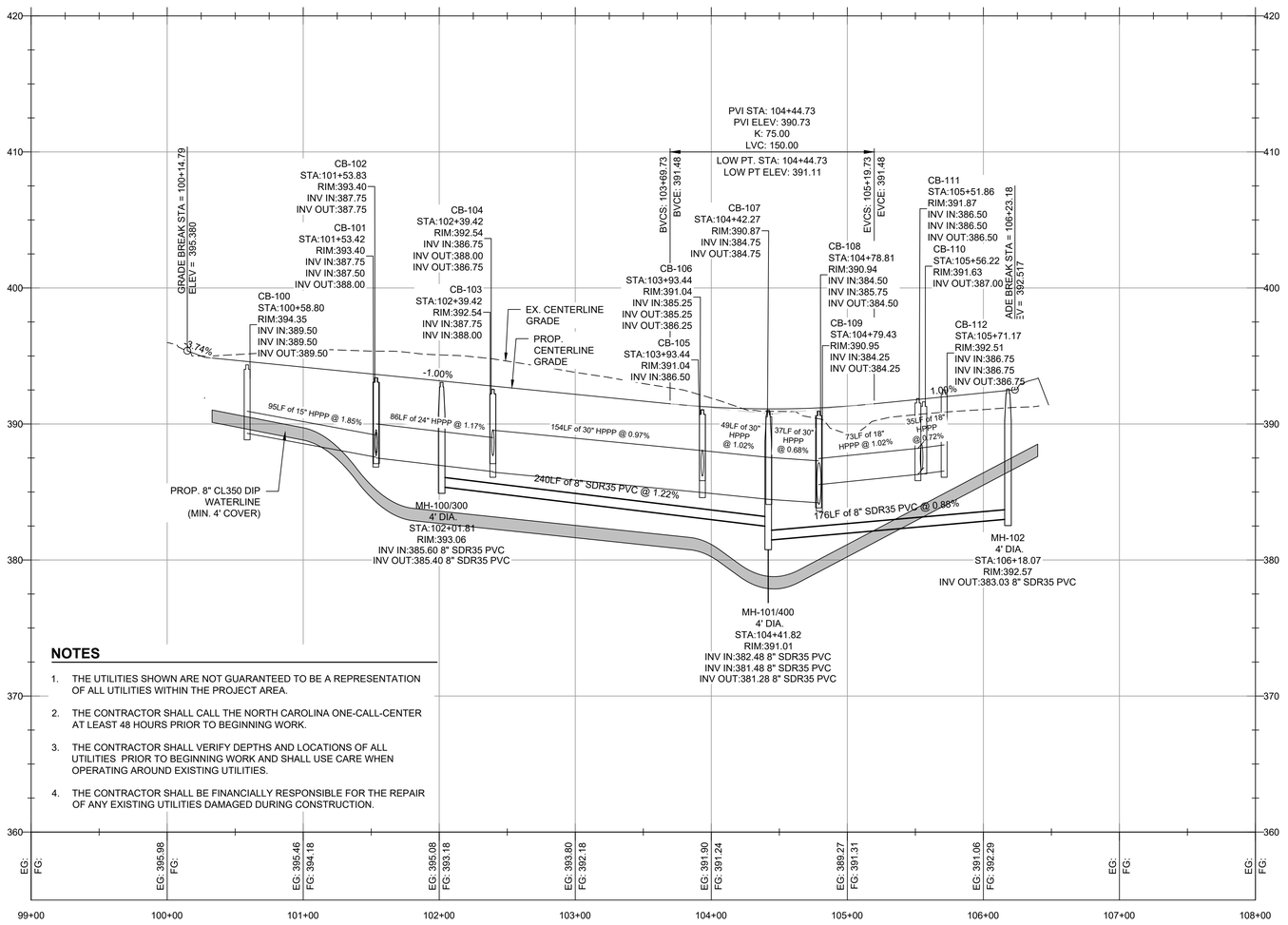
EROSION & SEDIMENT CONTROL BASIN DETAIL

C-13

SHEET 13 OF 30



ROAD 1 PLAN VIEW
STA 100+00 - END



NOTES

1. THE UTILITIES SHOWN ARE NOT GUARANTEED TO BE A REPRESENTATION OF ALL UTILITIES WITHIN THE PROJECT AREA.
2. THE CONTRACTOR SHALL CALL THE NORTH CAROLINA ONE-CALL-CENTER AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
3. THE CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF ALL UTILITIES PRIOR TO BEGINNING WORK AND SHALL USE CARE WHEN OPERATING AROUND EXISTING UTILITIES.
4. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR THE REPAIR OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.

50 25 0 50
SCALE: 1 INCH = 50 FEET
HORIZONTAL SCALE

5 2.5 0 5
SCALE: 1 INCH = 5 FEET
VERTICAL SCALE

ROAD 1 PROFILE VIEW
STA 100+00 - END

CALL 48 HOURS BEFORE YOU DIG
NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. ROAD CENTERLINE
- EX. CHANNEL/STREAM
- EX. CHANNEL/STREAM BUFFER
- EX. CHAIN LINK FENCE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. TREE LINE
- PROP. LOT LINES
- PROP. EASEMENT
- PROP. MAJOR CONTOUR (5')
- PROP. MINOR CONTOUR (1')
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. GATE VALVE
- PROP. FIRE HYDRANT ASSEMBLY WITH GATE VALVE AND TEE
- PROP. SEWER MANHOLE

WATER DISTRIBUTION AND SANITARY SEWER NOTES

1. ALL WATER DISTRIBUTION AND SANITARY SEWER CONSTRUCTION TO BE IN ACCORDANCE WITH THE CITY OF RALEIGH AND NCDEQ STANDARDS AND SPECIFICATIONS.
2. SEE UTILITY PLANS (SHEET C-7) FOR CITY OF RALEIGH UTILITY NOTES & WATER/SEWER SERVICE CONNECTION LOCATIONS.

ATTENTION CONTRACTORS

THE CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER, AND/OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES INSPECTOR AT 919-996-3245 OR HTTPS://CITYWORKS.RALEIGHNC.GOV/PUICONTRACTORS/NEW AND SCHEDULE A PRE-CONSTRUCTION MEETING PRIOR TO BEGINNING ANY CONSTRUCTION. RALEIGH WATER MUST BE CONTACTED AT (919) 996-4540 AT LEAST TWENTY-FOUR HOURS PRIOR TO BEGINNING ANY WORK ACTIVITY AROUND CRITICAL WATER AND SEWER INFRASTRUCTURE.

FAILURE TO NOTIFY THE CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION, WILL RESULT IN THE ISSUANCE OF MONETARY FINES, AND REQUIRE RE-INSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOBSITE, OR ANY OTHER VIOLATION OF RALEIGH WATER WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

PUBLIC
WATER DISTRIBUTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # W-

PUBLIC
SEWER COLLECTION / EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # S-

FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

50 25 0 50
SCALE: 1 INCH = 50 FEET

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

ROAD 1 PLAN & PROFILE

C-14
SHEET 14 OF 30

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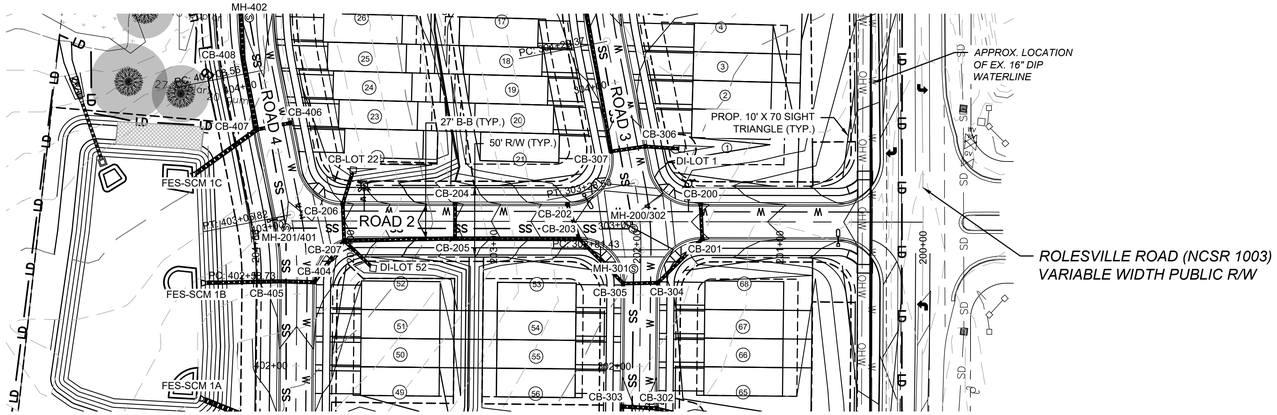
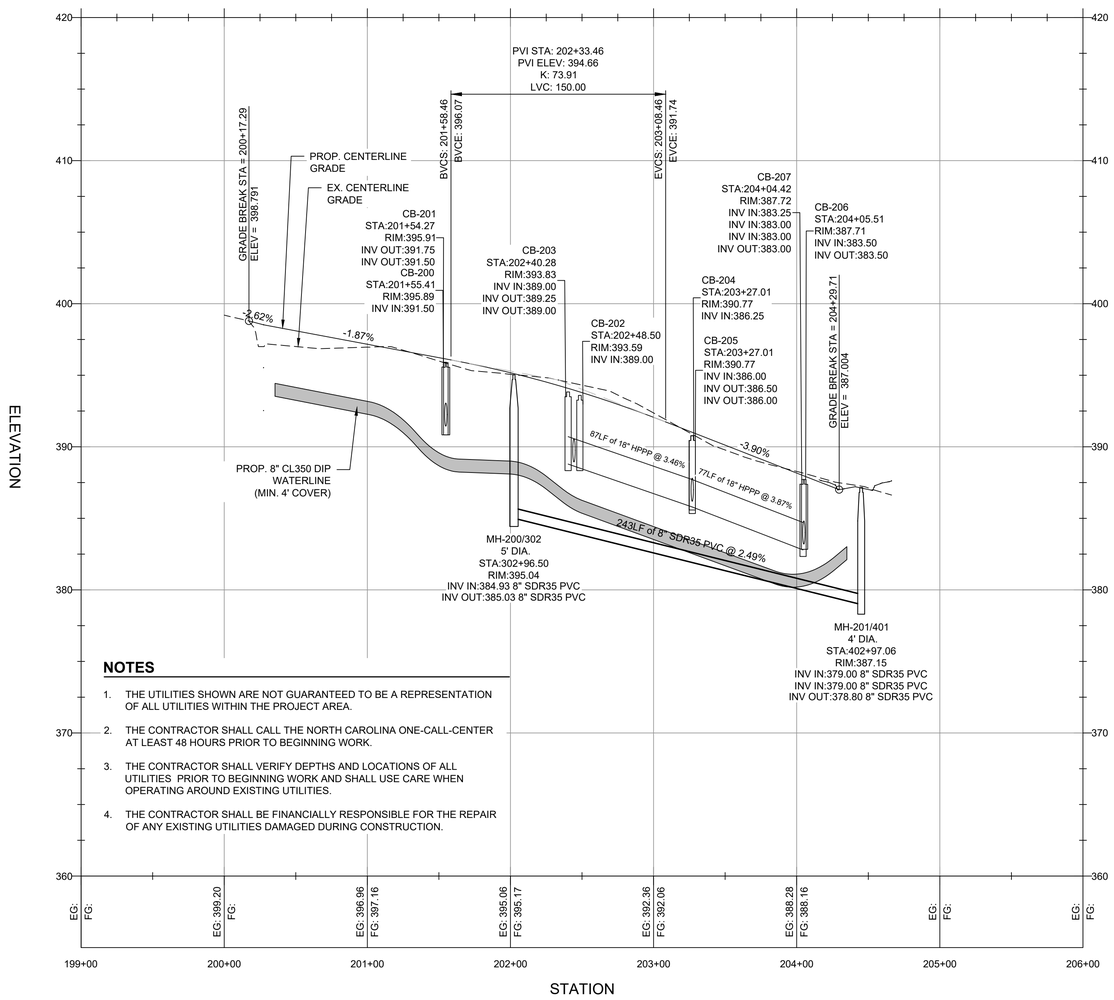


ROAD 2 PLAN VIEW

STA 200+00 - END



NOTES

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SCALE: 1 INCH = 50 FEET

HORIZONTAL SCALE

ROAD 2 PROFILE VIEW

STA 200+00 - END

SCALE: 1 INCH = 5 FEET

VERTICAL SCALE

CALL 48 HOURS BEFORE YOU DIG

NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

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LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. ROAD CENTERLINE
- EX. CHANNEL/STREAM
- EX. CHANNEL/STREAM BUFFER
- EX. CHAIN LINK FENCE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. TREE LINE
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- PROP. STORM SEWER
- PROP. GATE VALVE
- PROP. FIRE HYDRANT ASSEMBLY WITH GATE VALVE AND TEE
- PROP. SEWER MANHOLE

WATER DISTRIBUTION AND SANITARY SEWER NOTES

1. ALL WATER DISTRIBUTION AND SANITARY SEWER CONSTRUCTION TO BE IN ACCORDANCE WITH THE CITY OF RALEIGH AND NCDEQ STANDARDS AND SPECIFICATIONS.
2. SEE UTILITY PLANS (SHEET C-7) FOR CITY OF RALEIGH UTILITY NOTES & WATER/SEWER SERVICE CONNECTION LOCATIONS.

ATTENTION CONTRACTORS

THE CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER, AND/OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES INSPECTOR AT 919-996-3245 OR HTTPS://CITYWORKS.RALEIGHNC.GOV/PUCONTRACTORS/NEW AND SCHEDULE A PRE-CONSTRUCTION MEETING PRIOR TO BEGINNING ANY CONSTRUCTION. RALEIGH WATER MUST BE CONTACTED AT (919) 996-4540 AT LEAST TWENTY-FOUR HOURS PRIOR TO BEGINNING ANY WORK ACTIVITY AROUND CRITICAL WATER AND SEWER INFRASTRUCTURE.

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PUBLIC WATER DISTRIBUTION / EXTENSION SYSTEM

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CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # W-

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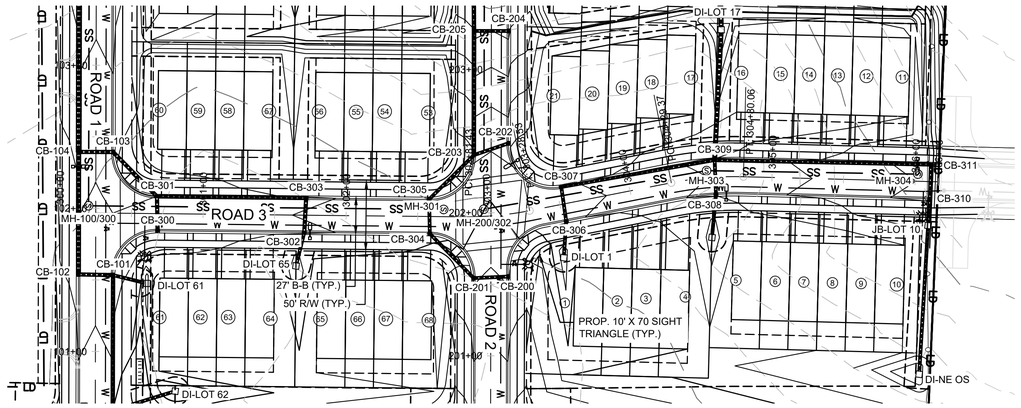
PROJECT NO.:	21029

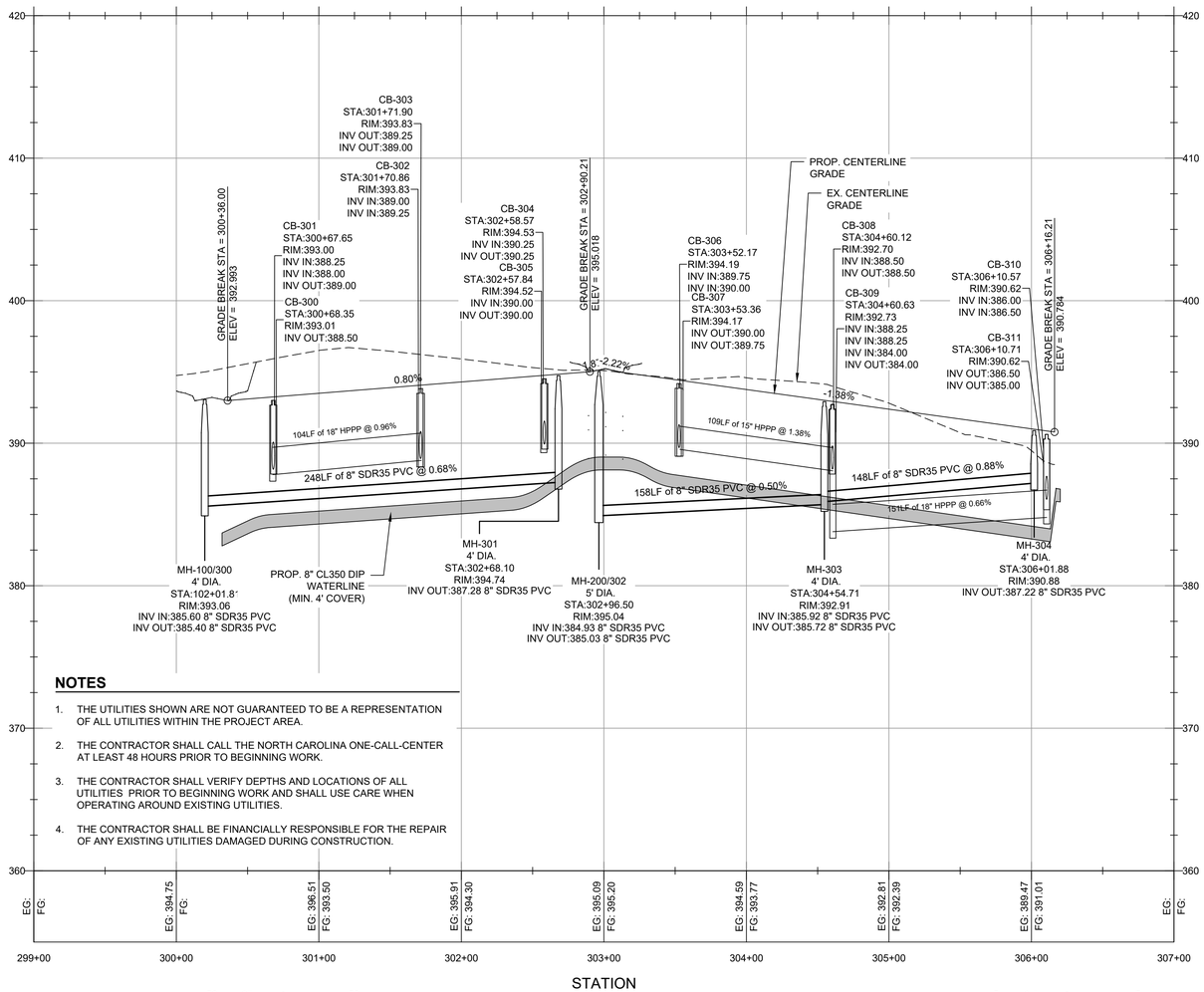
ROAD 2 PLAN & PROFILE

C-15

SHEET 15 OF 30



ROAD 3 PLAN VIEW
STA 300+00 - END



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ROAD 3 PROFILE VIEW
STA 300+00 - END

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PUBLIC UTILITIES DEPARTMENT PERMIT # W-

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

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OPTIMAL DEVELOPMENT LLC

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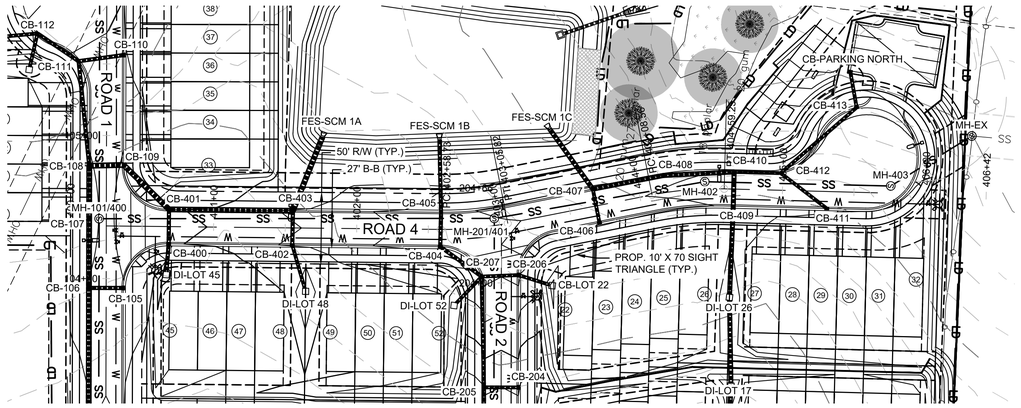
PROJECT NO.:	21029

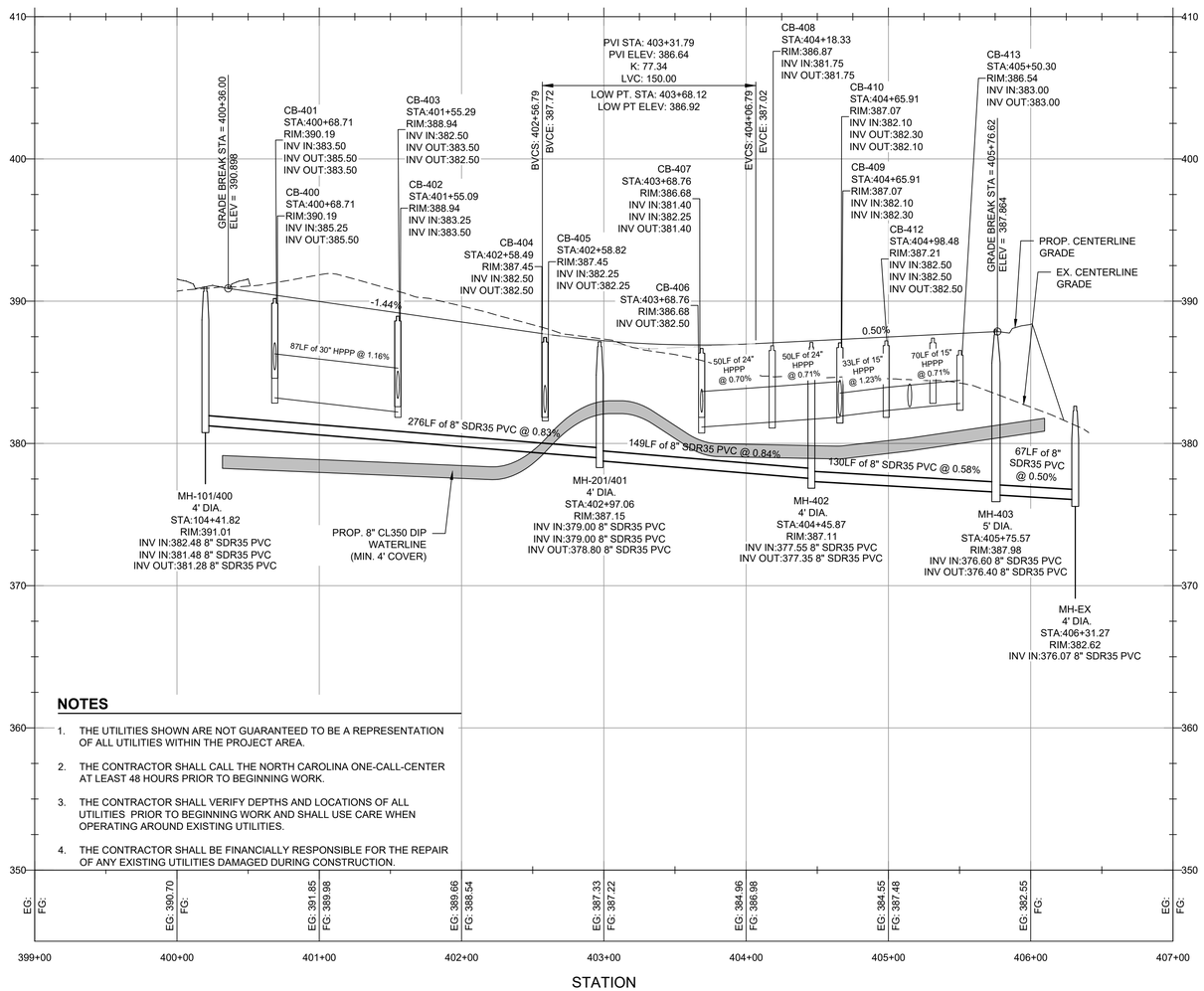
ROAD 3 PLAN & PROFILE

C-16

SHEET 16 OF 30



ROAD 4 PLAN VIEW
STA 400+00 - END



ROAD 4 PROFILE VIEW
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CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # W-

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RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
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NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

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PROJECT NO.:	21029

ROAD 4 PLAN & PROFILE

C-17
SHEET 17 OF 30

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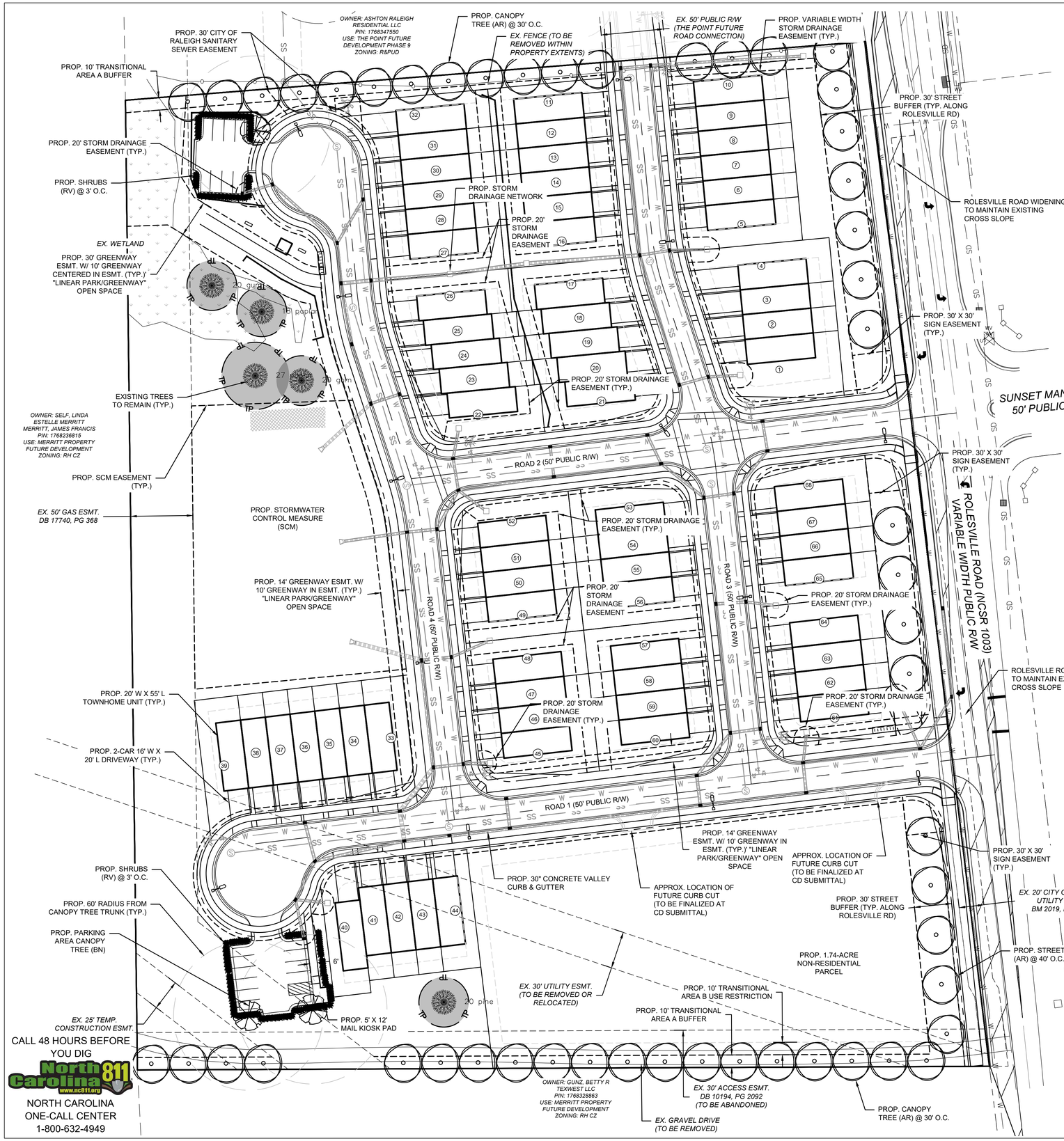

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- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
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- EX. MINOR CONTOUR (1')
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. CONCRETE
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE PROTECTION FENCE
- EX. QUALIFYING EVERGREEN/DECIDUOUS TREE TO REMAIN
- PROP. CANOPY TREE (AR)
- PROP. CANOPY TREE (BN)
- PROP. SHRUB (RV)

NOTES

1. ALL NEW PLANTINGS SHALL MEET THE REQUIREMENTS OF THE TOWN OF ROLESVILLE LAND DEVELOPMENT ORDINANCE (LDO) SECTION 6.2.
2. ALL DISTURBED AREAS NOT OCCUPIED BY STRUCTURES, PAVING OR PLANTINGS SHALL BE GRADED AND SEEDED AS INDICATED IN SPECIFICATIONS.
3. ALL TREE PLANTINGS SHALL BE MULCHED WITH 4" CLEAN, PINE STRAW MULCH.
4. ALL PLANT BEDS TO BE EDGED WITH TYPICAL "V-CHANNEL" EDGE.
5. A MINIMUM OF FOUR INDIVIDUAL SOIL SAMPLES SHALL BE TAKEN THROUGHOUT THE SITE FOR OVERALL SOIL ANALYSIS.
6. CONTRACTOR TO UTILIZE ALL ONSITE TOPSOIL. CONTRACTOR SHALL SUPPLY ADDITIONAL TOPSOIL AT NO ADDITIONAL COST TO OWNER IF EXISTING TOPSOIL IS NOT SUFFICIENT TO MEET THE NEEDS OF THIS PROJECT.
7. ALL PLANTING AREAS TO RECEIVE 1 CY OF SOIL CONDITIONER FOR EACH 75 SF OF PLANT BED AREA. ACCEPTABLE SOIL CONDITIONERS SHALL BE PULVERIZED PINE BARK, PEAT MOSS OR SHREDDED/COMPOSTED LEAVES.
8. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING UTILITIES BEFORE BEGINNING OF GRADING AND LANDSCAPE INSTALLATION.
9. CONTRACTOR TO VERIFY QUANTITIES OF PLANTINGS AS SHOWN. PLANTINGS INDICATED ON PLANS SHALL PREVAIL OVER QUANTITIES INDICATED IN PLANT LIST IF DISCREPANCIES ARISE.
10. ALL PLANTS ARE TO BE THOROUGHLY "WATERED IN" THE SAME DAY AS PLANTED.
11. THE PLANT HOLE WIDTH SHALL BE A MINIMUM THREE TIMES THE DIAMETER OF THE ROOT BALL.
12. REMOVE ALL STRAPPING AND TWINE FROM ROOT BALL. REMOVE WIRE BASKET AND BURLAP FROM TOP 1/3 OF ROOT BALL BEFORE BACKFILLING AROUND BALL IS COMPLETED.
13. ALL TREES WHICH ARE SMOOTH BARKED AT THE TIME OF PLANTING AND HAVE MORE THAN 2' OF ALL TREE WRAPPING SHALL EXTEND FROM THE TOP OF THE BACKFILL TO THE LOWERMOST TREE BRANCHES.
14. ALL TREES, WHEN PLANTED, SHALL HAVE THE SAME RELATIONSHIP TO FINISHED GRADE AS TO THE GRADING PLAN.
15. LANDSCAPING SHOWN MEETS QUANTITY REQUIREMENTS. ALL INSTALLATION AND MAINTENANCE SHALL BE PER TOWN OF ROLESVILLE LDO.
16. ALL ADDITIONAL LANDSCAPING SHALL BE PER OWNER.

LANDSCAPING REQUIREMENTS

PERIMETER BUFFERS

TYPE A TRANSITIONAL BUFFER
CANOPY TREES SHALL BE PLACED AT 30' O.C.

CANOPY TREES PROVIDED: 34

STREETSCAPE BUFFER

STREET TREES SHALL BE PLACED AT 40' O.C.

CANOPY TREES PROVIDED: 16

PARKING LANDSCAPING

- ALL PARKING SPACES SHALL BE WITHIN 60' FROM THE TRUNK OF A CANOPY TREE
- PARKING PERIMETER SHALL CONSIST OF A SINGLE CONTINUOUS ROW OF SHRUBS NO GREATER THAN 3' ON-CENTER AND WITHIN 5' OF THE PARKING LOT EDGE

CANOPY TREES PROVIDED: 3
SHRUBS PROVIDED: 121

TREE PRESERVATION PLAN NOTES

1. TREE SURVEY PROVIDED BY S&EC, DATED OCTOBER 29, 2024.
2. THE CRZ SHALL REMAIN FREE OF ALL BUILDING MATERIALS, REFUSE, AND DEBRIS.
3. TREE SURVEY RESULTS:

   54 EXISTING TREES (EVERGREEN > 20" AND/OR DECIDUOUS > 18") IDENTIFIED ONSITE
   5 EXISTING TREES TO REMAIN (10%, 5.4)
   49 EXISTING TREES TO BE REMOVED FOR A REPLACEMENT VALUE OF 196 TREES (4 REPLACEMENT TREES PER TREE REMOVED)
4. TREE PRESERVATION CALCULATIONS:

   REQUIRED TREE PRESERVATION: 10% OF EXISTING TREES IN GOOD HEALTH SHALL BE PRESERVED
   PROPOSED TREE PRESERVATION: 10%
5. REPLACEMENT TREE CALCULATIONS:

   REQUIRED REPLACEMENT TREES: 5
   PROPOSED TREES: 5

PLANT LIST

KEY	SCIENTIFIC NAME	COMMON NAME	QUAN.	CAL.	PLANTING HT.
CANOPY TREES					
BN	BETULA NIGRA	RIVER BIRCH	3	1.5"	8'
AR	ACER RUBRUM	RED MAPLE	50	1.5"	8'
SHRUBS					
RV	RHODODENDRON VASEYI	PINKSHELL AZALEA	121		18"

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ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

LANDSCAPE PLAN

C-18
SHEET 18 OF 30

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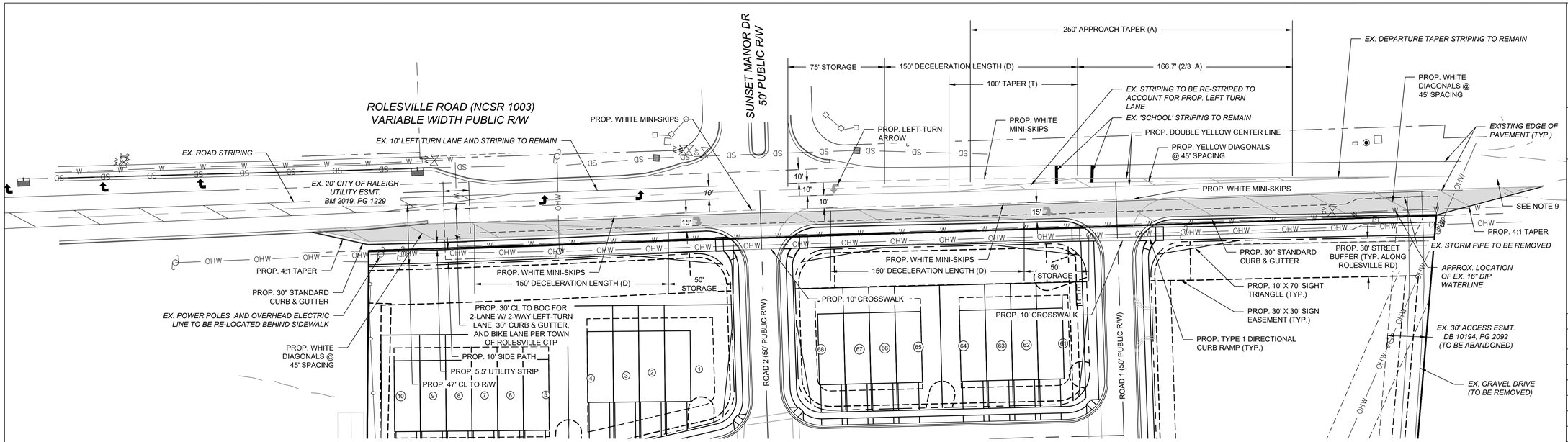
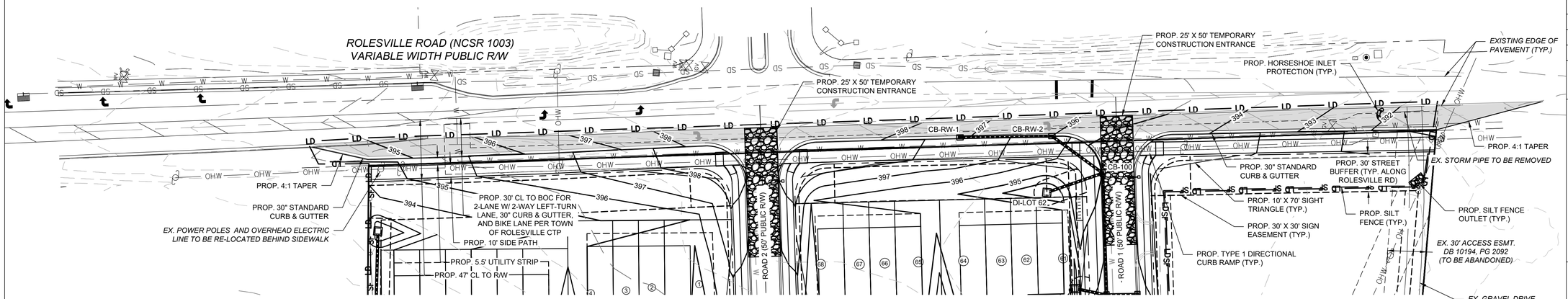


TURN LANE SITE PLAN



TURN LANE GRADING & EROSION CONTROL PLAN

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT OWNERS
- EX. EASEMENT
- EX. CHAIN LINK FENCE
- EX. COMMUNICATIONS LINE
- EX. OVERHEAD ELECTRIC LINE
- EX. WATER LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. MAJOR CONTOUR (5')
- EX. MINOR CONTOUR (1')
- PROP. SETBACK LINE
- PROP. EASEMENT/BUFFER
- PROP. WATER LINE
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. MAJOR CONTOUR (5')
- PROP. MINOR CONTOUR (1')
- PROP. LIMIT OF DISTURBANCE
- PROP. SILT FENCE
- PROP. CONSTRUCTION ENTRANCE
- PROP. HORSESHOE INLET PROTECTION
- PROP. SILT FENCE OUTLET
- PROP. INLET PROTECTION
- PROP. NEW PAVEMENT AREA

CALL 48 HOURS BEFORE YOU DIG

NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

NOTES

1. ALL ROADWAYS TO BE CONSTRUCTED IN ACCORDANCE WITH NCDOT STANDARDS AND SPECIFICATIONS.
2. ROAD WIDENING AND DIMENSIONS BASED ON NCDOT "POLICY ON STREET AND DRIVEWAY ACCESS", DATED JULY, 2003, RECOMMENDED TREATMENT FOR TURN LANES FOR SYMMETRICAL WIDENING.
3. ROAD WIDENING & TAPER CALCULATIONS BASED ON A LATERAL SHIFT, W, OF 5' AND 50 MPH DESIGN SPEED, S.
4. THE UTILITIES SHOWN ARE NOT GUARANTEED TO BE A REPRESENTATION OF ALL UTILITIES WITHIN THE PROJECT EXTENT.
5. THE CONTRACTOR SHALL CALL THE NORTH CAROLINA ONE-CALL-CENTER AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
6. THE CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF ALL UTILITIES PRIOR TO BEGINNING WORK AND SHALL USE CARE WHEN OPERATING AROUND EXISTING UTILITIES.
7. THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR THE REPAIR OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
8. THE ROAD SECTION FOR WIDENING SHALL BE:
   - 8.1. 10" OF CABC OR 5" OF B25.0B ASPHALT (IF LESS THAN 6' IN WIDTH UTILIZE 5" OF B25.0B ONLY)
   - 8.2. 4" OF I19.0B INTERMEDIATE COURSE LEFT 1.25" LOWER THAN THE EXISTING PAVEMENT
   - 8.3. MILL OUT 1.5" 1' INTO THE ADJACENT PAVEMENT TO PLACE A 1.5" LAYER OF SF9.5C MIX FROM THE NEW MILLED OUT EDGE TO THE NEW EDGE OF PAVEMENT
   - 8.4. FINAL LAYER SHALL BE 1.5" OF SF9.5C TO OVERLAY THE ENTIRE PROJECT
9. MILL OUT ON EACH END OF THE WIDENING ACROSS THE ENTIRE WIDTH OF THE EXISTING ROADWAY A TAPERED BUTT JOINT OVER 37.5' LONGITUDINALLY, 0" TO 1.5" IN DEPTH.
10. PAPER JOINTS SHALL BE IN PLACE DURING MILL ACROSS THE WIDTH OF THE ROADWAY.
11. INSTALL "BUMP" SIGN WHEN BUTT JOINTS ARE MILLED UNTIL THE FINAL LAYER OF ASPHALT IS PLACED.
12. PAVEMENT MARKINGS SHALL BE THERMOPLASTIC. RAISED PAVEMENT MARKERS SHALL BE INSTALLED.

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FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

40 20 0 40
SCALE: 1 INCH = 40 FEET

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
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ROAD WIDENING PLANS FOR ROLESVILLE ROAD

C-19

SHEET 19 OF 30

CONTINUOUS LINES

EDGE LINE — 4"/6" — YELLOW OR WHITE

LANE LINE — 4"/6" — WHITE

CENTER LINE — 4"/6" — YELLOW

GORE LINE — 8"/12" — WHITE

DIAGONAL LINE — 12" 45 MPH OR HIGHER; 8" LESS THAN 45 MPH — YELLOW OR WHITE

CROSSWALK LINE — 8" TRANSVERSE; 24" LONGITUDINAL — WHITE

RxR LINE — 16" — WHITE

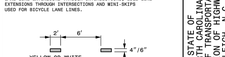
STOP OR TRANSVERSE BAR — 24" — WHITE

10'-30'/SP SKIP LINE

UNLESS OTHERWISED SHOWN, USE 10'-30'/SP SKIPS FOR SKIP LANE LINES AND SKIP CENTER LINES.

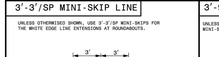
2'-6'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 2'-6'/SP MINI-SKIPS FOR LANE LINE EXTENSIONS THROUGH INTERSECTIONS, EDGE LINE EXTENSIONS THROUGH INTERSECTIONS AND MINI-SKIPS USED FOR BICYCLE LANE LINES.



3'-3'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-3'/SP MINI-SKIPS FOR THE WHITE EDGE LINE EXTENSIONS AT ROUNDABOUTS.



3'-9'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-9'/SP MINI-SKIPS FOR MINI-SKIP LANE LINES AND LINE EXTENSIONS THROUGH TAPERS.

GENERAL NOTES:

1- USE 6" LANE, EDGE, AND CENTER LINES ON ALL FULL CONTROL OF ACCESS FACILITIES AND OTHER ROUTES AS DIRECTED BY THE ENGINEER.

2- LANE LINES INDICATED AS "WIDE" ON THE ROADWAY STANDARD DRAWINGS SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 1 OF 2

1205.01

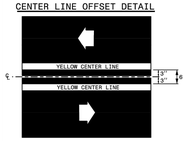
EDGE LINE OFFSET DETAIL

TABLE 1

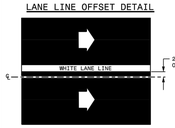
EDGE LINE OFFSETS FOR 2-LANE, 2-WAY ROADWAYS WITH UN-PAVED SHOULDERS

WIDTH (W) OF TRAVEL PAVEMENT	MAX. EDGE LINE OFFSET FROM E.O.T.	MINIMUM LANE WIDTH (W)
16' - 18'	2"	9' - 9'
19'	4"	9'
20'	6"	9.5'
21'	8"	10'
22'	10"	10'
23'	10"	10.5'
24'	1'	11'
26'	2'	11'
28'	2'	12'
30'	3'	12'
32'	4'	12'

CENTER LINE OFFSET DETAIL



LANE LINE OFFSET DETAIL



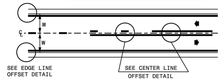
LEGEND

W = WIDTH OF TRAVEL LANE

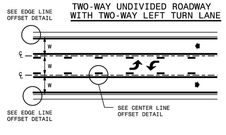
E.O.T.= EDGE OF TRAVEL

◆ DIRECTION OF TRAFFIC FLOW

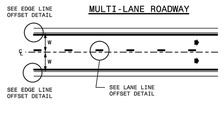
TWO-WAY UNDIVIDED ROADWAY



TWO-WAY UNDIVIDED ROADWAY WITH TWO-WAY LEFT TURN LANE



MULTI-LANE ROADWAY



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

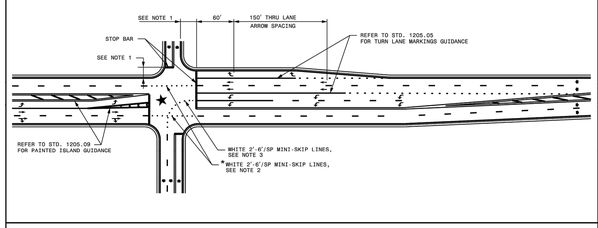
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 2 OF 2

1205.01

SIGNALIZED MULTI-LANE ROADWAY WITH TURN BAYS



GENERAL NOTES:

1- REFER TO THE PAVEMENT MARKING PLAN FOR STOP BAR LOCATIONS FOR SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR AS DIRECTED BY THE ENGINEER.

2- WINI-SKIP LANE LINE EXTENSIONS SHOULD BE USED AT INTERSECTIONS THAT HAVE REDUCED VISIBILITY CONDITIONS SUCH AS OFFSET, SKEWED, OR CURVED ROADWAYS.

3- WINI-SKIP LANE LINE EXTENSIONS SHALL BE USED WHERE MULTIPLE TURN LANES ARE USED.

4- REFER TO ROADWAY STANDARD DRAWINGS 1205.01, 1205.02, 1205.05, 1205.08 AND 1205.09 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

◆ DIRECTION OF TRAFFIC FLOW

PAVEMENT MARKING SYMBOLS

* OPTIONAL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

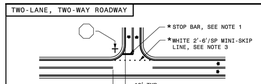
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** INTERSECTIONS

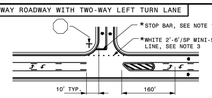
SHEET 1 OF 2

1205.04

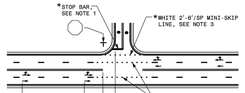
TWO-LANE, TWO-WAY ROADWAY



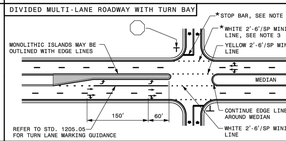
TWO-LANE, TWO-WAY ROADWAY WITH TWO-WAY LEFT TURN LANE



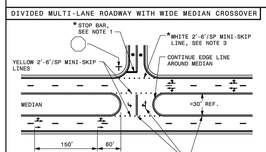
UNDIVIDED MULTI-LANE ROADWAY



DIVIDED MULTI-LANE ROADWAY WITH TURN BAY



DIVIDED MULTI-LANE ROADWAY WITH WIDE MEDIAN CROSSOVER



USE DOUBLE YELLOW CENTER LINE AND ARROW SYMBOLS IN MEDIAN CROSSOVER WHEN WIDTH OF MEDIAN EXCEEDS 30 FT, OTHERWISE THEY ARE NOT REQUIRED.

GENERAL NOTES:

1- PLACEMENT OF STOP BARS AT NON-SIGNALIZED INTERSECTIONS IS OPTIONAL AND USED WHERE IT IS IMPORTANT TO INDICATE THE POINT WHICH VEHICLES ARE REQUIRED TO STOP. PLACE STOP BARS NO LESS THAN 4 FEET AND NO MORE THAN 30 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY. USE 10 FEET AS THE TYPICAL SETBACK DISTANCE OR AS DIRECTED BY THE ENGINEER.

2- WINI-SKIP LANE LINE EXTENSIONS SHOULD BE USED AT INTERSECTIONS THAT HAVE REDUCED VISIBILITY CONDITIONS SUCH AS OFFSET, SKEWED, OR CURVED ROADWAYS.

3- WINI-SKIP EDGE LINE EXTENSIONS MAY BE PLACED THROUGH INTERSECTIONS AND MAJOR DRIVEWAYS.

4- REFER TO ROADWAY STANDARD DRAWINGS 1205.01, 1205.02, 1205.05, 1205.08 AND 1205.09 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

STOP SIGN — STATIONARY SIGN

◆ DIRECTION OF TRAFFIC FLOW — PAVEMENT MARKING SYMBOLS

* OPTIONAL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

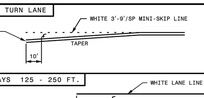
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** INTERSECTIONS

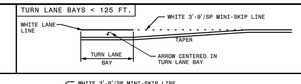
SHEET 2 OF 2

1205.04

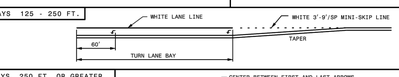
DIRECT TAPER TURN LANE



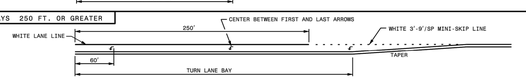
TURN LANE BAYS < 125 FT.



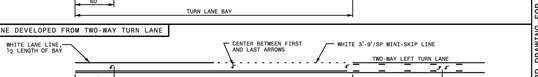
TURN LANE BAYS 125 - 250 FT.



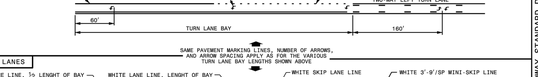
TURN LANE BAYS 250 FT. OR GREATER



LEFT TURN LANE DEVELOPED FROM TWO-WAY TURN LANE



DOUBLE TURN LANES



GENERAL NOTES:

1- USE THE GUIDANCE SHOWN ABOVE IN CONJUNCTION WITH THE INTERSECTION GUIDANCE SHOWN ON ROADWAY STANDARD DRAWING 1205.04.

2- THE NUMBER OF ARROWS SHOWN IS THE MINIMUM REQUIRED. USE ADDITIONAL ARROWS AS DIRECTED BY THE ENGINEER.

LEGEND

PAVEMENT MARKING SYMBOL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

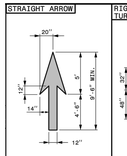
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** TURN LANES

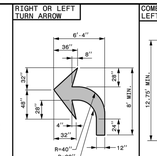
SHEET 1 OF 1

1205.05

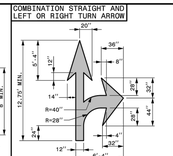
STRAIGHT ARROW



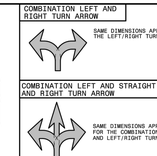
RIGHT OR LEFT TURN ARROW



COMBINATION STRAIGHT AND LEFT OR RIGHT TURN ARROW

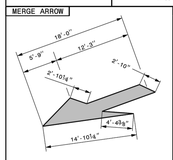


COMBINATION LEFT AND RIGHT TURN ARROW

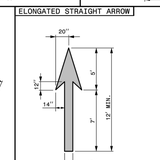


COMBINATION LEFT AND STRAIGHT AND RIGHT TURN ARROW

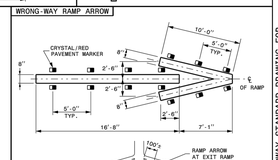
MERGE ARROW

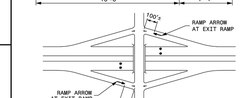


ELONGATED STRAIGHT ARROW



WRONG-WAY RAMP ARROW





GENERAL NOTES:

1- USE THE COLOR WHITE FOR ALL PAVEMENT MARKING SYMBOLS.

2- DO NOT LOCATE PAVEMENT MARKING SYMBOLS AS TO ENCROACH INTO INTERSECTION AREAS.

3- DO NOT PLACE SYMBOLS ACROSS TRANSVERSE EXPANSION JOINTS ON PORTLAND CEMENT CONCRETE PAVEMENTS, UNLESS APPROVED BY THE ENGINEER.

4- CONFORM ALL SYMBOLS TO THE FHWA "STANDARD HIGHWAY SIGNS" MANUAL WHICH INCLUDES PAVEMENT MARKINGS AND STANDARD ALPHABETS (REFER TO SHEETS 6 THRU 9). DIMENSIONS CAN VARY AMONG MANUFACTURERS, THEREFORE SLIGHT VARIANCES ARE ACCEPTABLE. HOWEVER, ALL SYMBOLS ARE REQUIRED TO BE APPROVED BY THE DEPARTMENT.

NOTE:

1- WHEN INSTALLING COLD APPLIED PLASTIC ON CONCRETE, IT IS RECOMMENDED TO USE COLD APPLIED PLASTIC WITH A BLACK CONTRASTING BOLDER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

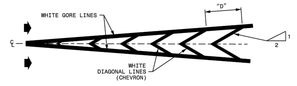
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** SYMBOLS AND WORD MESSAGES

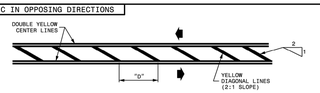
SHEET 1 OF 9

1205.08

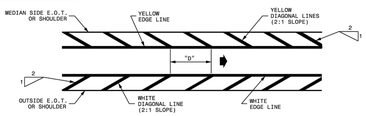
CHANNELIZING ISLAND SEPARATING TRAFFIC IN SAME DIRECTION



MEDIAN ISLAND SEPARATING TRAFFIC IN OPPOSING DIRECTIONS



EDGE OF PAVEMENT OR SHOULDER ISLAND



GENERAL NOTES:

1- "D" = SPACING OF DIAGONAL LINES (TYPICALLY EQUAL IN FEET TO THE POSTED SPEED LIMIT).

2- INCREASE SPACING OF DIAGONALS TO 200' OR MORE ON INTERSTATE ROADWAYS.

3- ADJUST SPACING OF DIAGONALS DEPENDING ON THE LENGTH OF THE ISLAND. SPACING MAY BE ADJUSTED AS DETERMINED BY THE ENGINEER.

LEGEND

E.O.T.= EDGE OF TRAVEL

◆ DIRECTION OF TRAFFIC FLOW

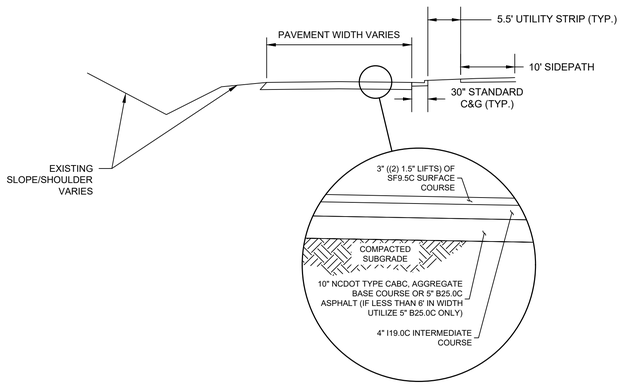
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** PAINTED ISLANDS

SHEET 1 OF 1

1205.09



ROAD WIDENING CROSS-SECTION

NO SCALE

CALL 48 HOURS BEFORE YOU DIG

NORTH CAROLINA ONE-CALL CENTER 1-800-632-4949

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FLM ENGINEERING

POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING

DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

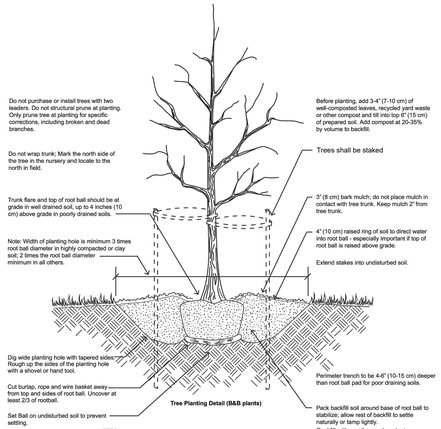
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

ROAD WIDENING DETAILS FOR ROLESVILLE ROAD

C-20

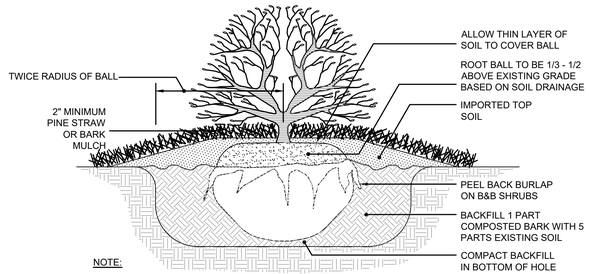
SHEET 20 OF 30



NOTES

1. Where several trees will be planted close together such that they will likely share root space, till in soil amendments to a depth of 4-6" (10-15cm) over the entire area.
2. For container grown trees, use fingers or small hand tools to pull the roots out of the outer layer of potting soil; then cut or pull apart any roots circling the perimeter of the container.
3. During the design phase, confirm that water drains out of the soil; use lowered planting hole depth and design alternative drainage system as required.
4. Thoroughly soak the tree root ball and adjacent prepared soil several times during the first month after planting and regularly throughout the following two summers.
5. The planting process is similar for deciduous and evergreen trees.

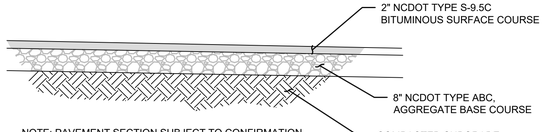
TREE PLANTING DETAIL
NO SCALE



NOTE:

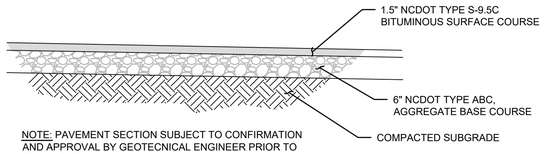
1. ALL SHRUB/EVERGREEN BEDS SHALL BE RAISED 6" - 8" ABOVE ADJACENT GRADE, AND TILLED WITH SOIL CONDITIONER.
2. ALL SHRUB/EVERGREEN BEDS IN PARKING ISLANDS ONLY SHALL BE RAISED 12" ABOVE ADJACENT GRADE AND TILLED WITH SOIL CONDITIONER.

TYP. SHRUB/EVERGREEN PLANTING DETAIL
NO SCALE



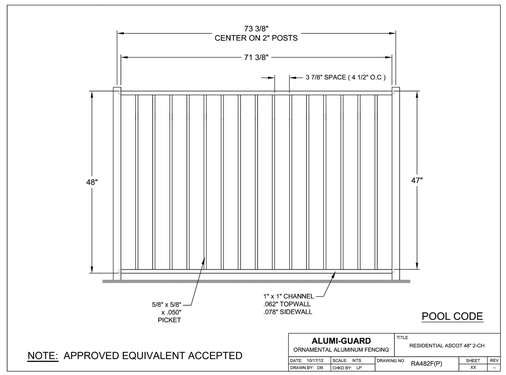
NOTE: PAVEMENT SECTION SUBJECT TO CONFIRMATION AND APPROVAL BY GEOTECNICAL ENGINEER PRIOR TO CONSTRUCTION

PARKING LOT PAVEMENT SECTION
NO SCALE



NOTE: PAVEMENT SECTION SUBJECT TO CONFIRMATION AND APPROVAL BY GEOTECNICAL ENGINEER PRIOR TO CONSTRUCTION

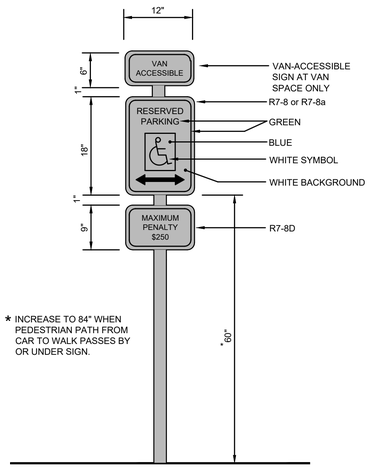
PRIVATE ASPHALT TRAIL PAVEMENT SECTION
NO SCALE



NOTE: APPROVED EQUIVALENT ACCEPTED

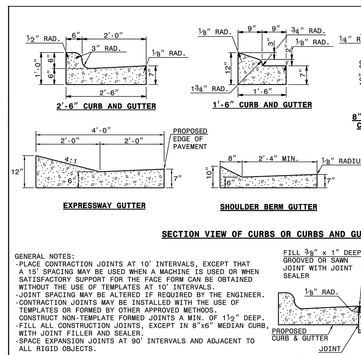
ALUMI-GUARD ORNAMENTAL ALUMINUM FENCING			TITLE: RESIDENTIAL ASCOT 48" 2-CH	
DATE: 10/17/12	SCALE: N/TS	DRAWING NO: RA482F(P)	SHEET: XX	REV: -
DRAWN BY: DR	CHKD BY: LP			

BLACK ALUMINUM FENCE ON RETAINING WALLS
NO SCALE



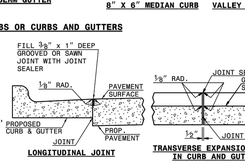
★ INCREASE TO 84" WHEN PEDESTRIAN PATH FROM CAR TO WALK PASSES BY OR UNDER SIGN.

ADA SIGN AND POST
NO SCALE



SECTION VIEW OF CURBS OR CURBS AND GUTTERS

GENERAL NOTES:
-PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
-JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
-CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS.
CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
-FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
-SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



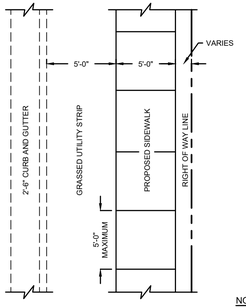
SECTION VIEW OF JOINTS

ROADWAY STANDARD DRAWING FOR CONCRETE CURB & GUTTER AND CURB & GUTTER

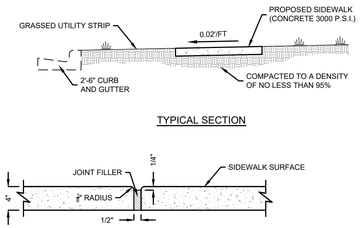
SHEET 1 OF 3
846.01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1:18



PLAN VIEW



TYPICAL SECTION

TRANSVERSE EXPANSION JOINT

NOTES:

1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
3. A 6 INCH DEPTH IS REQUIRED AT LOCATIONS OF DRIVEWAY CROSSINGS, AT STREET INTERSECTIONS (ALONG THE LENGTH OF RADIUS CURB RETURNS), AND IN THE HANDICAP RAMPS.

CONCRETE SIDEWALK
NO SCALE

1-Loop Wave Style Bike Rack - 3 Bike Capacity, Black

More Images

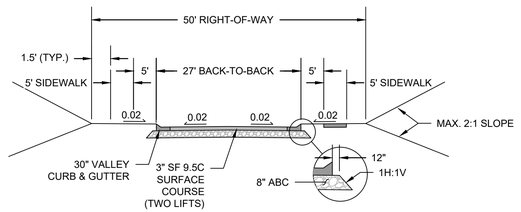
Upscale stylish look for downtown shopping and business districts.

- For stadiums, parks and athletic fields.
- 10-gauge steel with attractive powder coating.
- 2 3/8" diameter bar.
- Mounting hardware included.

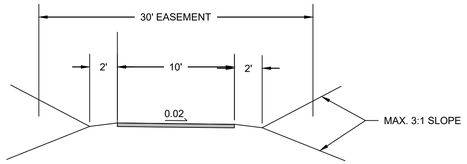
SPECIFY COLOR:

MODEL NO.	DESCRIPTION	SIZE L x W x H	BIKE CAPACITY	WT. (LBS.)	PRICE EACH 1	PRICE EACH 3+	COLOR	IN STOCK SHIPS TODAY
H-2892BL	1-Loop	22 x 2 1/2 x 34"	3	27	$230	$220	Black	1 ADD

BIKE RACK DETAIL
NO SCALE



TYPICAL INTERIOR ROADWAY CROSS-SECTION
NO SCALE



TYPICAL GREENWAY CROSS-SECTION
NO SCALE

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1-800-632-4949

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POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/1/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

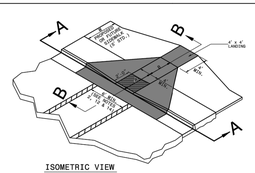
ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

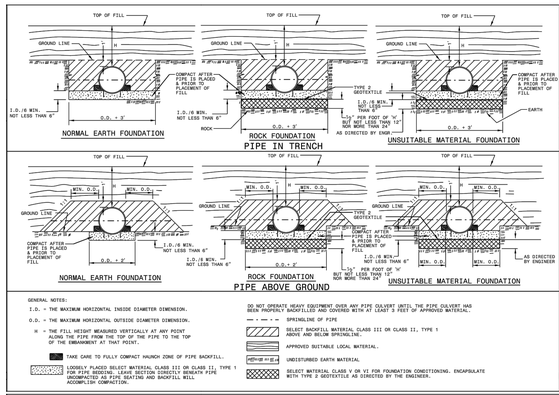
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

SITE DETAILS

C-21
SHEET 21 OF 30


A
B
B
A
4' x 4' LANDING
4' MIN.
4' MIN.
4' MIN.



GENERAL NOTES:

I.D. - THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. - THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H - THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

— — — — SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE 2 GEOTEXTILE AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **METHOD OF PIPE INSTALLATION**

FLEXIBLE PIPE

SHEET 1 OF 3

300.01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet) 16	14	12	10	8
12	12		204	256			
15	12		162	204			
18	12		135	169	239		
21	12		115	145	204		
24	12		100	126	178		
30	12		79	100	142		
36	12		65	83	117	152	
42	12		55	70	100	130	160
48	12		48	61	87	113	139
54	12			54	77	100	123
60	12				69	90	111
66	12					81	100
72	12					74	91
78	12						81
84	12						69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet) 16	14	12	10	8
12	12		123	155	216	281	344
15	12		98	123	174	224	275
18	12		81	102	144	187	228
21	12		69	87	123	160	195
24	12		60	76	108	139	171
27	12			67	95	123	151
30	12		60	85	111		136
36	12		50	71	92	113	
42	12			60	78	96	
48	12			52	68	84	
54	12			46	60	74	
60	12				50	62	
66	12					51	
72	12					41	

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
* (Maximum fill) 20' for pipe diameters ≤ 24"
17' for pipe diameters ≥ 30" and ≤ 60"

PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

RIGID PIPE

RCP - * (Minimum fill) 1' for Class IV & CLASS V
2' for Class III & Class II

* (Maximum fill) 10' - Class II pipe
20' - Class III pipe
30' - Class IV pipe
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Φbign Method)

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

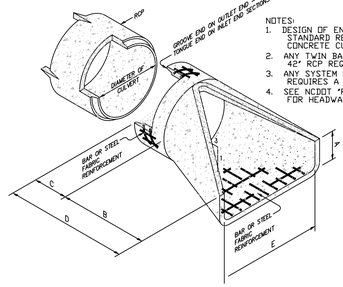
1-18

ROADWAY STANDARD DRAWING FOR **METHOD OF PIPE INSTALLATION**

FILL HEIGHT TABLES

SHEET 3 OF 3

300.01

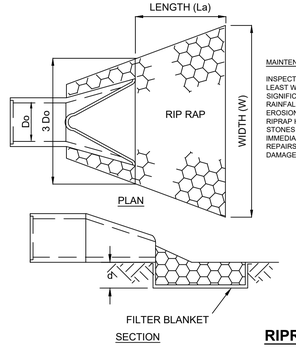


NOTES:
1. DESIGN OF END-SECTION SHALL CONFORM TO STANDARD REINFORCED SECTIONAL CONCRETE CULVERT PIPE.
2. ANY TWIN BARREL SYSTEM GREATER THAN 42" RCP REQUIRES A HEADWALL.
3. ANY SYSTEM OF MORE THAN 2 PIPES REQUIRES A HEADWALL.
4. SEE NCDOT "ROADWAY STANDARD DRAWINGS" FOR HEADWALL CONSTRUCTION DETAILS.

END SECTION DIMENSIONS					
DIA.	A	B	C	D	E
15"	7"	2'-3 1/4"	3'-11 1/2"	6'-2 3/4"	2'-6"
18"	9"	2'-3"	3'-11 3/4"	6'-2 3/4"	3'-0"
24"	9"	3'-7"	3'-1"	6'-8"	3'-11 3/4"
30"	1'-0"	4'-6 1/2"	1'-10 1/2"	6'-5"	5'-0"
36"	1'-4"	5'-0"	3'-1 1/2"	8'-1 1/2"	5'-11"
42"	1'-10 1/4"	5'-1 3/8"	3'-1"	8'-2 3/8"	6'-5 1/4"

FLARED END SECTION

NO SCALE



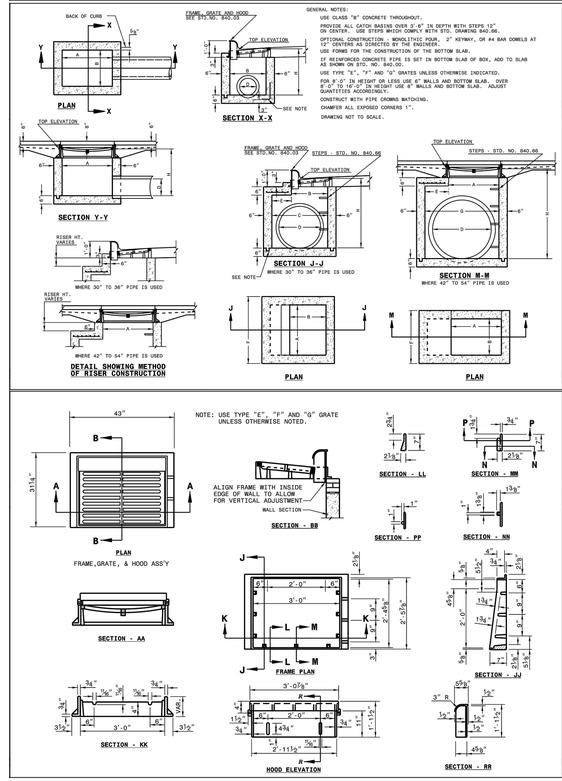
MAINTENANCE:

INSPECT PIPE INLET PROTECTION AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL EVENT TO SEE IF ANY EROSION AROUND OR BELOW THE RIPRAP HAS TAKEN PLACE, OR IF THE STONES HAVE BEEN DISLODGED. IMMEDIATELY MAKE ALL NEEDED REPAIRS TO PREVENT FURTHER DAMAGE.

OUTLET	Do	3Do	La	W	RIP RAP	d
FES-SCM OUT	24"	6'	12'	6'	CLASS B RIPRAP	22"

RIPRAP ENERGY DISSIPATOR

NO SCALE



GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR. 3" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.20.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

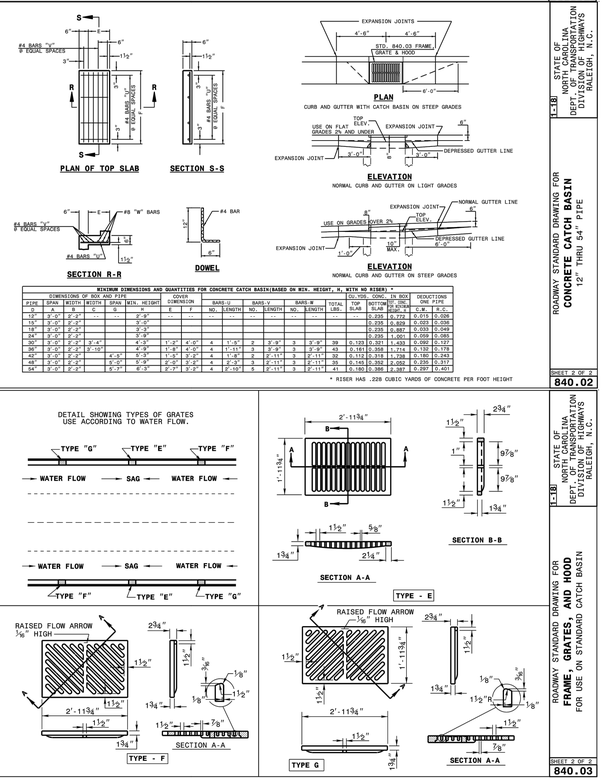
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **CONCRETE CATCH BASIN** 12" THRU 54" PIPE

SHEET 1 OF 2

840.02



MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

PIPE	DIMENSIONS OF BOX AND PIPE SPAN	WIDTH	WIDTH	HEIGHT	SPAN	WIDTH	HEIGHT	COVER CORNISH		BARS-U NO.	LENGTH	BARS-V NO.	LENGTH	BARS-W NO.	LENGTH	TOTAL LBS.	CU.YDS. CONC. IN BOX BOTTOM SLAB	SIDE WALLS	DEDUCTIONS ONE PIPE	C.M.	R.C.
D	A	B	C	G	S	E	F														
12"	3'-0"	2'-0"			2'-0"												0.235	0.774	0.033	0.036	
15"	3'-0"	2'-3"			2'-3"												0.235	0.839	0.033	0.036	
18"	3'-0"	2'-3"			2'-3"												0.235	0.887	0.033	0.049	
24"	3'-0"	2'-3"			2'-3"												0.235	1.001	0.059	0.065	
30"	3'-0"	2'-3"	3'-4"		4'-3"		1'-3"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.183	0.921	1.433	0.092	0.122
36"	4'-0"	2'-3"	3'-10"		4'-9"		1'-3"	4'-0"	4	1'-11"	2	3'-9"	3	3'-9"	43	0.183	0.958	1.714	0.130	0.178
42"	3'-0"	2'-3"			4'-3"		1'-3"	3'-3"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.798	0.180	0.243
48"	3'-0"	2'-3"			5'-0"		1'-3"	3'-3"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.148	0.352	2.052	0.235	0.317
54"	3'-0"	2'-3"			5'-7"		1'-3"	2'-7"	5	2'-10"	3	2'-11"	3	2'-11"	41	0.180	0.386	2.367	0.297	0.401

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **CONCRETE CATCH BASIN** 12" THRU 54" PIPE

SHEET 2 OF 2

840.02

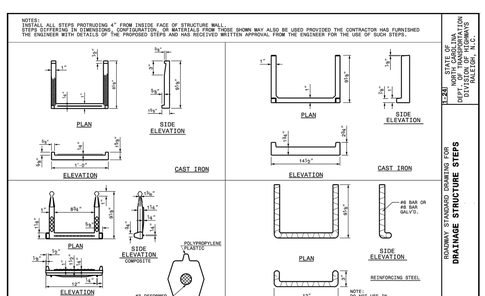
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **FRAME, GRATES, AND HOOD** FOR USE ON STANDARD CATCH BASIN

SHEET 2 OF 2

840.03



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **DRAINAGE STRUCTURE STEPS**

SHEET 1 OF 2

840.66

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FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

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ROLESVILLE, NC 27571

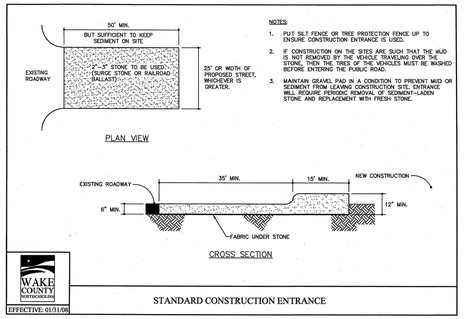
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

STORM DRAINAGE DETAILS

C-23

SHEET 23 OF 30

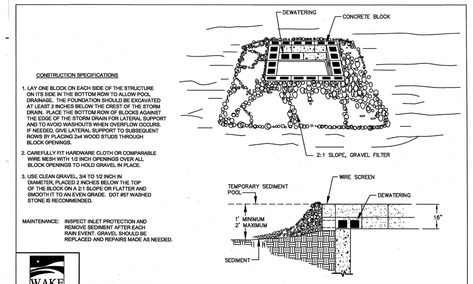


NOTES:

1. PUT SILT FENCE OR TREE PROTECTION FENCE UP TO ENSURE CONSTRUCTION ENTRANCE IS USED.
2. IF CONSTRUCTION ON THE SITES ARE SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING THE PUBLIC ROAD.
3. MAINTAIN GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING CONSTRUCTION SITE. ENTRANCE WILL REQUIRE PERIODIC REMOVAL OF SEDIMENT-LADEN STONE AND REPLACEMENT WITH FRESH STONE.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD CONSTRUCTION ENTRANCE



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE IN THE BOTTOM ROW TO ALLOW POOL DRAINAGE. THE FOUNDATION SHOULD BE EXCAVATED AT LEAST 2 INCHES BELOW THE CREST OF THE STORM DRAIN. PLACE THE BOTTOM ROW OF BLOCKS AGAINST THE EDGE OF THE STORM DRAIN FOR LATERAL SUPPORT AND TO AVOID WASHOUTS WHEN OVERFLOW OCCURS. PLACE ADDITIONAL BLOCKS FOR SUPPORT TO SUBSEQUENT ROWS BY PLACING 2X4 WOOD STUDS THROUGH BLOCK OPENINGS.
2. CAREFULLY FIT HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH 1/2 INCH OPENING OVER ALL BLOCK OPENINGS TO HOLD GRAVEL IN PLACE.
3. USE CLEAN GRAVEL, 3/4 TO 1/2 INCH IN DIAMETER, PLACED 2 INCHES BELOW THE TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER AND SMOOTH IT TO AN EVEN GRADE. DOT #57 WASHED STONE IS RECOMMENDED.

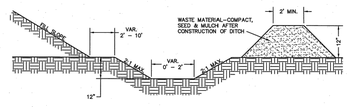
MAINTENANCE: INSPECT INLET PROTECTION AND REMOVE SEDIMENT AFTER EACH RAIN EVENT. GRAVEL SHOULD BE REPLACED AND REPAIRS MADE AS NEEDED.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD BLOCK & GRAVEL DROP INLET PROTECTION

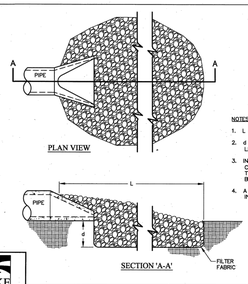
NOTES:

1. TEMPORARY DIVERSION DITCH TO BE USED TO INTERCEPT FLOW AND/OR DIVERT TO A SEDIMENT CONTROL MEASURE OR BMP.
2. SILT SHALL BE REMOVED WHEN IT REACHES 1/2 THE HEIGHT OF THE BARRIER.
3. DITCH SHALL BE RECONSTRUCTED WHEN DAMAGED BY EQUIPMENT OR COVERED BY FILL.
4. STABILIZE DIVERSION DITCH BERM WITH TEMPORARY SEEDING, MULCH WITH TAC, AND/OR EROSION CONTROL NETTING.



WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD TEMPORARY DIVERSION DITCH

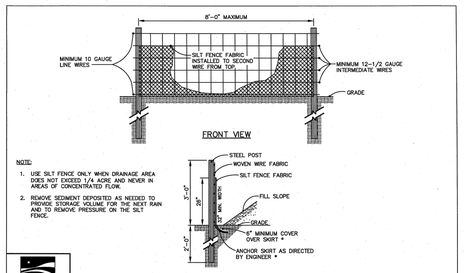


NOTES:

1. L = THE LENGTH OF THE RIPRAP APRON.
2. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6" (INCHES).
3. IN A WELL-DEFINED CHANNEL EXTEND THE APRON UP THE CHANNEL BANKS TO AN ELEVATION OF 6" (INCHES) ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK, WHICHEVER IS LESS.
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD PIPE OUTLET TO WELL-DEFINED CHANNEL

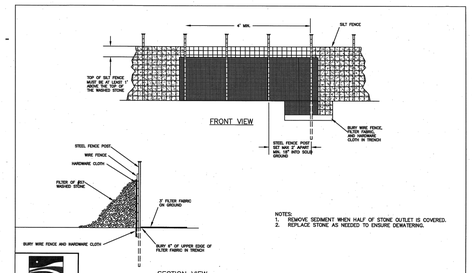


NOTE:

1. USE SILT FENCE ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND NEVER IN AREAS OF CONCENTRATED FLOW.
2. REMOVE SEDIMENT DEPOSITED AS NEEDED TO PROVIDE STORAGE VOLUME FOR THE NEXT RAIN AND TO REMOVE PRESSURE ON THE SILT FENCE.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD TEMPORARY SILT FENCE

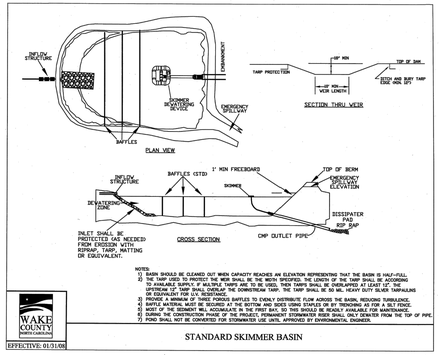


NOTES:

1. REMOVE SEDIMENT WHEN HALF OF STONE OUTLET IS COVERED.
2. REPLACE STONE AS NEEDED TO ENSURE DEWATERING.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD SILT FENCE OUTLET



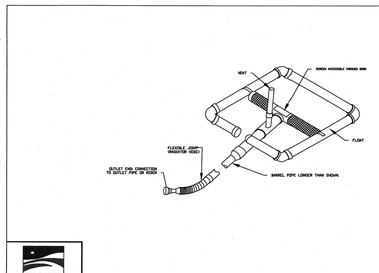
INLET SHALL BE PROTECTED AS NEEDED FROM EROSION WITH RIPRAP, TARP, MATTING OR EQUIVALENT.

NOTES:

1) BASIN SHOULD BE CLEANED OUT WHEN CAPACITY REACHES AN ELEVATION REPRESENTING THAT THE BASIN IS HALF-FULL.
2) THE TARP USED TO PROTECT THE WEIR SHALL BE THE WIDTH SPECIFIED. THE LENGTH OF THE TARP SHALL BE ACCORDING TO AVAILABLE SUPPLY. IF MULTIPLE TARPS ARE TO BE USED, THEN TARPS SHALL BE OVERLAPPED AT LEAST 12". THE UPSTREAM TARP SHALL BE PLACED OVER THE DOWNSTREAM TARP. THE TARP SHALL BE SO ML, HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT PER CPL SPECIFICATIONS.
3) PROVIDE A MINIMUM OF THREE POROUS BAFFLES TO EVENLY DISTRIBUTE FLOW ACROSS THE BASIN, REDUCING TURBULENCE.
4) BAFFLE MATERIAL MUST BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR A SILT FENCE.
5) MOST OF THE SEDIMENT WILL ACCUMULATE IN THE FIRST BAY, SO THIS SHOULD BE EASILY AVAILABLE FOR MAINTENANCE.
6) TOPS OF BAFFLES SHOULD BE 2 INCHES LOWER THAN THE TOP OF THE BERMS AND AT LEAST 6 INCHES HIGHER THAN THE ADJOINING BERM ON EITHER SIDE.
7) POND SHALL NOT BE CONVERTED FOR STORMWATER USE UNTIL APPROVED BY ENVIRONMENTAL ENGINEER.

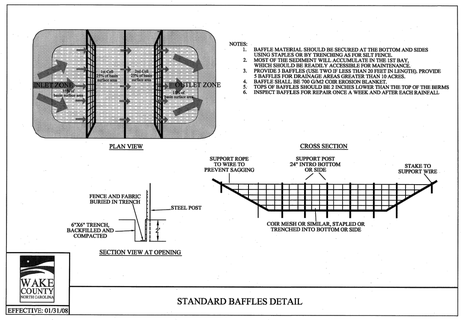
WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD SKIMMER BASIN



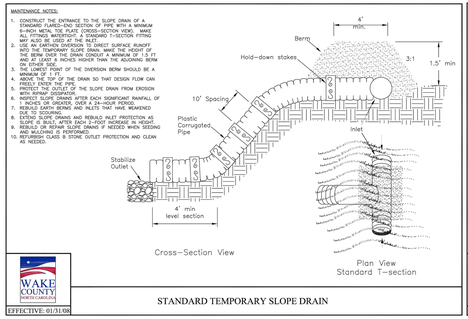
WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD SKIMMER DETAIL



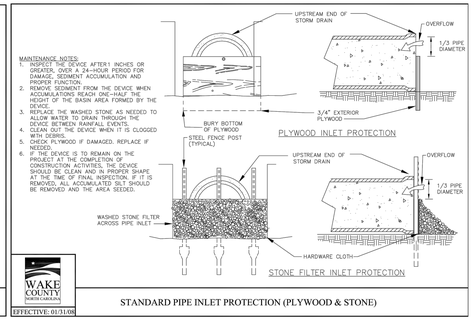
MAINTENANCE NOTES:

1. CONSTRUCT THE ENTRANCE TO THE SLOPE DRAIN OF A STANDARD FLARED-END SECTION OF PIPE WITH A MINIMUM 6-INCH METAL TOE PLATE (CORDS-SECTION VIEW). MAKE ALL FITTINGS WATERTIGHT. A STANDARD T-SECTION FITTING MAY BE USED AT THE TOP OF THE DRAIN.
2. USE AN EARTHEN DIVERSION TO DIRECT SURFACE RUNOFF INTO THE TEMPORARY SLOPE DRAIN. MAKE THE HEIGHT OF THE DIVERSION AT LEAST 1 FT HIGHER THAN THE TOP OF PIPE AND AT LEAST 6 INCHES HIGHER THAN THE ADJOINING BERM ON EITHER SIDE.
3. THE EARTH FILLET FRONT OF THE DIVERSION BERM SHOULD BE A MINIMUM OF 1 FT.
4. ABOVE THE TOP OF THE DRAIN SO THAT DESIGN FLOW CAN ENTER THE PIPE UNIMPEDED.
5. PROTECT THE OUTLET OF THE SLOPE DRAIN FROM EROSION WITH RIPRAP DISSIPATOR.
6. INSPECT THE DIVERSION AFTER EACH SIGNIFICANT RAINFALL OF 1 INCHES OR GREATER, OVER A 24-HOUR PERIOD.
7. REBUILD EARTH BERMS AND INLETS THAT HAVE WEAKENED OR BEEN BREACHED.
8. EXTEND SLOPE DRAINS AND REBUILD INLET PROTECTION AS SLOPE IS BUILT, AFTER EACH 2-FOOT INCREASE IN HEIGHT.
9. REBUILD OR REPAIR SLOPE DRAINS IF NEEDED WHEN SEEDING AND MULCHING IS PERFORMED.
10. REMOVE INLET PROTECTION AND CLEAN AS NEEDED.



WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD TEMPORARY SLOPE DRAIN

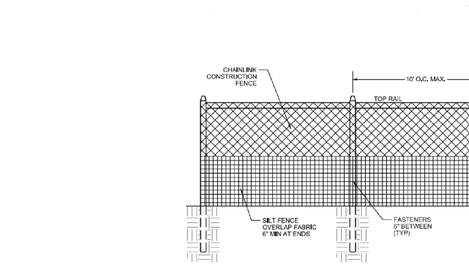


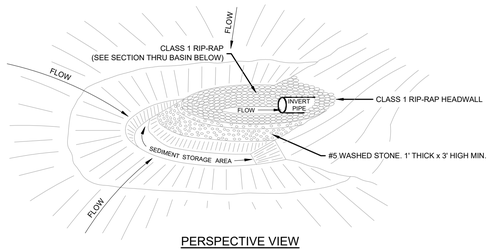
MAINTENANCE NOTES:

1. INSPECT THE DEVICE AFTER 1 INCHES OR GREATER, OVER A 24-HOUR PERIOD FOR DAMAGE, SEDIMENT ACCUMULATION AND PROPER FUNCTION.
2. REMOVE SEDIMENT FROM THE DEVICE WHEN ACCUMULATIONS REACH ONE-HALF THE HEIGHT OF THE BASIN AREA FORMED BY THE DEVICE.
3. REPLACE THE WASHED STONE AS NEEDED TO ALLOW WATER TO DRAIN THROUGH THE DEVICE BETWEEN RAINFALL EVENTS.
4. CLEAN OUT THE DEVICE WHEN IT IS CLOGGED WITH DEBRIS.
5. CHECK PLYWOOD IF DAMAGED. REPLACE IF NEEDED.
6. THE DEVICE IS TO REMAIN ON THE PROJECT AT THE COMPLETION OF CONSTRUCTION ACTIVITIES. THE DEVICE SHOULD BE CLEAN AND IN PROPER SHAPE AT THE TIME OF FINAL INSPECTION. IF IT IS REMOVED, ALL ACCUMULATED SILT SHOULD BE REMOVED AND THE AREA SEEDED.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

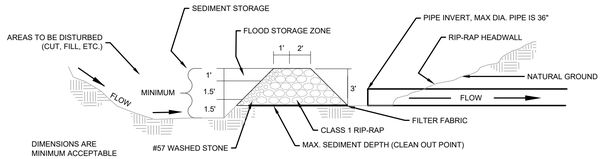
STANDARD PIPE INLET PROTECTION (PLYWOOD & STONE)





NOTES:

1. CLEAR THE AREA OF ALL DEBRIS THAT MIGHT HINDER EXCAVATION AND DISPOSAL OF SPOIL.
2. INSTALL THE CLASS B OR CLASS I RIPRAP IN A SEMI-CIRCLE AROUND THE PIPE INLET. THE STONE SHOULD BE BUILT UP HIGHER ON EACH END WHERE IT TIES INTO THE EMBANKMENT. THE MINIMUM CREST WIDTH OF THE RIPRAP SHOULD BE 3 FEET, WITH A MINIMUM BOTTOM WIDTH OF 11 FEET. THE MINIMUM HEIGHT SHOULD BE 2 FEET, BUT ALSO 1 FOOT LOWER THAN THE SHOULDER OF THE EMBANKMENT OR DIVERSIONS.
3. A 1 FOOT THICK LAYER OF NC DOT #5 OR #57 STONE SHOULD BE PLACED ON THE OUTSIDE SLOPE OF THE RIPRAP.
4. THE SEDIMENT STORAGE AREA SHOULD BE EXCAVATED AROUND THE OUTSIDE OF THE STONE HORSESHOE 18 INCHES BELOW NATURAL GRADE.
5. WHEN THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, FILL DEPRESSION AND ESTABLISH FINAL GRADING ELEVATIONS. COMPACT AREA PROPERLY, AND STABILIZE WITH GROUND COVER.



HORSESHOE ROCK PIPE INLET PROTECTION
NO SCALE

MAINTENANCE:

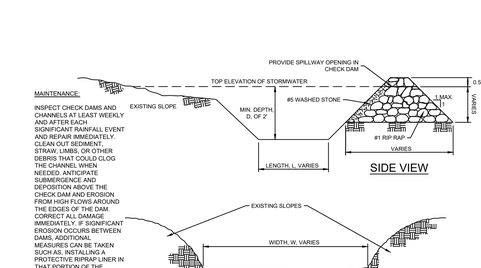
INSPECT ROCK DOUGHNUT INLET PROTECTION AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (½ INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY.

TO PROVIDE SATISFACTORY INLET PROTECTION EFFICIENCY, REMOVE SEDIMENT FROM THE SEDIMENT POOL AREA WHEN THE VOLUME IS DECREASED BY HALF. THIS WILL HELP PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN. STABILIZE EXCAVATED MATERIAL APPROPRIATELY.

TAKE CARE NOT TO DAMAGE OR UNDERCUT THE STRUCTURE DURING SEDIMENT REMOVAL. REMOVE DEBRIS FROM THE INLET AND REPLACE STONE AS NEEDED. IF THE INLET WAS COVERED WITH WIRE MESH THE MESH SHOULD BE CLEANED OF DEBRIS.

WHEN THE CONTRIBUTING DRAINAGE AREA HAS BEEN ADEQUATELY STABILIZED, REMOVE ALL MATERIALS AND DISPOSE OF SEDIMENT PROPERLY. BRING THE DISTURBED AREA TO THE GRADE OF THE DROP INLET. SMOOTH AND COMPACT IT AS NEEDED.

APPROPRIATELY STABILIZE ALL BARE AREAS AROUND THE INLET WITH GROUND COVER.



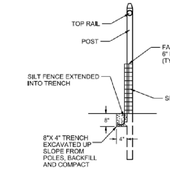
MAINTENANCE:

INSPECT CHECK DAMS AND CHANNELS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL EVENT AND REPAIR IMMEDIATELY. CLEAN OUT SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS THAT COULD CLOG THE CHANNEL WHEN NEEDED. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE CHECK DAM AND EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE DAM. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN DAMS, ADDITIONAL MEASURES CAN BE TAKEN SUCH AS, INSTALLING A PROTECTIVE RIPRAP LINER IN THAT PORTION OF THE CHANNEL. REMOVE SEDIMENT ACCUMULATED BEHIND THE DAMS AS NEEDED TO PREVENT DAMAGE TO CHANNEL VEGETATION. ALLOW THE CHANNEL TO DRAIN THROUGH THE STONE CHECK DAM. AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM. ADD STONES TO DAMS AS NEEDED TO MAINTAIN DESIGN HEIGHT AND CROSS SECTION.

NOTES

1. HEIGHT & WIDTH DETERMINED BY EXISTING TOPOGRAPHY AND SEDIMENT STORAGE REQUIRED.
2. KEY RIP RAP INTO THE DAM FOR STABILIZATION.
3. REMOVE SEDIMENT ACCUMULATION FROM BEHIND CHECK DAMS TO PREVENT DAMAGE TO CHANNEL VEGETATION. FLOW SHOULD BE MAINTAINED THROUGH THE DAM.

CHECK DAM WITH WEIR
NO SCALE



NOTES:

1. MAINTENANCE SHALL OCCUR WHEN NECESSARY. SILT FENCE SHALL BE REPLACED EVERY 6 MONTHS AND POSTS SHALL BE INSPECTED TO ENSURE STRUCTURAL INTEGRITY. SILT FENCE SHALL BE INSPECTED WEEKLY AND ALL MAINTENANCE ISSUES SHALL BE CORRECTED AT THAT TIME.
2. SILT FENCE SHOULD BE A MINIMUM OF 5 FEET FROM THE TOE OF SLOPE.

SUPER SILT FENCE
NO SCALE

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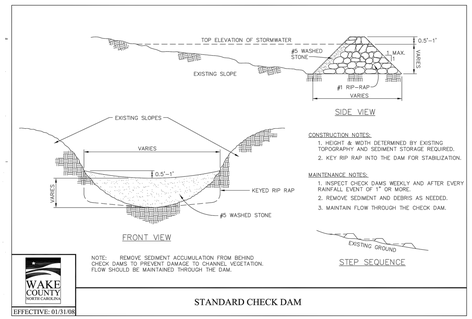
NOTES:

1. BAFFLE MATERIAL SHOULD BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR A SILT FENCE.
2. MOST OF THE SEDIMENT WILL ACCUMULATE IN THE 1ST BAY, WHICH SHOULD BE READILY ACCESSIBLE FOR MAINTENANCE.
3. FOR THE 3 BAFFLES USE TWO 8' LESS THAN 20 FEET IN LENGTH. PROVIDE TWO FEET OF OVERLAP FOR LENGTHS GREATER THAN 10 ACRES.
4. BAFFLE HEIGHT SHALL BE 700 AND 1000 FEET ELEVATION.
5. TOPS OF BAFFLES SHOULD BE 2 INCHES LOWER THAN THE TOP OF THE BERMS
6. INSPECT BAFFLES FOR REPAIR ONCE A WEEK AND AFTER EACH RAINFALL.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD BAFFLES DETAIL



CONSTRUCTION NOTES:

1. HEIGHT & WIDTH DETERMINED BY EXISTING TOPOGRAPHY AND SEDIMENT STORAGE REQUIRED.
2. KEY RIP RAP INTO THE DAM FOR STABILIZATION.

MAINTENANCE NOTES:

1. INSPECT CHECK DAMS WEEKLY AND AFTER EVERY RAINFALL EVENT OF 1" OR MORE.
2. REMOVE SEDIMENT AND DEBRIS AS NEEDED.
3. MAINTAIN FLOW THROUGH THE CHECK DAM.

NOTE: REMOVE SEDIMENT ACCUMULATION FROM BEHIND CHECK DAMS TO PREVENT DAMAGE TO CHANNEL VEGETATION. FLOW SHOULD BE MAINTAINED THROUGH THE DAM.

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD CHECK DAM

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PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/1/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION & SEDIMENT CONTROL DETAILS

C-24

SHEET 24 OF 30

FOR SHOULDERS, SIDE DITCHES, SLOPES (MAX 3:1):		
DATE	**TYPE**	**PLANTING RATE**
AUG 15-NOV 1	TALL FESCUE	300 LBS/ACRE
NOV 1-MAR 1	TALL FESCUE & ABRUZZI RYE	300 LBS/ACRE
MAR 1-APR 15	TALL FESCUE	300 LBS/ACRE
APR 15-JUN 30	HULLED COMMON BERMUDAGRASS	25 LBS/ACRE
JUL 1-AUG 15	TALL FESCUE AND BROWNTOP MILLET OR SORGHUM-SUDAN HYBRIDS ***	125 LBS/ACRE (TALL FESCUE); 35 LBS/ACRE (BROWNTOP MILLET); 30 LBS/ACRE (SORGHUM-SUDAN HYBRIDS)
*** **TEMPORARY:** RESEED ACCORDING TO OPTIMUM SEASON FOR DESIRED PERMANENT VEGETATION. DO NOT ALLOW TEMPORARY COVER TO GROW MORE THAN 12" IN HEIGHT BEFORE MOWING; OTHERWISE, FESCUE MAY BE SHADED OUT.		

FOR SHOULDERS, SIDE DITCHES, SLOPES (3:1 TO 2:1):		
DATE	**TYPE**	**PLANTING RATE**
MAR 1 - JUN 1	SERICEA LESPEDEZA (SCARIFIED) AND USE THE FOLLOWING COMBINATIONS:	50 LBS/ACRE
MAR 1 - APR 15	ADD TALL FESCUE	120 LBS/ACRE
MAR 1 - JUN 30	OR ADD WEEPING LOVE GRASS	10 LBS/ACRE
MAR 1 - JUN 30	OR ADD HULLED COMMON BERMUDAGRASS	25 LBS/ACRE
JUN 1 - SEPT 1	TALL FESCUE AND BROWNTOP MILLET OR SORGHUM-SUDAN HYBRIDS ***	120 LBS/ACRE (TALL FESCUE); 35 LBS/ACRE (BROWNTOP MILLET); 30 LBS/ACRE (SORGHUM-SUDAN HYBRIDS)
SEPT 1 - MAR 1	SERICEA LESPEDEZA (UNHULLED - UNSCARIFIED) AND TALL FESCUE	70 LBS/ACRE (SERICEA LESPEDEZA); 120 LBS/ACRE (TALL FESCUE)
NOV 1 - MAR 1	AND ABRUZZI RYE	25 LBS/ACRE
*** **TEMPORARY:** RESEED ACCORDING TO OPTIMUM SEASON FOR DESIRED PERMANENT VEGETATION. DO NOT ALLOW TEMPORARY COVER TO GROW MORE THAN 12" IN HEIGHT BEFORE MOWING; OTHERWISE, FESCUE MAY BE SHADED OUT.		

MIXTURE	
AGRICULTURAL LIMESTONE	2 TONS/ACRE (3 TONS/ACRE IN CLAY SOILS)
FERTILIZER	1,000 LBS/ACRE - 10-10-10
SUPERPHOSPHATE	500 LBS/ACRE - 20% ANALYSIS
MULCH	2 TONS/ACRE - SMALL GRAIN STRAW
ANCHOR	ASPHALT EMULSION AT 300 GALS/ACRE

SEEDBED PREPARATION:

1. CHISEL COMPACTED AREAS AND SPREAD TOPSOIL THREE INCHES DEEP OVER ADVERSE SOIL CONDITIONS, IF AVAILABLE.
2. RIP THE ENTIRE AREA TO SIX INCHES DEEP.
3. REMOVE ALL LOOSE ROCK, ROOTS, AND OTHER OBSTRUCTIONS LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
4. APPLY AGRICULTURAL LIME, FERTILIZER AN SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL (*SEE BELOW).
5. CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM REASONABLY UNIFORM SEEDBED IS PREPARED FOUR TO SIX INCHES DEEP.
6. SEED ON A FRESHLY PREPARED SEEDBED AND COVER SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK AFTER SEEDING.
7. MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
8. INSPECT ALL SEEDDED AREAS AND MAKE NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. IF STAND SHOULD BE OVER 60% DAMAGED, RE-ESTABLISH FOLLOWING THE ORIGINAL LIME, FERTILIZER AND SEEDING RATES.

*APPLY: AGRICULTURAL LIMESTONE- 2 TONS/ACRE MINIMUM OR PER SOIL TEST

FERTILIZER - 10-10-10 ANALYSIS @ 900 LBS/ACRE
SUPERPHOSPHATE - 500 LBS/ACRE OF 20% ANALYSIS
MULCH - 2 TONS (+/- 80 BALES) STRAW/ACRE
ANCHOR - USE LIQUID ASPHALT @ 400 GALS/ACRE
OR EMULSIFIED ASPHALT @ 300 GALS/ACRE

PERMANENT SEEDING SCHEDULE

NO SCALE

FOR LATE WINTER AND EARLY SPRING:

SEEDING MIXTURE:
RYE (GRAIN) - 120 LB/ACRE
ANNUAL LESPEDEZA* (KOBE IN PIEDMONT AND COASTAL PLAIN; KOREAN IN MOUNTAINS) - 50 LB/ACRE

*OMIT ANNUAL LESPEDEZA WHEN DURATION OF TEMPORARY COVER IS NOT TO EXTEND BEYOND JUNE

SEEDING DATES:
MOUNTAINS: ABOVE 2500 FEET: FEB. 15 - MAY 15
BELOW 2500 FEET: FEB. 1 - MAY 1
PIEDMONT: JAN. 1 - MAY 1
COASTAL PLAIN: DEC. 1 - APR. 15

SOIL AMENDMENTS:

FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LBS/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LBS/ACRE 10-10-10 FERTILIZER

MULCH:

APPLY 4,000 LBS/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:

REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE, AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE

FOR SUMMER:

SEEDING MIXTURE:
GERMAN MILLET* - 40 LB/ACRE

*IN THE PIEDMONT AND MOUNTAINS, A SMALL-STEMMED SUDANGRASS MAY BE SUBSTITUTED AT A RATE OF 50 LB/ACRE

SEEDING DATES:
MOUNTAINS: MAY 15 - AUG. 15
PIEDMONT: MAY 1 - AUG. 15
COASTAL PLAIN: APR. 15 - AUG. 15

SOIL AMENDMENTS:

FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER

MULCH:

APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:

REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE, AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE

FOR FALL:

SEEDING MIXTURE:
RYE (GRAIN) - 120 LB/ACRE

SEEDING DATES:
MOUNTAINS: AUG. 15 - DEC. 15
COASTAL PLAIN AND PIEDMONT: AUG. 15 - DEC. 30

SOIL AMENDMENTS:

FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 1,000 LB/ACRE 10-10-10 FERTILIZER

MULCH:

APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:

REPAIR AND REFERTILIZE DAMAGED AREAS IMMEDIATELY. TOPDRESS WITH 50 LB/ACRE OF NITROGEN IN MARCH. IF IT IS NECESSARY TO EXTEND TEMPORARY COVER BEYOND JUNE 15, OVERSEED WITH 50 LB/ACRE KOBE (PIEDMONT AND COASTAL PLAIN) OR KOREAN (MOUNTAINS) LESPEDEZA IN LATE FEBRUARY OR EARLY MARCH.

SEEDBED PREPARATION:

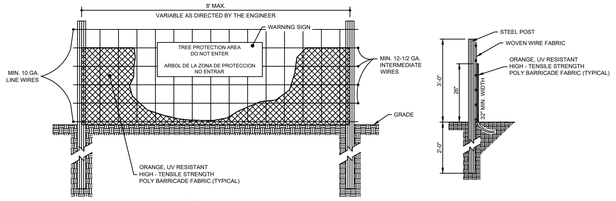
LIMING - APPLY LIME ACCORDING TO SOIL TEST RECOMMENDATIONS. IF THE PH (ACIDITY) OF THE SOIL IS NOT KNOWN, AN APPLICATION OF GROUND AGRICULTURAL LIMESTONE AT THE 6.106 RATE OF 1 TO 1 1/2 TONS/ACRE ON COARSE-TEXTURED SOILS AND 2-3 TONS/ACRE ON FINETEXTURED SOILS IS USUALLY SUFFICIENT. APPLY LIMESTONE UNIFORMLY AND INCORPORATE INTO THE TOP 4-6 INCHES OF SOIL. SOILS WITH A PH OF 6 OR HIGHER NEED NOT BE LIMED.

FERTILIZER - BASE APPLICATION RATES ON SOIL TESTS. WHEN THESE ARE NOT POSSIBLE, APPLY A 10-10-10 GRADE FERTILIZER AT 700-1,000 LB/ACRE. BOTH FERTILIZER AND LIME SHOULD BE INCORPORATED INTO THE TOP 4-6 INCHES OF SOIL. IF A HYDRAULIC SEEDER IS USED, DO NOT MIX SEED AND FERTILIZER MORE THAN 30 MINUTES BEFORE APPLICATION.

SURFACE ROUGHENING - IF RECENT TILLAGE OPERATIONS HAVE RESULTED IN A LOOSE SURFACE, ADDITIONAL ROUGHENING MAY NOT BE REQUIRED, EXCEPT TO BREAK UP LARGE CLODS. IF RAINFALL CAUSES THE SURFACE TO BECOME SEALED OR CRUSTED, LOOSEN IT JUST PRIOR TO SEEDING BY DISKING, RAKING, HARROWING, OR OTHER SUITABLE METHODS. GROOVE OR FURROW SLOPES STEEPER THAN 3:1 ON THE CONTOUR BEFORE SEEDING (PRACTICE 6.03, SURFACE ROUGHENING).

TEMPORARY SEEDING SCHEDULE

NO SCALE

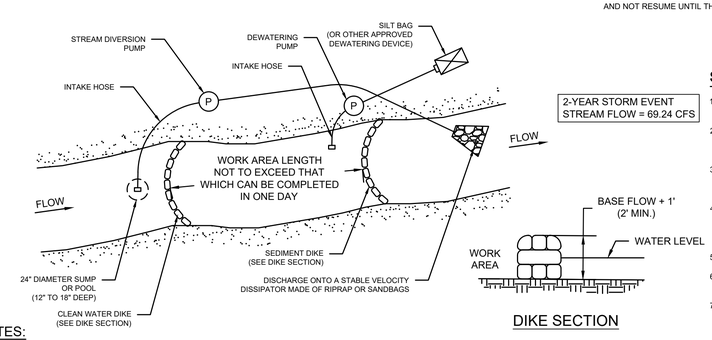


NOTES:

1. WARNING SIGNS TO BE MADE OF DURABLE WEATHERPROOF MATERIAL.
2. LETTERS TO BE 3" HIGH MINIMUM, CLEARLY LEGIBLE AND SPACED AS DETAILED.
3. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS.
4. PLACED A SIGN AT EACH END OF LINEAR TREE PROTECTION AND 50' ON CENTER THEREAFTER.
5. FOR TREE PROTECTION AREAS LESS THAN 200' IN PERIMETER, PROVIDE NO LESS THAN ONE SIGN PER PROTECTION AREA.
6. ATTACH SIGNS SECURELY TO FENCE POST AND FABRIC.
7. MAINTAIN TREE PROTECTION FENCE THROUGHOUT THE DURATION OF PROJECT.

TREE PROTECTION FENCE DETAIL

NO SCALE



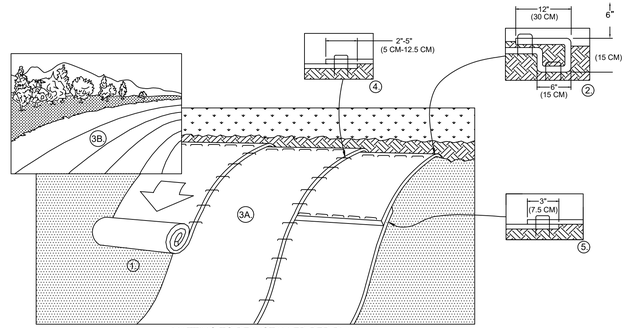
DIKE SECTION

NOTES:

1. PUMP AROUND DIKES SHALL NOT BE SET OUTSIDE THE LIMITS OF DISTURBANCE/IMPACT LIMITS SHOWN ON THE PLANS.
2. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED AS THE FIRST ORDER OF WORK. THE DEVICES SHALL REMAIN IN PLACE AND INSPECTED PER NCDEQ REQUIREMENTS UNTIL ALL DISTURBED AREAS ARE STABILIZED.
3. INSTALL PUMP AROUND DIVERSION AND DEWATER THE CONSTRUCTION ZONE THROUGH THE DEWATERING DEVICE. THE CONTRACTOR SHALL STAGE THE LIMITS OF THE PUMP AROUND FLOW DIVERSIUON TO DEWATER ONLY THAT SECTION SCHEDULED FOR THAT DAY'S WORK. AT THE END OF EACH WORK DAY, THE WORK AREA SHALL BE SABILIZED, THE PUMP AROUND REMOVED, AND THE FLOW RESTORED TO THE CHANNEL. WORK SHALL BE COMPLETED ONLY DURING FORECAST PERIODS OF DRY WEATHER.

PUMP AROUND DETAIL

NO SCALE



MATTING TO BE INSTALLED PER PLAN

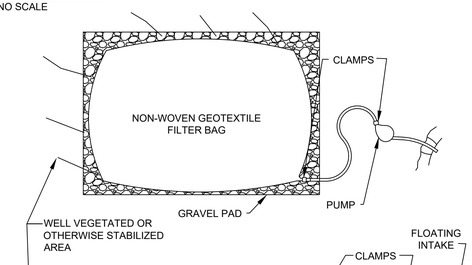
NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH. NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

DETAIL AND LANGUAGE PROVIDED BY NORTH AMERICAN GREEN REV. 1/2004

SLOPE INSTALLATION

NO SCALE



FILTER BAGS MAY BE USED TO FILTER WATER PUMPED FROM EXCAVATIONS PRIOR TO DISCHARGING.

FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.

THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

FILTER BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREAS AND DISCHARGED ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.

THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE FILTER BAG IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.

A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE REPLACEMENT BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE ½ FULL.

FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

SILT BAG

NO SCALE

STREAM CROSSING SEQUENCE

1. KEEP CLEARING AND EXCAVATION OF THE STREAM BANKS, BED, AND APPROACH SECTIONS TO A MINIMUM AND WITHIN PERMITTED LIMITS OF DISTURBANCE.
2. STUMPS AND ROOT WADS SHALL BE LEFT IN PLACE ALONG THE BANK. SILT FENCE SHALL BE INSTALLED ALONG THE TOP OF STREAM BANK UNTIL PERMANENT CROSSING CAN BE INSTALLED.
3. DIVERT ALL SURFACE WATER FROM THE CONSTRUCTION SITE TO SEDIMENT BASIN SB-1 AND CHECK DAM WITH WEIR CDW-1. LINE UNSTABLE STREAM BANKS WITH RIPRAP, OR OTHERWISE APPROPRIATELY STABILIZE THEM.
4. INSTALL STREAM PUMP AROUND. BEGIN BY PLACING PUMPS AND HOSES AT CROSSING. PREPARE SUMP, SILT BAG, AND VELOCITY DISSIPATOR. CONSTRUCT DIKES. BEGIN STREAM DIVERSION. REFER TO PUMP AROUND DETAIL, THIS SHEET.
5. INSTALL PERMANENT STREAM CROSSING CULVERT.
6. UPON COMPLETION OF THE INSTALLATION REMOVE SUMP, VELOCITY DISSIPATOR, SILT BAG, HOSES, AND PUMPS.
7. THE PERMITTEE SHALL REPORT TO THE RALEIGH REGIONAL OFFICE ANY NONCOMPLIANCE WITH THE 401 CERTIFICATION, ANY VIOLATION OF STREAM OR WETLAND STANDARDS INCLUDING BUT NOT LIMITED TO SEDIMENT IMPACTS, AND ANY VIOLATION OF STATE REGULATED RIPARIAN BUFFER RULES. INFORMATION SHALL BE PROVIDED ORALLY WITHIN 24 HOURS (OR THE NEXT BUSINESS DAY IF A WEEKEND OR HOLIDAY) FROM THE TIME THE APPLICANT BECAME AWARE OF THE CIRCUMSTANCES. A WRITTEN SUBMISSION SHALL ALSO BE PROVIDED WITHINS BUSINESS DAYS OF THE TIME THE APPLICANT BECOMES AWARE OF THE CIRCUMSTANCES. THE WRITTEN SUBMISSION SHALL CONTAIN A DESCRIPTION OF THE NONCOMPLIANCE AND ITS CAUSES; THE PERIOD OF NONCOMPLIANCE, INCLUDING EXACT DATES AND TIMES, IF THE NONCOMPLIANCE HAS NOT BEEN CORRECTED, THE ANTICIPATED TIME COMPLIANCE IS EXPECTED TO CONTINUE; AND STEPS TAKEN OR PLANNED TO REDUCE, ELIMINATE, AND PREVENT REOCCURRENCE OF THE NONCOMPLIANCE. THE DIVISION MAY WAIVE THE WRITTEN SUBMISSION REQUIREMENT ON A CASE-BY-CASE BASIS.
8. CONCENTRATED FLOW SHALL BE DIFFUSED USING APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES TO PREVENT STREAMBANK EROSION AND/OR OFFSITE SEDIMENTATION AND EROSION.

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ S75® Erosion Control Blanket

DESCRIPTION

The short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months, (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a lightweight photodegradable polypropylene netting having an approximate 0.50 x 0.50 in. (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm]) from the edge) as an overlap guide for adjacent mats.

The S75 shall meet Type 2.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Top side only, lightweight photodegradable	1.5 lb/1000 sq ft (0.73 kg/100 sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 ft (2.03 m)	8.0 ft (2.4 m)	16 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	40 lbs (18.14 kg)	50 lbs (22.68 kg)	96 lbs (43.54 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.5 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.50 in. (12.7 mm)
Resiliency	ECTC Guidelines	78.8%
Water Absorbency	ASTM D1117	301%
Mass/Unit Area	ASTM D6475	9.76 oz/sy (332 g/sm)
Swell	ECTC Guidelines	15%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.31 oz-in
Light Penetration	ASTM D6567	6.0%
Tensile Strength - MD	ASTM D6818	122.4 lbs/ft (1.81 kN/m)
Elongation - MD	ASTM D6818	36.1%
Tensile Strength - TD	ASTM D6818	79.2 lbs/ft (1.17 kN/m)
Elongation - TD	ASTM D6818	26.8%
Biomass Improvement	ASTM D7322	301%

Design Permissible Shear Stress	
Unvegetated Shear Stress	1.55 psf (74 Pa)
Unvegetated Velocity	5.00 fps (1.52 m/s)

Slope Design Data: C Factors			
Slope Gradients (S)			
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.029	N/A	N/A
20-50 ft	0.11	N/A	N/A
≥ 50 ft (15.2 m)	0.19	N/A	N/A

NTPEP Large-Scale Slope Testing
ASTM D6459 - C Factor = 0.012

Roughness Coefficients - Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.055
0.50 – 2.0 ft	0.055-0.021
≥ 2.0 ft (0.60 m)	0.021

Tensar International Corporation
2500 Northwinds Parkway
Suite 500
Alpharetta, GA 30009
800-TENSAR-1
tensarcorp.com

Tensar International Corporation warrants that at the time of delivery the product furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose, are hereby executed. If the product does not meet specifications on this page and Tensar is notified prior to installation, Tensar will replace the product at no cost to the customer. **This product specification supersedes all prior specifications for the product described above and is not applicable to any product shipped prior to January 1, 2012.**

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SLOPE MATTING

NO SCALE

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – VMax® SC250® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The SC250 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	70% Straw Fiber	0.35 lb/sq yd (0.19 kg/sm)
	30% Coconut Fiber	0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	5 lb/1000 sq ft (2.44 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 Ft (16.9 m)
Weight ± 10%	34 lbs (15.42 kg)
Area	40 sq yd (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.62 in. (15.75 mm)
Resiliency	ASTM 6524	95.2%
Density	ASTM D792	0.891 g/cm³
Mass/Unit Area	ASTM 6566	16.13 oz/sy (548 g/sm)
UV Stability	ASTM D4355/ 1000 HR	100%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D1388	222.65 oz-in.
Light Penetration	ASTM D6567	4.1%
Tensile Strength – MD	ASTM D6818	709 lbs/ft (10.51 kN/m)
Elongation – MD	ASTM D6818	23.9%
Tensile Strength – TD	ASTM D6818	712 lbs/ft (10.56 kN/m)
Elongation – TD	ASTM D6818	36.9%
Biomass Improvement	ASTM D7322	441%

Design Permissible Shear Stress		
	Short Duration	Long Duration
Phase 1: Unvegetated	3.0 psf (144 Pa)	2.5 psf (120 Pa)
Phase 2: Partially Veg.	8.0 psf (383 Pa)	8.0 psf (383 Pa)
Phase 3: Fully Veg.	10.0 psf (480 Pa)	8.0 psf (383 Pa)
Unvegetated Velocity	9.5 fps (2.9 m/s)	
Vegetated Velocity	15 fps (4.6 m/s)	

SPILLWAY MATTING

NO SCALE

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REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

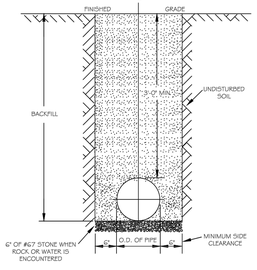
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

EROSION & SEDIMENT CONTROL DETAILS

C-25

SHEET 25 OF 30

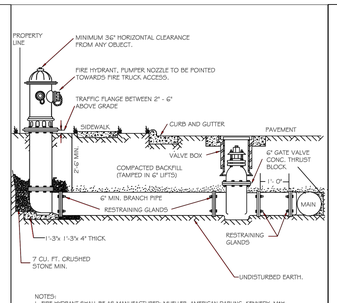


NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-3	D.W.C.	9-3-99	ABR	2-15-05
	RKH	5-31-00	J.P.S.	10-29-10

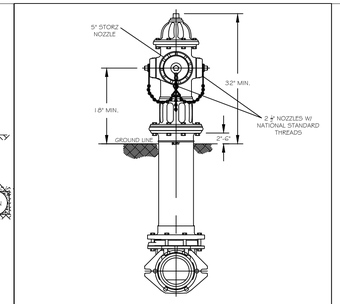


ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD FIRE HYDRANT INSTALLATION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4	MR	4-6-04	TKP	
	DTL	01-14-08		01-1-09

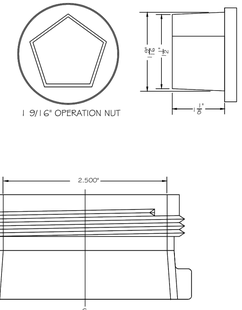


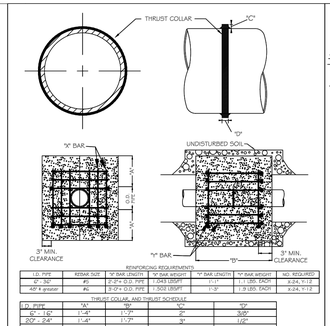
NOTES:
1. ALL PUBLIC FIRE HYDRANTS IN THE CITY OF RALEIGH AND THE MERGER TOWNS OF GARNER, ROLESVILLE, WAKE FOREST, KNIGHTDALE, WENDELL AND ZEBULON SHALL BE PAINTED CHROME YELLOW WITH HIGH REFLECTIVE ALUMINUM SILVER CAPS, BONNETS AND OPERATING NUTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
RALEIGH, GARNER, KNIGHTDALE, ROLESVILLE, WAKE FOREST, WENDELL & ZEBULON

STANDARD FIRE HYDRANT WITH 5" STORZ PUMPER NOZZLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-6	MAR	8-30-16		





REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-2"± O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
42" & greater	#6	2'-2"± O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

THRUST COLLAR AND THRUST SCHEDULE

I.D. PIPE	"X"	"Y"	"D"
6" - 16"	1'-4"	1'-7"	2"
20" - 24"	1'-6"	1'-7"	3"
30" - 36"	1'-8"	1'-7"	4"
42" & greater	1'-8"	1'-9"	6"

NOTES:
1. SEE STANDARD DETAIL W-8 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

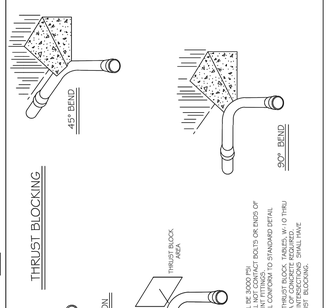
HYDRANT OPERATING NUT AND 2 1/2" OUTLET THREADS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-5	RKH	5-31-00	J.P.S.	11-1-10

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN DATA FOR WATER MAINS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-7	RKH	2-1-00	J.P.S.	11-1-10
	D.T.L.	6-16-06		



NOTES:
1. CONCRETE SHALL BE 3000 PSI.
2. CONCRETE SHALL BE PLACED IN BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. THRUST BLOCKING SHALL CONFORM TO STANDARD DETAIL W-5.
4. USE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11, FOR AREA OF CONCRETE REQUIRED.
5. SEE STANDARD DETAIL W-34 FOR SMALL VALVE CONCRETE THRUST BLOCKING.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD THRUST BLOCKING VIEWS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-9	D.W.C.	9-3-99	J.P.S.	5-1-00
		12-7-99	D.T.L.	6-16-06

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY SOFT CLAY OR SILTY SAND	SOFT CLAY OR MUCK	LOOSE SAND OR GRAVEL	ORDINARY ALLUVIAL SOIL	SAND, COMPACT FIRM CLAY	SAND, CLAY OR GRAVEL DRY SOIL	SAND, LOOSE UNIFORM DRY FINE SILT	SOFT CLAY, MUCK OR FINE SILT UNDERWATER	ROCK, FOOT LOADING
6"										
11 1/4°	1,108	1	1	1	1	1	1	2	1	
22 1/2°	2,207	1	2	2	1	1	1	3	1	
45°	4,328	2	3	3	1	1	2	5	1	
90°	7,996	2	4	5	1	1	2	8	1	
PLUG	5,635	2	3	4	1	1	2	6	1	
8"										
11 1/4°	1,970	1	1	2	1	1	1	2	1	
22 1/2°	3,922	1	2	3	1	1	1	4	1	
45°	7,624	2	4	5	1	1	2	8	1	
90°	14,215	4	6	9	2	2	4	15	2	
PLUG	10,053	3	5	6	2	2	3	10	1	
12"										
11 1/4°	4,433	2	3	3	1	1	2	5	1	
22 1/2°	8,826	3	5	6	2	2	3	9	1	
45°	17,312	5	9	11	3	3	5	18	2	
90°	31,993	8	16	19	4	4	8	32	4	
PLUG	22,619	6	12	14	3	3	6	23	3	
16"										
11 1/4°	7,881	2	4	5	1	1	2	8	1	
22 1/2°	15,691	4	8	10	2	2	4	16	2	
45°	30,779	8	16	19	4	4	8	31	4	
90°	56,861	15	29	35	8	8	15	57	6	
PLUG	40,213	10	21	25	5	5	10	41	5	

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY SOFT CLAY OR SILTY SAND	SOFT CLAY MUCK OR SILT	LOOSE SAND OR GRAVEL	ORDINARY ALLUVIAL SOIL	SAND, COMPACT FIRM CLAY	SAND, CLAY OR GRAVEL DRY SOIL	SAND, LOOSE UNIFORM DRY FINE SILT	SOFT CLAY, MUCK OR FINE SILT UNDERWATER	ROCK, FOOT LOADING
24"										
11 1/4°	17,734	5	9	11	3	3	5	18	2	
22 1/2°	35,305	9	18	22	5	5	9	36	4	
45°	69,252	18	35	42	9	9	18	70	7	
90°	127,934	32	64	77	16	16	32	128	13	
PLUG	90,478	23	46	55	12	12	23	91	10	
30"										
11 1/4°	27,709	7	14	17	4	4	7	2	3	
22 1/2°	55,163	14	28	34	7	7	14	56	6	
45°	108,206	28	55	65	14	14	28	109	11	
90°	199,902	50	100	120	25	25	50	200	20	
PLUG	141,372	36	71	85	18	18	36	142	15	
36"										
11 1/4°	39,901	10	20	24	5	5	10	40	4	
22 1/2°	79,439	20	40	48	10	10	20	30	8	
45°	155,816	39	76	94	20	20	39	156	16	
90°	287,855	72	144	172	36	36	72	288	29	
PLUG	203,575	51	102	122	26	26	51	204	21	
48"										
11 1/4°	70,935	18	36	43	9	9	18	71	8	
22 1/2°	141,218	36	71	85	18	18	36	142	15	
45°	277,007	70	139	166	35	35	70	277	28	
90°	511,742	128	256	320	64	64	128	512	52	
PLUG	361,911	91	181	217	46	46	91	362	37	

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-10	D.W.C.	9-23-99		

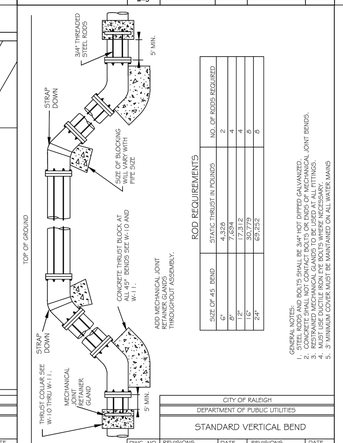
REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-11	D.W.C.	9-23-99		
			ABR	



ROD REQUIREMENTS

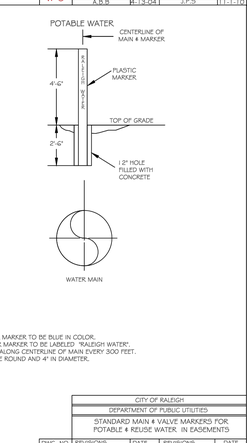
SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,624	4
12"	17,312	4
16"	30,779	6
24"	69,252	6

GENERAL NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. SEE STANDARD THRUST BLOCK TABLES W-10 AND W-11 FOR MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. ALL RODS SHALL BE TIGHTENED EVENLY.
5. 3" MINIMUM COVER MUST BE MAINTAINED ON ALL WATER MAINS

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD VERTICAL BEND

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-12	ABR	4-6-04	J.P.S.	11-1-10
	D.T.L.	6-16-06		

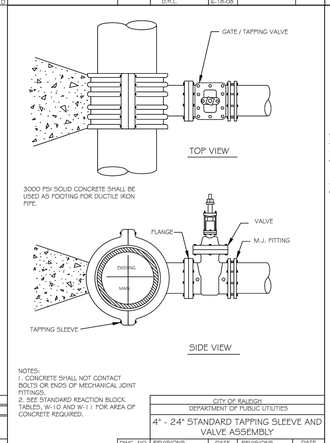


NOTES
1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER".
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD MAIN & VALVE MARKERS FOR POTABLE & REUSE WATER IN EASEMENTS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-13	D.W.C.	9-7-99	DTL	6-16-06
	RKH	5-31-00	J.P.S.	11-1-10

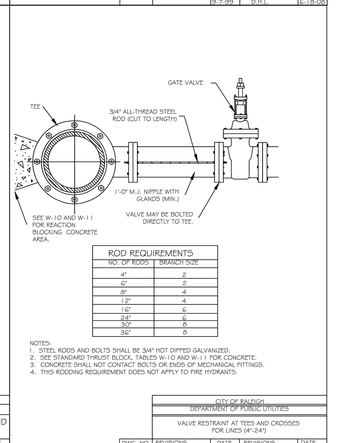


NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE STANDARD REACTION BLOCK TABLES, W-10 AND W-11 FOR AREA OF CONCRETE REQUIRED.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

4" - 24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-14	D.W.C.	9-7-99	RKH	5-31-00
	D.W.C.	9-7-99	J.P.S.	11-1-10



ROD REQUIREMENTS

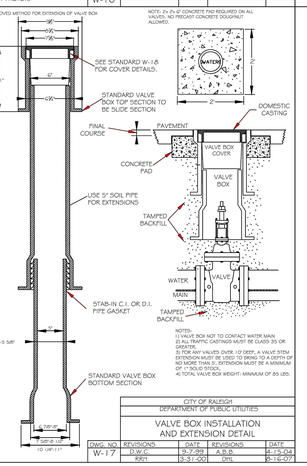
NO. OF RODS	BRANCH SIZE
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. SEE STANDARD THRUST BLOCK TABLES W-10 AND W-11 FOR CONCRETE.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-15	RKH	5-31-00	D.T.L.	6-16-06
	A.B.B.	4-19-04	J.P.S.	11-1-10

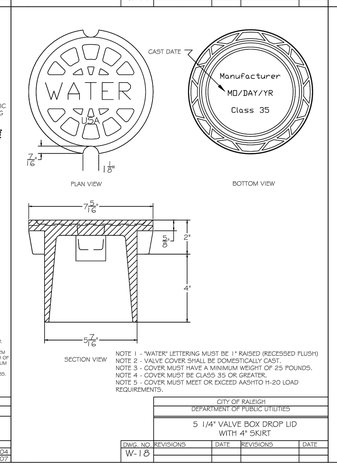


NOTES:
1) VALVE BOX NOT TO CONTACT WATER MAIN
2) ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
3) FOR ANY VALVES OVER 10' DEPP, A VALVE STEM EXTENSION MUST BE USED. THE TOP OF NUT SHALL BE NO MORE THAN 5' EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
4) TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

VALVE BOX INSTALLATION AND EXTENSION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-17	D.W.C.	9-7-99	A.B.B.	4-15-04
	RKH	5-31-00	DTL	6-16-07

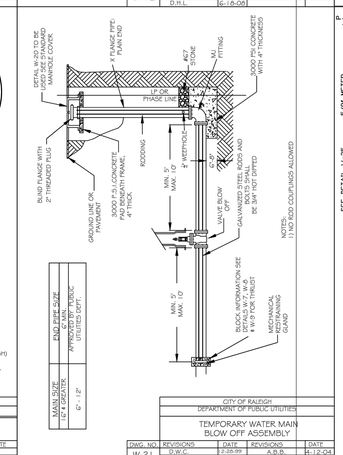


NOTE 1 - 'WATER' LETTERING MUST BE 1" RAISED (RECESSED FLUSH)
NOTE 2 - VALVE COVER SHALL BE DOMESTICALLY CAST.
NOTE 3 - COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
NOTE 4 - COVER MUST BE CLASS 35 OR GREATER.
NOTE 5 - COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

5 1/4" VALVE BOX DROP LID WITH 4" SKIRT

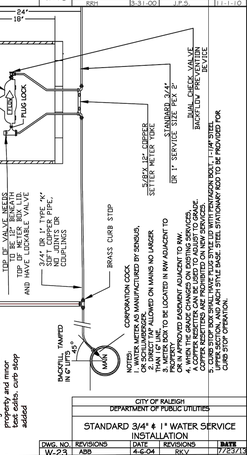
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-18				



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

TEMPORARY WATER MAIN BLOW OFF ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-21	D.W.C.	2-28-99	A.B.B.	4-12-04
	RKH	1-1-100	DTL	6-16-07

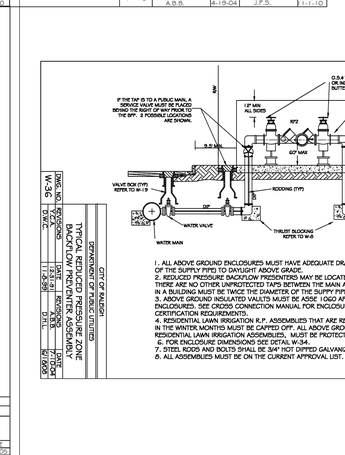


NOTES:
1. COVER WEIGHT: 113 LBS +/- 5%
2. LIDS TO BE COATED WITH BITUMINOUS COAL TAR COATING
3. BOLTS AND LIDS MUST BE MANUFACTURED FROM SAME DOMESTIC FOUNDRY.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

WATER METER BOX DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-25	R.K.V.	8-20-13	ABR	1-20-05
			J.P.S.	11-1-10



1. ALL ABOVE GROUND ENCLOSURES MUST HAVE ADEQUATE DRAINAGE (TWICE THE DIAMETER OF THE SUPPLY PIPE) TO DAYLIGHT ABOVE GRADE.
2. REDUCED PRESSURE BACKFLOW PREVENTERS MAY BE LOCATED IN A BUILDING PROVIDED THERE ARE NO OTHER UNPROTECTED TAPS BETWEEN THE MAIN AND THE BUILDING. DRAINAGE IN A BUILDING MUST BE TWICE THE DIAMETER OF THE SUPPLY PIPE.
3. ABOVE GROUND INSULATED VAULTS MUST BE ASSE 1060 APPROVED ABOVE GROUND ENCLOSURES. SEE CROSS CONNECTION MANUAL FOR ENCLOSURE FREEZE PROTECTION AND CERTIFICATION REQUIREMENTS.
4. RESIDENTIAL LAWN IRRIGATION R.P. ASSEMBLIES THAT ARE REMOVED TO PREVENT FREEZING IN THE WINTER MONTHS MUST BE CAPPED OFF. ALL ABOVE GROUND ASSEMBLIES, EXCEPT RESIDENTIAL LAWN IRRIGATION ASSEMBLIES, MUST BE PROTECTED FROM FROST.
5. FOR ENCLOSURE DIMENSIONS SEE DETAIL W-34.
6. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
7. ALL ASSEMBLIES MUST BE ON THE CURRENT APPROVAL LIST.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

BACKFLOW PREVENTER ASSEMBLY ENCLOSURE FOR DOMESTIC, FIRE LINE OR IRRIGATION

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-35	D.W.C.	2-28-99		
	RKH	1-1-100		
	D.T.L.	6-16-06		

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North Carolina 811 www.nc811.org
NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

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FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT
THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"
IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

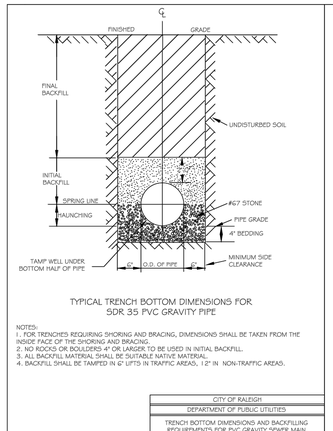
OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

WATER DETAILS

C-26

SHEET 26 OF 30

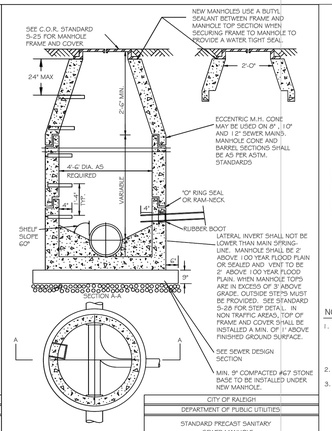


TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

NOTES:
1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.

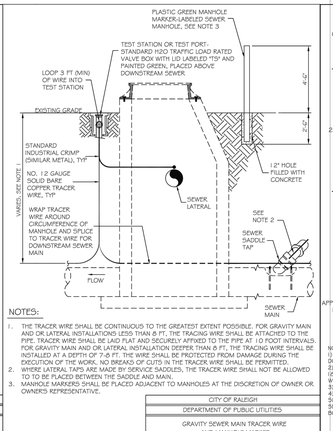
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
5-5	TO NOTES	8-1-67	R.W.C.	8-3-89
		7-2-82	KWH	3-30-00



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD PRECAST SANITARY SEWER MANHOLE

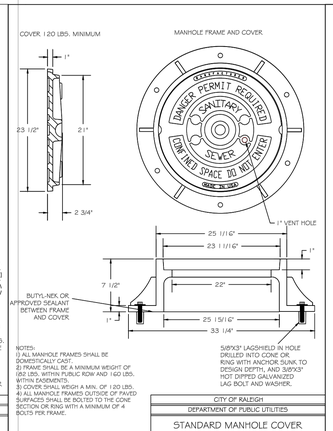
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE	REVISIONS	DATE
S-20	Y.C.A.	1-2-73	ABB	2-21-08		
	KWH	3-30-00	D.M.L.	6-16-08		



NOTES:
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7-8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OF CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNERS REPRESENTATIVE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER

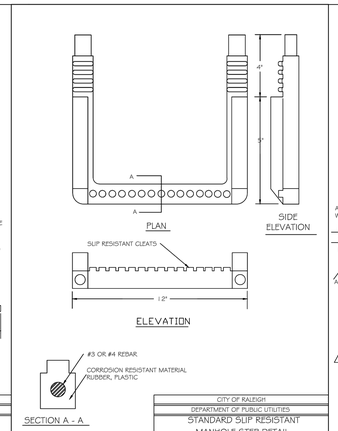
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20A	WKD	09-14		



NOTES:
1) ALL MANHOLE FRAMES SHALL BE CHEMICALLY CAST.
2) FRAME SHALL BE A MINIMUM WEIGHT OF 120 LBS. WITHIN PUBLIC ROW AND 140 LBS. WITHIN EASEMENTS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

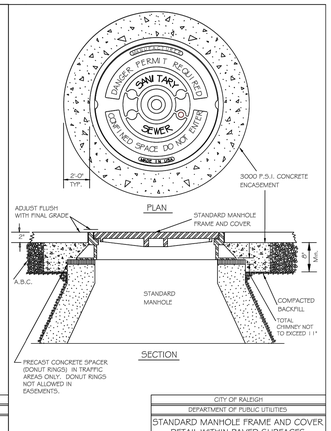
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-67	3-1-67	A.B.B.	8-9-05
	KWH	3-30-00	D.M.L.	6-18-08



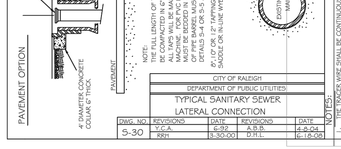
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD SLIP RESISTANT MANHOLE STEP DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-28	KWH	3-30-00		



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN PAVED SURFACES

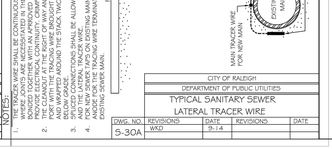
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-29	Y.C.A.	12-31-91	ABB	9-20-04
	KWH	3-30-00	DPL	1-29-07



NOTES:

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TYPICAL SANITARY SEWER LATERAL CONNECTION

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30	Y.C.A.	6-82	A.B.B.	4-6-04
	KWH	3-30-00	D.M.L.	6-16-08



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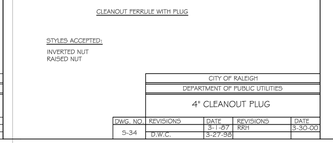
2. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE LATERAL WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.
3. TRACER WIRE SHALL BE ALLOWED TO BE SPLICED ONLY AT MANHOLES OR CLEANOUTS.
4. TRACER WIRE SHALL BE LOOPED INTO ALL MANHOLES AND CLEANOUTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TYPICAL SANITARY SEWER LATERAL TRACER WIRE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30A	WKD	9-14		



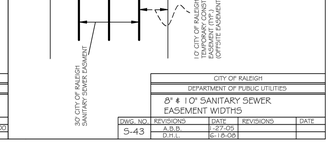
STANDARD 4" BRONZE CLEANOUT PLUG

CLEANOUT FERRULE WITH PLUG

STYLES ACCEPTED:
INVERTED NUT
RAISED NUT

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
4" CLEANOUT PLUG

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-34	R.W.C.	3-27-89	KWH	3-30-00



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
8" & 10" SANITARY SEWER EASEMENT WIDTHS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-43	A.B.B.	1-27-05		
	D.M.L.	6-16-08		

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FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
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SCALE ADJUSTMENT

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CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

OPTIMAL DEVELOPMENT LLC

DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

SEWER DETAILS

C-27

SHEET 27 OF 30

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days,*** a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

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FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
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OPTIMAL DEVELOPMENT LLC

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SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

SELF-INSPECTION RECORDKEEPING & REPORTING

C-28

SHEET 28 OF 30

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

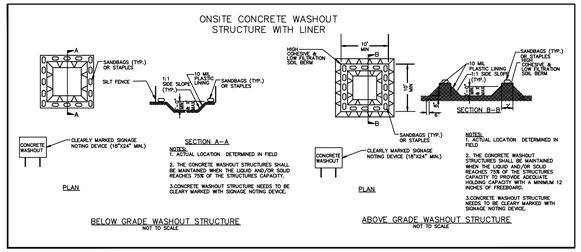
1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

CALL 48 HOURS BEFORE YOU DIG

NORTH CAROLINA ONE-CALL CENTER
1-800-632-4949

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FLM ENGINEERING
POST OFFICE BOX 91727
RALEIGH, NORTH CAROLINA 27675
PHONE: 919.610.1051
FIRM NC LICENSE NUMBER C-4222

NORTH CAROLINA PROFESSIONAL SEAL 039788 ENGINEER THOMAS CHASE MASSEY 7/31/25

REVISION HISTORY

REV #	DESCRIPTION	DATE	BY

ORIGINAL PLAN SIZE: 24" X 36"

ISSUED FOR PERMITTING
DO NOT USE FOR CONSTRUCTION

SCALE ADJUSTMENT

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING
0 1"

IF IT IS NOT 1 INCH ON THIS SHEET, ADJUST YOUR SCALE ACCORDINGLY

CONSTRUCTION INFRASTRUCTURE DRAWINGS

ROLESVILLE RD MIXED USE
1216 ROLESVILLE RD
ROLESVILLE, NC 27571

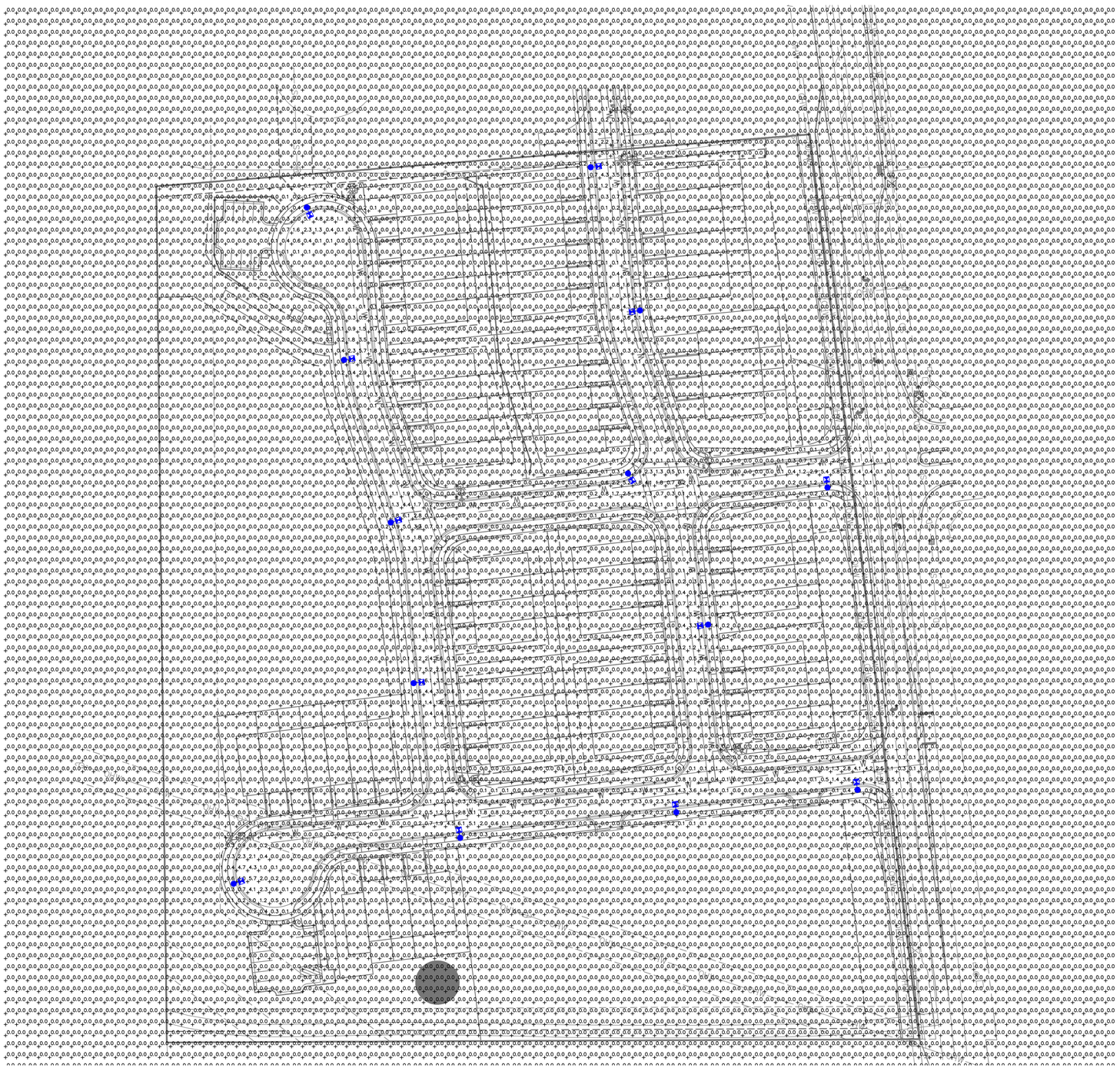
OPTIMAL DEVELOPMENT LLC

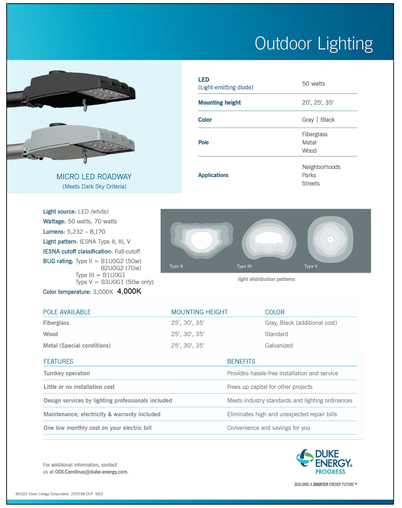
DATE:	07-31-2025
SCALE:	AS SHOWN
DESIGNED BY:	FLM
APPROVED BY:	FLM
PROJECT NO.:	21029

GROUND STABILIZATION & MATERIALS HANDLING

C-29

SHEET 29 OF 30

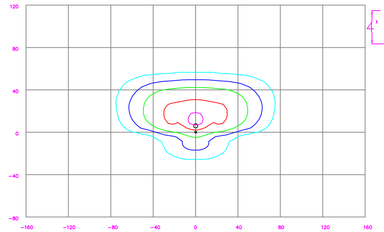




ISOFOOTCANDLE CURVES

FIXTURE: LED 50W ROADWAY
MOUNTING HEIGHT: 25 FT
LIGHT SOURCE: LED, 3000K, 70 CRI
LUMENS = 5342
PATTERN: TYPE III, B1-U0-G1(zero light at or above 90 degrees)

ASSY# LFIX-RW-LED-50-GRAY-III-3000K-____-P
POLE ASSY# LPOLE-DB-FG-25FT-GRAY-____-P (GRAY)



Schedule

Symbol	Label	QTY	Description	Number Lamps	Lamp Output	LLF
	A	13	LED 50w Roadway - Type III - 3000K	1	5312	0.85

NO.	DATE	REVISION	BY

DISTANCE CALIBRATION (INCHES)
0 0.5 1.0 2.0 3.0 4.0

LIGHTING DESIGN TOLERANCE

The calculated footcandle light levels in this lighting design are predicted values and are based on specific information that has been supplied to Duke Energy. Any inaccuracies in the supplied information, differences in luminaire installation, lighted area geometry including elevation differences, reflective properties of surrounding surfaces, obstructions (foliage or otherwise) in the lighted area, or lighting from sources other than listed in this design may produce different results from the predicted values. Normal tolerances of voltage, lamp output, and ballast and luminaire manufacture will also affect results.

DUKE ENERGY® PROGRESS

PROPRIETARY & CONFIDENTIAL

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ROLESVILLE TOWNHOMES
ROLESVILLE, NC
STREET LIGHTING ARRANGEMENT

Designed by DUKE ENERGY PROGRESS LIGHTING SOLUTIONS
Reviewed by N. Johnson
Scale 1" = 50'
Date 07/28/2025
Size Drawing size "D"
Description LED ROADWAY
Drawing No. 25-0322A
Sht. 1 OF 1