DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT
WASHINGTON REGULATORY OFFICE
2407 W. 5TH STREET
WASHINGTON NORTH CAROLINA 27889

September 20, 2024

Regulatory Program/Division

Sent Via Email: dougdaec@gmail.com

Joel & Stacy Justice
PO Box 308
Grandy, NC 27939

Dear Mr. & Mrs. Justice:

This letter is in response to your request to the Wilmington District, Washington Regulatory Field Office for an approved jurisdictional determination. The project/review area is located south of Indian Kettle Road, at Latitude 36.197470 and Longitude -75.859870; in Jarvisburg, Currituck County, North Carolina. The review area for this determination is limited to an approximately 15.48-acre area (comprised of one parcel (parcel numbers: 0109000053F0000)), which is illustrated on the enclosed site maps. This request has been assigned the file number SAW-2024-01349 (0 Indian Kettle Road Jarvisburg). This file number should be referenced in all correspondence concerning this project.

Based on our review of the information you furnished, a site inspection conducted on August 22, 2024, and other information available to our office, we have determined the above-referenced area does not contain any waters of the United States under U.S. Army Corps of Engineers (Corps) regulatory jurisdiction. This determination was made in accordance with the Corps regulatory authority pursuant to Section 404 of the Clean Water Act, and based upon criteria contained in the 1987 Corps of Engineers Wetland Delineation Manual and the Atlantic and Gulf Coastal Plain regional supplement. This determination is valid for a period of **five years** from the date of the letter, unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Division Appeals Officer at the address listed on the RFA form. In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under

33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received by the Corps by November 19, 2024. **It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.**

Section 404 of the Clean Water Act requires a Department of the Army (DA) permit be obtained prior to the discharge of dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 requires a DA permit be obtained for any work in, on, over or under navigable waters of the United States.

This determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the review area identified in this request. The determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

You are cautioned that work performed below the mean high water line or ordinary high water line in waters of the United States; and/or, the discharge of dredged or fill material into any areas identified on the enclosed information as within Federal jurisdiction, without a Department of the Army permit could subject you to enforcement action. Receipt of a permit from a state or local municipality does not obviate the requirement for obtaining a Department of the Army permit.

If you have any questions concerning this correspondence, please contact Joshua Tutt, Regulatory Specialist of the Washington Regulatory Field Office at 910-251-4629, by mail at the above address, or by email at Joshua.C.Tutt@usace.army.mil. Please take a moment to complete our customer satisfaction survey located at https://regulatory.ops.usace.army.mil/customer-service-survey/.

Sincerely,

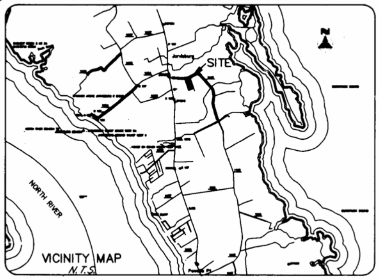
Joshua C. Tutt

Josh Tutt
Regulatory Specialist

Enclosures

cc: Doug Dorman, Atlantic Environmental LLC (via Dougdaec@gmail.com)

K - 30



PLAT NORTH
P.C. C-2, SL. 363

NOTES:
1. AREA DETERMINED BY COORDINATE METHOD.
2. IRON PINS AT ALL LOT CORNERS UNLESS OTHERWISE NOTED HEREON.
3. UNDERGROUND UTILITIES, IF ANY, WERE NOT LOCATED BY THIS SURVEY, FURTHER EVALUATION MAY BE REQUIRED.
4. NO RECOVERABLE NCGS MONUMENTS APPEAR TO BE WITHIN 2000' OF THE SUBJECT PROPERTY SHOWN HEREON.
5. THIS SURVEY IS SUBJECT TO ANY FACTS THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.
6. F.I.R.M. ZONE: ZONE X, PANEL #370078 9920 J
REVISION DATE: 12/6/2005
(SUBJECT TO CHANGE BY F.E.M.A.)
7. PIN NOS.: PARCEL A: 0109-000-0050-0000
RESIDUAL PARCEL: 0109-000-053F-0000
8. PROPERTY OWNERS: JOEL K. PEDERSEN &
STACY T. ANDREWS
PO BOX 69
JARVISBURG, NC 27947
9. PROPERTY ADDRESS: 150 BLACK FOREST LANE
JARVISBURG, NC 27947
10. RECORDED REFERENCES:
D.B. 403, PGS. 021-023 — P.C. F, SL. 141
D.B. 403, PG. 012 — P.C. C-2, SL. 363
D.B. 403, PG. 029
11. LOT COVERAGE:
RESIDENCE: 2,413 SQ.FT.
CONCRETE: 368 SQ.FT.
TRAILERS/STORAGE BUILDINGS: 1,419 SQ.FT.
TOTAL COVERAGE: 4,200 SQ.FT.

LINE TABLE		
LINE	LENGTH	BEARING
L1	52.96	S84°15'47"E
L2	20.27	N71°06'57"E

SURVEYORS CERTIFICATE
I, JAMES W. HUGGINS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM P.C. C-2, SL. 363; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN DEED BOOK 403, PAGE 021; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

THIS SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY; OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS ___ DAY OF ______, 20__

P.L.S. L-4580

OWNERS CERTIFICATE
THIS RECOMBINATION WAS PREPARED AT THE DIRECTION OF THE UNDERSIGNED OWNER OF THE PROPERTY AS SHOWN HEREON.

DATE 7/27/07

OWNER

OWNERS NOTARY
Nancy W. Warren, A NOTARY PUBLIC OF Dare COUNTY, NORTH CAROLINA, DO HEREBY CERTIFY THAT Joel K. + Stacy T. Justice PERSONALLY APPEARED BE FORE ME THIS DATE AND ACKNOWLEDGED THE DUE EXECUTION OF THE FOREGOING CERTIFICATE.

WITNESS MY HAND AND OFFICIAL SEAL THIS 27 DAY OF July, 2007.

Notary Public, North Carolina
County of Dare
Nancy W. Warren
My Commission Expires 4/10/2010

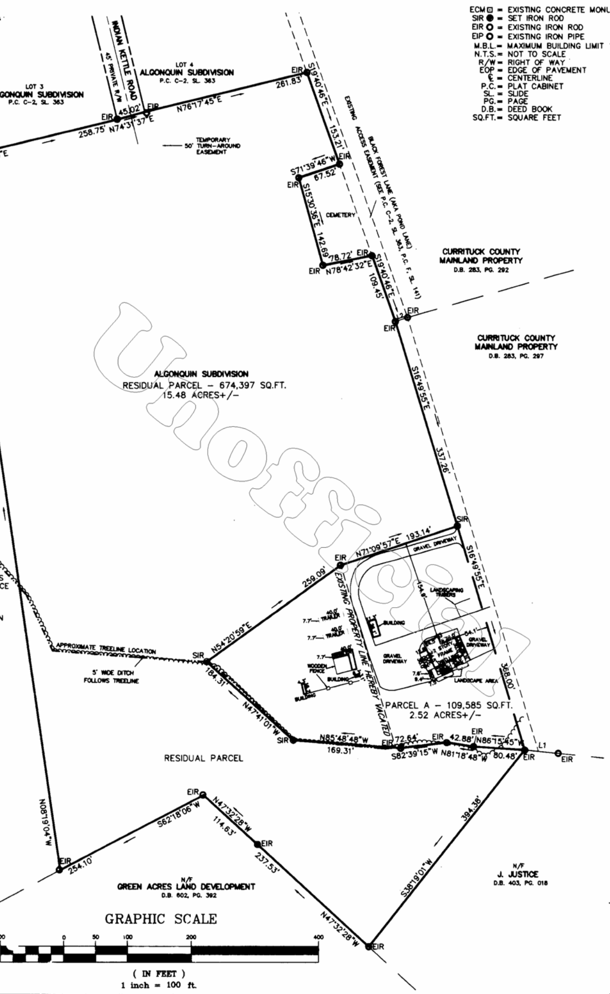
NOTARY PUBLIC
MY COMMISSION EXPIRES 4.10.10

STATE OF NORTH CAROLINA
COUNTY OF CURRITUCK
REVIEW OFFICER
I, Tammy D. Glave, REVIEW OFFICER OF CURRITUCK COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

DATE 7/30/07

REVIEW OFFICER

Filed for registration on June 30 2007
at 3:51 o'clock P.M.
Plat Cabinet K Page 30
Register of Deeds
Asst./Deputy



ECM ▫ = EXISTING CONCRETE MONU
SIR ● = SET IRON ROD
EIR ○ = EXISTING IRON ROD
EIP ○ = EXISTING IRON PIPE
M.B.L. = MAXIMUM BUILDING LIMIT
N.T.S. = NOT TO SCALE
R/W = RIGHT OF WAY
EOP = EDGE OF PAVEMENT
℄ = CENTERLINE
P.C. = PLAT CABINET
SL. = SLIDE
PG. = PAGE
D.B. = DEED BOOK
SQ.FT. = SQUARE FEET

BISSELL
Engineers, Planners, Surveyors and Environmental Specialists
Bissell Professional Group
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760

PROJECT:
JOEL K JUSTICE AND STACY T. JUSTICE
POPLAR BRANCH TWNSHP CURRITUCK COUNTY NORTH CAROLINA
LOT RECOMBINATION PLAT

REVISIONS

NO.	DATE	DESCRIPTION	BY

DATE: 07-18-07
SCALE: 1"=100'
DESIGNED: BPG
CHECKED: JWH
DRAWN: QMW
APPROVED: BPG
SHEET: 1 OF 1
CAD FILE: 3826-RECOMBO
PROJECT NO: 3826

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Joel & Stacy Justice, Atlantic Environmental	File Number: SAW-2024-01349	Date: 9/20/2024

Attached is:		See Section below
☐	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐	PERMIT DENIAL WITHOUT PREJUDICE	C
☐	PERMIT DENIAL WITH PREJUDICE	D
☒	APPROVED JURISDICTIONAL DETERMINATION	E
☐	PRELIMINARY JURISDICTIONAL DETERMINATION	F

SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable
You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial
You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable
You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision you may contact:	If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:
District Engineer, Wilmington Regulatory Division Attn: Joshua Tutt Wilmington District U.S. Army Corps of Engineers 2407 W. 5th Street Washington, NC 27889	Krista Sabin Regulatory Administrative Appeal Review Officer U.S. Army Corps of Engineers South Atlantic Division 60 Forsyth Street Room M9 Atlanta, Georgia 30303-8801 Phone: 904-314-9631 Email: Krista.D.Sabin@usace.army.mil

SECTION II – REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:
Email address of appellant and/or agent:	Telephone number:

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT
WASHINGTON REGULATORY OFFICE
69 DARLINGTON AVENUE
WASHINGTON NORTH CAROLINA 27889

CESAW-RG-W September 20, 2024

MEMORANDUM FOR RECORD

SUBJECT: US Army Corps of Engineers (Corps) Approved Jurisdictional Determination in accordance with the "Revised Definition of 'Waters of the United States'"; (88 FR 3004 (January 18, 2023) as amended by the "Revised Definition of 'Waters of the United States'; Conforming" (8 September 2023) ,[1] SAW-2024-01349 [(MFR 1 of 1)][2]

BACKGROUND. An Approved Jurisdictional Determination (AJD) is a Corps document stating the presence or absence of waters of the United States on a parcel or a written statement and map identifying the limits of waters of the United States on a parcel. AJDs are clearly designated appealable actions and will include a basis of JD with the document.[3] AJDs are case-specific and are typically made in response to a request. AJDs are valid for a period of five years unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.[4]

On January 18, 2023, the Environmental Protection Agency (EPA) and the Department of the Army ("the agencies") published the "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule"). On September 8, 2023, the agencies published the "Revised Definition of 'Waters of the United States'; Conforming", which amended the 2023 Rule to conform to the 2023 Supreme Court decision in *Sackett v. EPA*, 598 U.S., 143 S. Ct. 1322 (2023) ("*Sackett*").

This Memorandum for Record (MFR) constitutes the basis of jurisdiction for a Corps AJD as defined in 33 CFR §331.2. For the purposes of this AJD, we have relied on Section 10 of the Rivers and Harbors Act of 1899 (RHA),[5] the 2023 Rule as amended,

[1] While the Revised Definition of "Waters of the United States"; Conforming had no effect on some categories of waters covered under the CWA, and no effect on any waters covered under RHA, all categories are included in this Memorandum for Record for efficiency.
[2] When documenting aquatic resources within the review area that are jurisdictional under the Clean Water Act (CWA), use an additional MFR and group the aquatic resources on each MFR based on the TNW, the territorial seas, or interstate water that they are connected to. Be sure to provide an identifier to indicate when there are multiple MFRs associated with a single AJD request (i.e., number them 1, 2, 3, etc.).
[3] 33 CFR 331.2.
[4] Regulatory Guidance Letter 05-02.
[5] USACE has authority under both Section 9 and Section 10 of the Rivers and Harbors Act of 1899 but for convenience, in this MFR, jurisdiction under RHA will be referred to as Section 10.

as well as other applicable guidance, relevant case law, and longstanding practice in evaluating jurisdiction.

1. SUMMARY OF CONCLUSIONS.

    a. The review area is comprised entirely of dry land (i.e., there are no waters such as streams, rivers, wetlands, lakes, ponds, tidal waters, ditches, and the like in the entire review area and there are no areas that have previously been determined to be jurisdictional under the Rivers and Harbors Act of 1899 in the review area).

2. REFERENCES.

    a. "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule")

    b. "Revised Definition of 'Waters of the United States'; Conforming" 88 FR 61964 (September 8, 2023))

    c. *Sackett v. EPA*, 598 U.S. _, 143 S. Ct. 1322 (2023)

3. REVIEW AREA.
    a. Project Are Size (in acres): 15.48
    b. Location Description: The project/review area is located south of Indian Kettle Road.
    c. Center Coordinates of the Project Site (in decimal degrees)
    Latitude: 36.197470 Longitude: -75.859870
    d. Nearest City or Town: Jarvisburg
    e. County: Currituck
    f. State: North Carolina
    g. Other associated Jurisdictional Determinations (including outcomes):

4. NEAREST TRADITIONAL NAVIGABLE WATER (TNW), THE TERRITORIAL SEAS, OR INTERSTATE WATER TO WHICH THE AQUATIC RESOURCE IS CONNECTED.
    N/A

5. FLOWPATH FROM THE SUBJECT AQUATIC RESOURCES TO A TNW, THE TERRITORIAL SEAS, OR INTERSTATE WATER.
   N/A

6. SECTION 10 JURISDICTIONAL WATERS[6]: Describe aquatic resources or other features within the review area determined to be jurisdictional in accordance with Section 10 of the Rivers and Harbors Act of 1899. Include the size of each aquatic resource or other feature within the review area and how it was determined to be jurisdictional in accordance with Section 10.[7]
   N/A

7. SECTION 404 JURISDICTIONAL WATERS: Describe the aquatic resources within the review area that were found to meet the definition of waters of the United States in accordance with the 2023 Rule as amended, consistent with the Supreme Court's decision in *Sackett*. List each aquatic resource separately, by name, consistent with the naming convention used in section 1, above. Include a rationale for each aquatic resource, supporting that the aquatic resource meets the relevant category of "waters of the United States" in the 2023 Rule as amended. The rationale should also include a written description of, or reference to a map in the administrative record that shows, the lateral limits of jurisdiction for each aquatic resource, including how that limit was determined, and incorporate relevant references used. Include the size of each aquatic resource in acres or linear feet and attach and reference related figures as needed.
   N/A

8. NON-JURISDICTIONAL AQUATIC RESOURCES AND FEATURES

   a. Describe aquatic resources and other features within the review area identified in the 2023 Rule as amended as not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5). Include the type of excluded aquatic resource or feature, the size of the aquatic resource or feature within the review area and describe how it was determined to meet one of the exclusions listed in 33 CFR 328.3(b).[8] N/A

[6] 33 CFR 329.9(a) A waterbody which was navigable in its natural or improved state, or which was susceptible of reasonable improvement (as discussed in § 329.8(b) of this part) retains its character as "navigable in law" even though it is not presently used for commerce, or is presently incapable of such use because of changed conditions or the presence of obstructions.
[7] This MFR is not to be used to make a report of findings to support a determination that the water is a navigable water of the United States. The district must follow the procedures outlined in 33 CFR part 329.14 to make a determination that water is a navigable water of the United States subject to Section 10 of the RHA.
[8] 88 FR 3004 (January 18, 2023)

b. Describe aquatic resources and features within the review area that were determined to be non-jurisdictional because they do not meet one or more categories of waters of the United States under the 2023 Rule as amended (e.g., tributaries that are non-relatively permanent waters; non-tidal wetlands that do not have a continuous surface connection to a jurisdictional water).
N/A

9. DATA SOURCES. List sources of data/information used in making determination. Include titles and dates of sources used and ensure that information referenced is available in the administrative record.

   a. Office (Desk) Determination: 9/20/2024
   Date(s) of Field Determination (if applicable): 8/22/2024

   b. Data sources used to support this determination (included in the administrative record).
      i. Vicinity Map
      ii. Aerial Imagery
      iii. Soils Map
      iv. NWI Map
      v. Delineation Map

10. OTHER SUPPORTING INFORMATION. N/A

11. NOTE: The structure and format of this MFR were developed in coordination with the EPA and Department of the Army. The MFR's structure and format may be subject to future modification or may be rescinded as needed to implement additional guidance from the agencies; however, the approved jurisdictional determination described herein is a final agency action.

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
WILLIAM E. TOBY VINSON, JR
Interim Director

NORTH CAROLINA
Environmental Quality

September 27, 2024

LETTER OF APPROVAL

Joel K. Justice
150 Black Forest Ln
Jarvisburg, North Carolina 27947

RE: Project Name: Algonquin Subdivision
Application ID: PA-006867
Permit Number: CURRI-2025-0124
Acres Approved: 11 Acres
County: Currituck
City: Jarvisburg
Address: Indian Kettle Rd
River Basin: Pasquotank
Stream Classification: SC: Aquatic Life, Secondary Contact Recreation, Tidal Salt Water
Plan Type: New Plan - Single Family Subdivision (10 Lots), Road and Infrastructure

Dear Joel K. Justice,

This office has reviewed the subject erosion and sedimentation control plan. We hereby issue this Letter of Approval. Any modifications required for approval are listed in the body of the email that accompanied this attached letter. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of April 1, 2019, all new construction activities not explicitly exempt are required to complete and submit an electronic Notice of Intent (eNOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction General Permit. After the form is reviewed and found to be complete, you will receive a link with payment instructions for the annual permit fee. After the fee is processed, you will receive the COC. As the Financially Responsible Party shown on the FRO form submitted for this project, you MUST obtain the COC prior to commencement of any land disturbing activity. The eNOI form may be accessed at deq.nc.gov/NCG01.

Please direct questions about the eNOI form to the Stormwater Program staff in the Raleigh central office. If the owner/operator of this project changes in the future, the new responsible party must obtain a new COC.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

1. The approved E&SC plan as well as any approved deviation.
2. The NCG01 permit and the COC, once it is received.
3. Records of inspections made during the previous 12 months.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form and on the plan, which you provided. You are requested to file an amended form if there is any change in the information included on the form.

Your cooperation is appreciated.

Sincerely,

Signed by:

1B788953FD9E453...

Ginger Y. Turner, PE for
Samir Dumpor, PE
Regional Engineer
Land Quality Section

General Comments

1. This permit allows for a land disturbance, as called for on the application plan, not to exceed **11.0** acres. Exceeding that acreage will be a violation of this permit and would require a revised plan and additional application fee. Any addition in impervious surface, over that already noted on the approved plan, would also require a revised plan to verify the appropriateness of the erosion control measures and stormwater retention measures (NCGS 113A-54.1(b)).

2. Additional measures may be required - the applicant is responsible for the control of sediment on-site. If the approved erosion and sedimentation control measures prove insufficient, the applicant must take those additional steps necessary to stop sediment from leaving this site (NCGS 113A-57(3); 15A NCAC 4B .0115). Each sediment storage device must be inspected after each storm event (NCGS 113A54.1(e)). Maintenance and/or clean out is necessary anytime the device is at 50% capacity. All sediment storage measures will remain on site and functional until all grading and final landscaping of the project is complete (15A NCAC 04B .0113).

3. The applicant is responsible for obtaining any and all permits and approvals necessary for the development of this project prior to the commencement of this land disturbing activity. This could include our agency's Stormwater regulations and the Division of Water Resources' enforcement requirements within Section 401 of the Clean Water Act, the U.S. Army Corps of Engineers' jurisdiction of Section 404 of the Clean Water Act, the Division of Coastal Management's CAMA requirements, the Division of Solid Waste Management's landfill regulations, the Environmental Protection Agency and/or The U.S. Army Corps of Engineers jurisdiction of the Clean Water Act, local County or Municipalities' ordinances, or others that may be required. This approval cannot supersede any other permit or approval; however, in the case of a Cease-and-Desist Order from the Corps of Engineers, that Order would only apply to wetland areas. All highlands would still have to be in compliance with the N.C. Sedimentation Pollution Control Act.

4. If any area on site falls within the jurisdiction of Section 401 or 404 of the Clean Water Act, the applicant is responsible for compliance with the requirements of the Division of Water Resources (DWR), the Corps of Engineers and the Environmental Protection Agency (EPA) respectively. Any erosion control measures that fall within jurisdictional wetland areas must be approved by the aforementioned agencies prior to installation. The Land Quality Section must be notified of a relocation of the measures in question to the transition point between the wetlands and the uplands to assure that the migration of sediment will not occur. If that relocation presents a problem or contradicts any requirements of either DWR, the Corps, or the EPA, it is the responsibility of the applicant to inform the Land Quality Section regional office so that an adequate contingency plan can be made to assure sufficient erosion control remains on site. Failure to do so will be considered a violation of this approval (NCGS 113A-54.1(b)).

5. Any off-site borrow and waste required for this project must come from a site with an approved erosion control plan, a site regulated under the Mining Act of 1971, or a landfill regulated by the Division of Solid Waste Management. Trash/debris from demolition activities or generated by any activities on site must be disposed of at a facility regulated by the Division of Solid Waste Management or per Division of Solid Waste Management or Division of Water Resources rules and regulations. [15A NCAC 4B .0110]

6. A graveled construction entrance must be located at each point of access and egress available to construction vehicles during the grading and construction phases of this project. Access and egress from the project site at a point without a graveled entrance will be considered a violation of this approval. Routine maintenance of the entrances is critical (113A-54.1(b)).

7. Because sediment traps and basins are shown on the plan as the primary sedimentation and erosion control devices on this project, it is necessary that the traps and basins and their collection systems be installed before any other grading takes place on site, and that every structure that receives more than one acre of drainage is built so that each dewaters only from the surface (NCG010000). If that proves to be impractical, a revised plan must be submitted and approved that addresses erosion and sediment control needs during the interim period until the traps and basins are fully functioning (113A-54.1(b)).

8. Any and all existing ditches on this project site are assumed to be left undisturbed by the proposed development unless otherwise noted. The removal of vegetation within any existing ditch or channel is prohibited unless the ditch or channel is to be regraded with side slopes of 2 horizontal to 1 vertical or less steep (15A NCAC 04B .0124 (d)). Bank slopes may be mowed but stripping of vegetation is considered new earth work and is subject to the same erosion control requirements as new ditches (NCGS 113A52(6)).

9. As a condition of the NPDES General Stormwater Permit (NCG010000), the financially responsible party shall comply with the NCG01 Ground Stabilization and Materials Handling requirements that became effective April 1, 2019. The NCG01 Ground Stabilization and Materials Handling standard detail can be printed from the deq.nc.gov/NCG01 website.

10. As a condition of the NPDES General Stormwater Permit (NCG010000), the financially responsible party shall comply with the NCG01 Self-Inspection, Recordkeeping and Reporting requirements that became effective April 1, 2019. The NCG01 Self-Inspection, Recordkeeping and Reporting standard details can be printed from the deq.nc.gov/NCG01 website.

11. As a part of routine monitoring of the approved land-disturbing activity, the financially responsible party shall assure inspections of the area covered by the approved plan after each phase of the plan has been completed and after establishment of temporary ground cover in accordance with North Carolina General Statute 113A-54.1(e).

12. The NCG01 has a $120 yearly fee and our office often receives closure inspection requests days prior to yearly NCG01 fee payment due dates. Be advised the project requires a closure inspection report by DEMLR prior to filing the Notice of Termination (NOT) to terminate NCG01 coverage. The closure inspection should not be requested until after the site has achieved full vegetative stabilization and measures have been removed. The removal of temporary ESC measures, including basins, requires prior approval. Often, a full growing season is necessary between initial seeding/mulching and removal of measures. Please plan your construction accordingly to avoid contacting our office prematurely for a closure inspection. Also be advised you may be asked for representative site pictures prior to a closure inspection.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

November 19, 2024

Driveway Permit ID:
D011-027-24-00077

Subject: Driveway Permit – Indian Kettle Rd
County: Currituck

Joel K. & Stacy A. Justice
P.O. Box 208
Grandy, NC 27939

Dear Applicant,

Attached for your files is a copy of a Commercial Driveway Permit, which has been properly executed. Please note any comments, which may appear on the permit form.

Please feel free to contact the District Office at (252) 621-6400 if you have any questions.

Sincerely,

DocuSigned by:
Caitlin A Spear
930880FAC40F45A...

Caitlin A. Spear, PE
District Engineer

Attachments

Cc: Division Engineer
County Maintenance Engineer

Street and Driveway Access Permit
General Provisions

Our mission is to safely and efficiently manage and facilitate, as much as practicable, the accommodation of street and driveway accesses along NCDOT Highways, while protecting our public infrastructure.

Pre-Construction Notices

PCN 1 Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the Street and Driveway Access Permit.

PCN 2 Prior to beginning work, the Applicant shall contact the Road Maintenance Supervisor for the corresponding county, to provide or verify the proposed pipe diameter. Please see the last page of the General Provisions for Contact Information

PCN 3 Prior to beginning work, it is the requirement of the Applicant to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.

PCN 4 It shall be the responsibility of the Applicant to determine the location of utilities within the permitted area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The Applicant shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.

PCN 7 Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight.

Legal & Right-of-Way

RW 1 This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the District Engineer's office or their representative prior to construction or during construction, if an issue arises during construction to warrant changes.

RW 2 NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the Applicant to verify the right of way.

RW 3 Prior to the approval of any privately maintained facility within NCDOT right of way which the State of North Carolina is not the fee simple owner, written permission that each and every property owner affected by the installation shall be provided to NCDOT by the Applicant. (See corresponding attachment.)

RW 4 Applicant shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.

RW 6 No commercial advertising shall be allowed within NCDOT Right of Way.

Street and Driveway Access Permit
General Provisions

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Work Zone Traffic Control

TC 2 WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

TC 3 The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:

A) Manual on Uniform Traffic Control Devices (MUTCD) – North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).

B) NCDOT Maintenance / Utility Traffic Control Guidelines – This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.

TC 4 If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.

TC 5 Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.

Street and Driveway Access Permit
General Provisions

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TC 9 Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.

TC 10 Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current NCDOT Roadway Standard Drawings or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

TC 13 Any pavement markings that are damaged or obliterated shall be restored by the Applicant at no expense to NCDOT.

TC 14 Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines. The Applicant must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at https://www.youtube.com/watch?v=AOuYa5lW3dg&feature=youtu.be

TC 15 Parking and material storage shall not be allowed along the shoulders of any NCDOT roadways, any NCDOT roadways along the route and adjacent to the route.

TC 16 During periods of construction inactivity, place approved traffic control drums 3’ minimum from the existing travel way.

TC 17 Any violation of the Traffic Control provisions will result in the termination of the permit application and liquidated damages in the amount of $2,000 per hour or any portion thereof and will be assessed by the District Engineer's office.

Environmental Regulations

EC 1 The Applicant shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer’s Office at (252) 621-6310

EC 2 When surface area in excess of one acre will be disturbed, the Applicant shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.

Street and Driveway Access Permit
General Provisions

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EC 3 The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility permits or any utility permits when land disturbance within NCDOT right of way exceeds 1 acre. The VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.

EC 4 All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Applicant in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest NCDOT Standards Specifications for Roads and Structures and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this permit shall be replaced with plants of like kind or similar shape.

EC 5 No trees within NCDOT shall be cut without authorization from the Division Roadside Environmental Engineer. An inventory of trees measuring greater than 4 caliper inches (measured 6” above the ground) is required when trees within C/A right of way will be impacted by the encroachment installation. Mitigation is required and will be determined by the Division Roadside Environmental Engineer’s Office.

EC 6 Prior to installation, the Applicant shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.

EC 7 The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.

EC 8 The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the District Engineer or their agent.

EC 9 The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.

EC 10 Vegetative cover shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer.

Street and Driveway Access Permit
General Provisions

Our mission is to safely and efficiently manage and facilitate, as much as practicable, the accommodation of street and driveway accesses along NCDOT Highways, while protecting our public infrastructure.

General

G 1 An executed copy of the Street and Driveway Access Permit, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.

G 2 The Applicant and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this permit, the District Office shall be notified by the encroaching party immediately if any violations are cited.

G 3 Any REVISIONS marked in RED on the attached non-PE sealed plans shall be incorporated into and made part of the approved permit.

G 4 All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the District Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.

G 5 The Applicant shall notify the District Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the District Engineer or their representative.

G 8 Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Recovery Area. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.

G 9 No access to the job site, parking or material storage shall be allowed along or from the Control of Access Roadway.

G 10 Guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the District Engineer or their representative.

G 12 Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.

G 13 All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the District Engineer or their representative.

G 16 All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.

G 17 Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.

G 18 If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.

G 22 Strict compliance with the Policy on Street and Driveway Access to North Carolina Highways manual shall be required.

G 23 The Applicant may delegate the performance of certain provisions of this agreement to contractors or other parties. However, this shall not in any way release the Applicant from its obligations to the terms and provisions of the permit.

Street and Driveway Access Permit
General Provisions

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Engineering

E 1 All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: ASTM Standards, Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings, NCDOT Asphalt Quality Management System manual, and the approved plans.

Excavation

EX 1 Excavation material shall not be placed on pavement.

EX 2 It is the responsibility of the applicant and their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.

EX 3 The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Type B or C soils as defined by OSHA Technical Manual. Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.

Street and Driveway Access Permit
General Provisions

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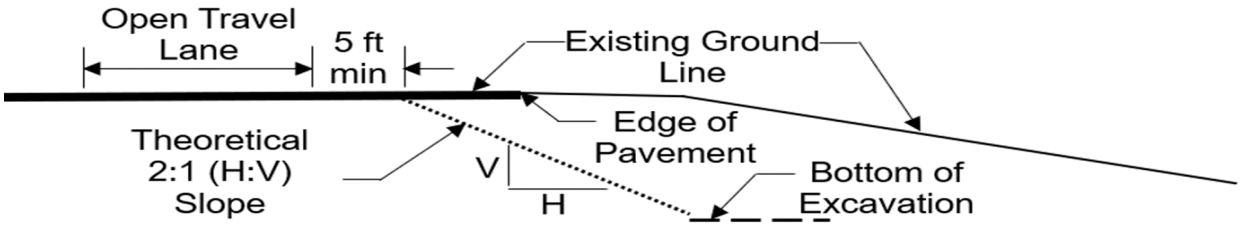
EX 3



EX 4 Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx and see SP11 R002).

A) Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT Utilities Accommodations Manual for more information on requirements for shoring plans and design calculations.) Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.

B) All trench excavation inside the limits of the theoretical one-to-one slope, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.

C) At the discretion of the District Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The applicant shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the applicant (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the permit and that the backfill material meets the Statewide Borrow Criteria.

D) The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.

Street and Driveway Access Permit
General Provisions

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EX 5 The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest NCDOT Standard Specifications for Roads and Structures, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.

EX 6 All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.

EX 7 All roadway sections, ditch lines and slopes, and shoulders affected by the operations under this encroachment shall be restored to the satisfaction of the District Engineer.

Pavement Repair

PR 7 Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform the permitted work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50’ mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Applicant.

Street and Driveway Access Permit
General Provisions

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Post-Construction

I 1 The Applicant shall notify the Roadway Maintenance Supervisor's office within 2 business days after construction is complete. The Roadway Maintenance Supervisor may perform a construction inspection. Any deficiencies may be noted and reported to the Applicant to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.

Roadway Maintenance Contact Information by County:

Camden
(252) 621-6420

Currituck
(252) 421-7200

Currituck OBX / Dare
(252) 473-2990

Gates
(252) 401-6050

Pasquotank
(252) 621-6420

Perquimans
(252) 426-4170

APPLICATION IDENTIFICATION		N.C. DEPARTMENT OF TRANSPORTATION
Driveway Permit No. D011-027-24-00077	Date of Application November 19, 2024	STREET AND DRIVEWAY ACCESS PERMIT APPLICATION
County: Currituck		
Development Name: Algonquin		

LOCATION OF PROPERTY:

Route/Road: Forbes Rd. (SR 1118)

Exact Distance 1422 ☐ Miles ☒ Feet N ☐ S ☐ E ☒ W ☐

From the Intersection of Route No. 1118 and Route No. Hwy 158 Toward Jarvisburg Elem.

Property Will Be Used For: ☒ Residential /Subdivision ☐ Commercial ☐ Educational Facilities ☐ TND ☐ Emergency Services ☐ Other

Property: ☒ is ☐ is not within Currituck County City Zoning Area.

AGREEMENT

- I, the undersigned property owner, request access and permission to construct driveway(s) or street(s) on public right-of-way at the above location.
- I agree to construct and maintain driveway(s) or street entrance(s) in absolute conformance with the current "Policy on Street and Driveway Access to North Carolina Highways" as adopted by the North Carolina Department of Transportation.
- I agree that no signs or objects will be placed on or over the public right-of-way other than those approved by NCDOT.
- I agree that the driveway(s) or street(s) will be constructed as shown on the attached plans.
- I agree that that driveway(s) or street(s) as used in this agreement include any approach tapers, storage lanes or speed change lanes as deemed necessary.
- I agree that if any future improvements to the roadway become necessary, the portion of driveway(s) or street(s) located on public right-of-way will be considered the property of the North Carolina Department of Transportation, and I will not be entitled to reimbursement or have any claim for present expenditures for driveway or street construction.
- I agree that this permit becomes void if construction of driveway(s) or street(s) is not completed within the time specified by the "Policy on Street and Driveway Access to North Carolina Highways".
- I agree to pay a $50 construction inspection fee. Make checks payable to NCDOT. This fee will be reimbursed if application is denied.
- I agree to construct and maintain the driveway(s) or street(s) in a safe manner so as not to interfere with or endanger the public travel.
- I agree to provide during and following construction proper signs, signal lights, flaggers and other warning devices for the protection of traffic in conformance with the current "Manual on Uniform Traffic Control Devices for Streets and Highways" and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the District Engineer.
- I agree to indemnify and save harmless the North Carolina Department of Transportation from all damages and claims for damage that may arise by reason of this construction.
- I agree that the North Carolina Department of Transportation will assume no responsibility for any damages that may be caused to such facilities, within the highway right-of-way limits, in carrying out its construction.
- I agree to provide a Performance and Indemnity Bond in the amount specified by the Division of Highways for any construction proposed on the State Highway system.
- The granting of this permit is subject to the regulatory powers of the NC Department of Transportation as provided by law and as set forth in the N.C. Policy on Driveways and shall not be construed as a contract access point.
- I agree that the entire cost of constructing and maintaining an approved private street or driveway access connection and conditions of this permit will be borne by the property owner, the applicant, and their grantees, successors, and assignees.
- **I AGREE TO NOTIFY THE DISTRICT ENGINEER WHEN THE PROPOSED WORK BEGINS AND WHEN IT IS COMPLETED.**

SIGNATURES OF APPLICANT

PROPERTY OWNER (APPLICANT)		WITNESS	
COMPANY	Joel K. & Stacy A. Justice	NAME	DEBORAH K MOSCOPULOS
SIGNATURE	[signature] [signature]	SIGNATURE	[signature]
ADDRESS	PO Box 208	ADDRESS	6670 CARATOKE HWY
	Grandy, NC 27939 Phone No. 252 493-2500		GRANDY NC 27939

AUTHORIZED AGENT		WITNESS	
COMPANY	Bissell Professional Group	NAME	Amy Wells
SIGNATURE	[signature]	SIGNATURE	[signature]
ADDRESS	3512 N. Croatan Highway	ADDRESS	6678 CARATOKE HWY
	Kitty Hawk, NC 27949 Phone No. 252-261-3266		GRANDY NC 27939

APPROVALS

APPLICATION RECEIVED BY DISTRICT ENGINEER

SIGNATURE　　DATE

APPLICATION APPROVED BY LOCAL GOVERNMENTAL AUTHORITY (when required)

SIGNATURE　　TITLE　　DATE

APPLICATION APPROVED BY NCDOT

DocuSigned by: Caitlin A Spear [signature]
3DB90FAC3CE45A...

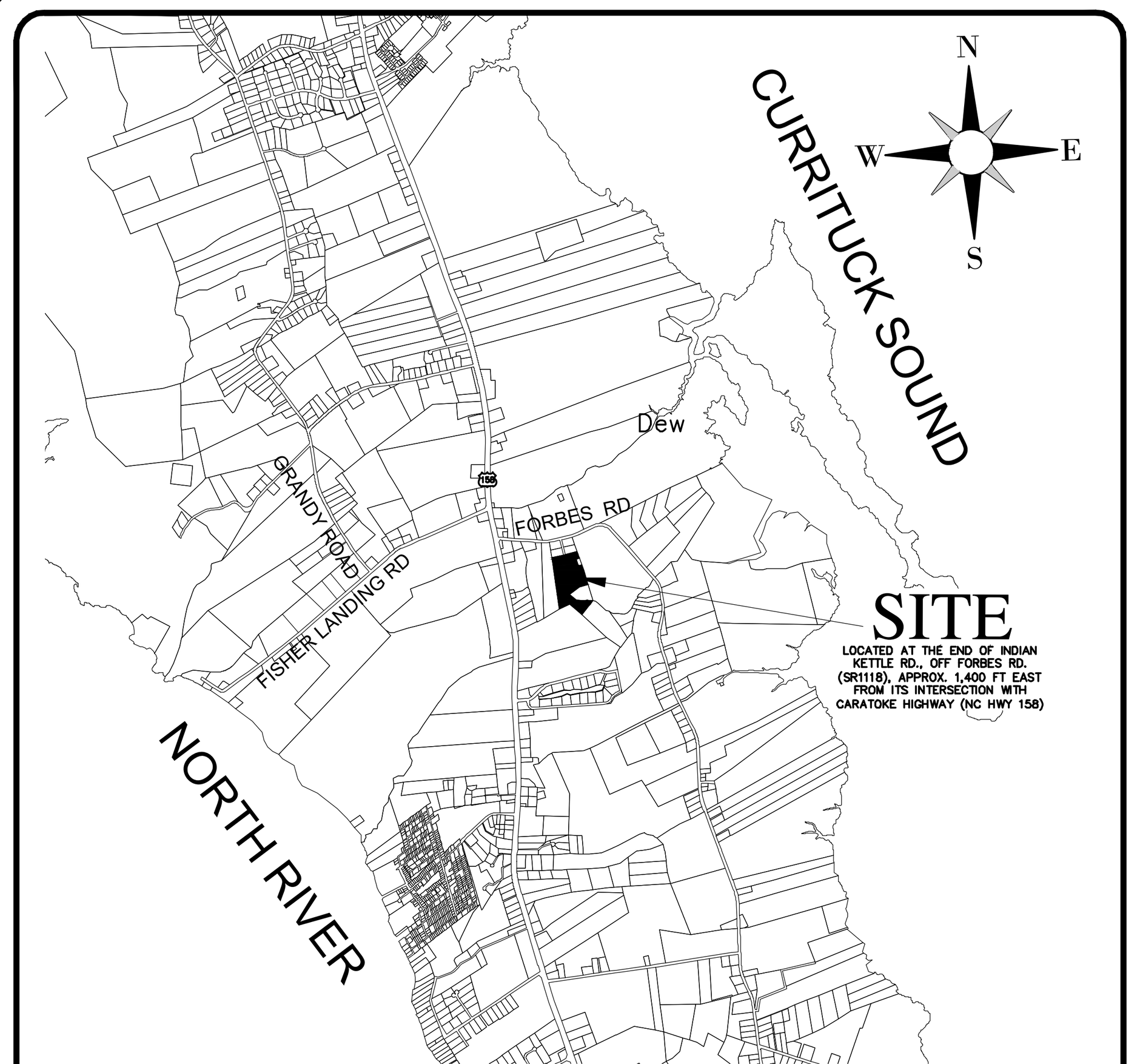
DISTRICT ENGINEER　　11/22/2024

SIGNATURE　　TITLE　　DATE

INSPECTION BY NCDOT

SIGNATURE　　TITLE　　DATE

COMMENTS:



VICINITY MAP SCALE: 1" = 4,000'

CONSTRUCTION DRAWINGS FOR

ALGONQUIN

A 10 LOT TRADITIONAL RESIDENTIAL SUBDIVISION

POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA

GENERAL NOTES:

1. PROJECT NAME: ALGONQUIN
2. OWNER/APPLICANT: JOEL K. & STACY A. JUSTICE
   PO BOX 208
   GRANDY, NC 27939
3. PROPERTY DATA:
   PARCEL ID#: 0109-000-053F-0000
   ADDRESS: INDIAN KETTLE RD. JARVISBURG, NC
   RECORDED REFERENCES: D.B. 02, PG. SP/55/57, PC: K, SL. 30
   PROPERTY ZONING: SFM
4. F.I.R.M. DATA:
   ZONE X. F.E.M.A. F.I.R.M. MAP PANEL 3720092000K, CID 370078, EFFECTIVE DATE DECEMBER 21, 2018.
5. THE PROPERTY CONTAINS NO 404 JURISDICTIONAL WETLANDS AS CONFIRMED BY THE US ARMY CORPS OF ENGINEERS.
6. EXISTING CONDITION INFORMATION BASED ON A COMBINATION OF THE FOLLOWING:
   - FIELD SURVEY DATA OBTAINED BY BISSELL PROFESSIONAL GROUP
   - 2020 AERIAL IMACERY OBTAINED FROM NCONEMAP.COM
   - ELEVATIONS ARE REFERENCED TO NAVD 1988 VERTICAL DATUM.
7. DRAINAGE AND UTILITY EASEMENTS WILL BE PROVIDED ON THE FINAL PLATS PREPARED FOR RECORDING OF THE SUBDIVISION.
   - A 10' EASEMENT FOR UTILITIES AND DRAINAGE TO BE DEDICATED ALONG ALL REAR AND SIDE PROPERTY LINES
   - A 15' EASEMENT FOR UTILITIES AND DRAINAGE TO BE DEDICATED ALONG ALL FRONT PROPERTY LINES.
   - A NON-EXCLUSIVE DRAINAGE EASEMENT TO BE DEDICATED TO CURRITUCK COUNTY & NCDEQ ACROSS ALL OPEN SPACE AREAS AND ALONG ALL MAJOR DRAINAGE WAYS SERVING MORE THAN 5 ACRES.
   - A 10' EASEMENT TO BE DEDICATED BEYOND THE 15' FRONT EASEMENT FOR PLANTING AND MAINTENANCE OF STREET TREES.
8. EXISTING VEGETATION IN OPEN SPACE AREAS SHALL BE MAINTAINED.
9. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.
10. THE PROJECT INCLUDES ROADWAY, SIDEWALK, DRAINAGE AND UTILITY IMPROVEMENTS ALONG SOME 340 FT OF THE EXISTING INDIAN KETTLE ROAD. ALL RELATED CONSTRUCTION SHALL STAY WITHIN THE LIMITS OF THE ROADWAY'S 45' PRIVATE R/W AND THE 15' DRAINAGE AND UTILITY EASEMENTS FRONTING THE (4) ADJOINING LOTS, AS PRESCRIBED BY THE SUBDIVISION PLAT RECORDED IN PC: C-2, SL: 363. THE CONTRACTOR SHALL NOTIFY THE LOT OWNERS AHEAD OF ANY CONSTRUCTION ACTIVITIES ON THEIR PROPERTY, MINIMIZE DISTURBANCES TO THEIR PROPERTY AND MAINTAIN REASONABLE MEANS OF ACCESS AND CLEANLINESS.

DEVELOPMENT NOTES:

1. PROPERTY SUMMARY:
   PROPOSED SUBDIVISION AREA: 14.53 AC.
   PROPOSED AREA TO BE RECOMBINED INTO PARCEL "A" 0.95 AC.
   TOTAL PROPERTY AREA: 15.48 AC,
2. DEVELOPMENT SUMMARY:
   PROPOSED LOT AREA: 9.41 AC.
   PROPOSED R/W AREA: 0.74 AC.
   PROPOSED OPEN SPACE AREA: 4.38 AC.
   TOTAL SUBDIVISION AREA: 14.53 AC.

   # OF PROPOSED LOTS: 10
   MINIMUM LOT AREA: 40,000 SF
   PROPOSED RIGHT-OF-WAY WIDTH: 45 FT.
   PROPOSED PAVED ROADWAY WIDTH: 20 FT.
   LINEAR FEET OF EXISTING ROAD TO BE IMPROVED: 340 L.F.±
   LINEAR FEET OF NEW ROAD TO BE CONSTRUCTED: 500 L.F.±
3. DEVELOPMENT IMPERVIOUS COVERAGE DATA (BUA):
   COVERAGE ON INDIVIDUAL LOTS WILL BE LIMITED TO 20.0% OF LOT AREA
   MAXIMUM TOTAL LOT COVERAGE: 81,979 SF
   ROADWAY COVERAGE 16,600 SF
   SIDEWALKS: 6,000 SF
   TOTAL COVERAGE: 104,579 SF
   COVERAGE PERCENTAGE: 16.52%
4. PROPOSED DISTURBED AREA: 11 ACRES

THE FOLLOWING PERMITS ARE REQUIRED PRIOR TO PROJECT CONSTRUCTION:

PERMIT	AGENCY	REFERENCE NUMBER	DATE OF ISSUANCE
SEDIMENTATION AND EROSION CONTROL PERMIT	N.C.D.E.Q. - DIVISION OF LAND RESOURCES		
STORMWATER MANAGEMENT LOW DENSITY PERMIT	N.C.D.E.Q. - DIVISION OF LAND RESOURCES		
WATERMAIN EXTENSION AUTHORIZATION TO CONSTRUCT	N.C.D.E.Q - PUBLIC WATER SUPPLY		
DRIVEWAY PERMIT	N.C.D.O.T.		
ENCROACHMENT AGREEMENT	N.C.D.O.T.		
CURRITUCK COUNTY PRELIMINARY PLAT & USE PERMIT	CURRITUCK COUNTY BOARD OF COMMISSIONERS	PB 21-21	8/21/2023
CURRITUCK COUNTY CONSTRUCTION AUTHORIZATION	CURRITUCK COUNTY PLANNING STAFF		

Sheet List Table

Sheet Number	Sheet Title
1	COVER SHEET, DEVELOPMENT NOTES & SITE LOCATION
2	EXISTING SITE CONDITIONS MAP
3	DEVELOPMENT OVERVIEW PLAN
4	GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN
5	EROSION AND SEDIMENT CONTROL PLAN
6	WATERMAIN EXTENSION AND WATER SERVICE PLAN
7	LANDSCAPING, SIGNAGE AND BUFFERING PLAN
8	EXISTING INDIAN KETTLE RD. PLAN AND PROFILE
9	PROPOSED INDIAN KETTLE RD. PLAN AND PROFILE
10	ROADWAY, DRAINAGE & TYP. CONSTRUCTION DETAILS
11	EROSION & SEDIMENT CONTROL CONSTRUCTION NOTES & DETAILS
12	NCG01 - SELF INSPECTION, RECORD KEEPING & REPORTING
13	NCG01 - GROUND STABILIZATION & MATERIALS HANDLING

STORMWATER CERTIFICATE

I,____________________, OWNER/AGENT HEREBY CERTIFY THE INFORMATION INCLUDED ON THIS AND ATTACHED PAGES IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

ON THE PLAN ENTITLED, ALGONQUIN CONSTRUCTION DRAWINGS - GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN, STORMWATER DRAINAGE IMPROVEMENTS SHALL BE INSTALLED ACCORDING TO THESE PLANS AND SPECIFICATIONS AND APPROVED BY CURRITUCK COUNTY. YEARLY INSPECTIONS ARE REQUIRED AS PART OF THE STORMWATER PLAN. THE OWNER IS RESPONSIBLE FOR ALL MAINTENANCE REQUIRED. CURRITUCK COUNTY ASSUMES NO RESPONSIBILITY FOR THE DESIGN, MAINTENANCE, OR PERFORMANCE OF THE STORMWATER IMPROVEMENTS.

DATE OWNER/AGENT

North Carolina One-Call Center Inc.
811
Know what's below. Call before you dig.

FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

SURVEY LEGEND	
SCM	SET CONCRETE MONUMENT
SIR	SET IRON ROD
EIR	EXISTING IRON ROD
EIP	EXISTING IRON PIPE
CP	CALCULATED POINT
M.B.L.	MAXIMUM BUILDING LIMIT
N.T.S.	NOT TO SCALE
P.C.	PLAT CABINET
D.B.	DEED BOOK
SL	SLIDE
SF	SQUARE FEET
AC	ACRES

LEGEND

- ROADWAY CENTERLINE
- RIGHT-OF-WAY
- PROPERTY BOUNDARY
- ADJOINING PROPERTY LINE
- EXISTING DITCH CENTERLINE
- EXISTING TREE LINE (APPROXIMATE)
- PROPOSED SWALE W/ FLOW ARROW
- PROPOSED SWALE HIGH POINT
- EXISTING GRADE CONTOUR
- PROPOSED GRADE CONTOUR
- x 0.00 EXISTING SPOT GRADE
- +0.00 PROPOSED SPOT GRADE
- EXISTING CULVERT
- PROPOSED CULVERT
- PROPOSED DRAINAGE STRUCTURE
- NO PARKING SIGN
- CROSSWALK

EROSION CONTROL LEGEND

- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED SILT FENCE
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED TEMPORARY CHECK DAM

UTILITY LEGEND

- X12WL EXISTING WATER LINE
- WL PROPOSED WATER LINE (SIZE AS NOTED)
- PROPOSED FIRE HYDRANT (APRX)
- PROPOSED WATER SERVICE (APRX)
- PROPOSED VALVE (APRX)
- PROPOSED BLOW-OFF (APRX)
- PROPOSED REDUCER (APRX)

PROFILE LEGEND

- EXISTING GRADE @ ROAD C/L
- PROPOSED GRADE @ ROAD C/L
- WL PROPOSED WATER LINE (SIZE AS NOTED)
- PROPOSED HYDRANT ASSEMBLY
- PROPOSED GATE VALVE
- PROPOSED REDUCER

SOILS LEGEND	
	SOILS LINE
CnA	CONETOE LOAMY SAND
Mu	MUNDEN LOAMY SAND
No	NIMMO LOAMY SAND
Pt	PORTSMOUTH FINE SANDY LOAM

SCS - SOIL SURVEY OF CURRITUCK COUNTY

NOTE:
EXISTING SITE INFORMATION DESCRIBED HEREON IS BELIEVED TO BE ACCURATE, HOWEVER, BPG INC. MAKES NO WARRANTY AS TO THE ACCURACY. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THIS INFORMATION BEFORE RELYING ON IT. THE CONTENT OF THESE DOCUMENTS MAY ALSO INCLUDE TECHNICAL INACCURACIES OR TYPOGRAPHICAL ERRORS. IF SUCH CONDITIONS EXIST, THE CONTRACTOR SHALL CONSULT WITH THE ENGINEER PRIOR TO PROCEEDING WITH THE SCHEDULED WORK AND MAY CONTINUE AFTER AN AUTHORIZATION TO PROCEED HAS BEEN GRANTED.

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Firm License # C-956
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760

BISSELL PROFESSIONAL GROUP
Engineers, Planners, Surveyors and Environmental Specialists

COVER SHEET, DEVELOPMENT NOTES & SITE LOCATION

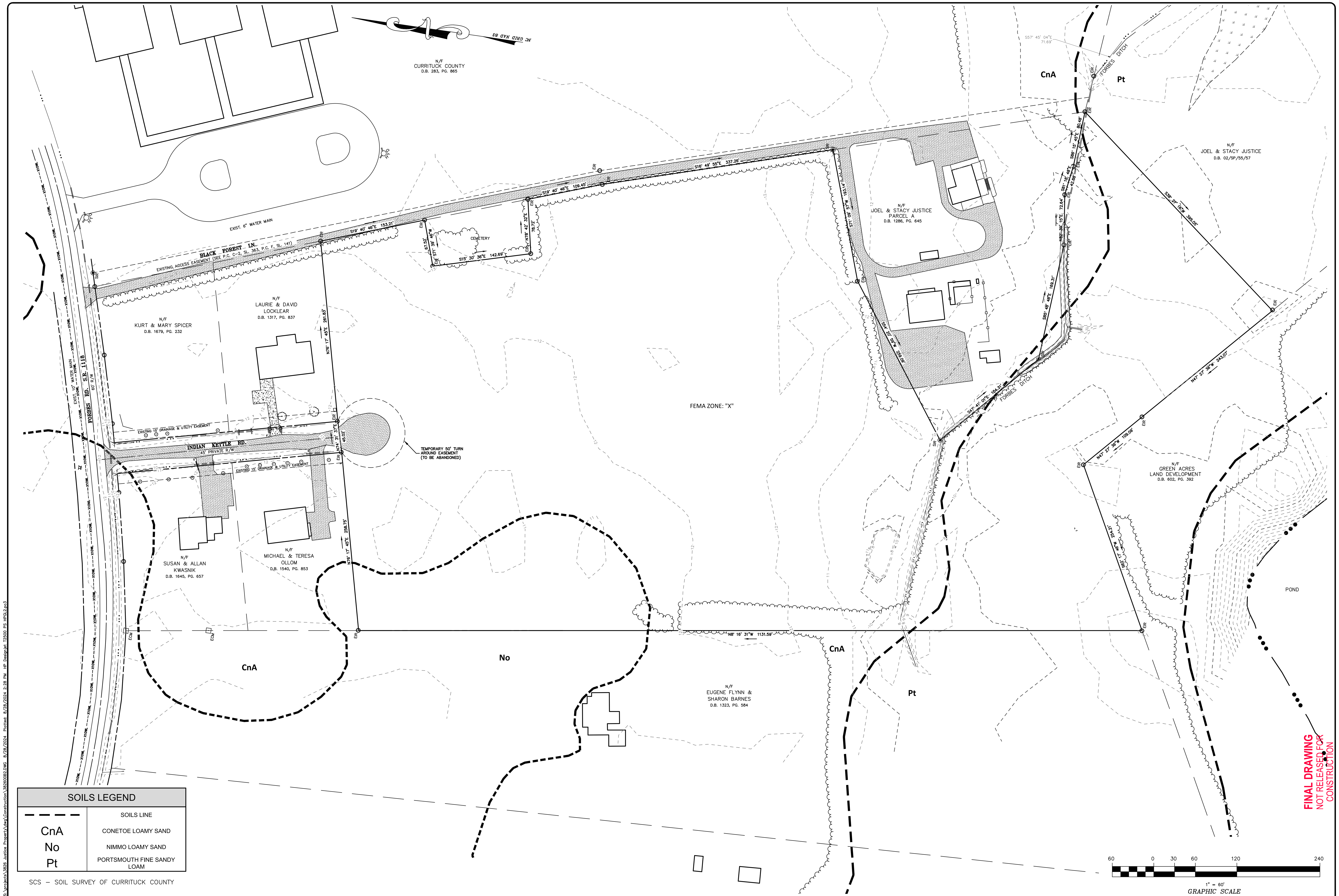
PROJECT: ALGONQUIN
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042639 DAVID M. KLEBITZ
DocuSigned by: 76B82DFDFA6D4CB...

DATE: 8/28/24	SCALE: N/A
DESIGNED: BPG	CHECKED: MSB
DRAWN: KFW/DMK	APPROVED: BPG
SHEET: 1 OF 13	
CAD FILE: 382600B2	
PROJECT NO: 3826	



SOILS LEGEND

— — —	SOILS LINE
CnA	CONETOE LOAMY SAND
No	NIMMO LOAMY SAND
Pt	PORTSMOUTH FINE SANDY LOAM

SCS – SOIL SURVEY OF CURRITUCK COUNTY

FINAL DRAWING
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EXISTING SITE CONDITIONS MAP

PROJECT:
ALGONQUIN
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042639 DAVID M. KLEBITZ
DocuSigned by: 76B82DFDBA6D4CB...

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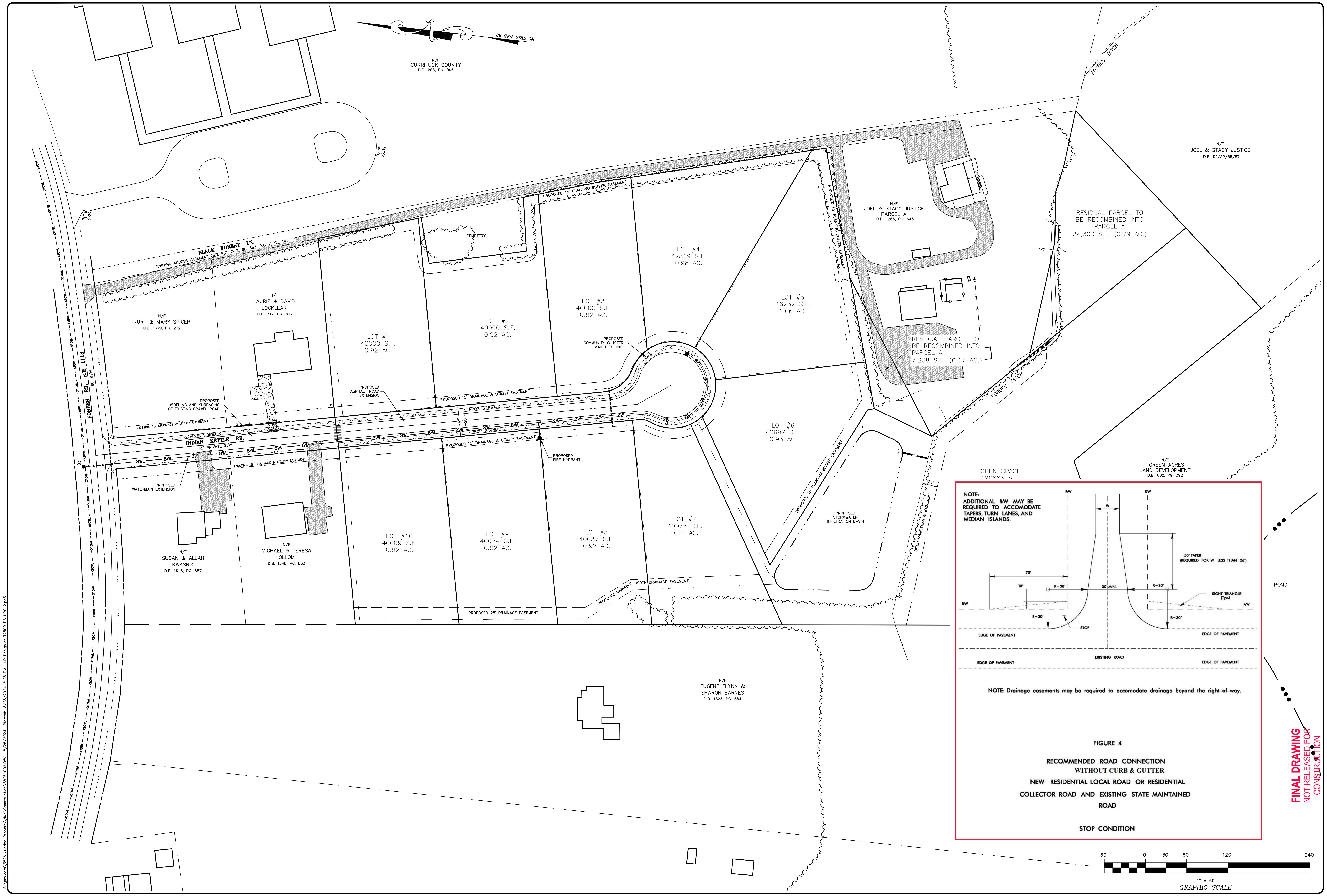
SHEET: 2 OF 13
CAD FILE: 382600B2
PROJECT NO: 3826

THE DRIVEWAY RADIUS SHALL BE WITHIN 30 FEET MINIMUM AND 50 FEET MAXIMUM



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DEVELOPMENT OVERVIEW PLAN

PROJECT: ALGONQUIN
POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA

CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

Docusigned by: SEAL 042639 — DAVID M. KLEBITZ, NORTH CAROLINA PROFESSIONAL ENGINEER

DATE: 8/28/24	SCALE: 1" = 60'
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SHEET: 3 OF 13

CAD FILE: 382600B2

PROJECT NO: 3826

WATER MAIN SPECIFICATIONS AND DETAILS FOR THIS PLAN, INCLUDING ALL MATERIALS AND INSTALLATION METHODS SHALL BE PROVIDED, INSTALLED, TESTED AND ACCEPTED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS AND DETAILS FOR THE CURRITUCK COUNTY WATER DEPARTMENT AND THE SOUTHERN OUTER BANKS WATER SYSTEM" AS APPROVED BY NCDEQ–DWR–PWS, SERIAL NUMBER 11–00630, LATEST REVISION.

A MINIMUM OF 36" OF COVER SHALL BE MAINTAINED OVER THE INSTALLED WATER MAIN.
A MINIMUM OF 24" OF SEPARATION SHALL BE PROVIDED FROM BOTTOM OF STORM DRAIN TO TOP OF WATER MAIN.

FINAL DRAWING
NOT RELEASED FOR
CONSTRUCTION

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WATERMAIN EXTENSION AND WATER SERVICE PLAN

PROJECT:
ALGONQUIN
POPLAR BRANCH TOWNSHIP
CURRITUCK COUNTY
NORTH CAROLINA

CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

DocuSigned by:
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042639
76B82DFDBA6D4CB
DAVID M. KLEBITZ

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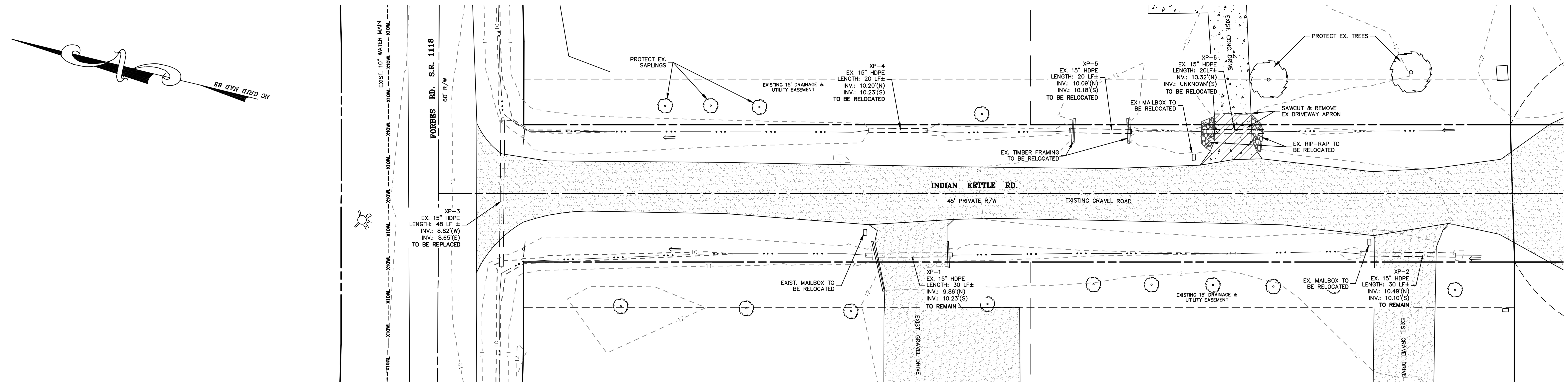
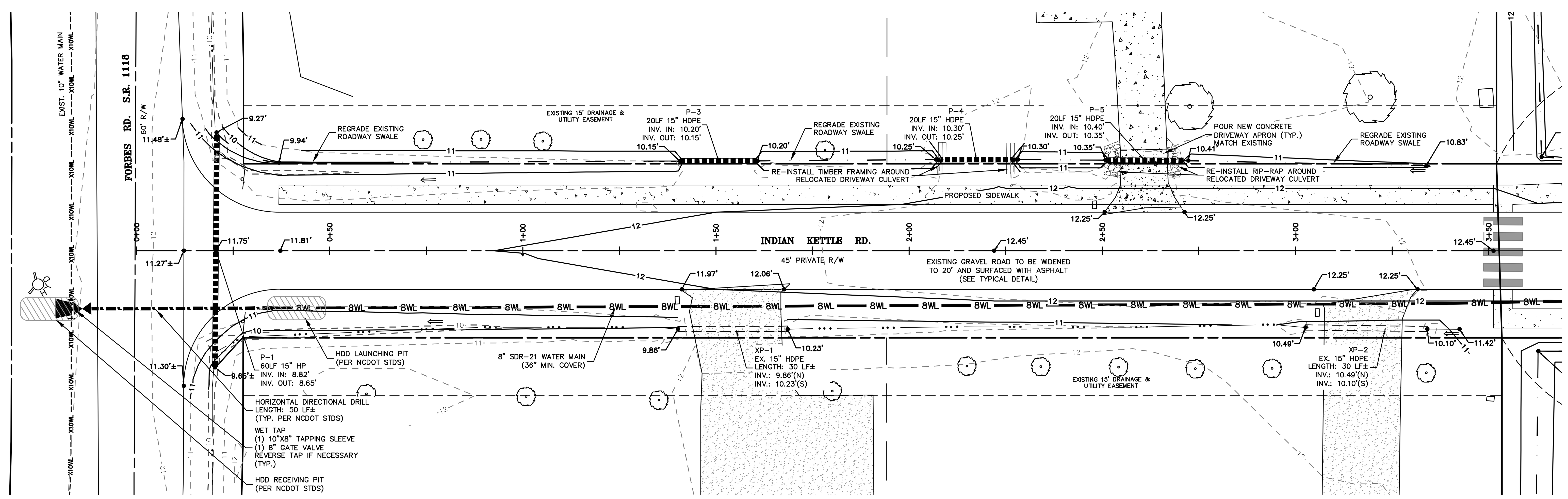
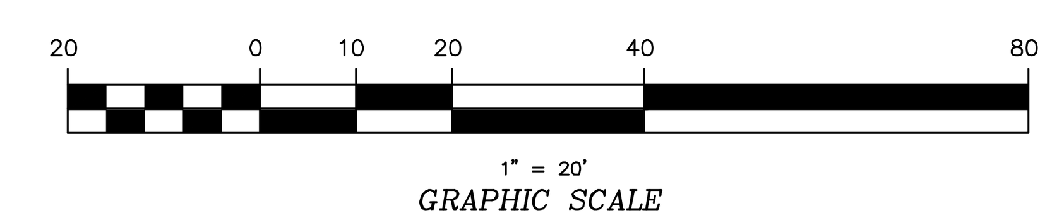
CAD FILE: 382600B2
PROJECT NO: 3826



ALIGNMENT: EXISTING INDIAN KETTLE RD. (STA 0+00 - 3+50) - DEMOLITION PLAN

SCALE: HOR.: 1"=20' VERT.(PLAN VIEW)

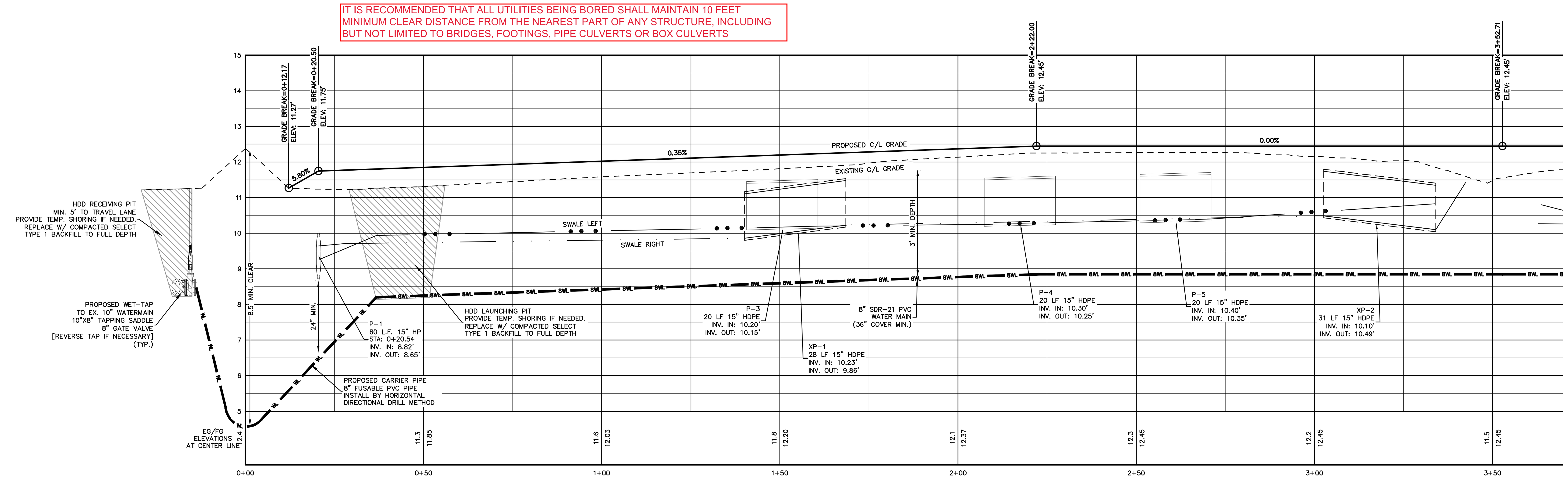




ALIGNMENT: EXISTING INDIAN KETTLE RD. (STA 0+00 - 3+50) - IMPROVEMENT PLAN

SCALE: HOR.: 1"=20' VERT.(PLAN VIEW)

IT IS RECOMMENDED THAT ALL UTILITIES BEING BORED SHALL MAINTAIN 10 FEET MINIMUM CLEAR DISTANCE FROM THE NEAREST PART OF ANY STRUCTURE, INCLUDING BUT NOT LIMITED TO BRIDGES, FOOTINGS, PIPE CULVERTS OR BOX CULVERTS



ALIGNMENT: EXISTING INDIAN KETTLE RD. (STA 0+00 - 3+50)

SCALE: HOR.: 1"=20' VERT.: 1"=2' (PROFILE VIEW)

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EXISTING INDIAN KETTLE RD
PLAN AND PROFILE

PROJECT: ALGONQUIN
POPLAR BRANCH TOWNSHIP, CURRITUCK COUNTY, NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

DocuSigned by: SEAL 042639 76882DFD6A6D4CB DAVID M. KLEBITZ

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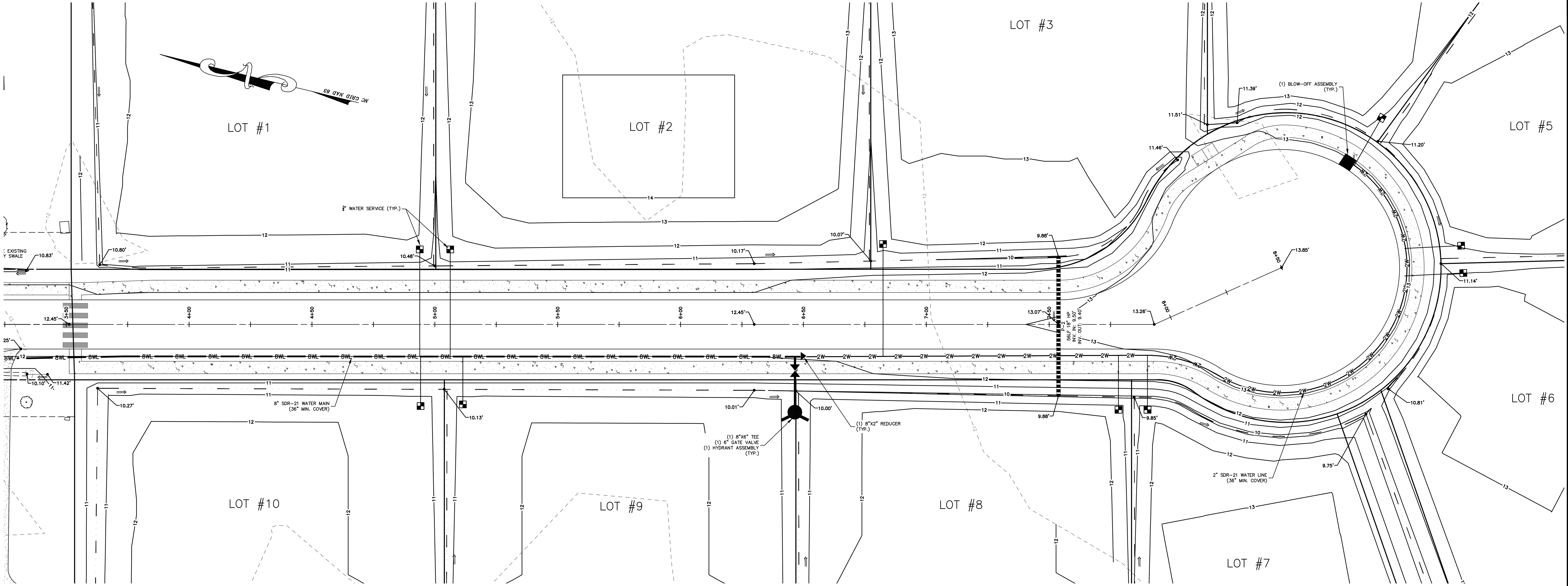
DRAWN: DMK	APPROVED: BPG

SHEET: 8 OF 13

CAD FILE: 382600B2

PROJECT NO: 3826

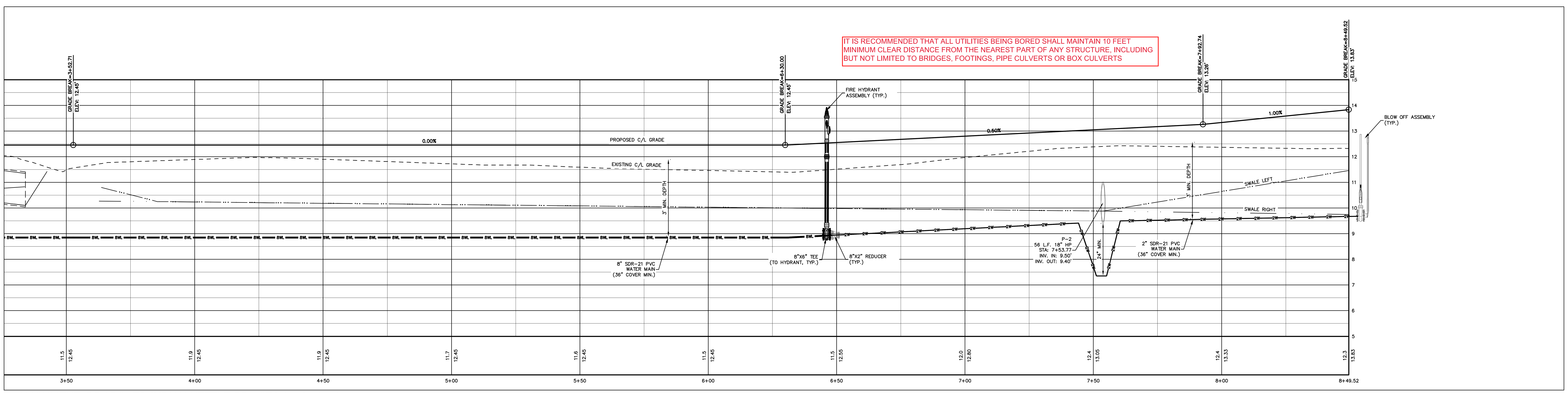


ALIGNMENT: PROPOSED INDIAN KETTLE RD. (STA 3+50 - 8+50)

SCALE: HOR.: 1"=20' VERT.(PLAN VIEW)

1" = 20'
GRAPHIC SCALE

IT IS RECOMMENDED THAT ALL UTILITIES BEING BORED SHALL MAINTAIN 10 FEET MINIMUM CLEAR DISTANCE FROM THE NEAREST PART OF ANY STRUCTURE, INCLUDING BUT NOT LIMITED TO BRIDGES, FOOTINGS, PIPE CULVERTS OR BOX CULVERTS



ALIGNMENT: PROPOSED INDIAN KETTLE RD. (STA 3+50 - 8+50)

SCALE: HOR.: 1"=20' VERT.: 1"=2' (PROFILE VIEW)

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FINAL DRAWING
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PROPOSED INDIAN KETTLE RD
PLAN AND PROFILE

PROJECT:
ALGONQUIN
POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042639 DAVID M. KLEBITZ
DocuSigned by: 76982DFD566D4CB

DATE: 8/28/24	SCALE: 1" = 20'
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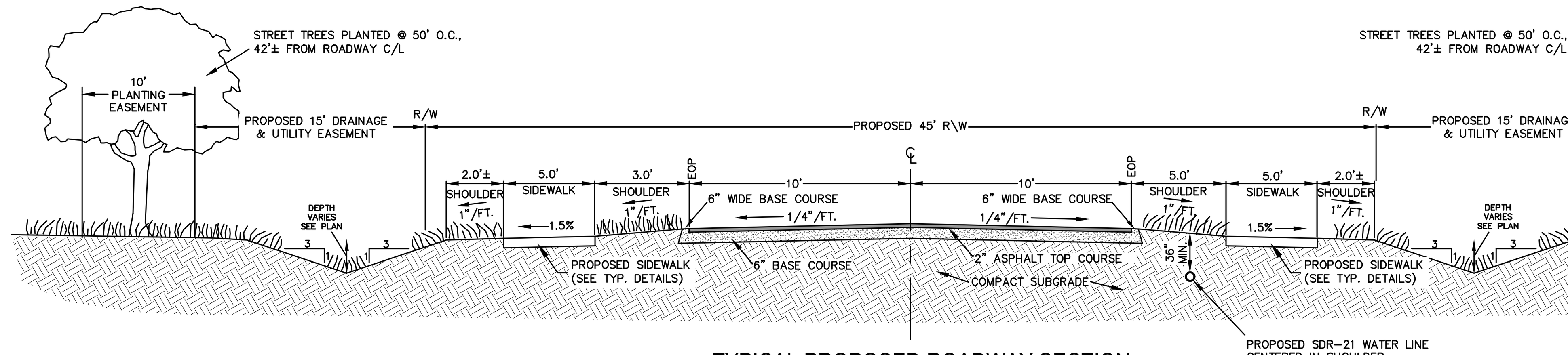
SHEET: 9 OF 13

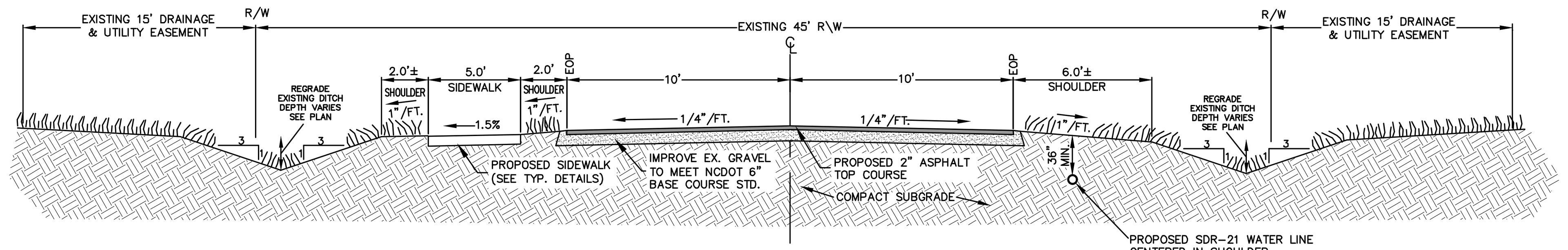
CAD FILE: 382600B2

PROJECT NO: 3826



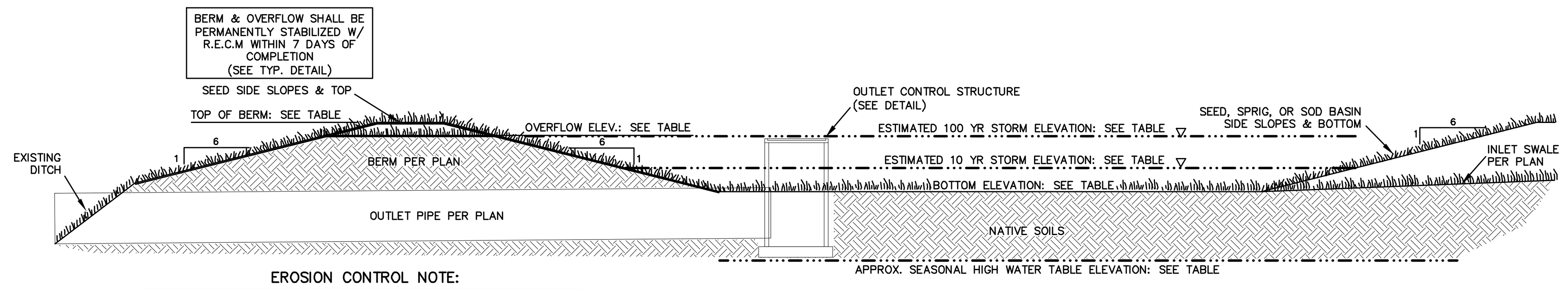
TYPICAL PROPOSED ROADWAY SECTION

NOT TO SCALE — SECTION VIEW



TYPICAL EXISTING GRAVEL ROAD IMPROVEMENT SECTION

NOT TO SCALE — SECTION VIEW



EROSION CONTROL NOTE:

DURING CONSTRUCTION, THE BMP WILL BE UTILIZED AS EROSION & SEDIMENT CONTROL SEDIMENT BASIN. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS PROPERLY STABILIZED, THE BMPS SHALL BE CLEANED AND RESTORED TO THEIR DESIGN SPECIFICATIONS AND THE BANKS PERMANENTLY STABILIZED **WITHIN 7 DAYS.**

TOP ELEV. (FMSL)	OVERFLOW ELEV. (FMSL)	100YR STORM ELEV. (FMSL)	10YR STORM ELEV. (FMSL)	BOTTOM ELEV. (FMSL)	SHWT ELEV. (FMSL)
12.00	11.50	11.46	10.04	9.50	7.50±

BASIN ELEVATION TABLE

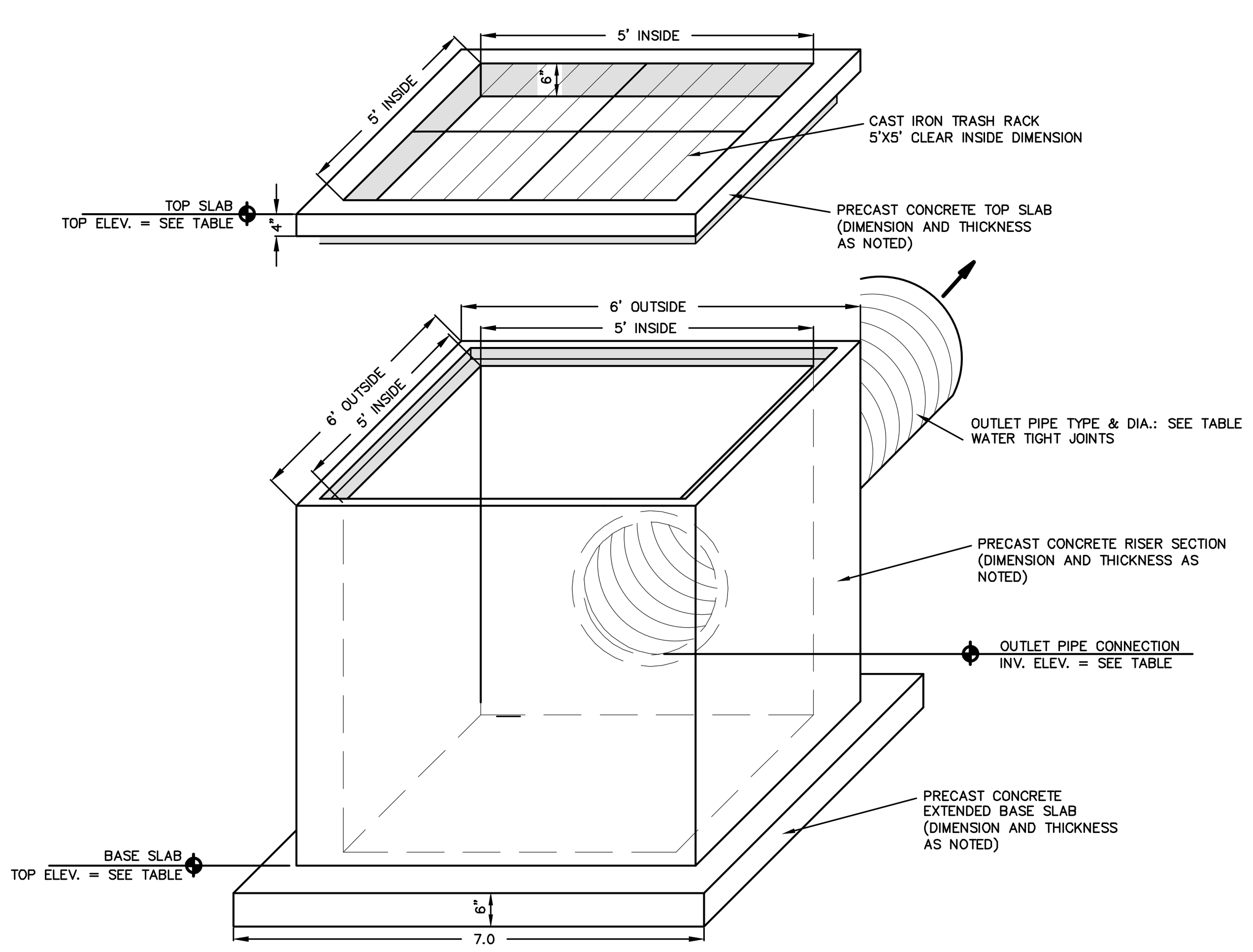
BMP CONSTRUCTION SEQUENCE NOTES:

THE FOLLOWING SEQUENCE IS IN ADDITION TO THE **"CONSTRUCTION SEQUENCE SCHEDULE"** PROVIDED UNDER THE EROSION AND SEDIMENT CONTROL SPECIFICATIONS.

1. THE POND SHALL BE CONSTRUCTED AS DIRECTED ON THE PLAN AND DETAILS. PERIMETER SLOPE IMPROVEMENTS SHALL BE STABILIZED WITH TEMPORARY VEGETATION WITHIN 7 DAYS OF CONSTRUCTION. THIS WILL CREATE A TEMPORARY SEDIMENT BARRIER DURING PROJECT CONSTRUCTION. A GOOD TEMPORARY MEANS OF STABILIZATION IS A WET HYDROSEED MIX.
2. DURING CONSTRUCTION, THE POND WILL BE UTILIZED AS AN EROSION & SEDIMENT CONTROL SEDIMENT BASIN. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS PROPERLY STABILIZED THE POND SHALL BE CLEANED AND RESTORED TO ITS DESIGN SPECIFICATIONS AND THE BANKS PERMANENTLY STABILIZED **WITHIN 7 DAYS.**

STORMWATER INFILTRATION BASIN TYPICAL CROSS SECTION

NOT TO SCALE — (LOCATION AS DENOTED ON PLAN)



OUTLET CONTROL STRUCTURE

NO SCALE — LOCATION AS NOTED ON PLAN

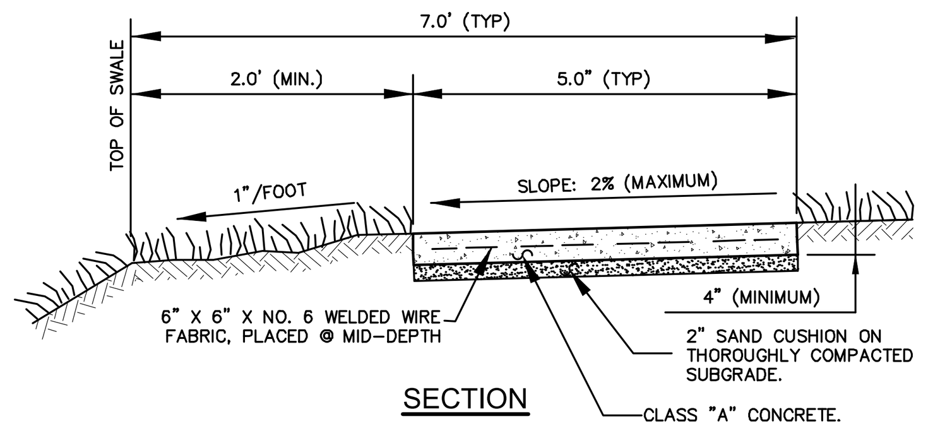
THE CONTRACTOR SHALL CONFIRM ALL STRUCTURE DIMENSIONS AND COORDINATE WITH MANUFACTURER BEFORE FABRICATION

STRUCTURE	STRUCTURE: TOP ELEV. (FMSL)	STRUCTURE: BASE ELEV. (FMSL)	OUTLET PIPE: DIAMETER (INCHES)	OUTLET PIPE: INVERT IN (FMSL)
01	11.40	7.40	(1) 24" HDPE	7.70

OUTLET CONTROL STRUCTURE TABLE

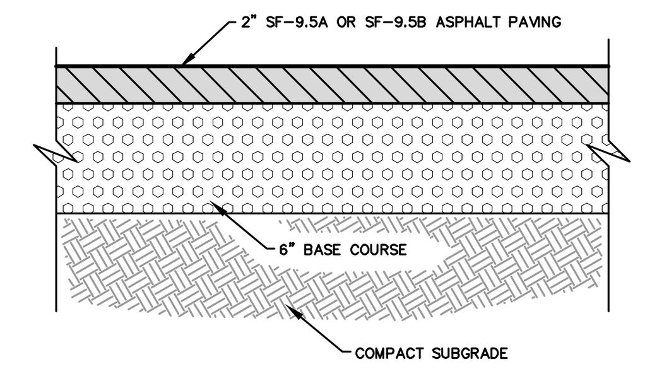
OUTLET STRUCTURE NOTES:

1. STRUCTURE DESIGN SPECIFICATIONS SHALL CONFORM TO LATEST ASTM C913 SPECIFICATIONS FOR "PRECAST CONCRETE WATER & WASTEWATER STRUCTURES.
2. CONCRETE COMPRESSIVE STRENGTH SHALL BE A MINIMUM OF 3,000PSI.
3. STEEL REINFORCING DESIGN TO CONFORM TO THE REQUIREMENTS OF ASTM C890 SPECIFICATIONS FOR "STRUCTURAL DESIGN LOADING FOR WATER & WASTEWATER STRUCTURES" AND SHALL UTILIZE GRADE 60 RE-BARS CONFORMING TO THE REQUIREMENTS OF ASTM A615 OR WWF CONFORMING TO THE REQUIREMENTS OF ASTM A185 OR BOTH.
4. PIPE PENETRATION TO BE AS SPECIFIED. PIPE TO BE INSTALLED AS PER NCDOT STANDARDS FOR MORTAR JOINT CONNECTIONS.
5. JOINTS TO BE SEALED WITH BUTYL RUBBER JOINT SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990, OR MORTAR AS PER NCDOT REQUIREMENTS OR BOTH.
6. ANY DEVIATIONS FROM THE APPROVED PLAN & SPECIFICATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.



CONCRETE SIDEWALK DETAIL

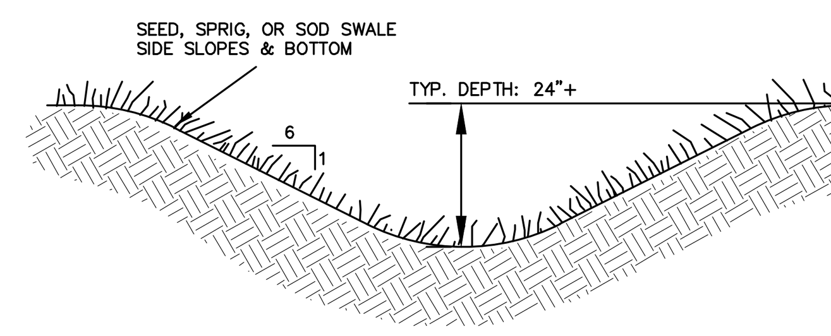
NOT TO SCALE



TYPICAL RESIDENTIAL ROADWAY PAVEMENT SECTION

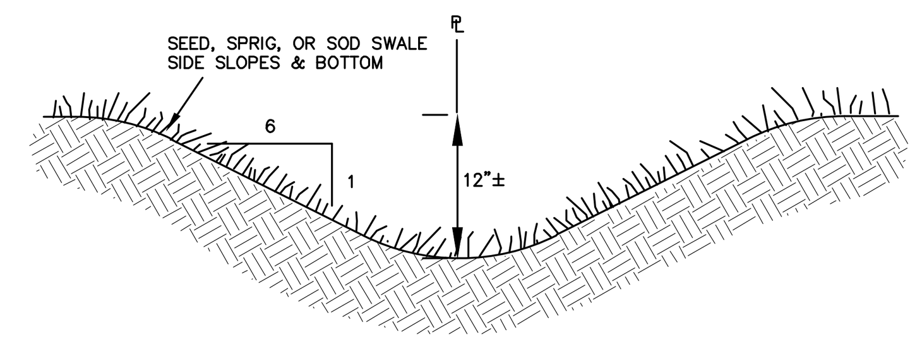
NOT TO SCALE

NOTE:
PAVING SHALL CONSIST OF FINE GRADING THE SPECIFIED PARKING & DRIVE AREAS AND INSTALLING 2" SF-9.5A OR SF-9.5B ASPHALT CONCRETE SURFACE COURSE IN CONJUNCTION WITH A 6" AGGREGATE BASE COURSE. THE SOIL SUBGRADE BENEATH PAVEMENTS SHALL BE COMPACTED TO AT LEAST 95% OF ASTM D 698 PRIOR TO ANY PLACEMENT OF SUBBASE FILL OR STONE BASE COURSE. ALL SITE PREPARATION AND THE DESIGN AND CONSTRUCTION OF ALL FOUNDATIONS, GROUND SLABS, AND PAVEMENTS SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS PROVIDED BY A GEOTECHNICAL ENGINEER.



TYPICAL PRIMARY SWALE SECTION

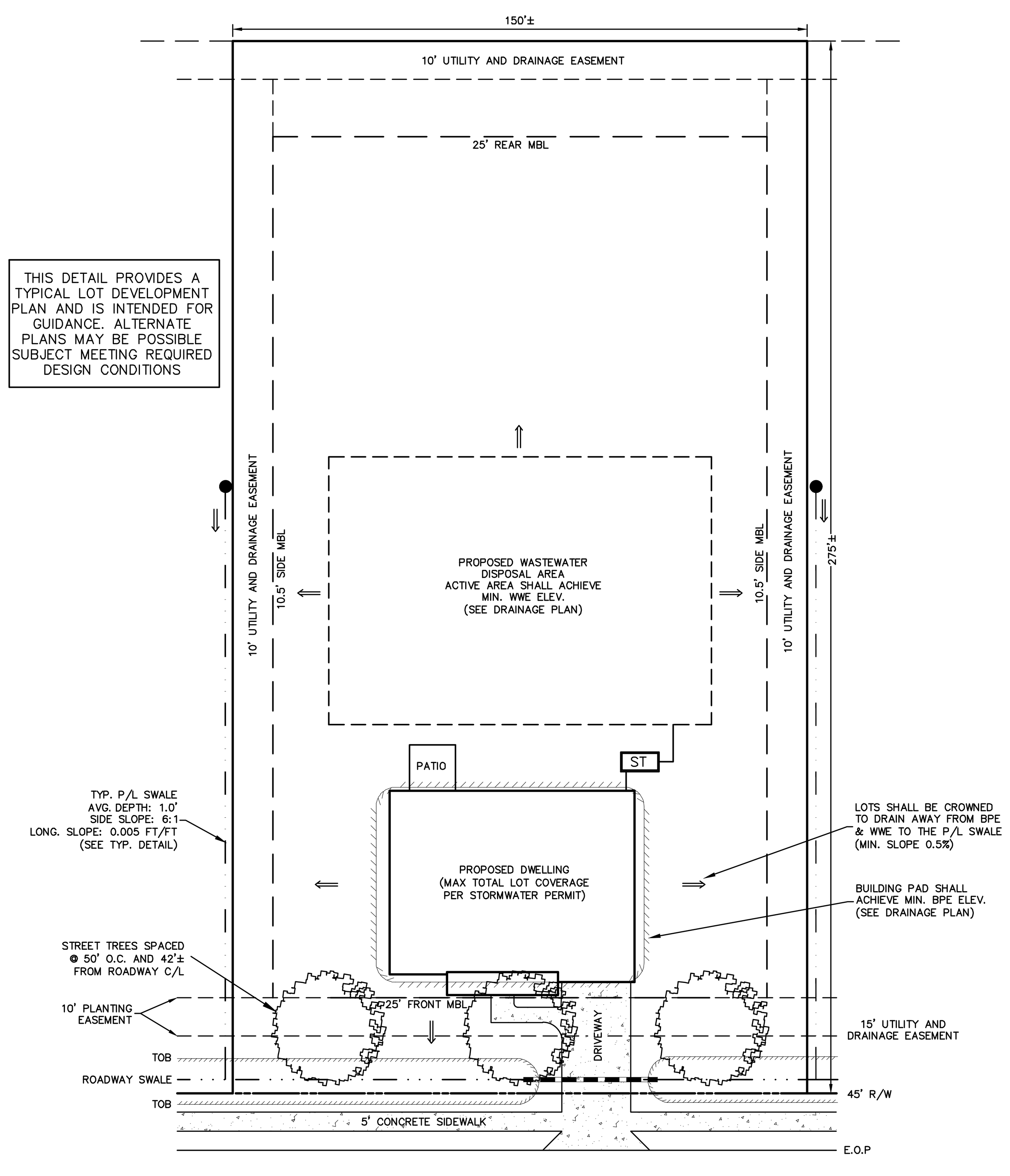
NOT TO SCALE — MIN. LONGITUDINAL SLOPE: 0.10%



TYPICAL PROPERTY LINE SWALE SECTION

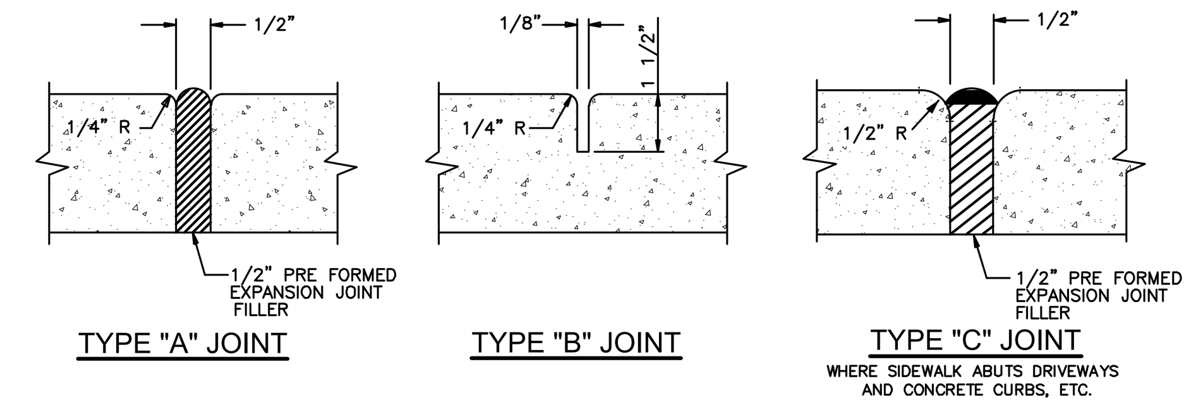
NOT TO SCALE — MIN. LONGITUDINAL SLOPE: 0.005 FT/FT

THIS DETAIL PROVIDES A TYPICAL LOT DEVELOPMENT PLAN AND IS INTENDED FOR GUIDANCE. ALTERNATE PLANS MAY BE POSSIBLE SUBJECT MEETING REQUIRED DESIGN CONDITIONS



MINIMUM DIMENSIONAL STANDARDS

MINIMUM LOT SIZE = 40,000 S.F.
MINIMUM LOT WIDTH = 125'
(EXCEPT CUL-DE-SAC LOTS)
SCALE: 1"=30'

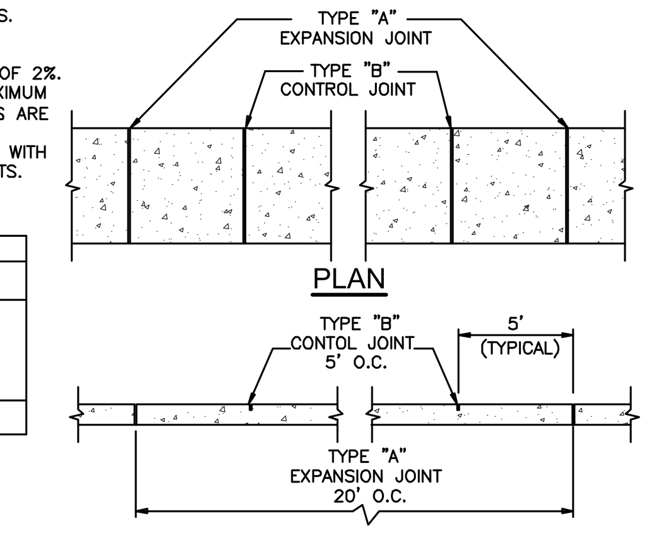


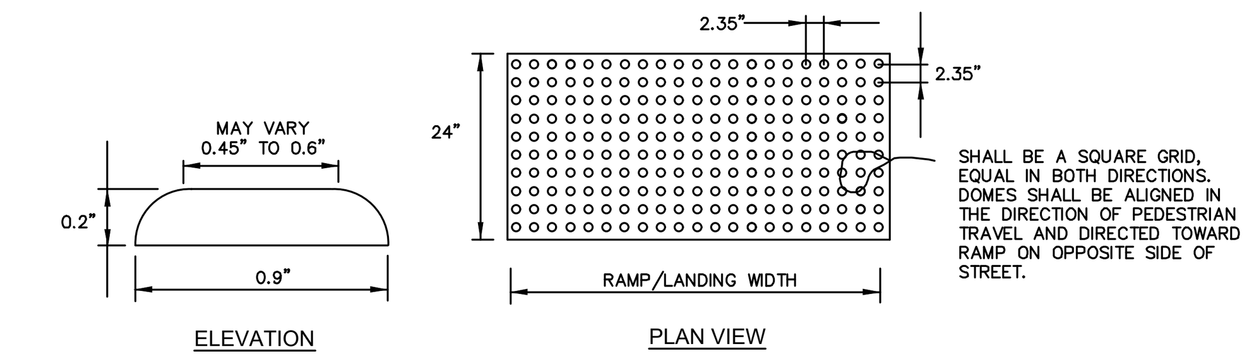
SIDEWALK AND WALKING TRAIL NOTES:

1. WALKS SHALL HAVE A 4 INCH MINIMUM THICKNESS.
2. CONCRETE SHALL BE A MINIMUM OF 3,000 PSI.
3. WALKS SHALL HAVE A 5 FOOT MINIMUM WIDTH.
4. CROSS SLOPE SHALL BE LIMITED TO A MAXIMUM OF 2%.
5. LONGITUDINAL SLOPE SHALL BE LIMITED TO A MAXIMUM OF 1:20 (V:H) EXCEPT WHERE ACCESIBILTY RAMPS ARE PROVIDED AS NOTED.
6. ALL SIDEWALKS AND TRAILS SHALL BE COMPLIANT WITH THE LATEST HANDICAP ACCESSIBILITY REQUIREMENTS.

TABLE OF SIDEWALK JOINTS

TYPE	LOCATION
"A"	20' CENTER TO CENTER ON SIDEWALKS, P.C. AND P.T. OF CURVES. JUNCTION OF EXISTING AND NEW SIDEWALKS, DRIVEWAYS, AND SIMILAR STRUCTURES.
"B"	5' CENTER TO CENTER ON SIDEWALKS.



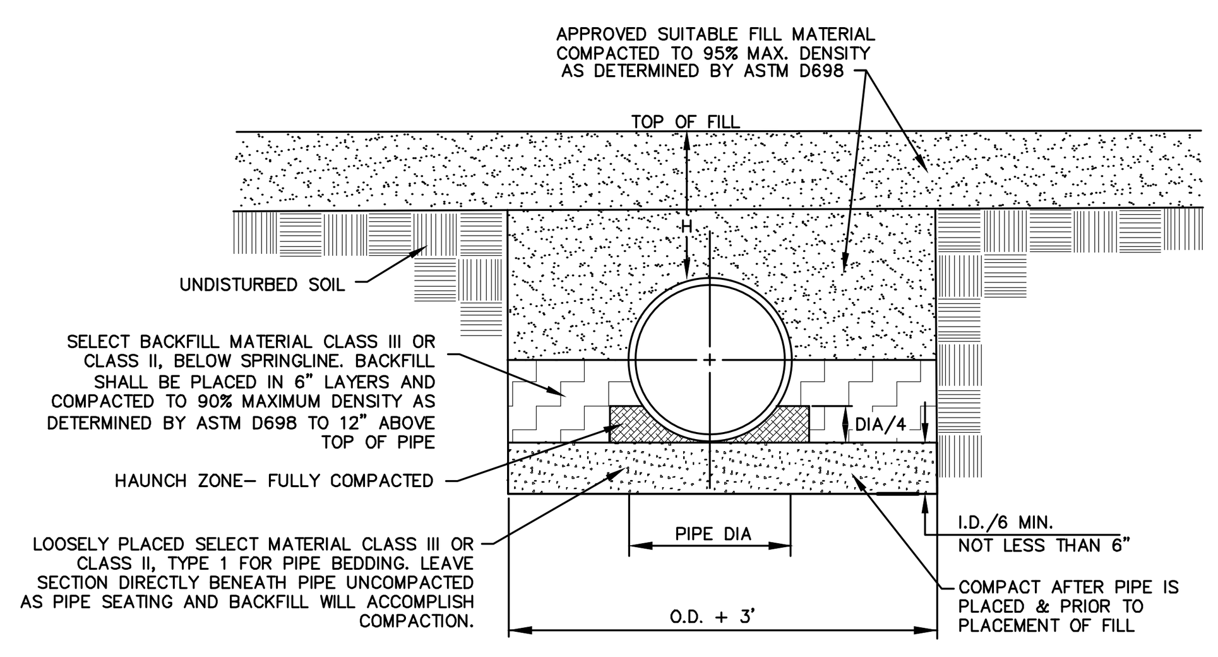


TRUNCATED DOME DETECTABLE WARNING DETAIL

NOT TO SCALE

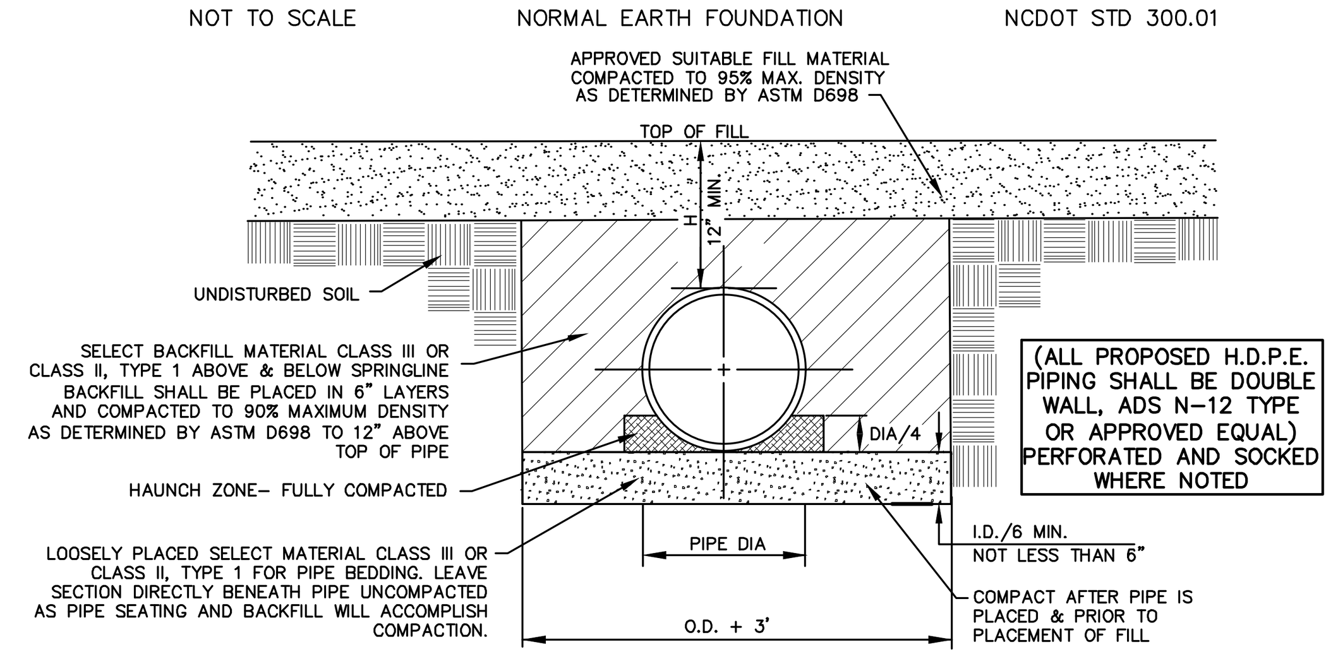
DETECTABLE WARNING GENERAL NOTES

1. DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES MANUFACTURED BY "COTE-L INDUSTRIES, INC.". CALLED "SAFTI-TRAX", WITH POLYURETHANE COATING "DURABAK", OR APPROVED EQUAL. APPLIED ON SMOOTH (NON-GROOVED) CLEAN CONCRETE RAMP, AND SHALL CONFORM TO THE DETAILS IN THE PLANS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. ALL DETECTABLE WARNING AREAS SHALL START AT BACK OF CURB, BE 24 INCHES IN DEPTH AND COVER THE COMPLETE WIDTH OF THE RAMP AREA 48 INCHES MIN..
3. 70% VISUAL CONTRAST IS REQUIRED. THE COLOR SHALL BE AN INTEGRAL PART OF THE DETECTABLE WARNING MATERIAL, AS SPECIFIED ON THE PLANS. COLOR TO BE DETERMINED BY THE CITY STAFF, SAFETY YELLOW IS THE DEFAULT COLOR.
4. THE SMOOTH AND CLEAN CONCRETE UNDER DETECTABLE WARNING DEVICE AREA SHALL BE INCLUDED IN THE COST OF THE CONCRETE CURB RAMP. THE COST OF FURNISHING AND INSTALLING THE DETECTABLE WARNING DEVICE SHALL BE INCLUDED SEPARATELY AS "DETECTABLE WARNING DEVICE" PER SQUARE FOOT OR AS OUTLINED IN THE SPECIFICATIONS.
5. DETECTABLE WARNING SURFACE:
APPLIED A COATING OF "DURABAK" SLIP-RESISTANT POLYURETHANE COATING TO THE SMOOTH, CLEAN CONCRETE SURFACE. ON TOP OF THE POLYURETHANE COATING APPLY TRUNCATED DOMES FROM A "SAFTY-TRAX" CONTACT SHEET. ON TOP OF THE TRUNCATED DOMES AND INITIAL POLYURETHANE COATING PLACE THREE ADDITIONAL COATS OF "DURABAK" POLYURETHANE COATING. COLOR TO BE DETERMINED BY CITY STAFF OR AS SPECIFIED ON THE PLANS. SAFETY YELLOW IS A DEFAULT COLOR.
6. ALL RAMPS AND DETECTABLE WARNING SHALL BE ALIGNED IN THE DIRECTION OF PEDESTRIAN TRAVEL AND DIRECTED TOWARD RAMP ON THE OPPOSITE SIDE OF STREET.



STANDARD RIGID PIPE INSTALLATION DETAIL

NOT TO SCALE — NORMAL EARTH FOUNDATION — NCDOT STD 300.01



STANDARD FLEXIBLE PIPE INSTALLATION DETAIL

NOT TO SCALE — NORMAL EARTH FOUNDATION — NCDOT STD 300.01

GENERAL PIPE INSTALLATION NOTES

1. ALL EXCAVATIONS SHALL COMPLY WITH THE TERMS AND CONDITIONS OF THE CONSTRUCTION STANDARDS FOR EXCAVATIONS IN OSHA "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION", CHAPTER XV11 OF TITLE 29, CFR, PART 1926. THE CONTRACTOR SHALL HAVE A COMPETENT PERSON ON THE JOB AT ALL TIMES AND SHALL EMPLOY A PROFESSIONAL ENGINEER TO ACT UPON ALL PERTINENT MATTERS OF THE WORK.
2. 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
3. THE PIPE CULVERT INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH NCDOT TYPICAL STANDARD DETAIL 300.01.
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. MINIMUM FILL HEIGHT (H) FOR SIDE DRAIN PIPES (NOT BELOW PAVEMENT STRUCTURES) SHALL BE 1', OR AS SPECIFIED BY THE PIPE MANUFACTURER, WHICHEVER IS GREATER.
4. PIPES TO BE INSTALLED BELOW PAVEMENT STRUCTURES SHALL HAVE THE FOLLOWING MINIMUM FILL HEIGHT (H) AS MEASURED FROM THE TOP OF PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE.
12" - 60" FLEXIBLE HDPE PIPE, H = 2' MINIMUM
CLASS IV & CLASS V RIGID RCP PIPE, H = 1' MINIMUM
CLASS II & CLASS III RIGID RCP PIPE, H = 2' MINIMUM
SEE NCDOT STANDARD 300.01 FOR MAXIMUM AND MINIMUM FILL HEIGHT REQUIREMENTS FOR OTHER TYPES OF FLEXIBLE AND RIGID PIPE.

FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

Bissell Professional Group
Firm License # C-956
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760
BISSELL PROFESSIONAL GROUP
Engineers, Planners, Surveyors and Environmental Specialists

ROADWAY, DRAINAGE &
TYP. CONSTRUCTION DETAILS

PROJECT: ALGONQUIN
POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

DocuSigned by: SEAL 042639 — DAVID M. KLEBITZ — 76982DFD6A6D4CB

DATE: 8/28/24	SCALE: AS NOTED
DESIGNED: BPG	CHECKED: MSB
DRAWN: KFW/DMK	APPROVED: BPG

SHEET: 10 OF 13
CAD FILE: 382600B2
PROJECT NO: 3826

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 03, 2024

CURRITUCK COUNTY WATER DEPARTMENT
ATTN: KENNETH C. GRIFFIN , PUBLIC UTILITIES DIRECTOR
P.O. BOX 220
CURRITUCK, NC 27929

Re: **Authorization to Construct (This is not a Final Approval)**
Issue Date: December 03, 2024
ALGONQUIN SUBDIVISION
Serial No.: 24-00966 Water System No.: NC0427010
Currituck County

Dear Applicant:

This letter is to confirm that a complete Engineer's Report and a Water System Management Plan have been received, and that engineering plans and specifications have been approved by the Department for **ALGONQUIN SUBDIVISION, Serial No.: 24-00966.**

The "Authorization to Construct" is valid for 36 months from the issue date. Authorization to construct may be extended if the Rules Governing Public Water Systems [15A NCAC 18C] and site conditions have not changed (see Rule .0305). The "Authorization to Construct" and the engineering plans and specifications approval letter shall be posted at the primary entrance of the job site before and during construction.

Upon completion of the construction or modification, **and prior to placing the new construction or modification into service**, the applicant must submit an Engineer's Certification and Applicant's Certification to the Public Water Supply Section.

- **Engineer's Certification:** in accordance with Rule .0303(a), the applicant shall submit a certification statement signed and sealed by a registered professional engineer stating that construction was completed in accordance with approved engineering plans and specifications, including any provisions stipulated in the Department's engineering plan and specification approval letter.
- **Applicant's Certification:** in accordance with Rule .0303(c), the applicant shall submit a signed certification statement indicating that the requirements for an Operation and Maintenance Plan and Emergency Management Plan have been satisfied in accordance with Rule .0307(d) and (e) and that the system has a certified operator in accordance with Rule .1300. The "Applicant's Certification" form is available at http://www.ncwater.org/ (click on Public Water Supply Section, Plan Review, Plan Review Forms).

Certifications can be sent by mail or attachment to an e-mail message to **PWSSection.PlanReview@deq.nc.gov.**

If this "Authorization to Construct" is for a new public water system, the owner must submit a completed **application for an Operating Permit** and the appropriate fee. For a copy of the application for an Operating Permit please call (919) 707-9076.

Once the certifications and permit application and fee (if applicable) are received and determined adequate, the Department will issue a Final Approval letter to the applicant. In accordance with Rule .0309(a), **no portion of this project shall be placed into service until the Department has issued Final Approval.**

Please contact us at (919) 707-9100 if you have any questions or need additional information.

Sincerely,

RBSadosky

Rebecca Sadosky, Ph.D., Chief
Public Water Supply Section
Division of Water Resources, NCDEQ

cc: JAMIE MIDGETTE, P.E., Regional Engineer
BISSELL PROFESSIONAL GROUP

North Carolina Department of Environmental Quality
Division of Water Resources

Authorization to Construct

Project Applicant:	**CURRITUCK COUNTY WATER DEPARTMENT**
Public Water System Name:	**CURRITUCK COUNTY WATER SYSTEM**
Water System No.:	**NC0427010**
Project Name:	**ALGONQUIN SUBDIVISION**
Serial No.:	**24-00966**
Issue Date:	**December 03, 2024**
Expiration Date:	36 Months after Issue Date

In accordance with 15A NCAC 18C .0305, this Authorization to Construct must be posted at the primary entrance to the job site during construction.

MARK S. BISSELL
BISSELL PROFESSIONAL GROUP
P.O. BOX 1068
KITTY HAWK, NC 1068

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 3, 2024

Currituck County Water Department
Attention: Kenneth C. Griffin, Public Utilities Director
P.O. Box 220
Currituck, North Carolina 27929

Re: Engineering Plans Approval
Distribution Extension
Algonquin Subdivision
Currituck County Water System
Water System No.: NC0427010
Currituck County
Serial No.: 24-00966

Dear Applicant:

Enclosed please find one copy of the "Application for Approval..." together with one copy of the referenced engineering plans bearing the Division of Water Resources stamp of approval for the referenced project. These engineering plans are approved under Division of Water Resources Serial Number, 24-00966 dated December 3, 2024.

Engineering plans prepared by Mark S. Bissell, P.E., call for the installation of approximately 660 linear feet of 8-inch water main, 330 linear feet of 4-inch water main, valves, a fire hydrant, and associated appurtenances to serve 10 single family lots. The proposed 8-inch water main will run along Indian Kettle Road and connect to an existing 10-inch water main along Forbes Road. The proposed 8-inch water main that runs along Indian Kettle Road will transition to a 4-inch water main and terminate at a blow-off assembly at the end of Indian Kettle Road. Construction of this project must be in accordance with Currituck County Water System's standard specifications.

Please note that in accordance with 15A NCAC 18C .0309(a), no construction, alteration, or expansion of a water system shall be placed into service or made available for human consumption until the Public Water Supply Section has issued Final Approval. Final Approval will be issued and mailed to the applicant upon receipt of both an Engineer's Certification and an Applicant's Certification submitted in accordance with 15A NCAC 18C .0303 (a) and (c).

These plans in the foregoing application are approved insofar as the protection of public health is concerned as provided in the rules, standards and criteria adopted under the authority of Chapter 130A-317 of the General Statutes. This approval does not constitute a warranty of the design, construction or future operation of the water system.

One copy of the "Application for Approval..." and a copy of the plans with a seal of approval from the department are enclosed. One copy of the approved documents in a digital format (USB) is being forwarded to our Washington Regional Office. The second copy of the USB is being retained in our office.

If the Public Water Supply Section can be of further service, please call (919) 707-9100.

Sincerely,

RBSadosky

Rebecca Sadosky, Ph.D., Chief
Public Water Supply Section
Division of Water Resources

RS/DE

Enclosures: Approval Documents

cc: Jamie Midgette, P.E., Washington Regional Office
Currituck County Health Department
Bissell Professional Group

ROY COOPER
Governor

MARY PENNY KELLEY
Secretary

WILLIAM E. TOBY VINSON, JR
Interim Director

NORTH CAROLINA
Environmental Quality

December 3, 2024

Attn: Joel K. & Stacy A. Justice - Owners
P.O. Box 208
Grandy, NC 27939

Subject: **State Stormwater Management Permit No. SW7240901**
Algonquin Subdivision
Low Density Subdivision Project
Currituck County

Dear Joel K. & Stacy A. Justice:

The Washington Regional Office received a complete State Stormwater Management Permit Application for the subject project on September 3, 2024. Staff review of the plans and specifications has determined that the project, as proposed, complies with the Stormwater Regulations set forth in 15A NCAC 2H.1000 amended on January 1, 2017 (2017 Rules). We are hereby forwarding Permit No. SW7240901 dated December 3, 2024, for the construction of the built-upon areas (BUA) and vegetated conveyances associated with the subject project.

This permit shall be effective from the date of issuance until rescinded and the project shall be subject to the conditions and limitations as specified therein and does not supersede any other agency permit that may be required. Failure to comply with these requirements will result in future compliance problems. Please note that this permit is not transferable except after notice to and approval by the Division.

This cover letter, attachments, and all documents on file with DEMLR shall be considered part of this permit and is herein incorporated by reference.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing by filing a written petition with the Office of Administrative Hearings (OAH). The written petition must conform to Chapter 150B of the North Carolina General Statutes and must be filed with the OAH within thirty (30) days of receipt of this permit. You should contact the OAH with all questions regarding the filing fee (if a filing fee is required) and/or the details of the filing process at 6714 Mail Service Center, Raleigh, NC 27699-6714, or via telephone at 919-431-3000, or visit their website at www.NCOAH.com. Unless such demands are made this permit shall be final and binding.

If you have any questions concerning this permit, please contact Denis Hyska in the Washington Regional Office, at (252) 948-3973 or denis.hyska@deq.nc.gov.

Sincerely,

Denis Hyska, CAPM
Division of Energy, Mineral and Land Resources

Enclosures: Attachment A – Max Allowable BUA per Lot
Attachment B – Designer's Certification Form
Application Documents

cc: David A. Deel, PE – Deel Engineering LLC. (dadeeleng@gmail.com)
Currituck County Inspections - Bill Newns (bill.newns@currituckcountync.gov)
Washington Regional Office

STATE OF NORTH CAROLINA

DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION OF ENERGY, MINERAL AND LAND RESOURCES

STATE STORMWATER MANAGEMENT PERMIT

LOW DENSITY SUBDIVISION DEVELOPMENT

In compliance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations promulgated and adopted by the North Carolina Environmental Management Commission, including 15A NCAC 02H.1000 amended on January 1, 2017 (2017 Rules), the "stormwater rules"),

PERMISSION IS HEREBY GRANTED TO

Joel K. & Stacy A. Justice

Algonquin Subdivision

Indian Kettle Road, Jarvisburg, Currituck County

FOR THE

construction, management, operation and maintenance of built-upon area (BUA) for a 24% low density subdivision project (the "low density area") discharging to Class SC waters as outlined in the application, approved stormwater management plans, supplements, calculations, operation and maintenance agreement, recorded documents, specifications, and other supporting data (the "approved plans and specifications") as attached and/or on file with and approved by the Division of Energy, Mineral and Land Resources (the "Division" or "DEMLR"). The project shall be constructed, operated and maintained in accordance with these approved plans and specifications. The approved plans and specifications are incorporated by reference and are enforceable parts of this permit.

This permit shall be effective from the date of issuance until rescinded and shall be subject to the following specified conditions and limitations. The permit issued shall continue in force and effect until the permittee files a request with the Division for a permit modification, transfer, or rescission; however, these actions do not stay any condition. The issuance of this permit does not prohibit the Director from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit for cause as allowed by the laws, rules, and regulations contained in 15A NCAC 2H.1000 and NCGS 143-215.1 et.al.

1. BUA REQUIREMENTS. The maximum amount of BUA allowed for the entire project is 104,579 square feet. The BUA requirements and allocations for this project are as follows:

a. LOW DENSITY AREA BUA LIMITS. The low-density area, in the approved plans and specifications, must not exceed 24% per the requirements of the stormwater rules. Within this low-density area, this permit approves a percent BUA of 16.52% and the construction of a total of 104,579 square feet of BUA. This permit does not provide any allocation of BUA for future development within this low-density area.

b. BUA FOR INDIVIDUAL LOTS. Each of the ten (10) lots are limited to a maximum of BUA, as indicated in the approved plans and specifications. **The maximum BUA assigned to each lot via this permit and the recorded deed restrictions and protective covenants may not be increased or decreased by either the individual lot owner or the permittee unless and until the permittee notifies the Division and obtains written approval from the Division.**

2. PERVIOUS AREA IMPROVEMENTS. At this time, none of the pervious area improvements listed in G.S. 143-214.7(b2) or the Stormwater Design Manual have been proposed for this project. Pervious area improvements will be allowed in this project if documentation is provided demonstrating those improvements meet the requirements of the stormwater rule.

3. LOW DENSITY AREA REQUIREMENTS. The low-density area requirements for this project are as follows:

a. LOW DENSITY AND CONVEYANCE DESIGN. The low-density area is permitted based on the design criteria presented in the sealed, signed and dated supplement and as shown in the approved plans and specifications. This low-density area and conveyances must be provided and maintained at the design condition.

b. PIPING. Other than the piping shown on the approved plans, only minimal amounts of piping under driveways and roads is allowed within the low-density area when it cannot be avoided. No additional piping is allowed.

c. DISPERSED FLOW. The low-density area has maximized dispersed flow of stormwater runoff through vegetated areas and minimized the channelization of flow.

d. VEGETATED CONVEYANCES. Stormwater runoff that could not be released as dispersed flow may be transported by vegetated conveyances with minimum side slopes of 3:1 (H:V) designed to not erode during the peak flow from the 10-year storm event as defined in the stormwater rules and approved by the Division

4. NON-ENFORCEABLE SCMS. The two wet ponds shown on the plans are **not** required by the Division and have not been demonstrated to meet the Minimum Design Criteria and therefore are not considered a part of the approved stormwater treatment system. These additional measures are incorporated only by reference and are not enforceable parts of the permit.

5. VEGETATED SETBACKS. A 50-foot wide vegetative setback must be provided and maintained in grass or other vegetation adjacent to all surface waters as shown on the approved plans. The setback is measured horizontally from the normal pool elevation of impounded structures, from the top of bank of each side of streams or rivers, and from the mean high waterline of tidal waters, perpendicular to the shoreline.

a. RELEASE OF STORMWATER NOT TREATED IN A STORMWATER CONTROL MEASURE (SCM). Stormwater that is not treated in an SCM, such as in the low-density area (including roof drains), must be released at the edge of the vegetated setback and allowed to flow through the setback as dispersed flow.

6. RECORDED DOCUMENT REQUIREMENTS. The stormwater rules require the following documents to be recorded with the Office of the Register of Deeds prior to the sale of individual lots or groups of lots:

   a. ACCESS AND/OR EASEMENTS. The entire stormwater conveyance system and maintenance accesses must be located in public rights-of-way, dedicated common areas that extend to the nearest public right-of-way, and/or permanent recorded easements that extend to the nearest public right-of-way for the purpose of inspection, operation, maintenance, and repair.

   b. OPERATION AND MAINTENANCE AGREEMENT. The operation and maintenance agreement must be recorded with the Office of the Register of Deeds.

   c. FINAL PLATS. The final recorded plats must reference the operation and maintenance agreement and must also show all public rights-of-way, dedicated common areas, and/or permanent drainage easements, in accordance with the approved plans.

   d. DEED RESTRICTIONS AND PROTECTIVE COVENANTS. Recorded deed restrictions and protective covenants must include, at a minimum, the following statements related to stormwater management:

      i. The following covenants are intended to ensure ongoing compliance with State Stormwater Management Permit Number SW7240606, as issued by the Division of Energy, Mineral and Land Resources (the "Division") under 15A NCAC 02H.1000, effective January 1, 2017.
      ii. The State of North Carolina is made a beneficiary of these covenants to the extent necessary to maintain compliance with the Stormwater Management Permit.
      iii. These covenants are to run with the land and be binding on all persons and parties claiming under them.
      iv. The covenants pertaining to stormwater may not be altered or rescinded without the express written consent of the Division.
      v. Alteration of the drainage as shown on the approved plans may not take place without the concurrence of the Division.
      vi. The maximum built-upon area (BUA) per lot is **15,000** square feet. This allotted amount includes any BUA constructed within the lot property boundaries, and that portion of the right-of-way between the front lot line and the edge of the pavement not shown on the approved plans. BUA has the same meaning as G.S. 143-214.7, as amended.
      vii. The maximum allowable BUA shall not be exceeded on any lot until the permit is modified to ensure compliance with the stormwater rules, permit, and the approved plans and specifications.
      viii. Filling in, piping or altering any vegetated conveyances (ditches, swales, etc.) associated with the development, except for average driveway crossings, is prohibited by any persons.
      ix. A 50-foot wide vegetative setback must be provided and maintained adjacent to all surface waters in accordance with 15A NCAC 02H.1003(4) and the approved plans.
      x. All roof drains shall be released no closer than at the edge of the 50-foot wide vegetated setback and allowed to flow through the setback as dispersed flow. At no time shall stormwater runoff be piped into or through the setback.
      xi. Any individual or entity found to be in noncompliance with the provisions of a stormwater management permit or the requirements of the stormwater rules is subject to enforcement procedures as set forth in NCGS 143, Article 21.

e. DEEDS FOR INDIVIDUAL LOTS. The permittee shall record deed restrictions and protective covenants prior to the issuance of a certificate of occupancy to ensure the permit conditions and the approved plans and specifications are maintained in perpetuity.

7. CONSTRUCTION. During construction, erosion shall be kept to a minimum and any eroded areas of the on-site stormwater system will be repaired immediately.

   a. PROJECT CONSTRUTION, OPERATION AND MAINTNEANCE. During construction, all operation and maintenance for the project and stormwater system shall follow the Erosion Control Plan requirements until the Sediment-Erosion Control devices are no longer needed.

   b. FINAL GRADING. The vegetated areas and vegetated conveyances shall be entirely constructed and vegetated. Once the final grading is completed and the site is stabilized, the permittee shall provide and perform the operation and maintenance as outlined in the applicable section below.

8. MODIFICATIONS. No person or entity, including the permittee, shall alter any component shown in the approved plans and specifications, except for minimum driveway crossings. Prior to the construction of any modification to the approved plans, the permittee shall submit to the Director, and shall have received approval for modified plans, specifications, and calculations including, but not limited to, those listed below. For changes to the project that impact the certifications, a new or updated certification(s), as applicable, will be required and a copy must be submitted to the appropriate DEQ regional office upon completion of the modification.

   a. Any modification to the approved plans and specifications, regardless of size including the BUA, details, etc.

   b. Redesign or addition to the approved amount of BUA.

   c. Further development, subdivision, acquisition, lease or sale of any, all or part of the project and/or property area as reported in the approved plans and specifications.

   d. The construction of any permeable pavement, #57 stone area, public trails, or landscaping material within the common areas to be considered a permeable surface that were not included in the approved plans and specifications.

   e. Altering, modifying, removing, relocating, redirecting, regarding, or resizing of any component of the approved stormwater collection system and/or vegetative conveyance shown on the approved plan, except for minimum driveway crossings within the low density area.

   f. The construction of any allocated future BUA.

   g. Adding the option to use permeable pavement or #57 stone within the lots as a permeable surface. The request may require a proposed amendment to the deed restrictions and protective covenants for the subdivision to be submitted and recorded.

   h. Other modifications as determined by the Director.

9. DESIGNER'S CERTIFICATION. Upon completion of the project, the permittee shall determine if the project is in compliance with the approved plans and take the necessary following actions:

   a. If the permittee determines that the project is in compliance with the approved plans, then within 45 days of completion, the permittee shall submit to the Division one hard copy and one electronic copy of the following:

      i. The completed and signed Designer's Certification provided in Attachment A noting any deviations from the approved plans and specifications. Deviations may require approval from the Division.
      ii. A copy of the recorded operation and maintenance agreement.
      iii. Unless already provided, a copy of the recorded deed restrictions and protective covenants; and
      iv. A copy of the recorded plat delineating the public rights-of-way, dedicated common areas and/or permanent recorded easements, when applicable.

   b. If the permittee determines that the project is <u>not</u> in compliance with the approved plans, the permittee shall submit an application to modify the permit within 30 days of completion of the project or provide a plan of action, with a timeline, to bring the site into compliance.

10. OPERATION AND MAINTENANCE. The permittee shall provide and perform the operation and maintenance necessary, as listed in the signed operation and maintenance agreement to assure that all components of the permitted on-site stormwater system are maintained at the approved design condition. The approved operation and maintenance agreement must be followed in its entirety and maintenance must occur at the scheduled intervals.

    a. CORRECTIVE ACTIONS REQUIRED. In the event that the low-density area fails to meet the requirements of low density, the permittee shall take immediate corrective actions. This includes actions required by the Division and the stormwater rules such as the construction of additional or replacement on-site stormwater systems. These additional or replacement measures shall receive a permit from the Division prior to construction.

    b. MAINTENANCE RECORDS. Records of maintenance activities must be kept and made available upon request to authorized personnel of the Division. The records will indicate the date, activity, name of person performing the work and what actions were taken.

11. CURRENT PERMITTEE NAME OR ADDRESS CHANGES. The permittee shall submit a completed <u>Permit Information Update Application Form</u> to the Division within 30 days to making any one or more of the following changes:

    a. A name change of the current permittee;

    b. A name change of the project;

    c. A mailing address change of the permittee.

12. TRANSFER. This permit is not transferable to any person or entity except after notice to and approval by the Director. Neither the sale of the project and/or property, in whole or in part, nor the conveyance of common area to a third party constitutes an approved transfer of the permit.

a. TRANSFER REQUEST. The transfer request must include the appropriate application, documentation and the processing fee as outlined in 15A NCAC 02H.1045(2) and must be submitted upon occurrence of any one or more of the following events:

i. The sale or conveyance of the project and/or property area in whole or in part, except in the case of an individual residential lot sale that is made subject to the recorded deed restrictions and protective covenants;
ii. The assignment of declarant rights to another individual or entity;
iii. The sale or conveyance of the common areas to a Homeowner's or Property Owner's Association, subject to the requirements of NCGS 143-214.7(c2);
iv. Dissolution of the partnership, corporate, or LLC entity, subject to NCGS 55-14-05 or NCGS 57D-6-07 and 08;
v. Bankruptcy.
vi. Foreclosure, subject to the requirements of Session Law 2013-121;

b. TRANSFER INSPECTION. Prior to transfer of the permit, a file review and site inspection will be conducted by Division personnel to ensure the permit conditions have been met and that the project and the on-site stormwater system complies with the permit conditions. Records of maintenance activities performed to date may be requested. Projects not in compliance with the permit will not be transferred until all permit and/or general statute conditions are met.

13. COMPLIANCE. The permittee is responsible for complying with the terms and conditions of this permit and the approved plans and specifications until the Division approves the transfer request.

a. REVIEWING AND MONITORING EACH LOT FOR COMPLIANCE. The permittee is responsible for verifying that the proposed BUA on each individual lot, within each drainage area and for the entire project does not exceed the maximum amount allowed by this permit. The permittee shall review all individual lot plans for new construction and all subsequent modifications and additions for compliance. The plans reviewed must include all proposed BUA, grading, and driveway pipe placement. The permittee shall not approve any lot plans where the maximum allowed BUA limit has been exceeded or where modifications are proposed to the grading and/or to the stormwater collection system and/or to the vegetated conveyance unless and until a permit modification has been approved by the Division. The permittee shall review and routinely monitor the project and each lot to ensure continued compliance with the conditions of the permit, the approved plans and specifications, and the recorded deed restrictions and protective covenants. The permittee shall notify any lot owner that is found to be in noncompliance with the conditions of this permit in writing and shall require timely resolution.

b. ARCHITECTURAL REVIEW BOARD (ARB) OR COMMITTEE (ARC). The permittee may establish an ARB or ARC to conduct individual lot reviews. However, any approval given by the ARB or ARC on behalf of the permittee does not relieve the permittee of the responsibility to maintain compliance with the conditions of the permit and the approved plans and specifications.

c. APPROVED PLANS AND SPECIFICATIONS. A copy of this permit, approved plans, application, supplements, operation and maintenance agreement, all applicable recorded documents, and specifications shall be maintained on file by the permittee at all times.

d. MAINTENANCE ACCESS. SCMs, stormwater collection systems, and vegetated conveyances must be accessible for inspection, operation, maintenance and repair as shown on the approved plans.

e. DIVISION ACCESS. The permittee grants Division Staff permission to enter the property during normal business hours to inspect all components of the permitted project.

f. ENFORCEMENT. Any individual or entity found to be in noncompliance with the provisions of a stormwater management permit or the requirements of the stormwater rules is subject to enforcement procedures as set forth in NCGS 143 Article 21.

g. ANNUAL CERTIFICATION. The permittee shall electronically submit to the Division an annual certification completed by either the permittee or their designee confirming the projects conformance with permit conditions.

h. OBTAINING COMPLIANCE. The Director may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the Director for modifying the site to meet minimum requirements. The permittee shall provide copies of modified plans and certification in writing to the Director that the changes have been made.

i. OTHER PERMITS. The issuance of this permit does not preclude the permittee from obtaining and complying with any and all other permits or approvals that are required for this development to take place, as required by any statutes, rules, regulations, or ordinances, which are imposed by any other Local, State or Federal government agency having jurisdiction. Any activities undertaken at this site that cause a water quality violation or undertaken prior to receipt of the necessary permits or approvals to do so are considered violations of NCGS 143-215.1, and subject to enforcement procedures pursuant to NCGS 143-215.6.

The permit was issued this the 3rd day of December 2024.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

For Toby Vinson, Interim Director
Division of Energy, Mineral and Land Resources
By Authority of the Environmental Management Commission

Permit Number SW7240901

Attachment A

Maximum Allowable BUA for Each Lot

LOT No.	LOT AREA (ft^2)	MAX ALLOWABLE BUA (ft^2)
1	40,000	8,000
2	40,000	8,000
3	40,000	8,000
4	42,819	8,564
5	46,232	9,246
6	40,697	8,139
7	40,075	8,015
8	40,037	8,007
9	40,024	8,005
10	40,009	8,002

Attachment B

Certification Forms

The following blank Designer Certification forms are included and specific for this project:

- As-Built Permittee Certification
- As-Built Designer's Certification for Low Density Projects

A separate certification is required for each SCM. These blank certification forms may be copied and used, as needed, for each SCM and/or as a partial certification to address a section or phase of the project.

AS-BUILT PERMITTEE CERTIFICATION

I hereby state that I am the current permittee for the project named above, and I certify by my signature below, that the project meets the below listed Final Submittal Requirements found in NCAC 02H.1042(4) and the terms, conditions and provisions listed in the permit documents, plans and specifications on file with or provided to the Division.

☐ Check here if this is a partial certification. Section/phase/SCM #?_____
☐ Check here if this is part of a Fast Track As-built Package Submittal.

Printed Name_____Signature_____

I, _____, a Notary Public in the State of _____

County of _____, do hereby certify that _____

personally appeared before me this _____ day of _____, 20_____

and acknowledge the due execution of this as-built certification. (SEAL)

Witness my hand and official seal

_____

My commission expires _____

Permittee's Certification NCAC .1042(4)	Completed / Provided	N/A
A. DEED RESTRICTIONS / BUA RECORDS		
1. The deed restrictions and protective covenants have been recorded and contain the necessary language to ensure that the project is maintained consistent with the stormwater regulations and with the permit conditions.	Y or N	
2. A copy of the recorded deed restrictions and protective covenants has been provided to the Division.	Y or N	
3. Records which track the BUA on each lot are being kept. (See Note 1)	Y or N	
B. MAINTENANCE ACCESS		
1. The SCMs are accessible for inspection, maintenance and repair.	Y or N	
2. The access is a minimum of 10 feet wide.	Y or N	
3. The access extends to the nearest public right-of-way.	Y or N	
C. EASEMENTS		
1. The SCMs and the components of the runoff collection / conveyance system are located in recorded drainage easements.	Y or N	
2. A copy of the recorded plat(s) is provided.	Y or N	
D. SINGLE FAMILY RESIDENTIAL LOTS - Plats for residential lots that have an SCM include the following:	Y or N	
1. The specific location of the SCM on the lot.	Y or N	
2. A typical detail for the SCM.	Y or N	
3. A note that the SCM is required to meet stormwater regulations and that the lot owner is subject to enforcement action as set	Y or N	

forth in NCGS 143 Article 21 if the SCM is removed, relocated or altered without prior approval.		
E. OPERATION AND MAINTENANCE AGREEMENT	Y or N	
1. The O&M Agreement is referenced on the final recorded plat.	Y or N	
2. The O&M Agreement is recorded with the Register of Deeds and appears in the chain of title.	Y or N	
F. OPERATION AND MAINTENANCE PLAN – maintenance records are being kept in a known set location for each SCM and are available for review.	Y or N	
G. DESIGNER'S CERTIFICATION FORM – has been provided to the Division.	Y or N	

Note 1- Acceptable records include ARC approvals, as-built surveys, and county tax records.

Provide an explanation for every requirement that was not met, and for every "N/A" below. Attach additional sheets as needed.

AS-BUILT DESIGNER'S CERTIFICATION FOR LOW DENSITY PROJECTS

I hereby state that I am a licensed professional and I certify by my signature and seal below, that I have observed the construction of the project named above to the best of my abilities with all due care and diligence, and that the project meets all of the MDC found in 15A NCAC 02H.1003, in accordance with the permit documents, plans and specifications on file with or provided to the Division, except as noted on the "AS-BUILT" drawings, such that the intent of the stormwater rules and the general statutes has been preserved.

☐ Check here if this is a partial certification. Section or phase_____

☐ Check here if this is part of a Fast-Track As-Built Package Submittal per 15A NCAC 02H .1044(3).

☐ Check here if the Designer did not observe the construction but is certifying the project.

☐ Check here if pictures of the project are provided.

Printed Name_____Signature _____

NC Registration Number_____Date _____

SEAL:

Consultant's Mailing Address:

_____

City:_____State:_____ Zip:_____

Phone:(___) _____

Consultant's Email address:

_____

① Circle N if the as-built value differs from the Plan/permit. If N is circled, provide an explanation on page 3.
② N/E = Not Evaluated (provide explanation on page 2). ③N/A = Not Applicable to this project/plan.

Consultant's Certification (MDC 15A NCAC 02H .1003)			
Project Density and Built-Upon Area	①As-built	②N/E	③N/A
1. The project has areas of high density based on natural drainage area boundaries, variations in land use or construction phasing.	Y or N		
2. The project's built-upon area does not exceed the maximum limit specified in the permit.	Y or N		
Dispersed Flow	①As-built	②N/E	③N/A
1. The project maximizes dispersed flow through vegetated areas and minimizes channelized flow.	Y or N		

Vegetated Conveyances	①As-built	②N/E	③N/A
1. Stormwater that is not released as dispersed flow is transported by vegetated conveyances.	Y or N		
2. The project has a minimal amount of non-vegetated conveyances to reduce erosion.	Y or N		
3. Other than minimal piping under driveways and roads, no piping has been added beyond what is shown on the approved plans.	Y or N		
4. Side slopes are no steeper than 3H:1V.	Y or N		
5. The conveyance does not erode in response to the peak flow from the 10-year storm.	Y or N		
Curb outlet systems (if applicable)	①As-built	②N/E	③N/A
1. The swale or vegetated area can carry the peak flow from the 10-year storm at a non-erosive velocity.	Y or N		
2. The longitudinal slope of the swale or vegetated areas does not excee 5%.	Y or N		
3. The swale has a trapezoidal cross-section and a minimum bottom wid of two feet.	Y or N		
4. The minimum length of the swale or vegetated area is 100 feet.	Y or N		
5. Side slopes are no steeper than 3H:1V.	Y or N		
6. The project utilizes treatment swales designed per Section .1061 in lieu of the curb outlet system requirements.	Y or N		
Vegetated Setbacks (if applicable)	①As-built	②N/E	③N/A
1. The width of the vegetated setback is at least 50'.	Y or N		
2. The width of the vegetated setback has been measured from the norm pool of impounded waters, the MHW line of tidal waters, or the top of bank of each side of rivers or streams.	Y or N		
3. The vegetated setback is maintained in grass or other vegetation.	Y or N		
4. BUA that meets the requirements of NCGS 143-214.7(b2)(2) is locate in the setback.	Y or N		
5. BUA that does NOT meet the requirements of NCGS 143-214.7(b2)(2) located within the setback and is limited to: • Publicly-funded linear projects (road, greenway, or sidewalk) • Water dependent structures • Minimal footprint uses such as poles, signs, utility appurtenances, and security lights.	Y or N		
6. The amount of BUA within the setback is minimized, and channeling of the runoff from the BUA has been avoided.	Y or N		

7. Stormwater is not discharged (via swale or pipe) through a vegetated setback. Stormwater is released at the edge of the setback and allowed to flow through the setback as dispersed flow.	Y or N		
Outlets	①As-built	②N/E	③N/A
1. Stormwater outlets do not cause erosion downslope of the discharge point during the peak flow from the 10-year storm.	Y or N		
Variations	①As-built	②N/E	③N/A
1. The project has variations from the MDC that were not previously approved. (Modification may be required.)	Y or N		
Deed restrictions (if applicable)	①As-built	②N/E	③N/A
1. Deed restrictions are recorded and ensure that the project and the BUA will be maintained in perpetuity consistent with the permit, approved plans, and specifications.	Y or N		
For Subdivisions Only (Residential or Commercial)	①As-built	②N/E	③N/A
1. The number of platted lots is consistent with the approved plans.	Y or N		
2. The project area is consistent with the approved plans.	Y or N		
3. The layout of the lots and streets is consistent with the approved plan.	Y or N		
4. The width / radius of streets, paved accesses, cul-de-sacs and sidewal is consistent with the approved plan.	Y or N		
5. No piping, other than those minimum amounts needed under a driveway or under a road, has been added.	Y or N		
6. The lot grading, road grading, vegetated conveyances, piping, inverts, and elevations are consistent with the approved plans.	Y or N		

Provide an explanation for every requirement that was not met, and for every "N/A" below. Attach additional sheets as needed.

Deel Engineering, PLLC
NC Firm License P-1045

December 11, 2024

Currituck County Planning
Currituck Historic Courthouse
153 Courthouse Road, Suite 302
Currituck, North Carolina 27929

Re: Stormwater Management Design Submittal
Major Stormwater Plan
Algonquin Subdivision
Jarvisburg, Currituck County, NC

On behalf of Joel & Stacy Justice, we hereby submit for your review a Major Stormwater Plan application package for the stormwater management system design for the Algonquin Subdivision.

Three copies of the following items are included with and shall be considered part of this submittal package:

1. Major Stormwater Plan Form SW-002
2. NRCS Method Peak Flow Form SW-004 (pre-con & post-con)
3. Infiltration Basin Supplement
4. Infiltration Basin O&M Agreement
5. Stormwater Management Plan Narrative
6. EPA SWMM Model Report (Presented in Appendix D of the SWM Narrative)
7. 24" x 36" EPA SWMM Model Existing Conditions Schematic Plan (Electronic Copy only)
8. 24" x 36" EPA SWMM Model Proposed Conditions Schematic Plan

This package is being submitted with a matching Construction Plans TRC Submittal, and so additional Construction Plans are not included under this transmittal (you will receive your plans under the TRC submittal). An electronic copy of all documents will also accompany the TRC Submittal.

At your earliest convenience, please review the attached information for compliance. If you have any questions, or if you require any additional information, please do not hesitate to contact me at (252) 202-3803.

Sincerely,

David A. Deel, P.E.
Encl: as stated

Major Stormwater Plan Form SW-002

Review Process

Contact Information

Currituck County
Planning and Community Development
153 Courthouse Road, Suite 110
Currituck, NC 27929

Phone: 252.232.3055
Fax: 252.232.3026

Website: http://www.co.currituck.nc.us/planning-community-development.cfm

Currituck County
Engineering Department
153 Courthouse Road, Suite 302
Currituck, NC 27929

Phone: 252.232.6035

General

Major stormwater plan approval is required for:

- Major subdivisions.
- Major site plans - development or expansion on a nonresidential, multi-family, or mixed use lot by 5,000 square feet or more of impervious coverage or resulting in 10% or more total impervious coverage.

Step 1: Application Submittal

The applicant must submit a complete application packet consisting of the following:

- Completed Currituck County Minor Stormwater Plan Form SW-002 (unless submitting a major subdivision or major site plan).
- Completed Rational Method Form SW-003 or NRCS Method Form SW-004.
- Stormwater management plan drawn to scale. The plan shall include the items listed in the major stormwater plan design standards checklist.
- Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable.
- NCDENR permit applications, if applicable.
- Number of Copies Submitted:
  - 3 Copies of required plans
  - 3 Hard copies of ALL documents
  - 1 PDF digital copy (ex. Compact Disk – e-mail not acceptable) of all plans AND documents.

On receiving an application, staff shall determine whether the application is complete or incomplete. A complete application contains all the information and materials listed above, and is in sufficient detail to evaluate and determine whether it complies with appropriate review standards. An application for major stormwater plan must be submitted and approved prior altering an existing drainage system, performing any land disturbing activity or, before construction documents are approved.

Step 2: Staff Review and Action

Once an application is determined complete staff shall approve, approve subject to conditions or disapprove the application.

OFFICIAL USE ONLY:
Permit Number: _____
Date Filed: _____
Date Approved: _____

Major Stormwater Plan
Form SW-002

Contact Information

APPLICANT:		PROPERTY OWNER:	
Name:	Joel K. & Stacy A. Justice	Name:	same as applicant
Address:	P.O. Box 208 Grandy, NC 27939	Address:	
Telephone:	252-493-2500	Telephone:	
E-Mail Address:	joel@bluewaterrestoration.com	E-Mail Address:	

Property Information

Physical Street Address: End of Indian Kettle Road, Jarvisburg, NC 27958

Parcel Identification Number(s): 0109000053F0000

FEMA Flood Zone Designation: X

Request

Project Description: Proposed 10 Lot residential Subdivision on 14.53 Ac. of vacant land

Total land disturbance activity: 479,160 sf

Calculated volume of BMPs: 57,905 sf

Maximum lot coverage: 104,579 total sf (81,979 Lots)

Proposed lot coverage: 104,579 total sf (81,979 Lots)

TYPE OF REQUEST

- ☐ Major subdivision (10-year, 24-hour rate)
- ☐ Major site plan (5-year, 24-hour rate)

METHOD USED TO CALCULATE PEAK DISCHARGE

- ☐ Rational Method
- ☐ NRCS Method (TR-55 and TR-20)
- ☐ Simple volume calculation for small sites (less than 10 acres)
- ☐ Alternative stormwater runoff storage analysis
- ☐ Downstream drainage capacity analysis

I hereby authorize county officials to enter my property for purposes of determining compliance. All information submitted and required as part of this process shall become public record.

Joel K. Justice Stacy A. Justice
Property Owner(s)/Applicant

12/11/2024
Date

The table below depicts the design standards of the major stormwater plan application. Please make sure to include all applicable listed items to ensure all appropriate standards are reviewed.

Major Stormwater Plan

Design Standards Checklist

Date Received: _____

Project Name: Algonquin Subdivision

Applicant/Property Owner: Joel K. & Stacy A. Justice

Minor Stormwater Plan Design Standards Checklist		
General		
1	Property owner name and address.	DAD
2	Site address and parcel identification number.	DAD
3	North arrow and scale to be 1" = 100' or larger.	DAD
Site Features		
4	Scaled drawing showing existing and proposed site features: Property lines with dimensions, acreage, streets, easements, structures (dimensions and square footage), fences, bulkheads, septic area (active and repair), utilities, vehicular use areas, driveways, and sidewalks.	DAD
5	Approximate location of all designated Areas of Environmental Concern (AEC) or other such areas which are environmentally sensitive on the property, such as Maritime Forest, CAMA, 404, or 401 wetlands as defined by the appropriate agency.	DAD
6	Existing and proposed ground elevations shown in one foot intervals. All elevation changes within the past six months shall be shown on the plan.	DAD
8	Limits of all proposed fill, including the toe of fill slope and purpose of fill.	DAD
9	Square footage of all existing and proposed impervious areas (structures, sidewalks, walkways, vehicular use areas regardless of surface material), including a description of surface materials.	DAD
10	Existing and proposed drainage patterns, including direction of flow.	DAD
11	Location, capacity, design plans (detention, retention, infiltration), and design discharge of existing and proposed stormwater management features.	DAD
12	Elevation of the seasonal high water level as determined by a licensed soil scientist.	DAD
13	Plant selection.	DAD
Permits and Other Documentation		
14	NCDENR stormwater permit application (if 10,000sf or more of built upon area).	DAD
15	NCDENR erosion and sedimentation control permit application (if one acre or more of land disturbance).	DAD
16	NCDENR coastal area management act permit application, if applicable.	N/A
17	Stormwater management narrative with supporting calculations.	DAD
18	Rational Method Form SW-003 or NRCS Method Form SW-004	DAD
19	Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable	N/A
20	Design spreadsheets for all BMPs (*Appendix F – Currituck County Stormwater Manual*).	N/A
21	Detailed maintenance plan for all proposed BMPs.	

Certificate		
22	The major stormwater plan shall contain the following certificate: I, _____, owner/agent hereby certify the information included on this and attached pages is true and correct to the best of my knowledge. On the plan entitled _____, stormwater drainage improvements shall be installed according to these plans and specifications and approved by Currituck County. Yearly inspections are required as part of the stormwater plan. The owner is responsible for all maintenance required. Currituck County assumes no responsibility for the design, maintenance, or performance of the stormwater improvements. Date:_____ Owner/Agent:_____	

Major Stormwater Plan Submittal Checklist

Staff will use the following checklist to determine the completeness of your application. Please make sure all of the listed items are included. Staff shall not process an application for further review until it is determined to be complete.

Major Stormwater Plan Form SW-002

Submittal Checklist

Date Received: _____

Project Name: Algonquin Subdivision

Applicant/Property Owner: Joel K. & Stacy A. Justice

Major Stormwater Plan Form SW-002 Submittal Checklist		
1	Completed Major Stormwater Plan Form SW-002	
2	Completed Rational Method Form SW-003 or NRCS Method Form SW-004	
3	Stormwater plan	
4	NCDENR permit applications, if applicable	
5	3 copies of plans	
6	3 hard copies of ALL documents	
7	**1 PDF digital copy of all plans AND documents (ex. Compact Disk – e-mail not acceptable)**	

Comments

_____

_____

_____

NRCS Method Peak Flow
Form SW-004

Project Information

Project Location: Algonquin Subdivision

Parcel Identification Number(s): 0109000053F0000

Check One: ☒ Pre-Development ☐ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
		Totals		

See Appendix C in SWM Narrative

$CN_{Weighted} = \frac{SCN*A}{SA} =$ _____

Use CN =

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency. . . . . Yr			
Rainfall, P (24-hour) (Use Table 2-7). . . . . In			
Runoff, Q. . . . . In			

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre			Post		
1.	Surface description							
2.	Manning's roughness coeff., n (Table 2-9)							
3.	Flow Length, L (total L<= 300 ft)	ft						
4.	24-hr rainfall, P	in	4.0			6.0		
5.	Land Slope, s	ft / ft						
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$			+			=	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+			=	
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?							
	If pipe, enter D (in):							
	If channel, enter bottom width:							
	If channel, enter side slopes (_:1):							
12.	Cross sectional flow area, a	sq ft						
13.	Wetted perimeter, w_p	ft						
14.	Hydraulic radius, $r = a / w_p$	ft						
15.	Channel slope, s	ft / ft						
16.	Manning's roughness coeff., n							
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec						
18.	Flow length, L	ft						
19.	$T_t = L / 60V$	min		+			=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	

See Calculations in SWM Narrative / EPA SWMM Narrative

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	_____	sq mi (acres/640)
Runoff Curve Number, CN	=	_____	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	_____	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	_____	% of A_m (_____ acres covered)

See Calculations in SWM Narrative / EPA SWMM Narrative

				Storm #3
2.	Frequency			
3.	Rainfall, P (24-hour)			
4.	Initial abstraction, I_a ..... (Use CN)	in		
5.	Compute I_a/P			
6.	Unit peak discharge, q_u ..... (use T_c and I_a/P with Figure 2-9)	csm/in		
7.	Runoff, Q ..... (From Runoff Curve Number Worksheet)	in		
8.	Pond and swamp adjustment factor, F_p ..... (Use Table 2-10)			
9.	Peak discharge, Q_p ..... (Where $Q_p = q_u A_m Q F_p$)	cfs		

Applicant

12/11/2024
Date

NRCS Method Peak Flow
Form SW-004

Project Information

Project Location: Algonquin Subdivision

Parcel Identification Number(s): 0109000053F0000

Check One: ☐ Pre-Development ☒ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
		Totals		

See Appendix C in SWM Narrative

$CN_{Weighted} = \frac{SCN*A}{SA} =$ _____

Use CN =

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency. . . . . Yr			
Rainfall, P (24-hour) (Use Table 2-7). . . . . In			
Runoff, Q. . . . . In			

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre			Post		
1.	Surface description							
2.	Manning's roughness coeff., n (Table 2-9)							
3.	Flow Length, L (total L<= 300 ft)	ft						
4.	24-hr rainfall, P	in	4.0			6.0		
5.	Land Slope, s	ft / ft						
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$			+			=	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+			=	
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?							
	If pipe, enter D (in):							
	If channel, enter bottom width:							
	If channel, enter side slopes (_:1):							
12.	Cross sectional flow area, a	sq ft						
13.	Wetted perimeter, w_p	ft						
14.	Hydraulic radius, $r = a / w_p$	ft						
15.	Channel slope, s	ft / ft						
16.	Manning's roughness coeff., n							
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec						
18.	Flow length, L	ft						
19.	$T_t = L / 60V$	min		+			=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	

See Calculations in SWM Narrative / EPA SWMM Narrative

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	_____	sq mi (acres/640)
Runoff Curve Number, CN	=	_____	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	_____	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	_____	% of A_m (_____ acres covered)

See Calculations in SWM Narrative / EPA SWMM Narrative

					Storm #3
2.	Frequency				
3.	Rainfall, P (24-hour)				
4.	Initial abstraction, I_a (Use CN)	in			
5.	Compute I_a/P				
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in			
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in			
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)				
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs			

Applicant

Date 12/11/2024

Please complete the yellow shaded items.

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

INFILTRATION BASIN

This form must be completely filled out, printed, initialed, and submitted.

I. PROJECT INFORMATION

Project Name	Algonquin Subdivision
Contact Person	David A. Deel, P.E.
Phone Number	252-202-3803
Date	12/11/2024
Drainage area number (for projects with multiple drainage areas, as labeled on plans)	Entire Developed Site

II. DESIGN INFORMATION

Site Characteristics

Drainage area (Include both on- and off-site areas that flow to the infiltration basin)	633,132.00	ft^2	
Impervious surface area (Include both on- and off-site areas that flow to the infiltration basin)	104,579.00	ft^2	
Percent impervious	16.52	%	
Project within 0.5 miles & draining to SA Waters			

Peak Flow Calculations

Peak flow from the **wooded** 2-year, 24-hour storm	2.25	ft^3/sec	
Post-development 10-yr, 24-hr discharge	2.25	ft^3/sec	
Pre/Post peak flow control	0.00	ft^3/sec	

Storage Volume

Minimum volume required (1.5" Rainfall Water Quality Volume)	15722.21	ft^3	
Volume provided	57,905.00	ft^3	OK

Soils Report Summary (Include soils report)

Soil type	)arse loamy sand		
Infiltration rate (Minimum 0.52 in/hr)	11.27	in/hr	OK
SHWT elevation	6.54	fmsl	

Basin Bottom Dimensions

Basin length	varies	ft	
Basin width	varies	ft	
Bottom Surface Area (Used to calculate drawdown time)	24,734.00	ft^2	

Basin Design Parameters

Basin side slopes	3.00	:1	OK
Basin bottom elevation	9.50	fmsl	OK
Storage elevation	11.50	fmsl	
Storage Surface Area (Provide surface area at storage elevation)	33,298.00	ft^2	
Top elevation	11.50	fmsl	
Drawdown time	0.10	days	

Additional Information

Maximum runoff to each inlet to the basin?	1.44	ac-in	OK
Length of vegetative filter for overflow (Minimum 50 feet in length for SA waters; Minimum 30 feet in length for non-SA waters)	30.00	ft	OK
Distance to structure	>100	ft	OK
Distance from surface waters (Minimum 50 feet from SA waters; Minimum 30 feet from non-SA waters)	>100	ft	OK
Distance from water supply well(s) (Minimum 100 feet)	>100	ft	OK
Separation from impervious soil layer	>6	ft	OK
Naturally occuring soil above shwt	4.20	ft	OK

Bottom covered with 4-in of clean sand? (Bottom of basin must be covered with clean sand to an average depth of 4 inches, unless native soils contain less than 2% fines)	Yes	OK
Proposed drainage easement provided?	Yes	OK
Capures all runoff at ultimate build-out?	Yes	OK
Bypass provided for larger storms? (Runoff in excess of design volume must be bypassed)	Yes	OK
Pretreatment device provided (List type provided)	Veg Swales	

III. REQUIRED ITEMS CHECKLIST

EDIT Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal**

Requried Item:	**Initials**	**Page or plan sheet number and any notes:**
1. Plans (1" - 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C or Curve Number, CN per basin), - Basin dimensions, - Pretreatment system, - High flow bypass system, - Overflow device - Maintenance access, - Proposed drainage easement and public right of way (ROW), and - Boundaries of drainage easement.	DAD	Entire Plan Set
2. Plan details (1" = 30' or larger) for the infiltration basin showing: -Bypass structure, - Basin bottom dimensions, - Basin cross-section with benchmark for sediment cleanout, - Flow distribution detail for inflow, - Vegetated filter strip, and - Pretreatment device	DAD	Sheet 10
3. Section view of the infiltration basin (1" = 20' or larger) showing: - Pretreatment and treatment areas, and - Inlet and outlet structures	DAD	Sheet 10
4. A table of elevations, areas, incremental volumes, & accumulated volumes to verify the volume provided.	DAD	SWM Narrative
5. A soils report that is based on actual field investigations, soil borings, and infiltration tests. County soil maps are not acceptable.	DAD	SWM Narrative Appendices
6. A construction sequence that shows how the infiltration basin will be protected from sediment until the entire drainage area is stabilized.	DAD	Sheet 11
7. The supporting calculations.	DAD	SWM Narrative
8. A detailed description for the operation and maintenance of the infiltration basin. Refer to the *Currituck County Stormwater Manual Appendix B - Sample Maintenance Plan*	DAD	Attached Maintenance Agreement

Operation & Maintenance Agreement

Project Name:	**Algonquin Subdivision**
Project Location:	**Jarvisburg, Currituck County, NC**

Cover Page

Maintenance records shall be kept on the following BMP(s). This maintenance record shall be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired, or replaced **immediately.** These deficiencies can affect the integrity of structures, safety of the public, and the pollutant removal efficiency of the BMP(s).

The BMP(s) on this project include (check all that apply & corresponding O&M tables will be added automatically):

Bioretention Cell	Quantity:		Location(s):	
Dry Detention Basin	Quantity:		Location(s):	
Grassed Swale	Quantity:	1	Location(s):	Throughout Project Area
Green Roof	Quantity:		Location(s):	
Infiltration Basin	Quantity:	1	Location(s):	South End of Project
Infiltration Trench	Quantity:		Location(s):	
Level Spreader/VFS	Quantity:		Location(s):	
Permeable Pavement	Quantity:		Location(s):	
Proprietary System	Quantity:		Location(s):	
Rainwater Harvesting	Quantity:		Location(s):	
Sand Filter	Quantity:		Location(s):	
Stormwater Wetland	Quantity:		Location(s):	
Wet Detention Basin	Quantity:	0	Location(s):	
Disconnected Impervious Area	Present:	No	Location(s):	
User Defined BMP	Present:	No	Location(s):	

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed for each BMP above, and attached O&M tables. I agree to notify NCDENR of any problems with the system or prior to any changes to the system or responsible party.

* Responsible Party:	**Joel K. Justice & Stacy A. Justice**
Title & Organization:	**Property Owners**
Street address:	**P.O. Box 208**
City, state, zip:	**Grandy, NC 27958**
Phone number(s):	**252-493-2500**
Email:	**joel@bluewaterrestoration.com**

Signature: Joel K. Justice Stacy A. Justice Date: 12-11-24

I, Kimberly W Healy, a Notary Public for the State of NC

County of Currituck, do hearby certify that Joel K Justice + Stacy A Justice

personally appeared before me this 11th day of December, 2024 and

acknowledge the due execution of the Operations and Maintenance Agreement.

Witness my hand and official seal, Kimberly W Healy.

KIMBERLY W. HEALY NOTARY PUBLIC CURRITUCK COUNTY, NC My Comm. Expires 10-12-25

Seal

My commission expires Oct. 12, 2025

Grassed Swale Maintenance Requirements

Important maintenance procedures:

- The drainage area of the grassed swale will be carefully managed to reduce the sediment load to the grassed swale.
- After the first-time fertilization to establish the grass in the swale, fertilizer will not be applied to the grassed swale.

The grassed swale will be inspected **once a quarter**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How to remediate the problem:
The perimeter of the BMP	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
The entire length of the swale	Trash/debris is present.	Remove the trash/debris.
	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then re-sod (or plant with other appropriate species) and water until established. Provide lime and a one-time fertilizer application.
	Sediment covers the grass at the bottom of the swale.	Remove sediment and dispose in an area that will not impact streams or BMPs. Re-sod if necessary.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
The outlet device	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Department of Environment and Natural Resources Regional Office.

Infiltration System Maintenance Requirements

Important maintenance procedures:

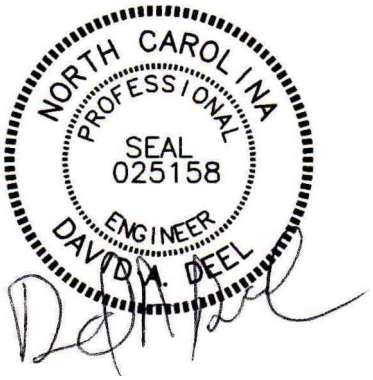
- The drainage area will be carefully managed to reduce The sediment load to The infiltration basin.
- Immediately after the infiltration basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the infiltration basin will be fertilized after the initial fertilization that is required to establish the vegetation.
- The vegetation in and around the basin will be maintained at a height of approximately six inches.

After the infiltration basin is established, it shall be inspected **once a quarter and within 24 hours after every storm event greater than 1.0 inches (or 1.5 inches if in a Coastal County)**. Records of operation and maintenance shall be kept in a known set location and shall be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How to remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the infiltration basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
The inlet device: swale		
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
The main treatment area	A visible layer of sediment has accumulated.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP. Replace any media that was removed in the process. Revegetate disturbed areas immediately.
	Water is standing more than 5 days after a storm event.	Replace the top few inches of filter media and see if this corrects the standing water problem. If so, revegetate immediately. If not, consult an appropriate professional for a more extensive repair.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
The outlet device	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Department of Environment and Natural Resources Regional Office.

Stormwater Management Plan Narrative
Algonquin Subdivision
Residential Subdivision
Jarvisburg
Currituck County Submittal
October 2, 2024



General

The Algonquin Subdivision project is a proposed Residential Subdivision to be located on a (+/-) 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The project will be limited to a maximum of 16.52% Built-Upon-Area (BUA) and, accordingly, an NCDEQ Low Density Stormwater Permit is being pursued for this Project.

The following narrative will detail the proposed Stormwater Management design for the Algonquin Subdivision development and demonstrate compliance with the Currituck County Peak Flow Mitigation requirements.

Summary of Existing Conditions

The project site consists of a 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in "Forbes Ditch" which flows to the east and ultimately outfalls to Currituck Sound. Soils across the site consist primarily of loamy sand.

Summary of Proposed Conditions

The Algonquin Subdivision consists of 10 single family residential lots with associated subdivision road and infrastructure. Runoff from the proposed subdivision road, lots, and open spaces will be collected in a series of grassed swales and conveyed to the southwest corner of the property. In the southwest corner, a dry infiltration basin, sized to capture and infiltrate runoff from the 10-year rainfall event, will be installed in order to meet Currituck County's peak flow reduction requirements. This infiltration basin is NOT intended to be an NCDEQ SCM and is not included as a part of the NCDEQ Low Density Stormwater Permit. The total coverage (BUA) proposed is 16.52% impervious coverage.

The entirety of the post-construction runoff resulting from a 10-yr, 24 hr storm event will be retained and infiltrated in the proposed infiltration basin in order to maintain a peak off-site flow rate which does not exceed the 2-yr, 24 hr peak runoff rate for the site in a theoretical wooded pre-development condition. The bulk of the runoff from the post-construction 100-yr, 24 hr storm event will also be retained and infiltrated, with minor overflow resulting in a peak flow rate which does not exceed the actual calculated pre-construction 100-yr, 24 hr peak runoff rate for the site.

Stormwater Collection, Treatment, Storage and Disposal

Although NCDEQ requirements do not dictate the installation of SCM's, an infiltration basin is proposed to meet the requirements of Currituck County's Stormwater Management Ordinance.

Collection

The stormwater runoff will be collected and directed via site grading, limited storm piping, and vegetated swales to the infiltration basin.

Treatment

The proposed infiltration basin will offer several methods of stormwater runoff treatment prior to release. Runoff from developed areas will enter the basin via vegetated swales. The combination of limited, disperse impervious coverage and vegetated conveyances provide the treatment associated with a Low Density Permit and filtration / infiltration within the swale system should be considered the preliminary treatment method for the system. Primary treatment is provided within the infiltration basin due to filtration & biological processes within the soil subsurface of the pond.

Storage

Currituck County's Stormwater Ordinance requires that the runoff rate from the 10-yr, 24-hr rainfall event in the post-construction condition not exceed the pre-construction value from the 2-yr, 24 hr rainfall event across a theoretically wooded site. An EPA SWMM Model was constructed of the subdivision and the pond was configured to meet this storage requirement. Due to the high-infiltration in-situ soils, the results required full capture and infiltration of the runoff from the 10-yr, 24 hr rainfall event (5.74 inch rainfall event).

Disposal

As discussed in previous sections the majority of stormwater runoff entering this management system will be infiltrated, therefore infiltration will be the primary source of disposal. Using a factor of safety of 2.0 and an infiltration rate of 11.27 in/hr (per the soils investigation report), the drawdown time is calculated to be 4.99 hours for the proposed infiltration basin at maximum storage capacity.

In the event that the capacity of the system is exceeded, runoff will overflow the system via an overflow structure located in the southeast end of the basin which will then discharge to Forbes Ditch.

Peak Flow Mitigation

Currituck County's Stormwater Ordinance requires that the runoff rate from the 10-yr, 24-hr storm in the post-construction condition not exceed the runoff rate from the 2-yr, 24-hr storm in the pre-construction, theoretical fully wooded condition. In order to demonstrate compliance and to adequately account for off-site, downstream factors and interconnection of outfalls via internal farm ditches, an EPA SWMM Model was constructed of the entire drainage shed.

Pre-development peak flow was calculated utilizing the NRCS (SCS) Method within EPA SWMM as per the Currituck Stormwater Ordinance. Due to the large number of drainage areas which were individually analyzed, the results are presented in excel spreadsheet format in the Appendix to this narrative rather than on the County's forms. Pre-development & post-development peak flows calculated for points of interest were as follows:

E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

2yr-10yr Analysis (Currituck County Req'mt):

	2yr-10yr Pre* (cfs)	10yr Post (cfs)
E006-E005	2.25	2.25
E012-E011	0.05	0.06**

100yr Analysis (Additional Flow Check):

	100yr Pre (cfs)	100yr Post (cfs)
E006-E005	8.87	8.85
E012-E011	1.48	1.65**

* ”2-yr / 10yr Pre” results reported represent results from the model with the 10-yr rainfall event applied to all off-site drainage areas and the 2-yr rainfall event applied to the Project Site

**Peak flow within existing ditch E010-E009B is marginally increased in the post-construction condition as compared to the pre-construction condition. This is the result of off-site improvements to Indian Kettle Road requested by the County. All runoff from the Project Site that originally flowed to Forbes Road has been re-routed to the proposed infiltration basin in the post-construction condition. Modeled increases in flow at the Forbes Road ditch are marginal and within the capacity of the existing Forbes Road Ditch.

Soils

Information collected on site indicates that the soils found throughout this site are composed primarily of sandy loam. These soil types will have moderately high to high permeability. These findings generally correlate with the description mapped and discussed in the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Currituck County, North Carolina, which map the soil for this site as follows:

CnA – Conetoe loamy sand, Permeability is moderately high to high

No – Nimmo loamy sand, Permeability is moderately high to high

Pt – Portsmouth fine sandy loam, Permeability is very low to moderately high

A soils report has been included in the appendix of this narrative.

Calculations

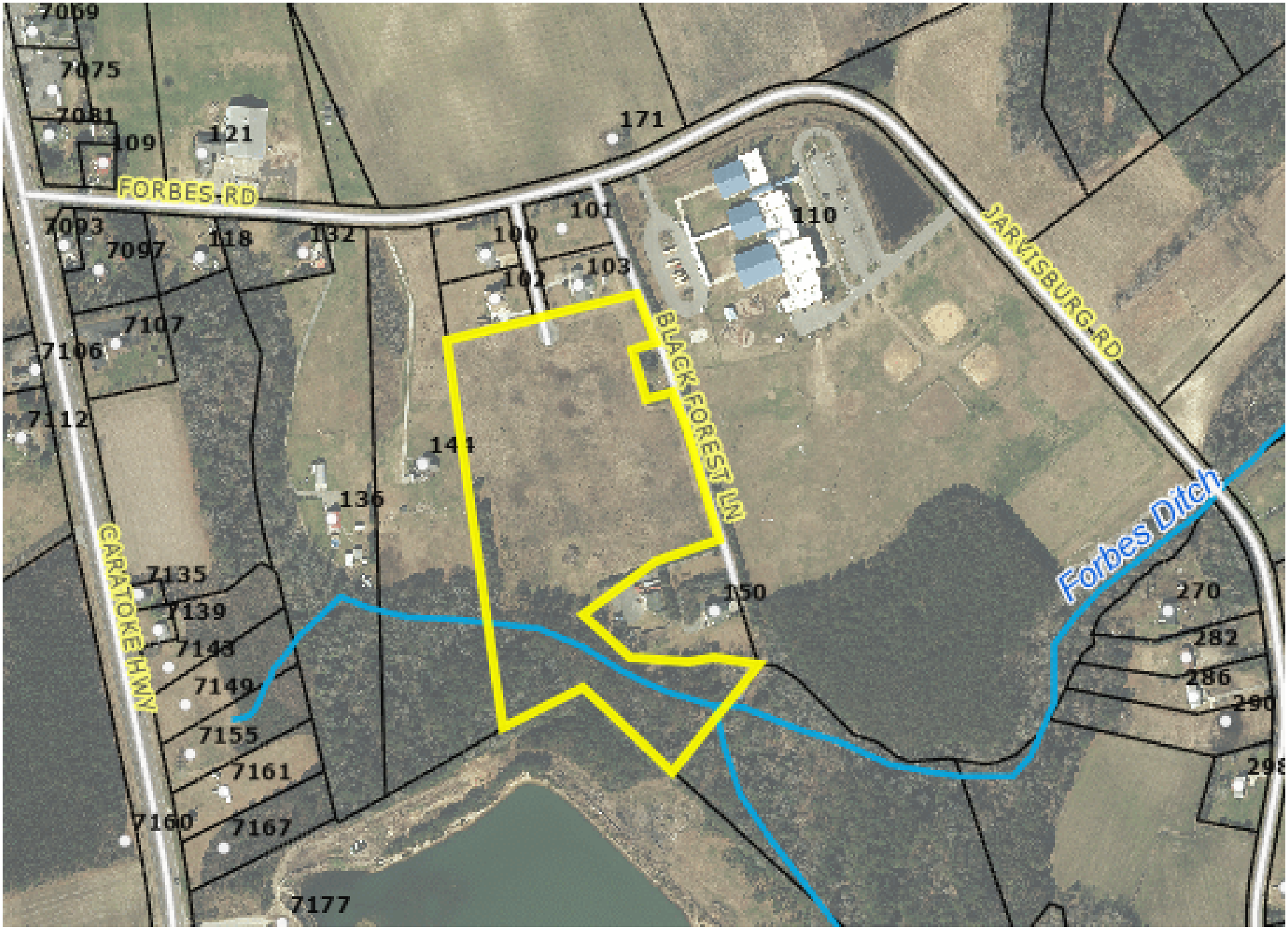
A set of Drainage Area Tabulations & EPA SWMM Model Report can be found within appendix portion of this narrative.

Conclusions

The proposed stormwater management plan for this site will handle the difference in runoff between the pre-development 2-yr, 24hr and the post-development 10-yr, 24 hr storm events, as prescribed by the Currituck County Stormwater Management Ordinance. Additionally, the design mitigates peak flows from the 100-yr, 24 hr storm events.

This proposed design will more than adequately serve the stormwater management requirements of this site.

APPENDIX A
Aerial GIS Imagery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JARVISBURG RD
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BLACK FOREST LN
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Forbes Ditch
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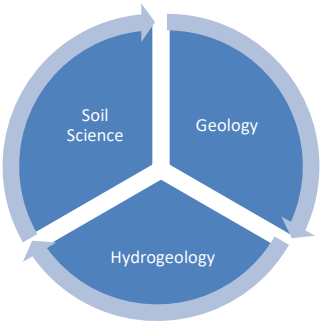
APPENDIX B
Protocol Sampling Soils Report



Protocol Sampling Service, Inc.
"Experts in Environmental Compliance"

4114 Laurel Ridge Drive
Raleigh, North Carolina 27612

(919) 210-6547

Protocolsampling@yahoo.com
Environmentalservicesnc.com

August 27, 2024

Mr. David Klebitz, P.E.
Bissell Professional Group, Inc.
Post Office Box 1068
Kitty Hawk, North Carolina 27949

Re: **Storm Water Management Soil Investigation**
Algonquin Subdivision
Indian Kettle Road
Jarvisburg, Currituck County, North Carolina
Protocol Job No. 24-127

Dear Mr. Klebitz:

The following Soil Investigation is submitted to assist in a site assessment for the proposed storm water management improvements associated with the Algonquin Subdivision along Indian Kettle Road in Jarvisburg, North Carolina. The study area is being considered for one (1) infiltration basin.

SITE HISTORY AND PHYSICAL CHARACTERISTICS

Residential development and the Jarvisburg Elementary School surround the study area. Protocol Sampling Service, Inc. of Raleigh, North Carolina was hired to perform an investigation to identify the depth to seasonal high-water table, if any restrictive layers are present and determine subsurface permeabilities at or slightly below the expected infiltration basin bottom.

SOIL INVESTIGATION

The field survey was conducted on Friday, June 21 and Wednesday, August 21, 2024. Two (2) soil borings were advanced from 48 to 60-inches below land surface (bls) with a hand auger at the proposed basin as shown on the attached exhibit. Soil color was determined with a Munsell Soil Color Chart. The presence of fill or other disturbances, the depth to the seasonal high-water table, soil structure and consistence were noted. The borings were also checked for reduced colors, an anaerobic smell or obvious soil wetness. Surface elevations range from 9.8 feet msl to 10.7 feet msl from south to north across the study area.

FINDINGS - Soil

- The subject property contains soil belonging to the Conetoe and Nimmo series. The Conetoe series is a loamy, mixed, thermic, Arenic Hapludult and the Nimmo coarse loamy over sandy or sandy-skeletal, mixed, thermic Typic Ochraquult.

- The Conetoe series soil was found to have an apparent depth to seasonal high-water table of 50-inches bls in the soil boring No.1 and the Nimmo series soil had an apparent depth to seasonal high-water table of 24-inches bls in the soil boring No.2. Static water levels were found from 72-inches bls in soil boring No.1, and 48-inches in Soil boring No.2.

- No major restrictive horizons were encountered to a depth of 80-inches in any of the soil borings.

FINDINGS - Conductivity

- **HYDRAULIC CONDUCTIVITY TESTING**

- Saturated hydraulic conductivity testing was performed to determine the subsurface permeability in the center of the proposed infiltration basin at the infiltrative elevation of 38-inches bls at a surveyed elevation of 10.70-'msl.

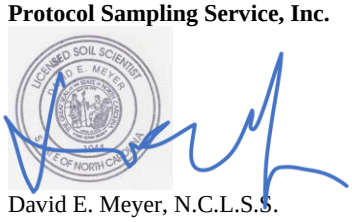
- Saturated hydraulic conductivity can be thought of as the ease with which pores of a saturated soil permit water movement. A common method to measure saturated hydraulic conductivity (K_{SAT}) of the unsaturated zone is by a constant-head well permeameter method (Amoozegar and Mecklenburg, 1999). These K_{SAT} tests take into account soil morphologic factors other than texture, because soil structure and clay mineralogy have been found to have a significant impact on the rate of water movement through soils (Bouma et al., 1983; Schoeneberger et al, 1995, Vepraskas et al, 1996). The Compact Constant Head Permeameter (Amoozemeter) is an example of a constant head permeameter which allows measurements of K_{SAT} in the vadose zone and is widely used in North Carolina and other parts of the country (Amoozegar, 2004; Amoozegar and Mecklenburg, 1999).

- The Ksat was run at an elevation of 7.54'-msl, 12-inches above the seasonal high water table elevation of 6.54'-msl (50-inches bls). The saturated hydraulic conductivity test (Ksat) reached steady state readings within five minutes and three consecutive readings revealed an average conductivity of 11.273 inches/hour. Porosity of the moderately well sorted fine to medium sand ranges from 20-25%.

The findings presented herein are based on the site conditions observed during performance of the field survey on Friday, June 21 and Wednesday, August 21, 2024.

Please call me at (919) 210-6547 if you have any questions or need further assistance.

Sincerely,
Protocol Sampling Service, Inc.



David E. Meyer, N.C.L.S.S.
President

Soil Profile Descriptions

A 0 – 10 inches; dark brown (7.5YR 3/3) loamy fine sand; granular; friable.

E 10 – 24 inches; yellowish brown (10YR 5/4) loamy sand; granular; friable.

Bt 24 – 36 inches; brownish yellow (10YR 6/8) sandy loam; subangular blocky; friable.

BC 36 – 50 inches; brownish yellow (10YR 6/8) and very pale brown (10YR 7/4) loamy sand; subangular blocky; friable. **Ksat 1 (38")**

C1 50 – 60 inches; brownish yellow (10YR 6/8) fine sand with strong brown (7.5YR 5/6) concentrations and gray (10YR 6/1) depletions; single grained; loose

C2 60 – 80 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose

Soil Series: **Conetoe**
Landscape: Coastal Plain
Landform: terrace
Parent Material: Marine sediments
Drainage Class: well drained
Particle Size Class: sandy
Temperature Regime: thermic
Subgroup Classification: Arenic Hapludult
Examination Method: auger boring
Date: June 21, 2024
Weather: Overcast, 78
Investigators: David Meyer
Shwt: 50"
Measured water table depth: 72"

A 0 – 8 inches; dark grayish brown (10YR 4/2) loamy sand; granular; friable.

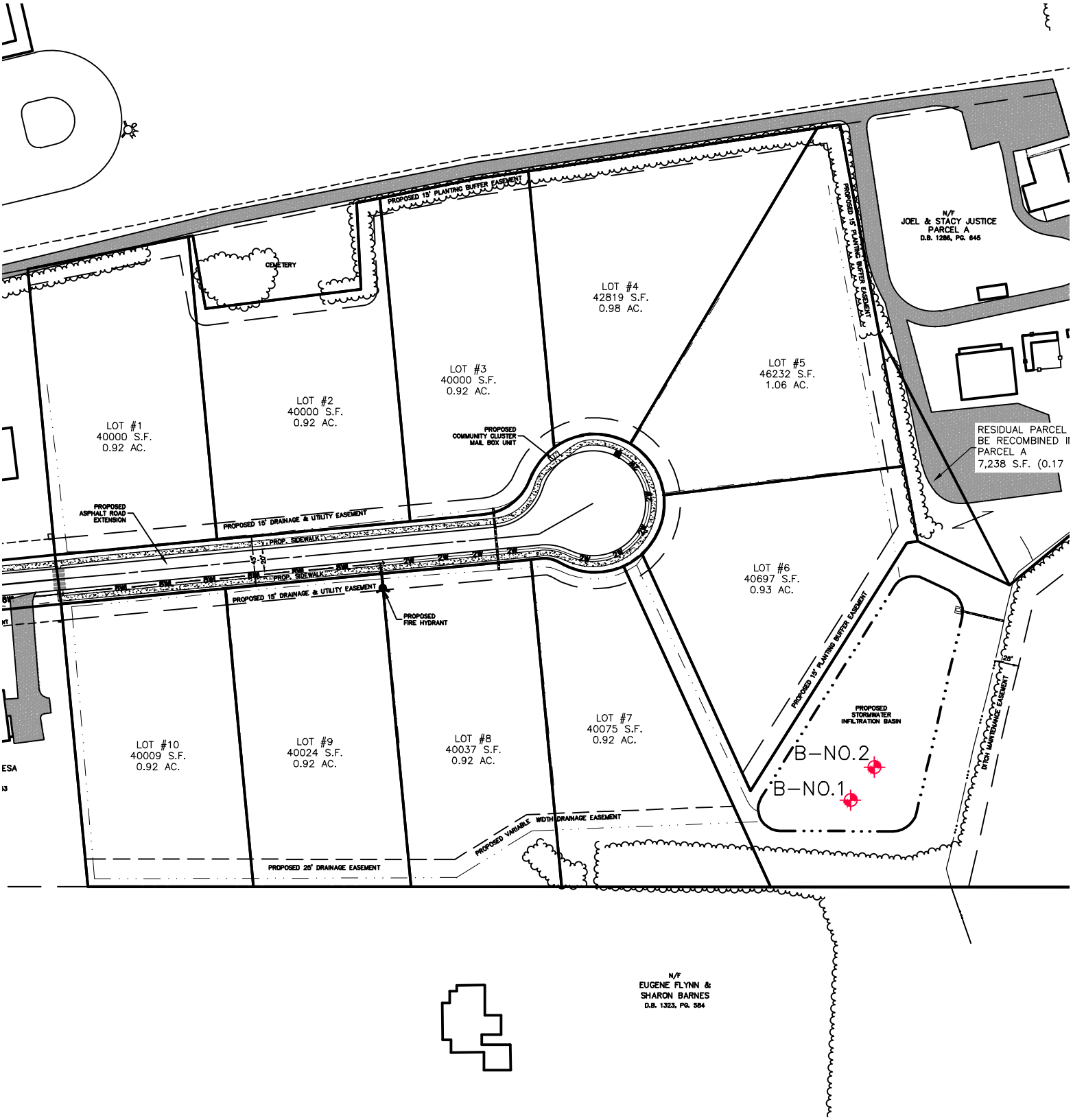
Bt1 8 – 18 inches; light brownish gray (10YR 6/2) loamy sand; granular; friable.

Bt2 18 – 24 inches; gray (10YR 6/1) sandy loam; subangular blocky; friable

C1 24 – 36 inches; light brownish gray (10YR 6/2) sand with strong brown (7.5YR 5/6) concentrations; granular; friable.

C2 36 – 48 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose

Soil Series: **Nimmo**
Landscape: Coastal Plain
Landform: low ridge, depressions
Parent Material: Marine sediments
Drainage Class: moderately well drained
Particle Size Class: coarse loamy
Temperature Regime: thermic
Subgroup Classification: Typic Ochraquult
Examination Method: auger boring
Date: June 21, 2024
Weather: Overcast, 78
Investigators: David Meyer
Shwt: 24"
Measured water table depth: 48"


PROPOSED 15' PLANTING BUFFER EASEMENT
CEMETERY
LOT #1
40000 S.F.
0.92 AC.
LOT #2
40000 S.F.
0.92 AC.
LOT #3
40000 S.F.
0.92 AC.
LOT #4
42819 S.F.
0.98 AC.
LOT #5
46232 S.F.
1.06 AC.
N/F
JOEL & STACY JUSTICE
PARCEL A
D.B. 1286, PG. 645
PROPOSED
COMMUNITY CLUSTER
MAIL BOX UNIT
PROPOSED
ASPHALT ROAD
EXTENSION
PROPOSED 15' DRAINAGE & UTILITY EASEMENT
PROP. SIDEWALK
RESIDUAL PARCEL
BE RECOMBINED I
PARCEL A
7,238 S.F. (0.17
LOT #6
40697 S.F.
0.93 AC.
PROPOSED
FIRE HYDRANT
PROPOSED 15' PLANTING BUFFER EASEMENT
PROPOSED
STORMWATER
INFILTRATION BASIN
B-NO.2
B-NO.1
LOT #10
40009 S.F.
0.92 AC.
LOT #9
40024 S.F.
0.92 AC.
LOT #8
40037 S.F.
0.92 AC.
LOT #7
40075 S.F.
0.92 AC.
PROPOSED VARIABLE WIDTH DRAINAGE EASEMENT
PROPOSED 25' DRAINAGE EASEMENT
DITCH MAINTENANCE EASEMENT
N/F
EUGENE FLYNN &
SHARON BARNES
D.B. 1323, PG. 584

SATURATED HYDRAULIC CONDUCTIVITY STUDY
Algonquin

Date: 8/14/2024
Location: SB-1 Conetoe
Number: Ksat 1
Horizon: C
Depth(inches): 38.0

Weather Condition: sunny
Temperature (F): 85

SET UP

		cm	in
Hole Depth:		96.5	38.0
Reference:	+	10.2	4.0
Head:	-	15.2	6.0
CHT Tube(s) setting:	=	91.4	36.0

	cm	in
Target Water Level:	15.2	6.0
eginning Water Level:	15.2	6.0
Ending Water Level:	15.2	6.0

Hole diameter (d): 5.0 cm
Hole radius (r): 2.5 cm
coefficient A: 0.001136

Valve Setting: x
1-ON 2-ON

NOTE: Readings based on Ending Water Level

Coversion Factor (C.F.): 105.0

Water Reading	Change in Water Leve	Chamber C.F.	Clock Time (min)	Elapsed Time (min)	(hr)	Q (cm3/hr)	K (cm/hr)	K (in/hr)	K gal/ft2/day
41			0.0						
33			2.0						
26	7.0	105.0	4.0	2.00	0.033	22050.0	25.0538	9.8637	147.577
22	4.0	105.0	5.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
19	3.0	105.0	6.0	1.00	0.017	18900.0	21.4747	8.4546	126.494
15	4.0	105.0	7.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
11	4.0	105.0	8.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
7	4.0	105.0	9.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
3	4.0	105.0	10.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
						Final Ksat	**28.633**	**11.273**	**168.659**

APPENDIX C
Drainage Area Tabulations

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-AL-E006

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.00	0	Weighted CN =	39
Woods	A Soils	30	0.00	0		
Open Space	A Soils	39	5.06	220475	Connected Impervious:	
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF	% of DA
	CN SubTotal		5.06	220475	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	5.06	220475	220475

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	705	S=	15.6	Ia=	3.13	312.73
Elev Up	12.8	Lag =	1.0 Hours			
Elev Dn (Inv)	9.05	Tc =	1.6 Hours			
Slope % = Y	0.53	Tc =	98.1 Minutes			
CN =	39					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-AL-E011

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.00	0	Weighted CN =	39
Woods	A Soils	30	0.00	0		
Open Space	A Soils	39	0.32	13996	Connected Impervious:	
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF	% of DA
	CN SubTotal		0.32	13996	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.32	13996	13996

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	150	S=	15.6	Ia=	3.13	93.31
Elev Up	12.3	Lag =	0.4 Hours			
Elev Dn (Inv)	11.9	Tc =	0.7 Hours			
Slope % = Y	0.27	Tc =	40.2 Minutes			
CN =	39					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-AL-E012

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.03	1094	Weighted CN =	60	
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.05	1989	Connected Impervious:		
Farm Fields	A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.07	3083	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.07	3083	3083

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	32	S=	6.7	Ia=	1.34	96.34
Elev Up	12.3	Lag =	0.0 Hours			
Elev Dn (Inv)	11.7	Tc =	0.0 Hours			
Slope % = Y	1.88	Tc =	2.6 Minutes			
CN =	60					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-AL-E013

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.02	833	Weighted CN =	74	
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.01	566	Connected Impervious:		
Farm Fields	A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.03	1399	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.03	1399	1399

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	32	S=	3.5	Ia=	0.70	43.72
Elev Up	12.3	Lag =	0.0 Hours			
Elev Dn (Inv)	11.7	Tc =	0.0 Hours			
Slope % = Y	1.88	Tc =	1.8 Minutes			
CN =	74					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-AL-E014

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.06	2524	Weighted CN = 40
Woods	A Soils	30	0.00	0	
Open Space	A Soils	39	5.83	253749	Connected Impervious:
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		5.88	256273	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 5.88 256273 256273

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	568	S=	15.3	Ia= 3.05	451.18
Elev Up	13.1	Lag =	0.9 Hours		
Elev Dn (Inv)	10.8	Tc =	1.6 Hours		
Slope % = Y	0.40	Tc =	93.1 Minutes		
CN =	40				

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E002

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.19	8360	Weighted CN = 46
Woods	A Soils	30	0.38	16625	
Open Space	A Soils	39	0.86	37622	Connected Impervious:
Woods	B Soils	55	0.31	13618	Area Ac. Area SF % of DA
	CN SubTotal		1.75	76225	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 1.75 76225 76225

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	360	S=	11.6	Ia= 2.31	211.74
Elev Up	12.92	Lag =	0.3 Hours		
Elev Dn (Inv)	9	Tc =	0.5 Hours		
Slope % = Y	1.09	Tc =	32.9 Minutes		
CN =	46				

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E003

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.01	370	Weighted CN =	48
Woods	A Soils	30	0.00	0		
Open Space	A Soils	39	0.14	6005	Connected Impervious:	
Woods	B Soils	55	0.14	5904	Area Ac. Area SF	% of DA
	CN SubTotal		0.28	12279	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.28	12279	12279

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	150	S=	10.6	Ia=	2.13	81.86
Elev Up	11	Lag =	0.1 Hours			
Elev Dn (Inv)	8.2	Tc =	0.2 Hours			
Slope % = Y	1.87	Tc =	11.8 Minutes			
CN =	48					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E004

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.17	7452	Weighted CN =	69
Woods	A Soils	30	0.00	0		
Open Space	A Soils	39	0.10	4147	Connected Impervious:	
Woods	B Soils	55	0.15	6430	Area Ac. Area SF	% of DA
	CN SubTotal		0.41	18029	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.41	18029	18029

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	230	S=	4.5	Ia=	0.89	78.39
Elev Up	12.3	Lag =	0.1 Hours			
Elev Dn (Inv)	8.2	Tc =	0.2 Hours			
Slope % = Y	1.78	Tc =	10.0 Minutes			
CN =	69					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E005

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.35	15392	Weighted CN =	69
Woods	A Soils	30	0.05	1985		
Open Space	A Soils	39	0.19	8402	Connected Impervious:	
Woods	B Soils	55	0.18	7773	Area Ac. Area SF	% of DA
	CN SubTotal		0.77	33552	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.77	33552	33552

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	251	S=	4.4	Ia=	0.89	133.67
Elev Up	12.4	Lag =	0.1 Hours			
Elev Dn (Inv)	8.8	Tc =	0.2 Hours			
Slope % = Y	1.43	Tc =	12.0 Minutes			
CN =	69					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E006

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.13	5764	Weighted CN =	53
Woods	A Soils	30	0.22	9711		
Open Space	A Soils	39	0.16	7050	Connected Impervious:	
Woods	B Soils	55	1.13	49125	Area Ac. Area SF	% of DA
	CN SubTotal		1.64	71650	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	1.64	71650	71650

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	322	S=	8.7	Ia=	1.74	222.52
Elev Up	12	Lag =	0.3 Hours			
Elev Dn (Inv)	10	Tc =	0.6 Hours			
Slope % = Y	0.62	Tc =	33.2 Minutes			
CN =	53					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E007

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	3.75	163514	Weighted CN =	58
Woods	A Soils	30	0.53	23253		
Open Space	A-B Soils Mix	53.2	18.80	818793	Connected Impervious:	
Woods	B Soils	55	17.66	769319	Area Ac. Area SF	% of DA
	CN SubTotal		40.75	1774879	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	40.75	1774879	1774879

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	1860	S=	7.3	Ia=	1.46	954.24
Elev Up	13	Lag =	2.3 Hours			
Elev Dn (Inv)	9.8	Tc =	3.8 Hours			
Slope % = Y	0.17	Tc =	230.4 Minutes			
CN =	58					

Existing Drainage Area Parameters - SCS Method

layiso

Algonquin Ex. Conditions - Actual Conditions

DA-E011

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.17	7308	Weighted CN =	48
Woods	A Soils	30	0.00	0		
Open Space	A Soils	39	0.93	40628	Connected Impervious:	
Woods	B Soils	55	0.00	0	Area Ac. Area SF	% of DA
	CN SubTotal		1.10	47936	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	1.10	47936	47936

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	490	S=	10.8	Ia=	2.17	97.83
Elev Up	13	Lag =	0.7 Hours			
Elev Dn (Inv)	11.3	Tc =	1.2 Hours			
Slope % = Y	0.35	Tc =	71.5 Minutes			
CN =	48					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E012

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.19	8167	Weighted CN =	49
Woods	A Soils	30	0.00	0		

Open Space	A Soils	39	0.93	40396	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		1.11	48563	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
1.11	48563	48563

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	130	S=	10.4	Ia=	2.09	373.56
Elev Up	12.1	Lag =	0.2 Hours			
Elev Dn (Inv)	11.6	Tc =	0.4 Hours			
Slope % = Y	0.38	Tc =	23.0 Minutes			
CN =	49					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E013

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.27	11702	Weighted CN =	55	
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.70	30571	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.97	42273	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
0.97	42273	42273

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	90	S=	8.1	Ia=	1.61	469.70
Elev Up	12.5	Lag =	0.1 Hours			
Elev Dn (Inv)	11.7	Tc =	0.2 Hours			
Slope % = Y	0.89	Tc =	9.6 Minutes			
CN =	55					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E014

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.44	19379	Weighted CN =	42	
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	8.13	354319	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		8.58	373698	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
8.58	373698	373698

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	830	S=	13.8		Ia= 2.76	450.24
Elev Up	12.79	Lag =	1.6	Hours		
Elev Dn (Inv)	11	Tc =	2.7	Hours		
Slope % = Y	0.22	Tc =	161.6	Minutes		
CN =	42					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Actual Conditions

DA-E003A

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 57
Woods	A Soils	30	0.00	0	
Open Space	B Soils	61	0.63	27635	
Woods	B Soils	55	1.15	50059	
	CN SubTotal		1.78	77694	

Connected Impervious:

Area Ac.	Area SF	% of DA
0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
1.78	77694	77694

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	305	S=	7.5		Ia= 1.50	254.73
Elev Up	12	Lag =	0.2	Hours		
Elev Dn (Inv)	9	Tc =	0.4	Hours		
Slope % = Y	0.98	Tc =	23.1	Minutes		
CN =	57					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E006

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.00	0	Weighted CN =	30	
Woods	A Soils	30	5.06	220475			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Farm Fields	A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		5.06	220475	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
5.06	220475	220475

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	705	S=	23.3	Ia=	4.67	312.73
Elev Up	12.8	Lag =	1.3	Hours		
Elev Dn (Inv)	9.05	Tc =	2.1	Hours		
Slope % = Y	0.53	Tc =	128.0	Minutes		
CN =	30					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E011

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.00	0	Weighted CN =	30	
Woods	A Soils	30	0.32	13996			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Farm Fields	A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.32	13996	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
0.32	13996	13996

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	150	S=	23.3	Ia=	4.67	93.31
Elev Up	12.3	Lag =	0.5	Hours		
Elev Dn (Inv)	11.9	Tc =	0.9	Hours		
Slope % = Y	0.27	Tc =	52.4	Minutes		
CN =	30					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E012

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 30
Woods	A Soils	30	0.07	3083	
Open Space	A Soils	39	0.00	0	Connected Impervious:
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.07	3083	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

0.07 3083 3083

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	32	S=	23.3	Ia=	4.67	96.34
Elev Up	12.3	Lag =	0.1 Hours			
Elev Dn (Inv)	11.7	Tc =	0.1 Hours			
Slope % = Y	1.88	Tc =	5.7 Minutes			
CN =	30					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E013

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 30
Woods	A Soils	30	0.03	1399	
Open Space	A Soils	39	0.00	0	Connected Impervious:
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.03	1399	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

0.03 1399 1399

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	32	S=	23.3	Ia=	4.67	43.72
Elev Up	12.3	Lag =	0.1 Hours			
Elev Dn (Inv)	11.7	Tc =	0.1 Hours			
Slope % = Y	1.88	Tc =	5.7 Minutes			
CN =	30					

Existing Drainage Area Parameters - SCS Method

Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E014

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 30
Woods	A Soils	30	5.88	256273	
Open Space	A Soils	39	0.00	0	Connected Impervious:
Farm Fields	A Soils	64	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		5.88	256273	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 5.88 256273 256273

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	568	S=	23.3	Ia=	4.67	451.18
Elev Up	13.1	Lag =	1.2	Hours		
Elev Dn (Inv)	10.8	Tc =	2.1	Hours		
Slope % = Y	0.40	Tc =	123.4	Minutes		
CN =	30					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P001

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.10	4213	Weighted CN =	55
Prop. Lots	A Soils	50.8	0.65	28377		
Open Space	A Soils	39	0.09	4115	Connected Impervious:	
Woods	A Soils	30	0.00	0	Area Ac. Area SF	% of DA
	CN SubTotal		0.84	36705	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
0.84	36705	36705

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	95	S=	8.2	Ia=	1.64	386.37
Elev Up	13.1	Lag =	0.1 Hours			
Elev Dn (Inv)	12.5	Tc =	0.2 Hours			
Slope % = Y	0.63	Tc =	12.0 Minutes			
CN =	55					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P002

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.04	1727	Weighted CN =	54
Prop. Lots	A Soils	50.8	0.45	19490		
Open Space	A Soils	39	0.02	722	Connected Impervious:	
Woods	A Soils	30	0.00	0	Area Ac. Area SF	% of DA
	CN SubTotal		0.50	21939	0.00 0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
0.50	21939	21939

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	95	S=	8.5	Ia=	1.70	230.94
Elev Up	13.1	Lag =	0.1 Hours			
Elev Dn (Inv)	12.5	Tc =	0.2 Hours			
Slope % = Y	0.63	Tc =	12.2 Minutes			
CN =	54					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P003

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.05	2097	Weighted CN = 54
Prop. Lots	A Soils	50.8	0.59	25774	
Open Space	A Soils	39	0.02	1048	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.66	28919	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 0.66 28919 28919

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	95	S=	8.6	Ia= 1.72	304.41
Elev Up	13.1	Lag =	0.1 Hours		
Elev Dn (Inv)	12.5	Tc =	0.2 Hours		
Slope % = Y	0.63	Tc =	12.3 Minutes		
CN =	54				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P004

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.08	3355	Weighted CN = 54
Prop. Lots	A Soils	50.8	0.85	37153	
Open Space	A Soils	39	0.04	1712	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.97	42220	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 0.97 42220 42220

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	95	S=	8.5	Ia= 1.70	444.42
Elev Up	13.1	Lag =	0.1 Hours		
Elev Dn (Inv)	12.5	Tc =	0.2 Hours		
Slope % = Y	0.63	Tc =	12.2 Minutes		
CN =	54				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P005

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 51
Prop. Lots	A Soils	50.8	0.16	7167	
Open Space	A Soils	39	0.00	0	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.16	7167	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 0.16 7167 7167

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	65	S=	9.7	Ia= 1.94	110.26
Elev Up	12.1	Lag =	0.1 Hours		
Elev Dn (Inv)	11	Tc =	0.1 Hours		
Slope % = Y	1.69	Tc =	6.0 Minutes		
CN =	51				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P006

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.08	3650	Weighted CN = 65
Prop. Lots	A Soils	50.8	0.14	6168	
Open Space	A Soils	39	0.03	1197	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		0.25	11015	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 0.25 11015 11015

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	90	S=	5.3	Ia= 1.07	122.39
Elev Up	13.6	Lag =	0.1 Hours		
Elev Dn (Inv)	12.4	Tc =	0.1 Hours		
Slope % = Y	1.33	Tc =	6.1 Minutes		
CN =	65				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P007

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.04	1764	Weighted CN = 52
Prop. Lots	A Soils	50.8	0.96	41894	
Open Space	A Soils	39	0.02	884	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		1.02	44542	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 1.02 44542 44542

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	290	S=	9.1	Ia= 1.81	153.59
Elev Up	12.9	Lag =	0.3 Hours		
Elev Dn (Inv)	11	Tc =	0.5 Hours		
Slope % = Y	0.66	Tc =	30.6 Minutes		
CN =	52				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P008

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.08	3342	Weighted CN = 53
Prop. Lots	A Soils	50.8	1.28	55823	
Open Space	A Soils	39	0.04	1659	Connected Impervious:
Woods	A Soils	30	0.00	0	Area Ac. Area SF % of DA
	CN SubTotal		1.40	60824	0.00 0 0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

Area Ac Area SF

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5) 1.40 60824 60824

Formula: Time of Concentration = 5 / 3 * Lag

					Width:
Length = l	290	S=	8.8	Ia= 1.77	209.74
Elev Up	12.9	Lag =	0.3 Hours		
Elev Dn (Inv)	11	Tc =	0.5 Hours		
Slope % = Y	0.66	Tc =	30.1 Minutes		
CN =	53				

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P009

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.06	2447	Weighted CN = 52
Prop. Lots	A Soils	50.8	1.40	60965	
Open Space	A Soils	39	0.02	968	
Woods	A Soils	30	0.00	0	
	CN SubTotal		1.48	64380	

Connected Impervious:

Area Ac.	Area SF	% of DA
0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
1.48	64380	64380

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	290	S=	9.1	Ia=	1.82	222.00
Elev Up	12.9	Lag =	0.3 Hours			
Elev Dn (Inv)	11	Tc =	0.5 Hours			
Slope % = Y	0.66	Tc =	30.6 Minutes			
CN =	52					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P010

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.00	0	Weighted CN = 51
Prop. Lots	A Soils	50.8	0.63	27253	
Open Space	A Soils	39	0.00	0	
Woods	A Soils	30	0.00	0	
	CN SubTotal		0.63	27253	

Connected Impervious:

Area Ac.	Area SF	% of DA
0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
0.63	27253	27253

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	92	S=	9.7	Ia=	1.94	296.23
Elev Up	12.4	Lag =	0.1 Hours			
Elev Dn (Inv)	11.2	Tc =	0.2 Hours			
Slope % = Y	1.30	Tc =	9.0 Minutes			
CN =	51					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P011

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.00	0	Weighted CN =	51	
Prop. Lots	A Soils	50.8	0.37	15963			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.37	15963	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.37	15963	15963

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	92	S=	9.7	Ia=	1.94	173.51
Elev Up	12.4	Lag =	0.1 Hours			
Elev Dn (Inv)	11.2	Tc =	0.2 Hours			
Slope % = Y	1.30	Tc =	9.0 Minutes			
CN =	51					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P012

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.00	0	Weighted CN =	51	
Prop. Lots	A Soils	50.8	0.44	19092			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.44	19092	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Total Drainage Area:

		Area Ac	Area SF	
Formula:	Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)	0.44	19092	19092

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	80	S=	9.7	Ia=	1.94	238.65
Elev Up	12.9	Lag =	0.1 Hours			
Elev Dn (Inv)	10.9	Tc =	0.1 Hours			
Slope % = Y	2.50	Tc =	5.8 Minutes			
CN =	51					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-P013

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.00	0	Weighted CN =	51	
Prop. Lots	A Soils	50.8	0.56	24195			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.56	24195	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
0.56	24195	24195

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	80	S=	9.7	Ia=	1.94	302.44
Elev Up	12.9	Lag =	0.1 Hours			
Elev Dn (Inv)	10.9	Tc =	0.1 Hours			
Slope % = Y	2.50	Tc =	5.8 Minutes			
CN =	51					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

DA-Pond1

		CN	Area Ac.	Area SF			
Permanent Pool - Water		98	0.00	0	Weighted CN =	42	
Prop. Lots	A Soils	50.8	0.80	34950			
Open Space	A Soils	39	1.03	44677	Connected Impervious:		
Woods	A Soils	30	0.26	11383	Area Ac.	Area SF	% of DA
	CN SubTotal		2.09	91010	0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:		
Area Ac	Area SF	
2.09	91010	91010

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	90	S=	13.6	Ia=	2.72	1011.22
Elev Up	12.5	Lag =	0.1 Hours			
Elev Dn (Inv)	11.7	Tc =	0.2 Hours			
Slope % = Y	0.89	Tc =	13.3 Minutes			
CN =	42					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

REVISED - E012

		CN	Area Ac.	Area SF		
Impervious - Disconnected		98	0.23	9985	Weighted CN =	51

Woods	A Soils	30	0.00	0
Open Space	A Soils	39	0.89	38578
Woods	B Soils	55	0.00	0
	CN SubTotal		1.11	48563

Connected Impervious:

Area Ac.	Area SF	% of DA
0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
1.11	48563	48563

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	130	S=	9.6		Ia= 1.91	373.56
Elev Up	12.1	Lag =	0.2	Hours		
Elev Dn (Inv)	11.6	Tc =	0.4	Hours		
Slope % = Y	0.38	Tc =	21.7	Minutes		
CN =	51					

Proposed Drainage Area Parameters - SCS Method

Algonquin Prop. Conditions

REVISED - E013

		CN	Area Ac.	Area SF	
Impervious - Disconnected		98	0.28	12348	Weighted CN = 56
Woods	A Soils	30	0.00	0	
Open Space	A Soils	39	0.69	29925	
Woods	B Soils	55	0.00	0	
	CN SubTotal		0.97	42273	

Connected Impervious:

Area Ac.	Area SF	% of DA
0.00	0	0.00

Formula: Potential Max Retention S = (1000 / CN) - 10

Formula: Lag = [(l^0.8) * (S+1)^0.7] / 1900* (Y^0.5)

Total Drainage Area:

Area Ac	Area SF	
0.97	42273	42273

Formula: Time of Concentration = 5 / 3 * Lag

						Width:
Length = l	90	S=	7.8		Ia= 1.56	469.70
Elev Up	12.5	Lag =	0.1	Hours		
Elev Dn (Inv)	11.7	Tc =	0.2	Hours		
Slope % = Y	0.89	Tc =	9.3	Minutes		
CN =	56					

APPENDIX D
EPA SWMM Model Report

EPA SWMM Model Report

Algonquin Subdivision – Residential Subdivision
Jarvisburg, Currituck County
October 2, 2024

General

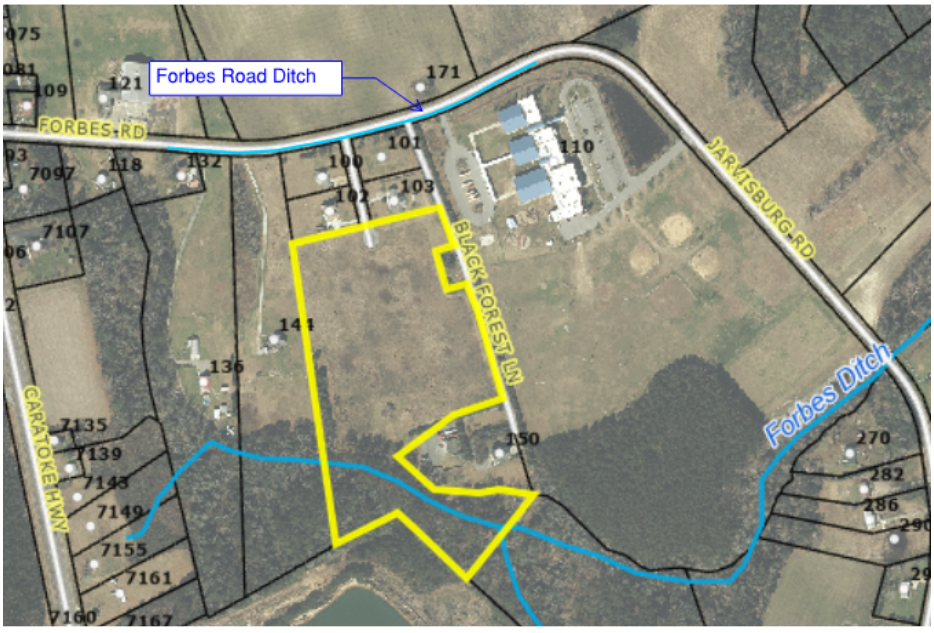
The following report will detail the EPA SWMM Model which was constructed & analyzed in order to provide design guidance for the stormwater management systems to be installed with the construction of the proposed Algonquin residential subdivision in Jarvisburg, NC.

The Project Site

The Algonquin Subdivision project is a proposed Residential Subdivision to be located on a (+/-) 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The project will be limited to a maximum of 16.52% Built-Upon-Area (BUA) and, accordingly, an NCDEQ Low Density Stormwater Permit is being pursued for this Project.

The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in "Forbes Ditch" which flows to the east and ultimately outfalls to Currituck Sound. Soils across the site consist primarily of loamy sand.

The Algonquin Subdivision consists of 10 single family residential lots with associated subdivision road and infrastructure. Runoff from the proposed subdivision road, lots, and open spaces will be collected in a series of grassed swales and conveyed to the southwest corner of the property. In the southwest corner, a dry infiltration basin, sized to capture and infiltrate runoff from the 10-year rainfall event, will be installed in order to meet Currituck County's peak flow reduction requirements. This infiltration basin is NOT intended to be an NCDEQ SCM and is not included as a part of the NCDEQ Low Density Stormwater Permit. .



Plans which accompany this submittal are schematic in nature and are intended to provide guidance in how the SWMM Model was constructed. A separate submission of detailed Construction Plans will be submitted for Currituck County Construction Plans review.

Target Design Standards

Post-construction runoff resulting from a 10-yr, 24 hr storm event will be retained and released at a peak flow rate which does not exceed the 2-yr, 24 hr peak runoff rate for the site in a theoretical wooded pre-development condition. Post-construction runoff resulting from a 100-yr, 24 hr storm event will be retained and released at a peak flow rate which does not exceed the actual calculated pre-construction 100-yr, 24 hr peak runoff rate for the site.

Pre-development peak flow was calculated utilizing the NRCS (SCS) Method as incorporated into EPA SWMM software. Two existing ditches were identified and analyzed as control links. Pre-development (target) peak flows calculated for the links of interest are as follows:

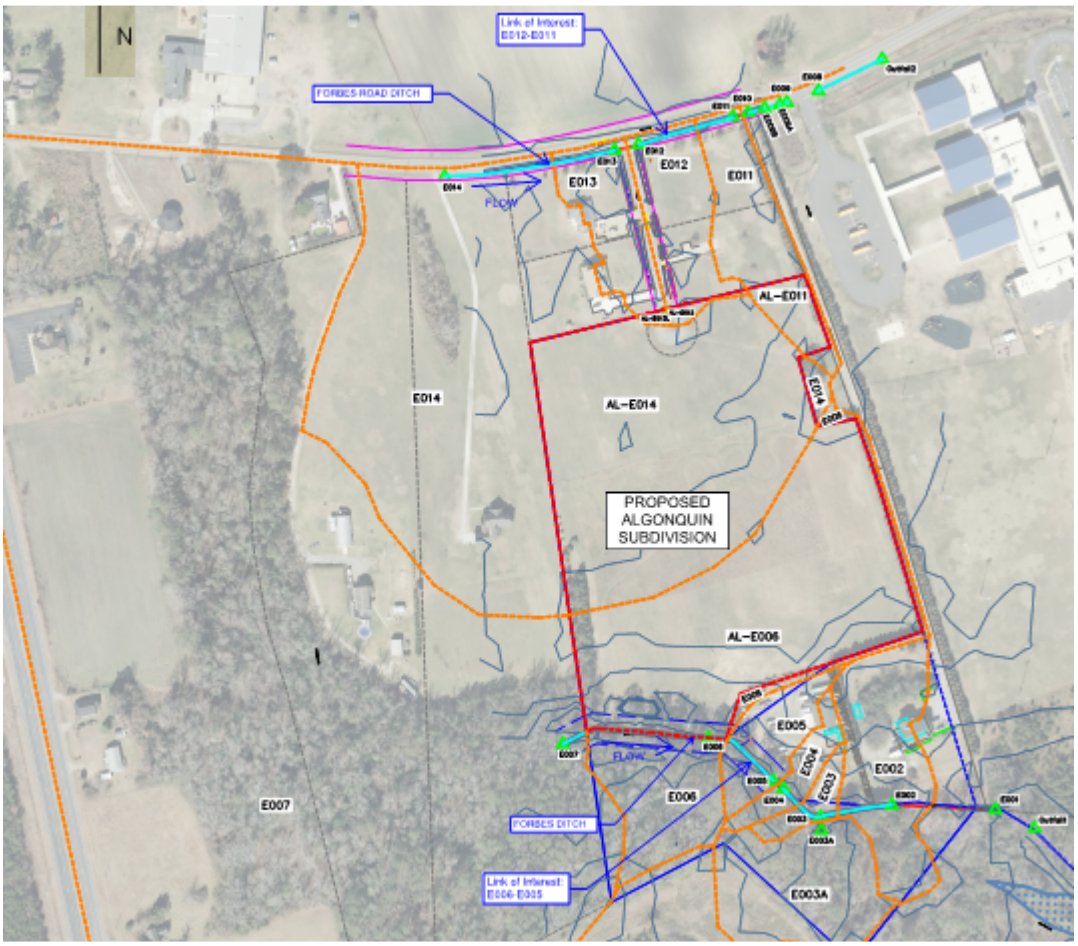
E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

2yr-10yr Analysis (Currituck County Req'mt):

	2yr-10yr Pre (cfs)
E006-E005	2.25
E012-E011	0.05

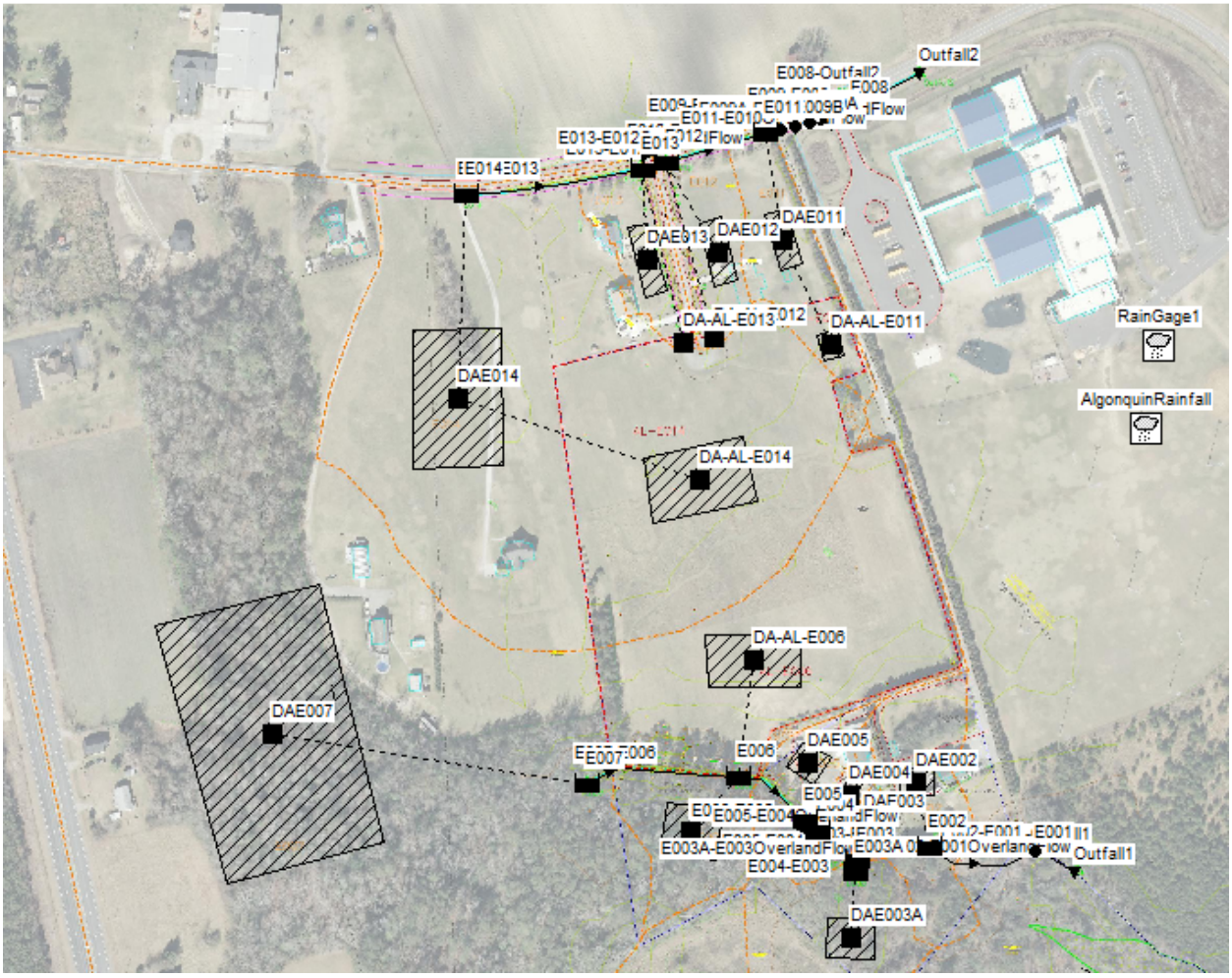
EPA SWMM Model (Ex. Conditions Aerial Schematic):

Electronic (readable) Copy enclosed with this submission



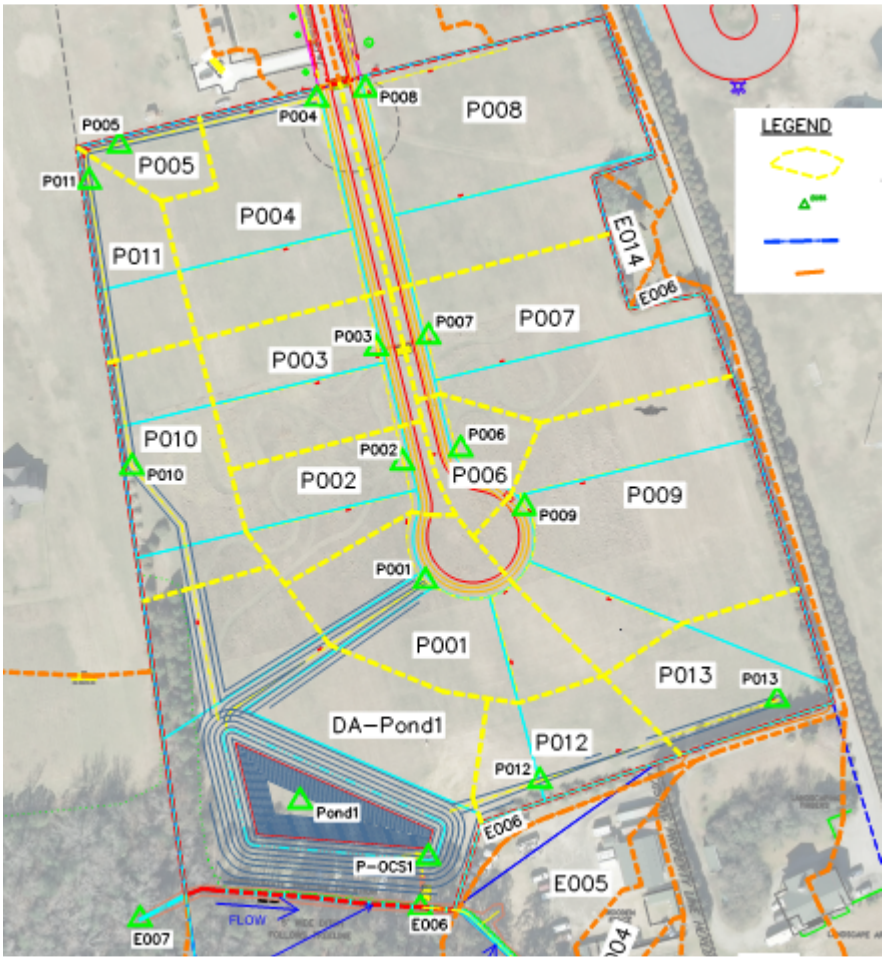
EPA SWMM Model (Ex. Conditions Graphical Model):

Electronic Copy enclosed with this submission



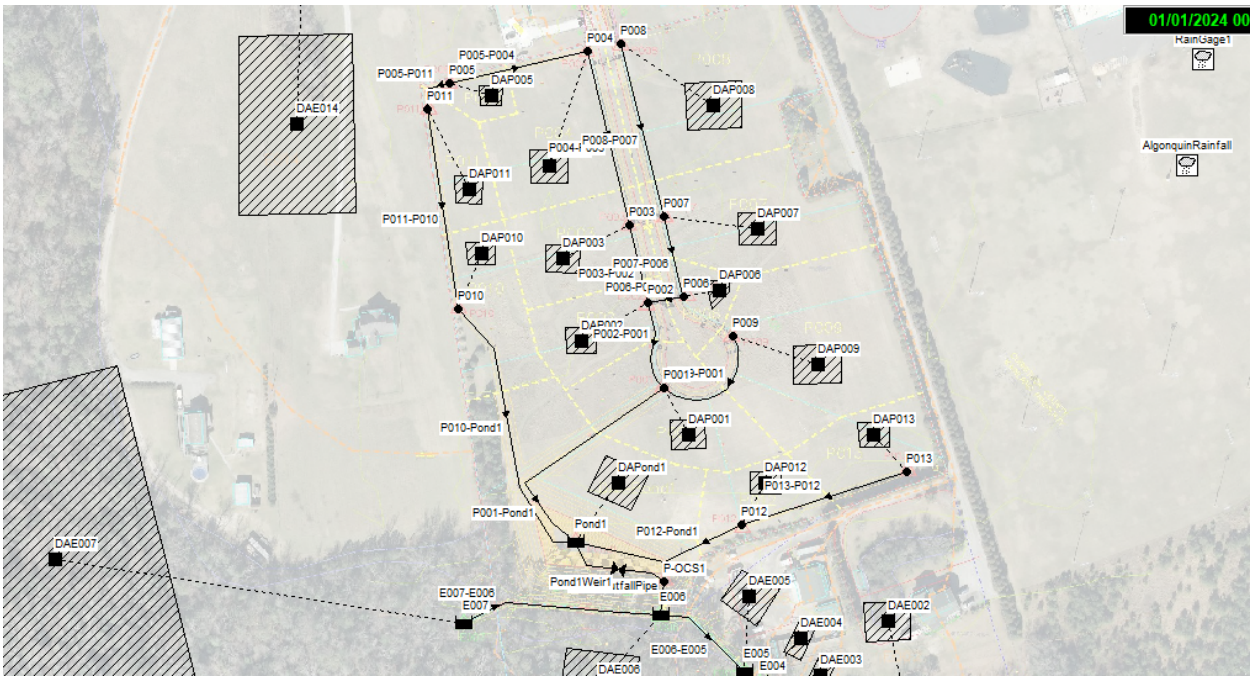
EPA SWMM Model (Prop. Conditions Aerial Schematic):

Full-Size (readable) Copy enclosed with this submission



EPA SWMM Model (Prop. Conditions Graphical Model):

Electronic Copy enclosed with this submission



Model Hydrology

Runoff was modeled utilizing the NRCS (SCS) Method for the 2-yr, 10-yr, and 100-yr, 24-hour storm events. NRCS standard Type III (coastal) rainfall distributions were utilized with total rainfall depths of:

2yr, 24hr Total Rainfall Depth = 3.74 in. (Currituck County Standard)
10yr, 24 hr Total Rainfall Depth = 5.74 in. (NOAA Atlas 14)
100yr, 24 hr Total Rainfall Depth = 9.54 in. (NOAA Atlas 14)

Runoff was routed through the model utilizing a Dynamic Wave method.

Model Elements

Model Elements input data is included in the electronic files accompanying this narrative.

Methodology

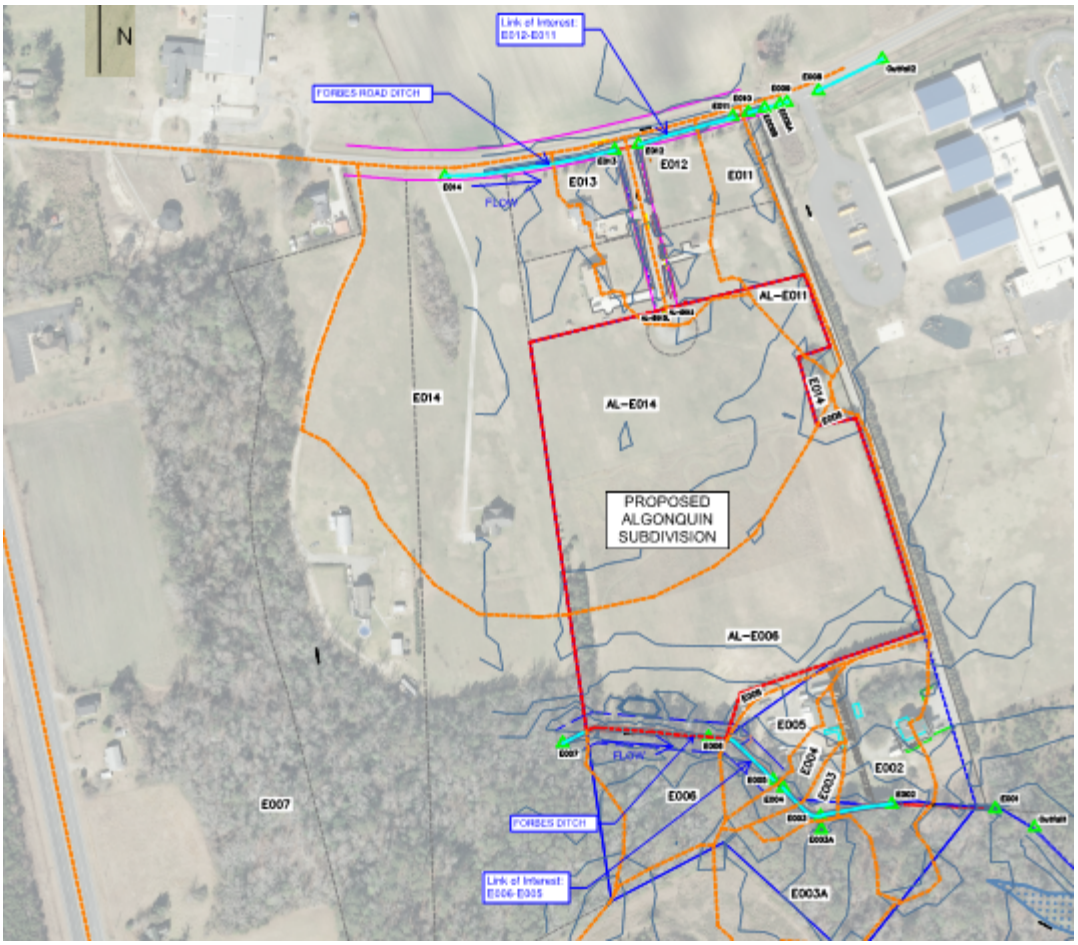
In an examination of the drainage shed, two Links of Interest (LOI) within the drainage system were identified:

E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in "Forbes Ditch" which flows to the east and ultimately outfalls to Currituck Sound.

All contributing drainage areas flowing to the two outlets were analyzed and the proposed Project Area was segregated from off-site areas so that on-site conditions can be changed for the pre- / post- construction analysis. LOI were identified at locations within the existing drainage system immediately downstream of the Project Area. These LOI were utilized as the "comparison locations" to analyze the effectiveness of the system design in mitigating post-construction flows to pre-construction levels.

Off-site drainage areas were included in the analysis so that tailwater effects at the outfalls can be properly accounted for in the model.



The Post-Construction design collects runoff from the proposed subdivision road, lots, and open spaces in a series of grassed swales and conveys it to the southwest corner of the property, where a dry infiltration basin, sized to capture and infiltrate runoff from the entirety of the 10-year rainfall event, is proposed.

Existing and Proposed Conditions models were run to generate Peak Flow results for the 2-yr, 10-yr, and 100-yr, 24 hr rainfall events. An overflow weir structure was then designed to allow small overflow from the 100-yr rainfall event in order to restrict the post-construction flows in Forbes Ditch below the pre-construction rate for the 100-yr rainfall event.

The overflow weir is configured as follows:

Pond	**Outfall**	**Weir Configuration**
Pond 1*	Forbes Ditch	20' weir @ Elev. 11.4'

*Note: The dry infiltration basin is identified as "Pond 1" in the model – the original modeling assumed that this feature would be a wet pond. During the design process, the wet pond that was originally modeled was converted to a dry infiltration basin but the naming convention was not changed. Therefore, "Pond 1" is a dry infiltration basin.

Results:

A complete tabulation of flow & velocity results for the proposed project can be found in the Appendix to the Stormwater Narrative. Summary results pertaining to the design and Currituck County Compliance are as follows:

Peak Flow Mitigation Results:

2-yr / 10-yr Rainfall Peak Flow Mitigation:

	2yr-10yr Pre* (cfs)	10yr Post (cfs)
E006-E005	2.25	2.25
E012-E011	0.05	0.06**

100-yr Rainfall Peak Flow Mitigation:

	100yr Pre (cfs)	100yr Post (cfs)
E006-E005	8.87	8.85
E012-E011	1.48	1.65**

* ”2-yr / 10yr Pre” results reported represent results from the model with the 10-yr rainfall event applied to all off-site drainage areas and the 2-yr rainfall event applied to the Project Site

**Peak flow within existing ditch E010-E009B is marginally increased in the post-construction condition as compared to the pre-construction condition. This is the result of off-site improvements to Indian Kettle Road requested by the County. All runoff from the Project Site that originally flowed to Forbes Road has been re-routed to the proposed infiltration basin in the post-construction condition. Modeled increases in flow at the Forbes Road ditch are marginal and within the capacity of the existing Forbes Road Ditch.

Infiltration Basin Drawdown:

Note: Infiltration within the dry infiltration basin was not modeled in EPA SWMM. In the model, the basin simply fills up and the water is trapped. Infiltration basin draw-down calculations, using NCDEQ SCM Manual methodology, are provided below.

Algonquin Subdivision - Jarvisburg
High Density Infiltration Basin Calculations
9/25/2024

DA1 Infiltration Basin

Above Grade Storage					
SHWT @:	6.54				
Bottom Basin @	9.5				
Top Storage @	11.5				
Elev:	Area (sf)	Avg Area	Vol	Sum Vol (cf)	
9.5	24734			0	
		25762	12881		
10.0	26790			12881	(Total)
		28931	28931		
11.0	31072			41812	
		32185	16093		
11.5	33298			**57905**	
		(Almost complete capture of 100-yr storm)			

Algonquin Subdivision
Infiltration System Dewatering (drawdown) Calculations
9/25/2024

Per SCM Manual:

T=FS x (Dv x 12)/(K x SA)

T = dewatering time (hrs)			
FS = factor of safety (use 2.0)		2	
Dv = design volume (cf)	(use Maximum Volume Stored instead)		
K = hydraulic conductivity of soil (in/hr) =		11.27	in/hr
SA = surface area of bottom of infil system (sf)			

Drainage Area 1 - Infiltration Basin

Actual Max Volume=	57905	cf
Surface Area =	24734	sf
T=	4.99	hrs
T=	0.21	days

Conclusions:

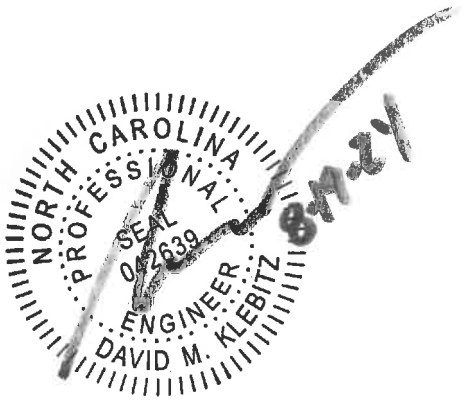
SWMM Modeling of the entire Algonquin Subdivision drainage shed demonstrates that the proposed design complies with the Currituck County Stormwater Ordinance requirement that Post-Development peak flow from the 10-yr, 24 hr rainfall event be maintained at or below the Pre-Development peak flow from a 2-yr, 24hr rainfall event across a theoretical wooded site. The proposed design also reduces post-development peak flow below the pre-development peak flow for the 100-yr, 24 hr rainfall event for the primary outfall (Forbes Ditch) and maintains the 100-yr flows in the Forbes Road Ditch within the ditch's current capacity.

APPENDIX E
SESCP Flow & Velocities Check

APPENDIX I – SEDIMENTATION & EROSION CONTROL CALCULATIONS

Calculations Include the Following:

- **EROSIVE VELOCITY CHECKS**
- **SEDIMENT BASIN CALCULATIONS**
- **EROSION CONTROL SKIMMER CALCULATIONS**



EROSIVE VELOCITY CHECK

Calculations Include the Following:

- 2 Year, Bare Soil Condition; 2 fps Max Velocity
- 10 Year, Vegetated Condition; 4 fps Max Velocity

Note:
This check is performed by highlighting respective summaries of conveyances that exceed maximum permissible velocities as determined by EPA SWMM modeling performed by Deel Engineering, PLLC.

2 YEAR, BARE SOIL CONDITION; 2 FPS MAX VELOCITY

Link Flow and Velocity - 2yr			Velocity Check
Link	Flow (cfs)	Velocity (fps)	Bare Soil > 2 fps
P001-Pond1	0.02	0.24	OK
P002-P001	0.02	0.27	OK
P003-P002	0.00	0.07	OK
P004-P003	0.00	0.00	OK
P005-P004	0.00	0.00	OK
P005-P011	0.00	0.00	OK
P006-P002	0.02	0.41	OK
P007-P006	0.00	0.07	OK
P008-P007	0.00	0.00	OK
P009-P001	0.00	0.00	OK
P010-Pond1	0.00	0.00	OK
P011-P010	0.00	0.00	OK
P012-Pond1	0.00	0.00	OK
P013-P012	0.00	0.00	OK
Pond1OutfallPipe	0.00	0.00	OK

*Estimated peak flows and velocities per EPA SWMM calculations prepared by Deel Engineering, PLLC.

10 YEAR, VEGETATED CONDITION; 4 FPS MAX VELOCITY

Link Flow and Velocity - 10yr		
Link	Flow (cfs)	Velocity (fps)
P001-Pond1	0.39	0.59
P002-P001	0.29	0.55
P003-P002	0.15	0.32
P004-P003	0.09	0.29
P005-P004	0.01	0.06
P005-P011	0.00	0.08
P006-P002	0.19	1.01
P007-P006	0.12	0.31
P008-P007	0.08	0.30
P009-P001	0.07	0.22
P010-Pond1	0.04	0.28
P011-P010	0.01	0.10
P012-Pond1	0.04	0.52
P013-P012	0.02	0.22
Pond1OutfallPipe	0.01	0.20

Velocity Check
Vegetated > 4 fps
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK

*Estimated peak flows and velocities per EPA SWMM calculations prepared by Deel Engineering, PLLC.

SEDIMENT BASIN CALCULATIONS

Algonquin
Resdential Subdvision

Sediment Basin
Calculations

8/19/2024

Sediment Basin A

Requirements			
*Tributary Disturbed Area**	11.00	*acres*	
Min. Required Storage Volume	19,800	ft^3	*(1,800 ft^3 /acre)*
*Estimated 10 year peak inflow***	0.43	*cfs*	
Min. Required Surface Area	187	ft^2	*(435 ft^2 /cfs)*
Design			
Choose Avg. Storage Depth	2.0	*ft*	
Necessary Storage Surface Area	9,900	ft^2	
Is Necessary Surface Area > Required	YES		
Choose Storage Width	100	*ft*	
Choose Storage Length	260	*ft*	
Length to Width Ratio	**2.6**	***OK***	
Surface Area Provided	**24,790**	ft^2	*132.5* ***times required***
Is Surface Area Provided > Required	YES		
Storage Volume Provided	**58,079**	ft^3	
Is Storage Volume Provided > Required	YES		*2.9* ***times required***

* Tributary Disturbed Area from Autocad
** Estimated 10 year peak flows per EPA SWMM calculations prepared by Deel Engineering, PLLC.

EROSION CONTROL SKIMMER CALCULATIONS

Algonquin
Residential Subdivision

Erosion Control Skimmer Calculations

8/19/2024

Sediment Basin A - Skimmer A

Drawdown Period [t_d]	2.00	*days*		
Drawdown Volume (Temp. pool) [V]	19,800	*ft^3*		
Drawdown Discharge Rate [Q_d]	9,900	*ft^3/day*	*0.11*	*cfs*
Choose Skimmer Body Diameter	4.0	*in.*	*1.31*	*fps*
Head on Orifice from Table [H]	0.333	*ft.*		
Resulting Orifice Diameter [D]	**2.7**	*in.*		
Is Orifice Diameter < Skimmer Body Diameter	**YES**			

Head on orifice of various skimmer sizes

Skimmer Size (in.)	Head on Orifice (ft.)
1.5	0.125
2	0.167
2.5	0.208
3	0.250
4	*0.333*
5	*0.333*
6	*0.417*
8	*0.500*

Table 6.64a NC Erosion Control Manual

Equations:

$Q_d = V / t_d$ (ft^3/day)

$D = \sqrt{[Q_d/(2310*\sqrt{H})]}$ (inches)

Drawdown volumes based on Min.Required per speparate Sediment Basin Calculation.

ALGONQUIN SUBDIVISION

EXISTING CONDITIONS
EPA SWMM MODEL EXHIBIT
DRAINAGE AREA, NODE & LINK LAYOUT

LEGEND

DRAINAGE AREA
(MULTIPLE COLORS)

E055
EPA SWMM NODE
(MULTIPLE COLORS)

EPA SWMM LINK (DITCH)

EPA SWMM LINK (PIPE)

N

Link of Interest:
E012-E011

FORBES ROAD DITCH

E014

FLOW

E013

E012

E011

E010

E009

E008

E009B

E009A

Outfall2

AL-E013L

AL-E012

AL-E011

E014

AL-E014

E006

PROPOSED
ALGONQUIN
SUBDIVISION

AL-E006

E007

FLOW

E006

E005

E004

E003

E002

E001

E003A

Outfall1

FORBES DITCH

Link of Interest:
E006-E005

E007

DEEL ENGINEERING, PLLC
P.O. BOX 3901
KILL DEVIL HILLS, NC 27948
(252)202-3803

SCALE: 1'=100'
10/2/2024

SHEET 1 OF 1

ALGONQUIN SUBDIVISION

PROPOSED CONDITIONS
EPA SWMM MODEL EXHIBIT
DRAINAGE AREA, NODE & LINK LAYOUT

Link of Interest:
E012-E011

FORBES ROAD DITCH

FLOW

Outfall2

E008

E009

E010

E011

E012

E013

E014

N

P008

P004

P005

P011

P010

P003

P007

P006

P002

P009

P001

P013

P012

DA–Pond1

Pond1

P–OCS1

E007

E006

E005

E004

E003

E003A

E002

E001

Outfall1

LEGEND

DRAINAGE AREA
(MULTIPLE COLORS)

E055
EPA SWMM NODE
(MULTIPLE COLORS)

EPA SWMM LINK (DITCH)

EPA SWMM LINK (PIPE)

INFILTRATION BASIN
OVERFLOW

FORBES DITCH

Link of Interest:
E006-E005

APPROXIMATE TREELINE LOCATION

5' WIDE DITCH
FOLLOWS TREELINE

EXISTING PROPERTY LINE HEREBY VACATED

CURRITUCK COUNTY
MAINLAND PROPERTY
D.B. 283, PG. 865 P.C. K, SL. 187

LANDSCAPING TIMBERS

WOODEN FENCE

LANDSCAPE AREA

DEEL ENGINEERING, PLLC
P.O. BOX 3901
KILL DEVIL HILLS, NC 27948
(252)202-3803

SCALE: 1'=60'
10/2/2024

SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

November 26, 2024

Joel K. & Stacy A. Justice
P.O. Box 208
Grandy, NC 27939

-AND-

Currituck County
153 Courthouse Rd
Currituck, NC 27929

County: Currituck

Subject: Encroachment to allow the installation of a water distribution system extension under SR1118

Dear Applicant,

Attached for your records is a copy of the approved encroachment package to allow the installation of a water distribution system extension under SR1118, to serve Algonquin on Indian Kettle Road. **Any and all damages done to State Routes must be properly repaired.** This approval will expire on November 26, 2025, unless construction has started or been completed prior to that date.

Please feel free to contact the District Office at (252) 621-6400 if you have any questions.

Sincerely yours,

DocuSigned by:
Caitlin A Spear
930880FAC40F45A...

Caitlin A. Spear, PE
District Engineer

Attachments
Cc: Division Engineer (W/Attachments)
County Maintenance Engineer (W/Attachments)

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION ONE – DISTRICT ONE
1929 NORTH ROAD STREET
ELIZABETH CITY, NC 27909

Telephone: (252) 621-6400
Fax: (252) 621-6410
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
1929 NORTH ROAD STREET
ELIZABETH CITY, NC 27909

Pre-Construction

Contact Offices & Outside Agency issues / Contacts / Info.

1. Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the encroachment agreement.

2. The Encroaching party or their contractor shall provide the following notices prior to construction activity within the NCDOT Right of Way:
   a. Three (3) business days advance phone call at telephone (252) 621-6400 or email to caspear@ncdot.gov to the District Engineer's office
   b. If the construction falls within the limits of an NCDOT managed construction project, five (5) business days advance phone call to the Resident Engineer, Mr. Brandon Tatum at (252) 621-6400 or email to bjtatum@ncdot.gov.

   Failure to provide these notifications prior to beginning construction is subject to the Division Engineer's discretion to cease construction activity for this encroachment. NCDOT reserves the right to cease any construction or maintenance work associated with this installation by the encroaching party until the construction or maintenance meets the satisfaction of the Division Engineer or their representative.

3. Prior to beginning work, it is the requirement of the Encroaching Party to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.

4. It shall be the responsibility of the encroaching party to determine the location of utilities within the encroachment area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The encroaching party shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.

5. The encroaching party shall notify the appropriate municipal office prior to beginning any work within the municipality's limits of jurisdiction.

6. Excavation within 1000 feet of a signalized intersection will require notification by the encroaching party to the Division Traffic Engineer at telephone number (252) 482-1857 no less than one week prior to beginning work. All traffic signal or detection cables must be located prior to excavation. Cost to replace or repair NCDOT signs, signals, pavement markings or associated equipment and facilities shall be the responsibility of the encroaching party.

7. At the option of the District Engineer, a preconstruction meeting including representatives of NCDOT, the encroaching party, contractors and municipality, if applicable, shall be required. A pre-construction conference held between a municipality (or other facility owner) and a contractor without the presence of NCDOT personnel with subsequent construction commencing may be subject to NCDOT personnel ceasing any work on NCDOT right-of-way related to this encroachment until such meeting is held. Contact the District office to schedule.

8. At the discretion of the District Engineer, a NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W form (See corresponding attachment) with the scheduled pre-construction meeting and associated construction schedule details must be completed and submitted to the District Engineer's office a minimum of one week prior to construction.

9. At the discretion of the District Engineer, the encroaching party (not the utility contractor) shall make arrangements to have a qualified inspector, under the supervision of a Professional Engineer registered in North Carolina, on site at all times during construction. The registered Professional Engineer shall be required to submit a signed and PE sealed certification that the utility was installed in accordance with the encroachment agreement.

Legal & Right-of-Way Issues

10. This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the Division Engineer's office or their representative prior to construction or during construction if an issue arises during construction to warrant changes.

11. NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the encroaching party to verify the right of way.

12. Encroaching party shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.

13. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with proof of dedication furnished to the District Engineer prior to beginning work.

14. No commercial advertising shall be allowed within NCDOT Right of Way.

15. The encroaching party shall obtain proper approval from all affected pole owners prior to attachment to any pole.

16. This agreement does not authorize installations within nor encroachment onto railroad rights of way. Permits for installations within railroad right of way must be obtained from the railroad and are the responsibility of the encroaching party.

Work Zone Traffic

17. Traffic control shall be coordinated with the District Engineer and the Division Traffic Engineer at telephone (252) 621-6400, prior to construction.

18. WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

    All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

    All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

    All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this

certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

19. The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:
    a. Manual on Uniform Traffic Control Devices (MUTCD) – North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).
    b. NCDOT Maintenance / Utility Traffic Control Guidelines – This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.

20. If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.

21. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.

22. Traffic shall be maintained at all times. All lanes of traffic are to be open during the hours of 7:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M. Monday through Friday, during any time of inclement weather, **or as directed by the District Engineer**. If the location of work calls for a rolling roadblock on a divided highway for US routes, the restriction is to work only on Sunday from 1:00 A.M. to 10:00 A.M, **or as Directed by the District Engineer**. Any violation of these hours will result in ceasing any further construction by the Encroaching Party or their contractor.

23. Nighttime and weekend operations will NOT be allowed unless written approval is received from the District Engineer. If nighttime or weekend work is allowed or required, all signs must be retro-reflective, and a work zone lighting plan must be submitted for approval prior to construction.

24. Two-way traffic shall be maintained at all times unless designated by the District Engineer. Traffic shall not be rerouted or detoured without the prior written approval from the District Engineer. No utility work will be allowed on state holidays from 7:00 PM the night before through 9:00 AM the day prior to, following or during local events without prior approval from the District Engineer. If the construction is within 1000 feet of a school location or on a designated bus route, the construction shall be coordinated with the school start and end times to avoid traffic delays.

25. Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.

26. Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current *NCDOT Roadway Standard Drawings or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.*

27. At the discretion of the District Engineer, a traffic control plan shall be developed and submitted under the seal and signature of a Licensed North Carolina Professional Engineer prior to construction. The plan shall be specific to the site and adequately detailed. Issues such as the close proximity to intersections shall be addressed.

28. Temporary and final pavement markings are the responsibility of the encroaching party. Final pavement markings and sign plans shall be submitted with the encroachment request to the Division Traffic Engineer prior to construction. Final pavement markings shall be thermoplastic unless otherwise directed by the Division Traffic Engineer or District Engineer.

29. Any pavement markings that are damaged or obliterated shall be restored by the encroaching party at no expense to NCDOT.

30. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines. The encroaching party must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be

Roadside Environmental

31. The encroaching party shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at (252) 621-6310.

32. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.

33. The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility encroachment agreements or any utility encroachments when land disturbance within NCDOT right of way exceeds 1 acre. When required, the VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.

34. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest *NCDOT Standards Specifications for Roads and Structures* and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this encroachment shall be replaced with plants of like kind or similar shape.

35. No trees within NCDOT right of way shall be cut without authorization from the Division Roadside Environmental Engineer. An inventory of trees measuring greater than 4 caliper inches (measured 6" above the ground) is required when trees within C/A right of way will be impacted by the encroachment installation. Mitigation is required and will be determined by the Division Roadside Environmental Engineer's Office.

36. Prior to installation, the Encroaching Party shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.

37. The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.

38. The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the Division Engineer or their agent.

39. The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.

Bonds

40. A Performance and Indemnity Bond in the amount of $0 shall be posted with the District Engineer's Office by the Party of the Second Part prior to beginning any work within the NCDOT Right of Way. The bond shall be held for a minimum of one year after a satisfactory final inspection of the installation by NCDOT. The bond may be held for a period longer than one year after completion if, in the opinion of NCDOT, the size or complexity of the installation warrants a longer period.

41. The release of the bond is subject to a final inspection by NCDOT. Contact the District office to schedule a Final Inspection and to request release of the bond.

42. When a Continuing Indemnity bond is on file with the central Raleigh office, the cashing of that bond may be used to fund any necessary repairs by NCDOT forces for unaddressed defects in workmanship by the encroaching party and/or by their contractor.

Control of Access

43. No access to the job site, parking or material storage shall be allowed along or from the **Control of Access Roadway.**

44. The installation within the Control of Access fence shall not adversely affect the design, construction, maintenance, stability, traffic safety or operation of the controlled access highway, and the utility must be serviced without access from the through-traffic roadways or ramps.

45. The resetting of the Control of Access fence shall be in accordance with the applicable NCDOT standard and as directed by the Division Engineer or their representative.

STIP (or Division Managed) Projects

46. State Transportation Improvement Project (STIP) X-XXXX is scheduled for future construction. Any encroachment determined to be in conflict with the construction of this NCDOT project shall be removed and/or relocated at the encroaching party's expense.

Construction

General

47. An executed copy of the encroachment agreement, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.

48. If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.

49. Any REVISIONS marked in RED on the attached non-PE sealed plans shall be incorporated into and made part of the approved encroachment agreement.

50. All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the Division Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.

51. The encroaching party shall notify the Division Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the Division Engineer or their representative.

52. A minimum of five-foot clearance is required for utility installations beneath or near drainage pipes, headwalls, and a minimum of two-foot clearance below the flowline of streams. If directional drilling, a minimum of ten-foot clearance distance is required from drainage structures and a minimum of five feet below flowline of streams.

53. At points where the utility is placed under existing storm drainage, the trench will be backfilled with excavatable flowable fill up to the outside diameter of the existing pipe.

54. Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Zone. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.

55. The Encroaching Party and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this encroachment, the District Office shall be notified by the encroaching party immediately if any violations are cited.

56. Any guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the Division Engineer or their representative.

57. Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.

58. All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the Division Engineer or their representative.

59. Detection tape, where required by NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act, shall be buried in the trench approximately 1 foot above the installed facility. Where conduit is installed in the right of way and is not of ferrous material, locating tape or detection wire shall be installed with the conduit.

60. All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.

61. Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.

Engineering

62. All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: *ASTM Standards*, *Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings,* NCDOT *Asphalt Quality Management System* manual, **and the approved plans.**

63. Regulator stations, metering stations, cathodic test stations, and anode beds are not permitted within NCDOT right of way. Header wires are permitted.

64. Non-Utility Communication and Data Transmission installations (ground mounted type or Small Cell pole-mounted type) must adhere to guidelines in the Utilities Accommodations Manual and, when located within municipal jurisdictions, are subject to review and approval by municipal ordinances and any additional municipal approval for proximity to historic districts and landmarks. All wiring and related telecommunications work shall conform to the latest regulations by the Federal Communications Commission.

65. All wiring and related electrical work shall conform to the latest edition of the National Electrical Safety Code.

66. Prior approval for any blasting must be obtained from the Division Engineer or their representative.

Location within R/W

67. All utility access points, such as manholes, vaults, handholes, splice boxes and junction boxes shall be located as close to the right of way line as possible and shall not be placed in the ditch line, side slopes of the ditches or in the pavement. All manholes, handholes, splice boxes, junction boxes and vaults and covers shall be flush with the ground when located within the vehicle clear zone. Slack loops for telecommunications in industry standard housing units shall be buried a minimum of 18 inches when buried or meet minimum NCDOT vertical and horizontal clearances when installed aerially.

68. Any utility markers, cabinets, pedestals, meter bases and services for meter reading required shall be as close to the Right of Way line as possible. If it is not feasible to install at or near Right of Way line, then written approval shall be obtained from NCDOT prior to installation.

69. Fire Hydrants shall be of the breakaway type. Hydrants shall be placed near the right of way line. In curb and gutter sections with written approval from the District, the hydrants may be placed at 6' behind the back of the curb or minimum 2' back of sidewalk.

70. Hot box (aka ASSE 1060) or Safe-T-Cover type enclosures covering utility main pipe joints, backflow preventers, valves, vent pipes, cross connections, pumps, grinders, irrigation assemblies, transformers, generators, and other similar large appurtenances shall be located outside sight distance triangles and off of the NCDOT Right-of-Way.

71. Sprinkler heads shall be located a minimum of 10 feet from the edge of pavement, edge of shoulder, or back of curb whichever is greater and shall be directed so that water does not spray or drain on the roadway surface, sidewalk, or passing vehicles at any time. Upon completion of the installation and prior to activation of the system, the Encroacher shall contact the District Engineer to schedule a test of the system to verify the spray pattern. Sprinkler systems shall not be operated during periods of high wind or freezing weather, or to the extent that the subgrade adjacent to the pavement structure becomes saturated. NCDOT reserves the right to require immediate termination and removal of any sprinkler system which in its judgement and opinion adversely affects safety, maintenance, or operation of the roadway.

72. Luminaire and/or utility poles and guy wires shall be set as close to the Right of Way line as practical and outside the Clear Zone in accordance with the latest version of the AASHTO Roadside Design Guide (See corresponding attachment) or made breakaway in accordance with the requirements of NCHRP Report 350. Any relocation of the utility poles from the original design due to Clear Zone requirements shall require a re-submittal for the utility design.

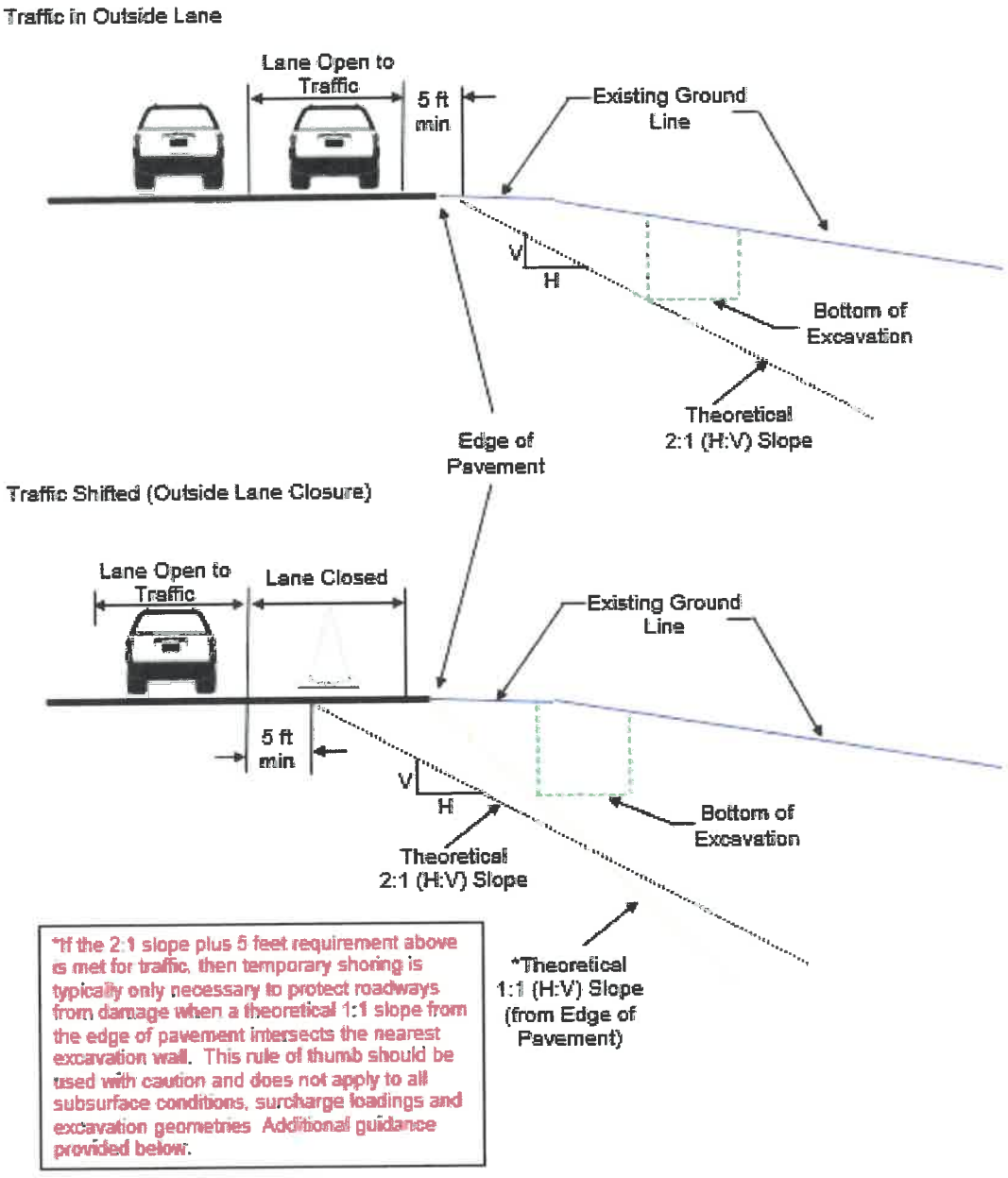
73. Luminaire and/or utility poles shall be set a minimum of 5'-6" behind face of any guardrail or otherwise sufficiently protected. However, standard placement may be reduced to 3'-6" behind face of guardrail when posts are spaced 3'-1 ½", or where speed limit is less than 55 MPH.

Excavation

74. Excavation material shall not be placed on pavement.

75. It is the responsibility of the encroaching party or their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.

76. The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries.

Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Type B or C soils as defined by OSHA Technical Manual. Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx and see SP11 R002

a. Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT *Utilities Accommodations Manual* for more information on requirements for shoring plans, design calculations, and subsurface investigation report.) **Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.**
b. All trench excavation inside the limits of the theoretical two-to-one slope plus 5 feet requirement, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.
c. The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest *NCDOT Standard Specifications for Roads and Structures,* which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.
d. At the discretion of the Division Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The encroaching party shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the encroaching party (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the encroachment agreement and that the backfill material meets the Statewide Borrow Criteria.
e. The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.

77. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.

Boring

78. Boring equipment will be provided of a type and size to facilitate boring in the local geologic conditions and shall be able to facilitate the encroachment work.

79. When Horizontal Directional Drilling (HDD) is used, the following stipulations apply:
    a. Use drilling fluids as appropriate for the type soils but use of water alone is prohibited. Pump drilling fluids only while drilling or reaming. Directional boring using jetting with a Bentonite (or equivalent material) slurry is recommended. Monitor flow rates to match the amount leaving the bore hole and do not increase pressure or flow to free stuck drill heads, reamers or piping. Open cutting to retrieve stuck drill heads is not allowed without prior permission from the District Engineer.
    b. The minimum depth shall adhere to the table below for transverse (under non-controlled access, partial controlled access, or limited controlled access roadway) installations and refers to maximum diameter of hole drilled and not the dimension of the carrier or encasement pipe.

Diameter of Drilled Hole (Backream)	Minimum Depth of Cover
2" to 6"	5 feet
>6" to 15"	12 times hole diameter (e.g. 6-inch hole means 6 feet minimum depth)
>15" to 36"	15 feet or greater

    c. Under fully controlled access roadway installations, the minimum depth for transverse crossings shall be 15 feet under any pavement (ramps or thru lanes)
    d. An overbore (backream diameter) shall not be more than 1.5 times the outside diameter of the pipe or encasement under any highway for pipes 12 inches in diameter or less. For pipes with outer diameter larger than 12 inches, the overbore may be no larger than outer diameter of pipe plus 6 inches. An overbore exceeding 1.5 times greater than the outside diameter of the pipe or encasement may be considered if the encroachment agreement includes a statement signed and sealed by a licensed North Carolina Professional Engineer indicating that an overbore in excess of 1.5 times the outside diameter of the pipe or encasement will appropriately arch and no damage will be done to the pavement or sub-grade.
    e. Directional boring is allowed beneath embankment material in naturally occurring soil.
    f. Any parallel installation utilizing the directional boring method shall be made at a minimum depth of three (3') feet (cover) below the ground surface and outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway.
    g. All directional bores shall maintain ten (10) feet minimum (clear) distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. Directional bores are not allowed beneath bridge footings, culvert wingwall footings, slope protection or retaining walls.
    h. The tip of the drill string shall have a cutter head.
    i. Detection wire shall be installed with non-ferrous material.
    j. HDPE pipe installed by directional boring shall not be connected to existing pipe or fittings for one (1) week from the time of installation to allow tensional stresses to relax.

Aerial clearances

80. Vertical clearance of overhead power and communication lines shall meet the National Electrical Safety Code requirements except the minimum vertical clearance shall be 18' for crossings over NCDOT roadways (24' over Fully Controlled Access roadways) and 16' for parallel installations.

81. When applicable for aerial installations, in relation to the bridge, the utility line shall be located with minimum clearances as indicated in Figure 3-3 in the Utilities Accommodations Manual for NCDOT **Required Clearances for Aerial Installations by Encroachment Near Bridge Structures**.

Pavement Detail and Repair

82. The paving of this roadway shall be in accordance with the latest version of NCDOT Standard Specifications, Sections 610, 1012 and 1020. The Contractor shall follow all procedures of the latest Quality Management System (QMS) Asphalt Manual for asphalt pavement - Maintenance Version (see https://connect.ncdot.gov/resources/Materials/MaterialsResources/Forms/Default.aspx) to find the most recent version. The Contractor must adhere to all testing requirements and quality control requirements specified. The Contractor shall contact the NCDOT Division QA Supervisor prior to producing plant mix and make the Supervisor aware that the mix is being produced for a future NCDOT road. Contact the District Engineer to determine the NCDOT Division QA Supervisor. Only NCDOT approved mix designs will be acceptable. A Quality Control Plan shall be submitted (as Directed by the District Engineer) to the District Engineer's Office prior to asphalt production utilizing form QMS-MV1. Failing mixes and/or densities are subject to penalties including monetary payments or removal and replacement. To minimize traffic queuing in construction areas, the possibility of traffic detours may be considered when working on high traffic routes even if traffic control is used. The District Engineer may require traffic detours.

83. When paving beyond utility installation is involved, a Roadway certification report sealed by a Professional Engineer shall be submitted to the District Engineer's office indicating the following:
    - Pavement thickness by type
    - Pavement density, core and/or test locations
    - Base thickness
    - Base density
    - Subgrade density

    Test frequency and method shall be in conformance with the NCDOT *Materials and Tests Manual.* Test must be performed by a Certified Technician including name and Certification number on report.

84. "Potholing" (or "daylighting") pavement cores to expose existing utilities shall be made with a circular minimum 6" to maximum 18" diameter "test" hole to a maximum depth of 12 inches. Pavement core locations shall not be placed in the wheel path whenever possible. Vacuum excavation shall be utilized to expose underground utilities below pavement subgrade. Displaced dirt and rock debris must be suctioned away from the excavation area through a large hose to a vacuum truck and disposed by the encroaching party. Avoid using mechanized equipment in the proximity of all exposed underground utility lines. Pavement cores shall be repaired within the same working day. The pavement core shall be retained and evaluated for reuse to fill the core hole.

    The excavation shall be backfilled and compacted with select material to the bottom of the existing pavement structure or as indicated by the District Engineer. If in good condition, the retained core shall be placed in the hole and secured with a waterproof, mechanical joint. If the pavement core is damaged and cannot be re-used, the core may be replaced with the surface mix, S9.5B. The asphalt patch shall match the thickness of the existing asphalt or four inches, whichever is greater and the use

of NCDOT approved sealant applied to the cracks to fill the voids. All materials must be listed on the NCDOT Approved Products List (APL) found at: https://apps.ncdot.gov/vendor/approvedproducts/.

85. The minimum pavement design for pavement repair shall be according to the most recent version of NCDOT Standard Drawing 654.01 (https://connect.ncdot.gov/resources/Specifications/Pages/default.aspx). The version valid in 2024 through 2030 is located at https://connect.ncdot.gov/resources/Specifications/2024StandardRdwyDrawings/Div%206%20Combined.pdf. The pavement design shall include a mechanical overlay extent to be a minimum of 25 feet each side of the pavement repair area OR as directed by the District Engineer.

86. Pavement cuts shall be repaired the same day the cuts are made unless an asphalt patch cannot be accomplished the same day due to material availability or time restrictions. When the asphalt patch is not feasible, the following apply:

    a. The pavement cut shall be filled to the surface with ABC stone or Flowable Fill per NCDOT's Standards and Specifications.
    b. Once the cut is filled, a minimum ¾-inch steel plate shall be placed and pinned to prevent moving. Plates shall be designed large enough to span a minimum of 1-foot on all sides on the pavement cut.
    c. When flowable fill is used, it shall cure for 24 hours prior to any asphalt material placement. Flowable fill bleed water shall not be present during paving operations. Paving shall not cause damage (shoving, distortion, pumping, etc.) to the flowable fill.
    d. Install and leave "BUMP" signs according to MUTCD until the steel plate has been removed. Once the flowable fill has cured, remove the steel plate, and mill/fill according to the directions of the District Engineer.
    e. All pavement cuts must be sealed with NCDOT approved sealant to prevent future pavement separation or cracking.

87. Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform encroachment work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Encroaching Party.

Post Construction

Close out/ Inspection

88. The Encroaching party shall notify the District Engineer's office within 2 business days after construction is complete. The District Engineer may perform a construction inspection. Any deficiencies may be noted and reported to the encroaching party to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.

89. At the discretion of the District Engineer, a final inspection report may be provided to the encroaching party upon satisfactory completion of the work.

90. When a performance bond is required, a written acknowledgement of the completed work by the District Engineer's office begins the one-year warranty period associated with the performance bond.

91. If the actual construction differs from the approved plans associated with this encroachment, a copy of "as-built" plans shall be submitted to the District Engineer's office in a PDF format and in a current ESRI GIS format within 4 weeks of construction.

92. The encroaching party shall provide the North Carolina Turnpike Authority (NCTA) with an electronic copy of coordinate correct as-built plans within two weeks of installation completion. Failure to provide the as-built plans may jeopardize future approvals within NCTA right of way.

93. A copy (in PDF format) of the completed ground water analysis shall be given to the District Engineer, including detailed drawings of the "as-built" wells showing location, depth and water level in well.

ATTACHMENT FORM

NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W

Instructions for use:
This form must be completed in its entirety and submitted directly to the designated personnel in the District Engineer's office via email, fax or hand delivery a minimum of one week prior to construction for the encroachment. If the designated NCDOT personnel names are unknown by the person completing this form, please contact the District Engineer's office to determine that contact info.

Date: _____ Submitted by Name: _____

To: District Personnel Name: Caitlin Spear
District Personnel Email: caspear@ncdot.gov
District Fax No.: (252) 621-6410

This notification is to inform you that we (encroaching party or their contractor) will begin construction work on the following project in a minimum of one week.

Encroachment number
(assigned by NCDOT) for the project: _____

Construction start date: _____

Approximate ending date: _____

Contact NCDOT inspector a minimum of 72 hrs. in advance to set-up Preconstruction meeting in the District Engineer's office or other location as directed by the District Engineer

Preconstruction meeting date & time: _____

Preconstruction meeting address: _____
_____

Type of project: _____
[Examples: power, telecommunication, water, sewer, gas, petroleum, other (describe)]

Contact Info for this project:

Contractor Company Name:
_____
Contractor Contact Name:
_____
Contractor Phone Number:
_____
Contractor Email:
_____

NCDOT Utility Inspector Name:
_____
NCDOT Utility Inspector Phone:
_____
NCDOT Utility Inspector Email:
_____
NCDOT Utility Project Manager Name:
_____
NCDOT Utility Project Manager Phone:
_____
NCDOT Utility Project Manager Email:
_____

TABLE 3.1 (Cont'd)

[U.S. Customary Units]

DESIGN SPEED	DESIGN ADT	FORESLOPES			BACKSLOPES		
		1V:6H or flatter	1V:5H TO 1V:4H	1V:3H	1V:3H	1V:5H TO 1V:4H	1V:6H or flatter
40 mph or less	UNDER 750	7 – 10	7 – 10	**	7 – 10	7 – 10	7 – 10
	750 – 1500	10 – 12	12 – 14	**	10 – 12	10 – 12	10 – 12
	1500 – 6000	12 – 14	14 – 16	**	12 – 14	12 – 14	12 – 14
	OVER 6000	14 – 16	16 – 18	**	14 – 16	14 – 16	14 – 16
45–50 mph	UNDER 750	10 – 12	12 – 14	**	8 – 10	8 – 10	10 – 12
	750 – 1500	14 – 16	16 – 20	**	10 – 12	12 – 14	14 – 16
	1500 – 6000	16 – 18	20 – 26	**	12 – 14	14 – 16	16 – 18
	OVER 6000	20 – 22	24 – 28	**	14 – 16	18 – 20	20 – 22
55 mph	UNDER 750	12 – 14	14 – 18	**	8 – 10	10 – 12	10 – 12
	750 – 1500	16 – 18	20 – 24	**	10 – 12	14 – 16	16 – 18
	1500 – 6000	20 – 22	24 – 30	**	14 – 16	16 – 18	20 – 22
	OVER 6000	22 – 24	26 – 32 *	**	16 – 18	20 – 22	22 – 24
60 mph	UNDER 750	16 – 18	20 – 24	**	10 – 12	12 – 14	14 – 16
	750 – 1500	20 – 24	26 – 32 *	**	12 – 14	16 – 18	20 – 22
	1500 – 6000	26 – 30	32 – 40 *	**	14 – 18	18 – 22	24 – 26
	OVER 6000	30 – 32 *	36 – 44 *	**	20 – 22	24 – 26	26 – 28
65–70 mph	UNDER 750	18 – 20	20 – 26	**	10 – 12	14 – 16	14 – 16
	750 – 1500	24 – 26	28 – 36 *	**	12 – 16	18 – 20	20 – 22
	1500 – 6000	28 – 32 *	34 – 42 *	**	16 – 20	22 – 24	26 – 28
	OVER 6000	30 – 34 *	38 – 46 *	**	22 – 24	26 – 30	28 – 30

* Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear-zone distances greater than the clear-zone shown in Table 3.1. Clear zones may be limited to 30 ft for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

** Since recovery is less likely on the unshielded, traversable 1V:3H slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of the recovery area at the toe of slope should take into consideration right-of-way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the through traveled lane and the beginning of the 1V:3H slope should influence the recovery area provided at the toe of slope. While the application may be limited by several factors, the foreslope parameters which may enter into determining a maximum desirable recovery area are illustrated in Figure 3.2.

NCDOT Required Clearances for Aerial Installations Near Bridge Structures

NOT TO SCALE

Any variation to this detail must be approved by the Division Engineer and/or State Utilities Manager.

Published by NCDOT Utilities Unit
June 2020

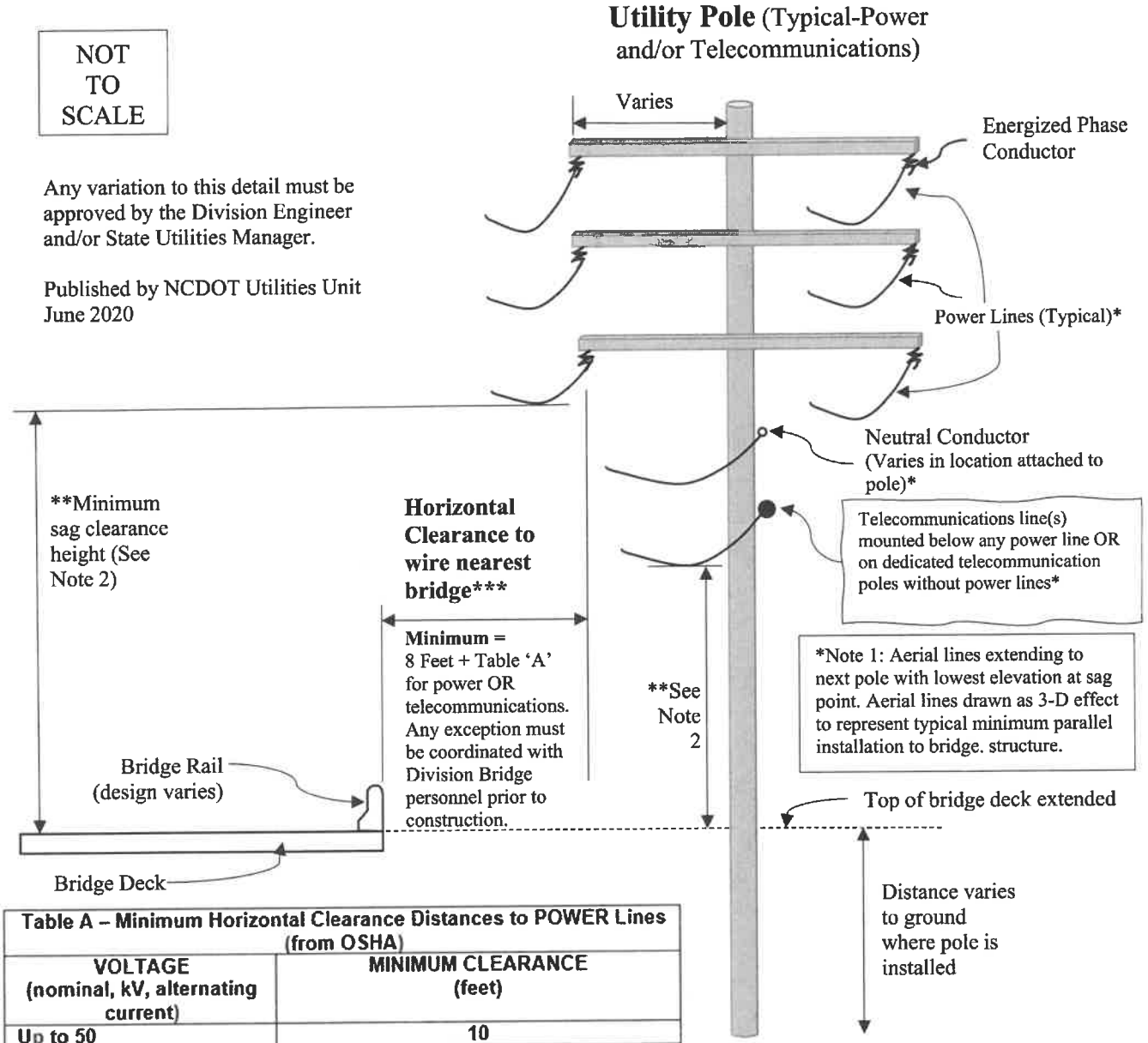


Table A – Minimum Horizontal Clearance Distances to POWER Lines (from OSHA)

VOLTAGE (nominal, kV, alternating current)	MINIMUM CLEARANCE (feet)
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1000	45
Over 1000	As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution

Note 2- **MINIMUN SAG CLEARANCE HEIGHT is 25 feet (applies to telecommunications AND power).

***Note 3: HORIZONTAL CLEARANCE EXCEPTION. If vertical sag clearance height for power above bridge deck is ≥ 45 feet AND voltage is ≤ 350kV, then Minimum Horizontal Clearance may be reduced to 3 feet. Any telecommunications attachment to power pole allowed in this exception must have a minimum 25 feet sag clearance height above bridge deck.

ROUTE SR1118 PROJECT Algonquin COUNTY OF Currituck

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

-AND-

Joel K. & Stacy A. Justice

PO Box 208, Grandy, NC 27939

-AND-

County of Currituck, North Carolina

153 Courthouse Rd. Currituck, NC 27929

THREE PARTY RIGHT OF WAY ENCROACHMENT AGREEMENT ON PRIMARY AND SECONDARY SYSTEM

E011-027-24-00447

THIS AGREEMENT, made and entered into this the 26th day of November, 20 24 , by and between the Department of Transportation, party of the first part; and Joel K. & Stacy A. Justice party of the second part; and County of Currituck, Noirth Carolina party of the third part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) SR1118 (Frobes Rd.) , located Approx. 1,407 feet east from the intersection with US HWY 158 (Caratoke Hwy.)

with the construction and/or erection of: Water distribution system extension to serve Algonquin

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.

e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,

   (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
   (2) cancellation, termination or suspension of the contract, in whole or in part.

f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

That when title to the subject that constitutes the aforesaid encroachment passes from the party of the second part and vests in the party of the third part, the party of the third part agrees to assume all responsibilities and rights and to perform all obligations as agreed to herein by the party of the second part.

R/W (166) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (166) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: [signature] DISTRICT ENGINEER

WITNESS:

Deborah K Moscopulos
DEBORAH K MOSCOPULOS
6670 CARATOKE HWY
GRANDY NC 27939

Joel K. & Stacy A. Justice
[signatures]

Second Party

WITNESS:

Amy Wells
Amy Wells
6670 CARATOKE HWY
GRANDY NC 27939

County of Currituck, North Carolina
[signature]
WITNESS: [signature]
Third Party Clerk to Board.

VICINITY MAP SCALE: 1" = 4,000'

CONSTRUCTION DRAWINGS FOR

ALGONQUIN

A 10 LOT TRADITIONAL RESIDENTIAL SUBDIVISION

POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA

Sheet List Table

Sheet Number	*Sheet Title*
1	COVER SHEET, DEVELOPMENT NOTES & SITE LOCATION
2	EXISTING SITE CONDITIONS MAP
3	DEVELOPMENT OVERVIEW PLAN
4	GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN
5	EROSION AND SEDIMENT CONTROL PLAN
6	WATERMAIN EXTENSION AND WATER SERVICE PLAN
7	LANDSCAPING, SIGNAGE AND BUFFERING PLAN
8	EXISTING INDIAN KETTLE RD. PLAN AND PROFILE
9	PROPOSED INDIAN KETTLE RD. PLAN AND PROFILE
10	ROADWAY, DRAINAGE & TYP. CONSTRUCTION DETAILS
11	EROSION & SEDIMENT CONTROL CONSTRUCTION NOTES & DETAILS
12	NCG01 - SELF INSPECTION, RECORD KEEPING & REPORTING
13	NCG01 - GROUND STABILIZATION & MATERIALS HANDLING

GENERAL NOTES:

1. PROJECT NAME: ALGONQUIN
2. OWNER/APPLICANT: JOEL K. & STACY A. JUSTICE, PO BOX 206, GRANDY, NC 27939
3. PROPERTY DATA:
   PARCEL ID#:0109-000-053F-0000
   ADDRESS: INDIAN KETTLE RD. JARVISBURG, NC
   RECORDED REFERENCES: D.B. 02, PG. SP/55/57, PC: K, SL. 30
   PROPERTY ZONING: SFM
4. F.I.R.M. DATA:
   ZONE X, F.E.M.A. F.I.R.M. MAP PANEL 3720092000K, CID 370078, EFFECTIVE DATE DECEMBER 21, 2018.
5. THE PROPERTY CONTAINS NO 404 JURISDICTIONAL WETLANDS AS CONFIRMED BY THE US ARMY CORPS OF ENGINEERS.
6. EXISTING CONDITION INFORMATION BASED ON A COMBINATION OF THE FOLLOWING:
   - FIELD SURVEY DATA OBTAINED BY BISSELL PROFESSIONAL GROUP
   - 2020 AERIAL IMAGERY OBTAINED FROM NCONEMAP.COM
   - ELEVATIONS ARE REFERENCED TO NAVD 1988 VERTICAL DATUM.
7. DRAINAGE AND UTILITY EASEMENTS WILL BE PROVIDED ON THE FINAL PLATS PREPARED FOR RECORDING OF THE SUBDIVISION.
   - A 10' EASEMENT FOR UTILITIES AND DRAINAGE TO BE DEDICATED ALONG ALL REAR AND SIDE PROPERTY LINES
   - A 15' EASEMENT FOR UTILITIES AND DRAINAGE TO BE DEDICATED ALONG ALL FRONT PROPERTY LINES.
   - A NON-EXCLUSIVE DRAINAGE EASEMENT TO BE DEDICATED TO CURRITUCK COUNTY & NCDEQ ACROSS ALL OPEN SPACE AREAS AND ALONG ALL MAJOR DRAINAGE WAYS SERVING MORE THAN 5 ACRES.
   - A 10' EASEMENT TO BE DEDICATED BEYOND THE 15' FRONT EASEMENT FOR PLANTING AND MAINTENANCE OF STREET TREES.
8. EXISTING VEGETATION IN OPEN SPACE AREAS SHALL BE MAINTAINED.
9. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.
10. THE PROJECT INCLUDES ROADWAY, SIDEWALK, DRAINAGE AND UTILITY IMPROVEMENTS ALONG SOME 340 FT OF THE EXISTING INDIAN KETTLE ROAD. ALL RELATED CONSTRUCTION SHALL STAY WITHIN THE LIMITS OF THE ROADWAY'S 45' PRIVATE R/W AND THE 15' DRAINAGE AND UTILITY EASEMENTS FRONTING THE (4) ADJOINING LOTS, AS PRESCRIBED BY THE SUBDIVISION PLAT RECORDED IN PC: C-2, SL: 363. THE CONTRACTOR SHALL NOTIFY THE LOT OWNERS AHEAD OF ANY CONSTRUCTION ACTIVITIES ON THEIR PROPERTY, MINIMIZE DISTURBANCES TO THEIR PROPERTY AND MAINTAIN REASONABLE MEANS OF ACCESS AND CLEANLINESS.

DEVELOPMENT NOTES:

1. PROPERTY SUMMARY:

PROPOSED SUBDIVISION AREA:	14.53 AC.
PROPOSED AREA TO BE RECOMBINED INTO PARCEL "A"	0.95 AC.
TOTAL PROPERTY AREA:	15.48 AC.

2. DEVELOPMENT SUMMARY:

PROPOSED LOT AREA:	9.41 AC.
PROPOSED R/W AREA:	0.74 AC.
PROPOSED OPEN SPACE AREA:	4.38 AC.
TOTAL SUBDIVISION AREA:	14.53 AC.
# OF PROPOSED LOTS:	10
MINIMUM LOT AREA:	40,000 SF
PROPOSED RIGHT-OF-WAY WIDTH:	45 FT.
PROPOSED PAVED ROADWAY WIDTH:	20 FT.
LINEAR FEET OF EXISTING ROAD TO BE IMPROVED:	340 L.F.±
LINEAR FEET OF NEW ROAD TO BE CONSTRUCTED:	500 L.F.±

3. DEVELOPMENT IMPERVIOUS COVERAGE DATA (BUA):
   COVERAGE ON INDIVIDUAL LOTS WILL BE LIMITED TO 20.0% OF LOT AREA

MAXIMUM TOTAL LOT COVERAGE:	81,979 SF
ROADWAY COVERAGE	16,600 SF
SIDEWALKS:	6,000 SF
TOTAL COVERAGE:	104,579 SF
COVERAGE PERCENTAGE:	16.52%

4. PROPOSED DISTURBED AREA: 11 ACRES

THE FOLLOWING PERMITS ARE REQUIRED PRIOR TO PROJECT CONSTRUCTION:

PERMIT	AGENCY	REFERENCE NUMBER	DATE OF ISSUANCE
SEDIMENTATION AND EROSION CONTROL PERMIT	N.C.D.E.Q. – DIVISION OF LAND RESOURCES		
STORMWATER MANAGEMENT LOW DENSITY PERMIT	N.C.D.E.Q – DIVISION OF LAND RESOURCES		
WATERMAIN EXTENSION AUTHORIZATION TO CONSTRUCT	N.C.D.E.Q – PUBLIC WATER SUPPLY		
DRIVEWAY PERMIT	N.C.D.O.T.		
ENCROACHMENT AGREEMENT	N.C.D.O.T.		
CURRITUCK COUNTY PRELIMINARY PLAT & USE PERMIT	CURRITUCK COUNTY BOARD OF COMMISSIONERS	PB 21-21	8/21/2023
CURRITUCK COUNTY CONSTRUCTION AUTHORIZATION	CURRITUCK COUNTY PLANNING STAFF		

STORMWATER CERTIFICATE

I,__________ OWNER/AGENT HEREBY CERTIFY THE INFORMATION INCLUDED ON THIS AND ATTACHED PAGES IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

ON THE PLAN ENTITLED, ALGONQUIN CONSTRUCTION DRAWINGS – GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN, STORMWATER DRAINAGE IMPROVEMENTS SHALL BE INSTALLED ACCORDING TO THESE PLANS AND SPECIFICATIONS AND APPROVED BY CURRITUCK COUNTY. YEARLY INSPECTIONS ARE REQUIRED AS PART OF THE STORMWATER PLAN. THE OWNER IS RESPONSIBLE FOR ALL MAINTENANCE REQUIRED. CURRITUCK COUNTY ASSUMES NO RESPONSIBILITY FOR THE DESIGN, MAINTENANCE, OR PERFORMANCE OF THE STORMWATER IMPROVEMENTS.

DATE ________ OWNER/AGENT ________

North Carolina One-Call Center Inc. 811 Know what's below Call before you dig.

FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

LEGEND

- ROADWAY CENTERLINE
- RIGHT-OF-WAY
- PROPERTY BOUNDARY
- ADJOINING PROPERTY LINE
- EXISTING DITCH CENTERLINE
- EXISTING TREE LINE (APPROXIMATE)
- PROPOSED SWALE W/ FLOW ARROW
- PROPOSED SWALE HIGH POINT
- EXISTING GRADE CONTOUR
- PROPOSED GRADE CONTOUR
- x 0.00 EXISTING SPOT GRADE
- +0.00 PROPOSED SPOT GRADE
- EXISTING CULVERT
- PROPOSED CULVERT
- PROPOSED DRAINAGE STRUCTURE
- NO PARKING SIGN
- CROSSWALK

EROSION CONTROL LEGEND

- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED SILT FENCE
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED TEMPORARY CHECK DAM

UTILITY LEGEND

- X12WL EXISTING WATER LINE
- WL PROPOSED WATER LINE (SIZE AS NOTED)
- PROPOSED FIRE HYDRANT (APRX)
- PROPOSED WATER SERVICE (APRX)
- PROPOSED VALVE (APRX)
- PROPOSED BLOW-OFF (APRX)
- PROPOSED REDUCER (APRX)

PROFILE LEGEND

- EXISTING GRADE @ ROAD C/L
- PROPOSED GRADE @ ROAD C/L
- WL PROPOSED WATER LINE (SIZE AS NOTED)
- PROPOSED HYDRANT ASSEMBLY
- PROPOSED GATE VALVE
- PROPOSED REDUCER

SURVEY LEGEND

SCMO	SET CONCRETE MONUMENT
SIR	SET IRON ROD
EIR	EXISTING IRON ROD
EIP	EXISTING IRON PIPE
CP	CALCULATED POINT
M.B.L.	MAXIMUM BUILDING LIMIT
N.T.S.	NOT TO SCALE
P.C.	PLAT CABINET
D.B.	DEED BOOK
SL	SLIDE
SF	SQUARE FEET
AC	ACRES

SOILS LEGEND

— — —	SOILS LINE
CnA	CONETOE LOAMY SAND
Mu	MUNDEN LOAMY SAND
No	NIMMO LOAMY SAND
Pt	PORTSMOUTH FINE SANDY LOAM

SCS – SOIL SURVEY OF CURRITUCK COUNTY

NOTE:
EXISTING SITE INFORMATION DESCRIBED HEREON IS BELIEVED TO BE ACCURATE, HOWEVER, BPG INC. MAKES NO WARRANTY AS TO THE ACCURACY. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THIS INFORMATION BEFORE RELYING ON IT. THE CONTENT OF THESE DOCUMENTS MAY ALSO INCLUDE TECHNICAL INACCURACIES OR TYPOGRAPHICAL ERRORS. IF SUCH CONDITIONS EXIST, THE CONTRACTOR SHALL CONSULT WITH THE ENGINEER PRIOR TO PROCEEDING WITH THE SCHEDULED WORK AND MAY CONTINUE AFTER AN AUTHORIZATION TO PROCEED HAS BEEN GRANTED.

BISSELL
Bissell Professional Group
Firm License # C-508
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760
Engineers, Planners, Surveyors and Environmental Specialists

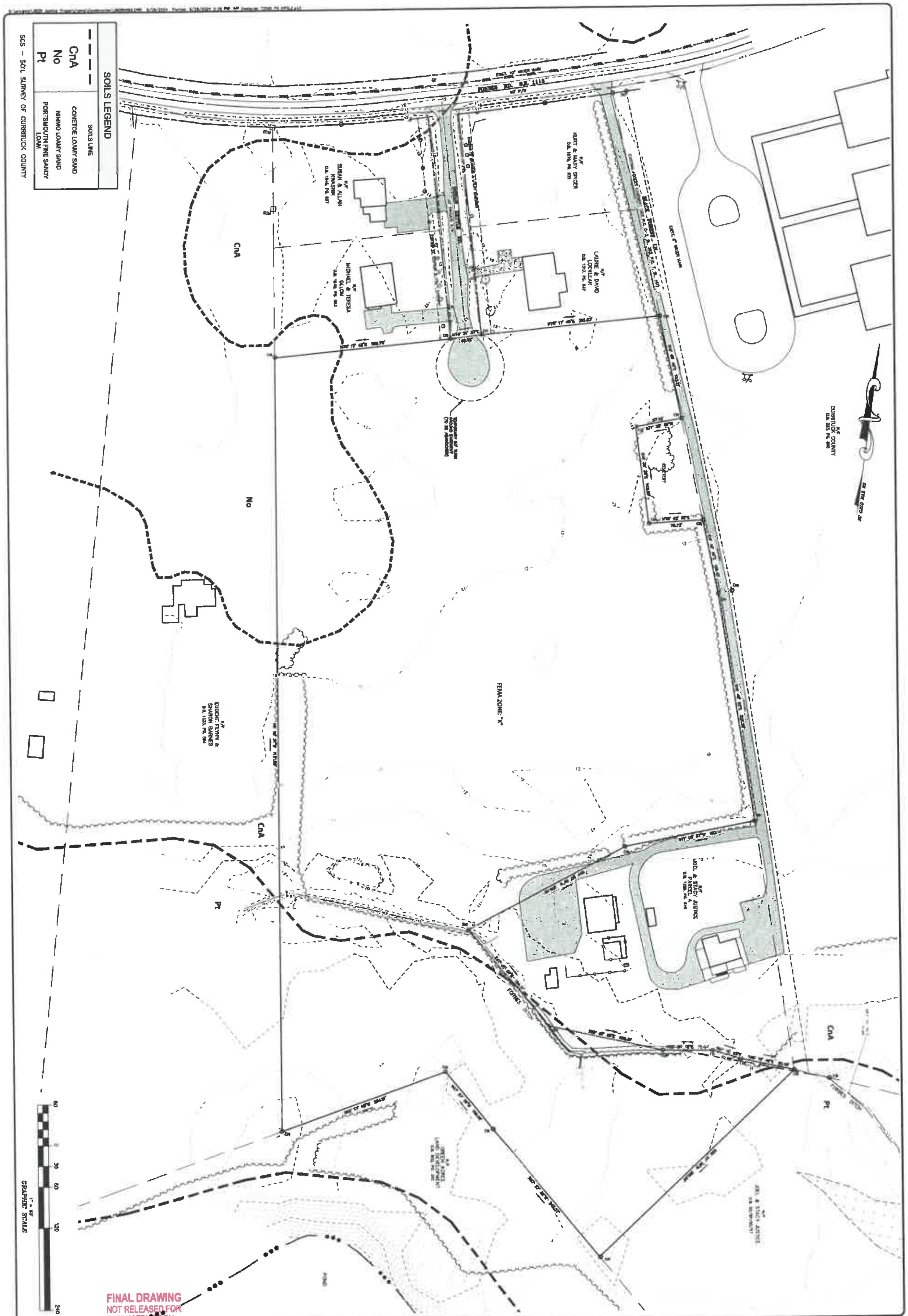
COVER SHEET, DEVELOPMENT NOTES & SITE LOCATION

PROJECT: ALGONQUIN
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY

DATE: 6/22/24 SCALE: N/A
BPG MSB
KFW/DMK BPG
SHEET: 1 of 13
CAD FILE: 382600B2
PROJECT NO: 3826



REVISIONS			
NO.	DATE	DESCRIPTION	BY

PROJECT:

ALGONQUIN

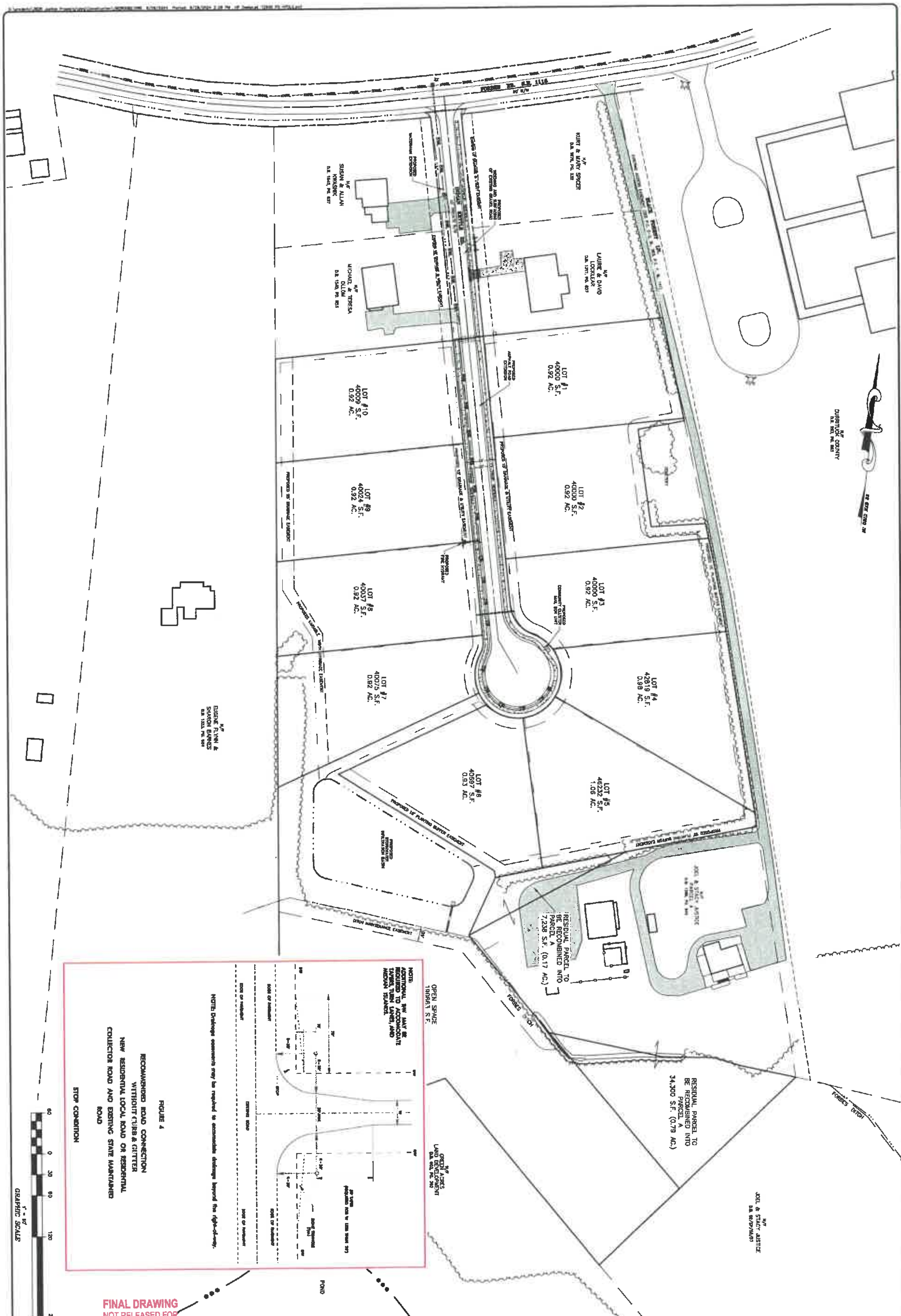
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA

CONSTRUCTION DRAWINGS

EXISTING SITE CONDITIONS MAP

BISSELL
Engineers, Planners, Surveyors and Environmental Specialists

SHEET: 2 of 13
CAD FILE: 3826M0B2
PROJECT NO. 3826


FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION
LOT #1 40000 S.F. 0.92 AC.
LOT #2 40000 S.F. 0.92 AC.
LOT #3 40000 S.F. 0.92 AC.
LOT #4 42819 S.F. 0.98 AC.
LOT #5 46232 S.F. 1.06 AC.
LOT #6 40597 S.F. 0.93 AC.
LOT #7 40075 S.F. 0.92 AC.
LOT #8 40037 S.F. 0.92 AC.
LOT #9 40024 S.F. 0.92 AC.
LOT #10 40009 S.F. 0.92 AC.
RESIDUAL PARCEL TO BE RECOMBINED INTO PARCEL A 7,238 S.F. (0.17 AC.)
RESIDUAL PARCEL TO BE RECOMBINED INTO PARCEL A 34,300 S.F. (0.79 AC.)
OPEN SPACE
FORBES DITCH
POND
FIGURE 4
RECOMMENDED ROAD CONNECTION WITHOUT CURB & GUTTER
NEW RESIDENTIAL LOCAL ROAD OR RESIDENTIAL COLLECTOR ROAD AND EXISTING STATE MAINTAINED ROAD
STOP CONDITION
GRAPHIC SCALE
THE DRIVEWAY RADIUS SHALL BE WITHIN 30 FEET MINIMUM AND 50 FEET MAXIMUM

REVISIONS			
NO.	DATE	DESCRIPTION	BY

PROJECT:

ALGONQUIN

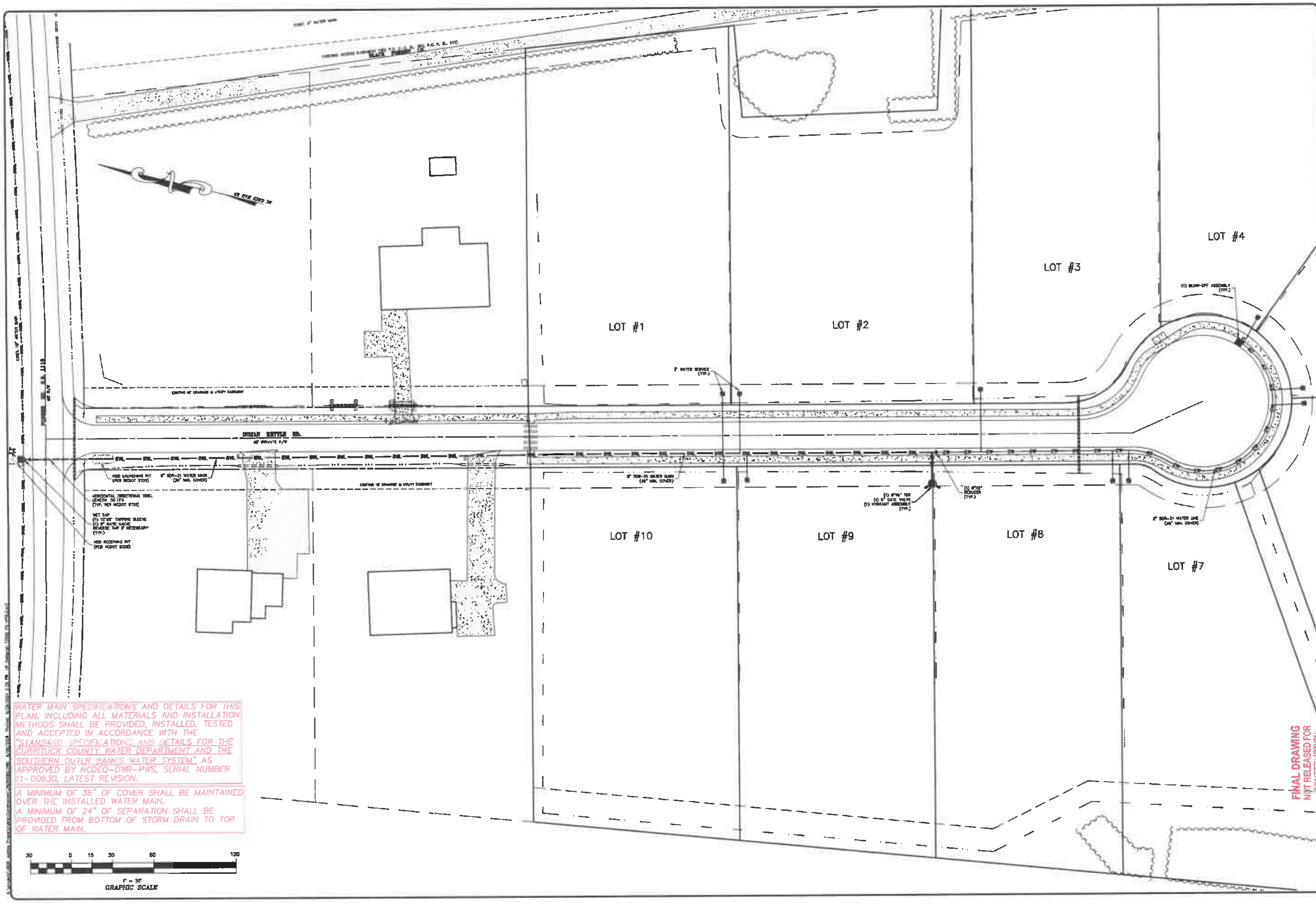
POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA

CONSTRUCTION DRAWINGS

DEVELOPMENT
OVERVIEW PLAN

BISSELL
Bissell Professional Group
Firm License # C-406
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760
Engineers, Planners, Surveyors and Environmental Specialists

SHEET: 3 OF 13
PROJECT NO: 3826


INDIAN KETTLE RD.
LOT #1
LOT #2
LOT #3
LOT #4
LOT #7
LOT #8
LOT #9
LOT #10
WATER MAIN SPECIFICATIONS AND DETAILS FOR THIS PLAN, INCLUDING ALL MATERIALS AND INSTALLATION METHODS SHALL BE PROVIDED, INSTALLED, TESTED AND ACCEPTED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS AND DETAILS FOR THE CURRITUCK COUNTY WATER DEPARTMENT AND THE SOUTHERN OUTER BANKS WATER SYSTEM" AS APPROVED BY NCDEQ-DWR-PWS, SERIAL NUMBER 11-00630, LATEST REVISION.
A MINIMUM OF 36" OF COVER SHALL BE MAINTAINED OVER THE INSTALLED WATER MAIN.
A MINIMUM OF 24" OF SEPARATION SHALL BE PROVIDED FROM BOTTOM OF STORM DRAIN TO TOP OF WATER MAIN.
30 0 15 30 60 120
1" = 30'
GRAPHIC SCALE
FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

REVISIONS			
NO.	DATE	DESCRIPTION	BY

PROJECT:

ALGONQUIN

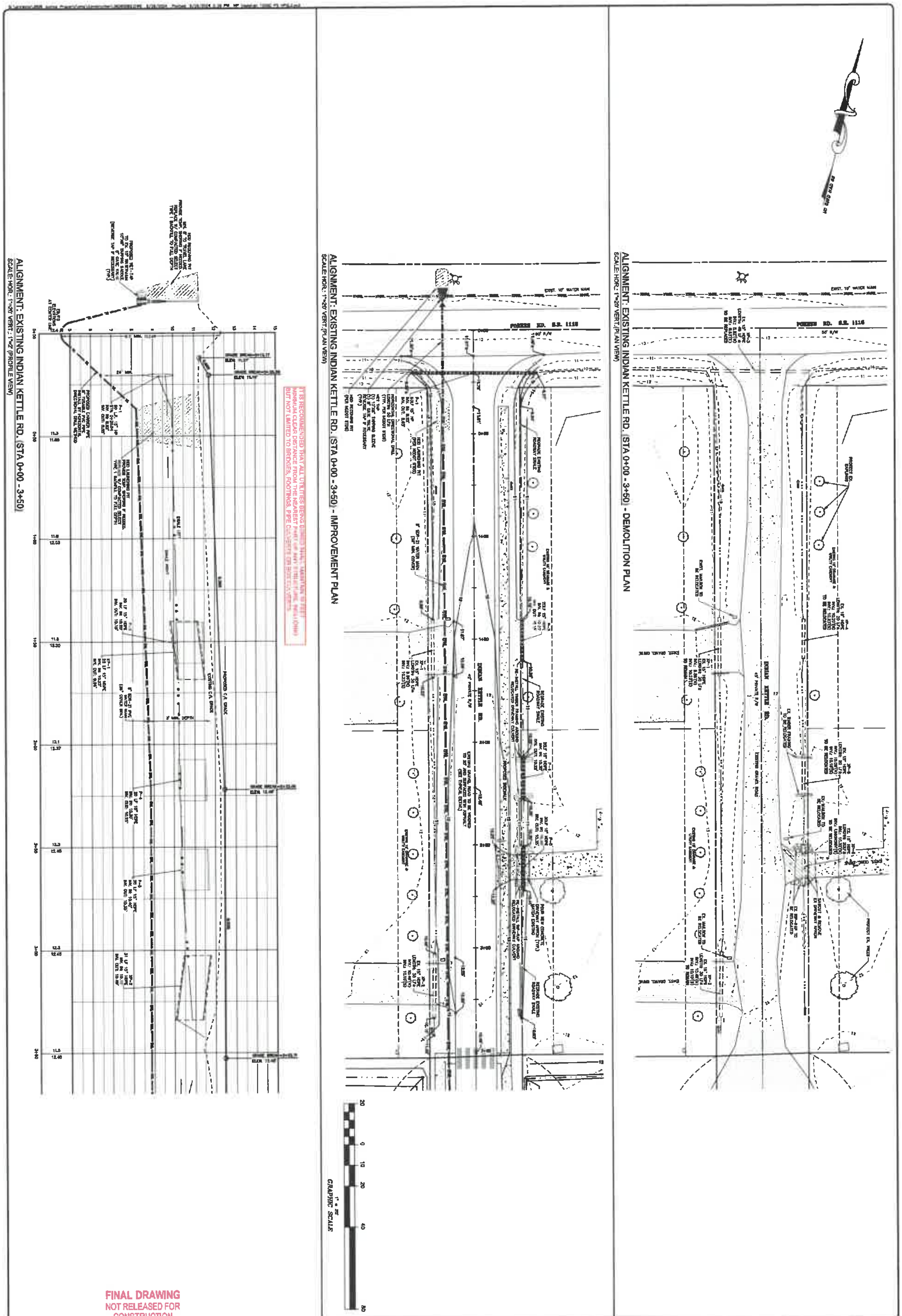
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA

CONSTRUCTION DRAWINGS

WATERMAIN EXTENSION AND WATER SERVICE PLAN

BISSELL
Bissell Professional Group
Engineers, Planners, Surveyors and Environmental Specialists

DATE: 4/26/24	SCALE: 1" = 30'
ENG: BPG	JSSB
DESIGN/DRAW: RPG	
SHEET: 6 of 13	
CAD FILE: 382600B2	
PROJECT NO: 3826	



FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

PROJECT NO: 3826	CADFILE: 382600B2	SHEET: 8 of 13	DWN: BPG	DES: BPG	CHK'D: MSB	DATE: 8/5/24	SCALE: 1" = 20'

REVISIONS

NO.	DATE	DESCRIPTION	BY

PROJECT:

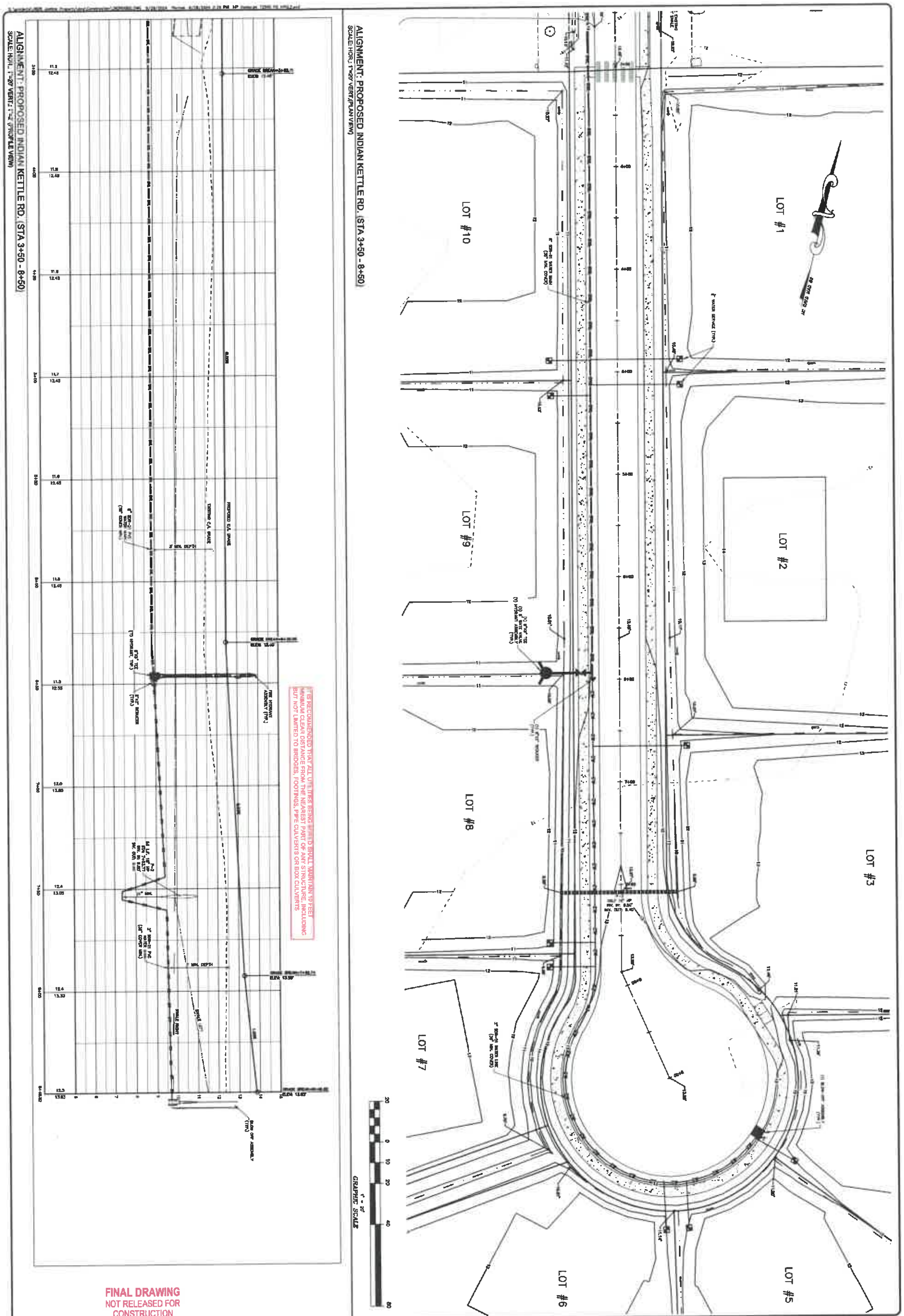
ALGONQUIN

POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA

CONSTRUCTION DRAWINGS

EXISTING INDIAN KETTLE RD PLAN AND PROFILE

BISSELL
Bissell Professional Group
Firm License # C-0956
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760
Engineers, Planners, Surveyors and Environmental Specialists



FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

SHEET:	9 of 13
CAD FILE:	382600B2
PROJECT NO.	3826
DATE	4-23-24
SCALE	1" = 20'
DSGN BY	BPC
DRWN BY	NSB
CHKD BY	WHG

REVISIONS			
NO.	DATE	DESCRIPTION	BY

PROJECT:

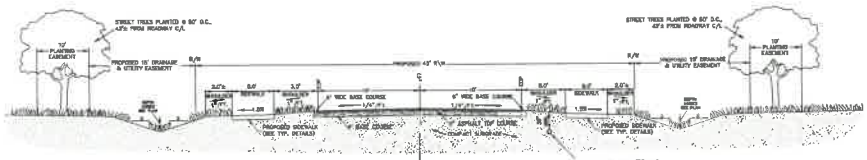
ALGONQUIN

POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA

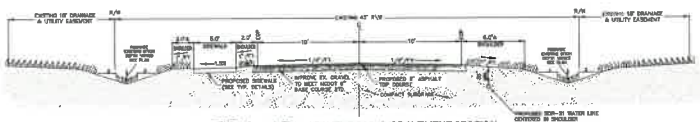
CONSTRUCTION DRAWINGS

PROPOSED INDIAN KETTLE RD
PLAN AND PROFILE

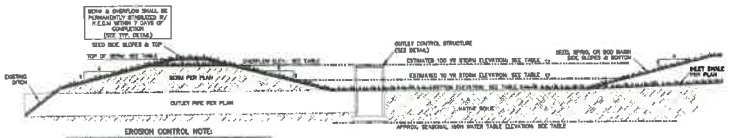
BISSELL
Bissell Professional Group
Firm License # C-956
3512 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3266
FAX (252) 261-1760
Engineers, Planners, Surveyors and Environmental Specialists



TYPICAL PROPOSED ROADWAY SECTION
NOT TO SCALE — SECTION VIEW



TYPICAL EXISTING GRAVEL ROAD IMPROVEMENT SECTION
NOT TO SCALE — SECTION VIEW



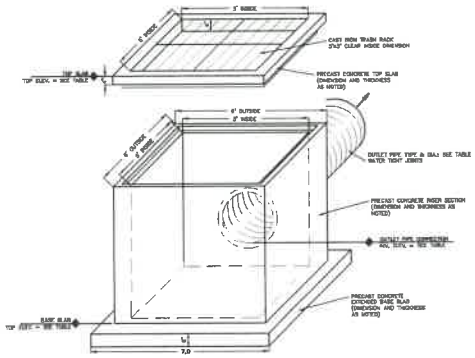
EROSION CONTROL NOTE:
DURING CONSTRUCTION, THE BMP WILL BE UTILIZED AS EROSION & SEDIMENT CONTROL SEDIMENT BASIN. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS PROPERLY STABILIZED, THE BMPS SHALL BE CLEANED AND RESTORED TO THEIR DESIGN SPECIFICATIONS AND THE BANKS PERMANENTLY STABILIZED WITHIN 7 DAYS.

TOP ELEV. (THIS)	OVERFLOW ELEV. (THIS)	100YR STORM ELEV. (THIS)	10YR STORM ELEV. (THIS)	BOTTOM ELEV. (THIS)	INVERT ELEV. (THIS)
12.00	11.50	11.18	10.04	8.50	7.00±

BASIN ELEVATION TABLE

BMP CONSTRUCTION SEQUENCE NOTES:
THE FOLLOWING SEQUENCE IS IN ADDITION TO THE "CONSTRUCTION SEQUENCE SCHEDULE" PROVIDED UNDER THE EROSION AND SEDIMENT CONTROL SPECIFICATIONS.
1. THE POND SHALL BE CONSTRUCTED AS DIRECTED ON THE PLAN AND DETAILS. PERIMETER SLOPE IMPROVEMENTS SHALL BE STABILIZED WITH TEMPORARY VEGETATION WITHIN 7 DAYS OF CONSTRUCTION. THIS WILL CREATE A TEMPORARY SEDIMENT BARRIER DURING PROJECT CONSTRUCTION. A GOOD TEMPORARY MEANS OF STABILIZATION IS A WET HYDROSEED MIX.
2. DURING CONSTRUCTION, THE POND WILL BE UTILIZED AS AN EROSION & SEDIMENT CONTROL SEDIMENT BASIN. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS PROPERLY STABILIZED THE POND SHALL BE CLEANED AND RESTORED TO ITS DESIGN SPECIFICATIONS AND THE BANKS PERMANENTLY STABILIZED WITHIN 7 DAYS.

STORMWATER INFILTRATION BASIN TYPICAL CROSS SECTION
NOT TO SCALE — (LOCATION AS DENOTED ON PLAN)



OUTLET CONTROL STRUCTURE
NO SCALE — LOCATION AS NOTED ON PLAN

THE CONTRACTOR SHALL CONFIRM ALL STRUCTURE DIMENSIONS AND COORDINATE WITH MANUFACTURER BEFORE FABRICATION.

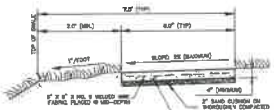
STRUCTURE	OUTLET PIPE			
	TOP ELEV. (THIS)	BASE ELEV. (THIS)	DIAMETER (INCHES)	INVERT IN (THIS)
01	11.40	7.40	(1) 24" HDPE	7.70

OUTLET CONTROL STRUCTURE TABLE

OUTLET STRUCTURE NOTES:
1. STRUCTURAL DESIGN SPECIFICATIONS SHALL CONFORM TO LATEST ASTM C913 SPECIFICATIONS FOR "PRECAST CONCRETE WATER & WASTEWATER STRUCTURES."
2. CONCRETE COMPRESSIVE STRENGTH SHALL BE A MINIMUM OF 5,000 PSI.
3. ALL REINFORCING DESIGN TO CONFORM TO THE REQUIREMENTS OF ASTM C913 SPECIFICATIONS FOR "STRUCTURAL DESIGN LOADING FOR WATER & WASTEWATER STRUCTURES" AND SHALL UTILIZE GRADE 60 RE-BAR CONFORMING TO THE REQUIREMENTS OF ASTM A615 OR "WIF CONFORMING TO THE REQUIREMENTS OF WSH A185 OR WSHA 496.
4. ALL PIPE TO BE WATER TIGHT JOINTS WITH RUBBER GASKETS AS PER MCDOT STANDARDS FOR WATER JOINT CONNECTIONS.
5. JOINTS TO BE SEALED WITH BUTYL RUBBER JOINT SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990, OR MORTAR AS PER MCDOT REQUIREMENTS OR BOTH.
6. ALL DIMENSIONS, STRUCTURAL DESIGN, PLAN & SPECIFICATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

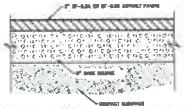
TYPICAL PRIMARY SWALE SECTION
NOT TO SCALE

TYPICAL PROPERTY LINE SWALE SECTION
NOT TO SCALE



SECTION

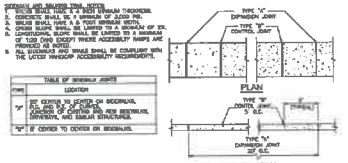
CONCRETE SIDEWALK DETAIL
NOT TO SCALE

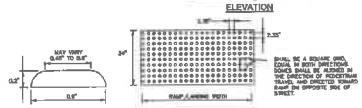


TYPICAL RESIDENTIAL ROADWAY PAVEMENT SECTION
NOT TO SCALE

NOTE:
PAVING SHALL CONSIST OF 1.5", ENSURING THE SPECIFIED PAVING or DRIVE AREAS AND WITH TWO 1.5" SF-9.5A OR SF-9.5B ASPHALT CONCRETE SURFACE COURSE IN CONFORMATION WITH 6" AGGREGATE BASE COURSE. THE SOIL SUBGRADE BENEATH PAVEMENTS SHALL BE COMPACTED TO A LEAST SIDE OF ASTM D 698 PRIOR TO ANY PLACEMENT OF AGGREGATE FILL OR STONE BASE COURSE. ALL SITE PREPARATION AND THE DESIGN AND CONSTRUCTION OF ALL PAVEMENTS, GRADED SLABS, AND PAVEMENTS SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS PROVIDED BY A GEOTECHNICAL ENGINEER.

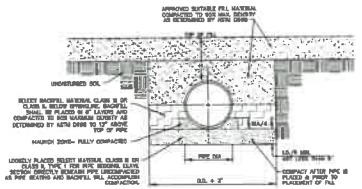
SIDEWALK AND DRIVEWAY TRAIL NOTES:
1. WHERE SHALL HAVE A 4 INCH MINIMUM THICKNESS.
2. CONCRETE SHALL BE A MINIMUM OF 3,000 PSI.
3. WALKS SHALL HAVE A 5 FOOT MINIMUM WIDTH.
4. ALL WALKS SHALL HAVE A RUNNING SLOPE NOT EXCEEDING 5%, LONGITUDINAL SLOPES SHALL BE LIMITED TO A MAXIMUM OF 1:20 (5%) EXCEPT WHERE ACCESSIBLE RAMPS ARE PROVIDED OR NOTED.
5. ALL SIDEWALKS AND WALKS SHALL BE COMPLIANT WITH THE LATEST HANDICAP ACCESSIBILITY REQUIREMENTS.



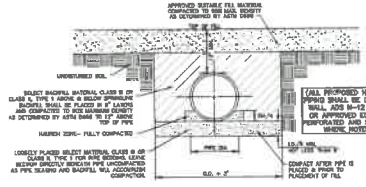


TRUNCATED DOME DETECTABLE WARNING DETAIL
NOT TO SCALE

DETECTABLE WARNING GENERAL NOTES
1. DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES MANUFACTURED BY "ECCO-L" (INDUSTRIES, INC.), CALLED "SAFE-T-TRAX", WITH POLYURETHANE COATING "DURABAN", OR APPROVED EQUAL, APPLIED ON SMOOTH (NON-GROOVED) CLEAN CONCRETE RAMP, AND SHALL CONFORM TO THE DETAILS IN THE PLANS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. ALL DETECTABLE WARNING AREAS SHALL START AT BACK OF CURB, BE 24 INCHES IN DEPTH AND COVER THE COMPLETE WIDTH OF THE RAMP AREA 48 INCHES MIN.,
3. 70% VISUAL CONTRAST IS REQUIRED, THE COLOR SHALL BE AN INTEGRAL PART OF THE DETECTABLE WARNING MATERIAL, AS SPECIFIED ON THE PLANS, COLOR TO BE DETERMINED BY THE CITY STAFF, SAFETY YELLOW IS THE DEFAULT COLOR.
4. THE SMOOTH AND CLEAN CONCRETE UNDER DETECTABLE WARNING DEVICE AREA SHALL BE INCLUDED IN THE COST OF THE CONCRETE CURB RAMP, THE COST OF FURNISHING AND INSTALLING THE DETECTABLE WARNING DEVICE SHALL BE INCLUDED SEPARATELY AS "DETECTABLE WARNING DEVICE" PER SQUARE FOOT OF AS OUTLINED IN THE SPECIFICATIONS.
5. DETECTABLE WARNING SURFACE:
   APPLIED A COATING OF "DURABAN" SUR-RESISTANT POLYURETHANE COATING TO THE SMOOTH, CLEAN CONCRETE SURFACE. ON TOP OF THE POLYURETHANE COATING APPLY TRUNCATED DOMES FROM A "SAFTY-TRAX" CONTACT SHEET, ON TOP OF THE TRUNCATED DOMES AND INITIAL POLYURETHANE COATING PLACE THREE ADDITIONAL COATS OF "DURABAN" POLYURETHANE COATING. COLOR TO BE DETERMINED BY CITY STAFF OR AS SPECIFIED ON THE PLANS, SAFETY YELLOW IS A DEFAULT COLOR.
6. ALL RAMPS AND DETECTABLE WARNING SHALL BE ALIGNED IN THE DIRECTION OF PEDESTRIAN TRAVEL AND DIRECTED TOWARD RAMP ON THE OPPOSITE SIDE OF STREET.

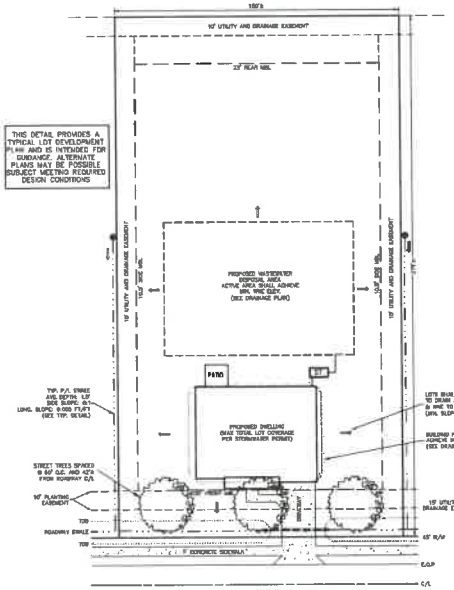


STANDARD RIGID PIPE INSTALLATION DETAIL
NOT TO SCALE — NORMAL EARTH FOUNDATION — NCDOT STD 300.01



STANDARD FLEXIBLE PIPE INSTALLATION DETAIL
NOT TO SCALE — NORMAL EARTH FOUNDATION — NCDOT STD 300.01

GENERAL PIPE INSTALLATION NOTES
1. ALL EXCAVATIONS SHALL CONFORM WITH THE TRENCH AND CONDITIONS OF THE OCCUPATION BY KNOWNOSE FOR EXCAVATIONS IN OSHA "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION" 29 CFR PART 1926, THE CONTRACTOR SHALL HAVE A COMPETENT PERSON ON THE JOB AT ALL TIMES WHO SHALL EMPLOY A PROFESSIONAL ENGINEER TO ALTER ALL PERTINENT MATTERS OF THIS WORK.
2. PLACE & COMPACT BEDDING MATERIAL UNDER AND AROUND PIPE IN DRY TRENCH. DO NOT PLACE PIPE IN WATER OR ON FROZEN BEDDING. REMOVE ANY SOFT OR UNSUITABLE MATERIAL AND BACKFILL WITH APPROVED MATERIAL.
3. THIS PIPE DIAL BAR INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH NCDOT TYPICAL STANDARD DETAIL 300.01.
   I.D. = THE MINIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
   O.D.= THE MIN. BARREL HORIZONTAL OUTSIDE DIAMETER DIMENSION.
   H = THE MINIMUM VERTICAL DISTANCE FROM THE TOP OF PAVEMENT ALONG THE PIPE PATH TO THE TOP OF THE PIPE TO THE TOP OF THE BARRELS WHICH IS THE POINT UNDERNEATH FILL HEIGHT FOR TOTAL DRAIN PIPES EXIST BELOW PAVEMENT STRUCTURE SHALL BE 1', OR AS SPECIFIED BY THE PIPE MANUFACTURER, WHICHEVER IS GREATER.
4. PIPES TO BE INSTALLED TO BOTTOM FLUSH STRUCTURES SHALL HAVE THE FOLLOWING MINIMUM FILL HEIGHT (H) AS MEASURED FROM THE TOP OF PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE.
   12-42 in R.C.P. OR H.D.P.E. PIPE = 1' MINIMUM
   12-60 in R.C.P. OR H.D.P.E. PIPE = 2' MINIMUM
   CLASS III R.C.P. OR H.D.P.E. PIPE = 2' MINIMUM
   SEE NCDOT STANDARD 300.01 FOR MINIMUM AND MAXIMUM FILL HEIGHT REQUIREMENTS FOR OTHER TYPES OF FLEXIBLE AND RIGID PIPE.



MINIMUM DIMENSIONAL STANDARDS
MINIMUM LOT SIZE = 40,000 S.F.
MINIMUM LOT WIDTH = 125'
(EXCEPT CUL-DE-SAC LOTS)
SCALE: 1"=30'

FINAL DRAWING
NOT RELEASED FOR CONSTRUCTION

Engineering Consultant Group
Civil Engineering
Land Planning
Surveying
P.O. Box 1548 Fayetteville, NC 28302
Phone: (910) 864-3548
Fax: (910) 864-3549
Engineers, Planners, Surveyors and Environmental Specialists

ROADWAY, DRAINAGE & TYP. CONSTRUCTION DETAILS

ALGONQUIN
POPLAR BRANCH TOWNSHIP — CURRITUCK COUNTY — NORTH CAROLINA

CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	BY	DATE

DATE: 11/2021 — SCALE: AS NOTED
DESIGNED: RPG — DRAWN: MSB
CHECKED: KPW/DHBC — APPROVED: RPG
SHEET: 10 of 13
CAD FILE: 382600B2
PROJECT NO: 3826

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Currituck County, North Carolina

October 8, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Currituck County, North Carolina
Survey Area Data: Version 24, Sep 9, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 18, 2022—May 31, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnA	Conetoe loamy sand, 0 to 3 percent slopes	4.0	71.1%
Mu	Munden loamy sand	0.1	1.9%
No	Nimmo loamy sand	1.5	27.0%
Totals for Area of Interest		**5.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Currituck County, North Carolina

CnA—Conetoe loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3rnf
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Conetoe and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conetoe

Setting

Landform: Ridges on marine terraces, ridges on stream terraces
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 8 inches: loamy sand
E - 8 to 22 inches: loamy sand
Bt - 22 to 40 inches: sandy loam
BC - 40 to 46 inches: loamy sand
C - 46 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F153AY030NC - Dry Loamy Rises and Flats, F153BY030NC - Dry Loamy Rises and Flats
Hydric soil rating: No

Minor Components

Leon

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F153AY070NC - Wet Spodosol Flats and Depressions, F153BY070NC - Wet Spodosol Flats and Depressions
Hydric soil rating: Yes

Mu—Munden loamy sand

Map Unit Setting

National map unit symbol: 3rnr
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Munden and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Munden

Setting

Landform: Ridges on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

A - 0 to 9 inches: loamy sand
Bt - 9 to 37 inches: fine sandy loam
C - 37 to 72 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F153BY040NC - Moist Loamy Rises and Flats
Hydric soil rating: No

Minor Components

Nimmo, undrained

Percent of map unit: 5 percent
Landform: Depressions on marine terraces, flats on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

No—Nimmo loamy sand

Map Unit Setting

National map unit symbol: 3rnv
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nimmo, drained, and similar soils: 80 percent
Nimmo, undrained, and similar soils: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nimmo, Drained

Setting

Landform: Depressions on marine terraces, flats on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 6 inches: loamy fine sand
Btg - 6 to 25 inches: fine sandy loam
Cg - 25 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Description of Nimmo, Undrained

Setting

Landform: Depressions on marine terraces, flats on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 6 inches: loamy fine sand
Btg - 6 to 25 inches: fine sandy loam
Cg - 25 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

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SAMPLE
FRACTION MITIGATION
CONTINGENCY PLAN
FOR DIRECTIONAL DRILLING

TABLE OF CONTENTS

FRAC-OUT CONTINGENCY PLAN (FCP)

1.0 Introduction and Purpose

Directional bore operations have a potential to release drilling fluids into the surface environment through frac-outs (A frac-out is the condition where drilling mud is released through fractured bedrock into the surrounding rock and sand and travels toward the surface.) Because drilling muds consist largely of a bentonite clay-water mixture, they are not classified as toxic or hazardous substances. However, if it is released into water bodies, bentonite has the potential to adversely impact fish and invertebrates.

While drilling fluid seepage associated with a frac-out is most likely to occur near the bore entry and exit points where the drill head is shallow, frac-outs can occur in any location along a directional bore. This Frac-Out Contingency Plan (FCP) establishes operational procedures and responsibilities for the prevention, containment, and clean-up of frac-outs associated with the proposed directional drilling utility project of _____. All personnel and Sub-Contractors responsible for the work must adhere to this plan during the directional drilling process.

The specific objectives of this plan are to:

1. Minimize the potential for a frac-out associated with directional drilling activities;
2. Provide for the timely detection of frac-outs;
3. Protect the environmentally sensitive riverbed and associated riparian vegetation;
4. Ensure an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling bentonite; and
5. Ensure that all appropriate notifications are made immediately to the customer, management and safety personnel.

2.0 Description of Work:

The proposed project consists of: *(Explain work task in detail to crew members.)*

Drilling operations will be halted by the drill rig operators immediately upon detection of a drop in drilling pressure or other evidence of a frac-out. The clean-up of all spills shall begin immediately. Management & safety department shall be notified immediately of any spills and shall be consulted regarding clean-up procedures. A spill kit shall be on-site and used if a frac-out occurs. A vacuum truck and containment materials, such as straw bales, shall also be on-site prior to and during all operations. The Site Supervisor will be immediately notified. In the event of a frac-out, the on-site foreman/supervisor will conduct an evaluation of the situation and direct recommended mitigation actions, based on the following guidelines:

a. If the frac-out is minor, easily contained. has not reached the surface and is not threatening sensitive resources, drilling operations may resume after use of a leak stopping compound or redirection of the bore;

b. If the frac-out has reached the surface, any material contaminated with Bentonite shall be removed by hand to a depth of 2-feet, contained and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite is either properly disposed of at an approved disposal facility or properly recycled in an approved manner. The Site Supervisor shall notify and take any necessary follow-up response actions in coordination with agency representatives. The Site Supervisor will coordinate the mobilization of equipment stored at off-site locations (e.g., vacuum trucks) on an as needed basis;

3.0 Site Supervisor/Foremen Responsibilities:

The Site Supervisor/Foremen has overall responsibility for implementing this FCP. The Site Supervisor/Foremen will ensure that all employees are trained prior to all drilling. The Site Supervisor/Foremen shall be notified immediately when a frac-out is detected. The Site Supervisor/Foremen will be responsible for ensuring that the safety department is aware of the frac-out, coordinating personnel, response, cleanup, regulatory agency notification and coordination to ensure proper clean-up, disposal of recovered material and timely reporting of the incident. The Site Supervisor/Foremen shall ensure all waste materials are properly containerized, labeled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The Site Supervisor/Foremen shall be familiar with all aspects of the drilling activity, the contents of this Frac-out Contingency Plan and the conditions of approval under which the activity is permitted to take place. The Site Supervisor/Foremen shall have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The Site Supervisor/Foremen shall assure that a copy of this plan is available (onsite) and accessible to all construction personnel. The Site Supervisor/Foremen shall ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of drilling operations.

4.0 Equipment:

The Site Supervisor shall ensure that:

- All equipment and vehicles are be checked and maintained daily to prevent leaks of hazardous materials;
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order;
- Equipment required to contain and clean up a frac-out release will either be available at the work site or readily available at an offsite location within 15-minutes of the bore site; and
- If equipment is required to be operated near a riverbed, absorbent pads and plastic sheeting for placement beneath motorized equipment shall be used to protect the riverbed from engine fluids;

5.0 Training

Prior to the start of construction, the Site Supervisor/Foremen, shall ensure that the crew members receive training in the following:

- The provisions of the Frac-out Contingency Plan, equipment maintenance and site specific permit and monitoring requirements;
- Inspection procedures for release prevention and containment equipment and materials;
- Contractor/crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of a frac-out and to immediately report any frac-out releases;
- Contractor/crew member responsibilities in the event of a release;
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate; and
- Protocols for communication with agency representatives who might be on-site during the clean-up effort.

6.0 Drilling Procedures

The following procedures shall be followed each day, prior to the start of work. The Frac-out Contingency Plan shall available on-site during **all** construction. The Site Supervisor/Foremen shall be on-site at any time that drilling is occurring or is planned to occur. The Site Supervisor/Foremen shall ensure that a Job Briefing meeting is held at the start of each day of drilling to review the appropriate procedures to be followed in case of a frac-out. Questions shall be answered and clarification given on any point over which the drilling crew or other project staff has concerns.

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels shall be monitored randomly by the operator. Pressure levels shall be set at a minimum level to prevent frac-outs. During the pilot bore, maintain the drilled annulus. Cutters and reamers will be pulled back into previously-drilled sections after each new joint of pipe is added.

Exit and entry pits shall be enclosed by silt fences a nd straw. A spill kit shall be on-site and used if a frac-out occurs. A vacuum truck shall be readily available on-site prior to and during all drilling operations. Containment materials (Straw, silt fencing, sand bags, frac-out spill kits, etc.) shall be staged on-site at location where they are readily available and easily mobilized for immediate use in the event of an accidental release of drilling mud (frac-out). If necessary, barriers (straw bales or sedimentation fences) between the bore site and the edge of the water source, shall be constructed, prior to drilling, to prevent released bentonite material from reaching the water.

Once the drill rig is in place, and drilling begins, the drill operator shall stop work whenever the pressure in the drill rig drops, or there is a lack of returns in the entrance pit. At this time the Site Supervisor/Foremen shall be informed of the potential frac-out. The Site Supervisor/Foremen and the drill rig operator(s) shall work to coordinate the likely location of the frac-out. The location of the frac-out shall be recorded and notes made on the location and measures taken to address the concern. The following subsections shall be adhered to when addressing a frac-out situation.

Water containing mud, silt, bentonite, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake, flowing stream or any other water source. The Bentonite used in the drilling process shall be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

6.1 Vac-Truck:

A vacuum truck shall be staged at a location from which it can be mobilized and relocated so that any place along the drill shot, can be reached by the apparatus, within 10 minutes of a frac-out.

6.2 Field Response to Frac-out Occurrence:

The response of the field crew to a frac-out release shall be immediate and in accordance with procedures identified in this Plan. All appropriate emergency actions that do not pose additional threats to sensitive resources will be taken, as follows:

a. Directional boring will stop immediately;
b. The bore stem will be pulled back to relieve pressure on frac-out;
c. The Site Supervisor/Foremen will be notified to ensure that management and the safety department is notified, adequate response actions are taken and notifications made;
d. The Site Supervisor/Foremen shall evaluate the situation and recommend the type and level of response warranted, including the level of notification required;
e. If the frac-out is minor, easily contained, has not reached the surface and is not threatening sensitive resources, a leak stopping compound shall be used to block the frac-out. If the use of leak stopping compound is not fully successful, the bore stem shall be redirected to a new location along the desired drill path where a frac-out has not occurred;
f. If the frac-out has reached the surface, any material contaminated with Bentonite shall be removed by hand, to a depth of 2-feet, contained and properly disposed of, as required by law. A dike or berm may be constructed around the frac-out to entrap released drilling fluid, if necessary. Clean sand shall be placed and the area returned to pre-project contours; and
g. If a frac-out occurs, reaches the surface and becomes widespread, the Site Supervisor/Foremen shall authorize a readily accessible vacuum truck and bulldozer stored off-site to be mobilized. The vacuum truck may be either positioned at either end of the line of the drill so that the frac-out can be reached by crews on foot, or may be pulled by a bulldozer, so that contaminated soils can be vacuumed up.

6.3 Response Close-out Procedures:

When the release has been contained and cleaned up, response closeout activities will be conducted at the direction of the Site Supervisor/Foremen and shall include the following:

a. The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source;
b. All frac-out excavation and clean-up sites will be returned to pre-project contours using clean fill, as necessary; and
c. All containment measures (fiber rolls, straw bale, etc.) will be removed, unless otherwise specified by the Site Supervisor/Foremen.

6.4 Construction Re-start:

For small releases not requiring external notification, drilling may continue, if 100 percent containment is achieved through the use of a leak stopping compound or redirection of the bore and the clean-up crew remains at the frac-out location throughout the construction period.

For releases requiring external notification and/or other agencies, construction activities will not restart without prior approval from the safety department.

6.5 Bore Abandonment:

Abandonment of the bore will only be required when all efforts to control the frac-out within the existing directional bore have failed.

7.0 Notification:

In the event of a Frac-out that reaches a water source, the Site Supervisor/Foremen will notify safety department so they can notify the appropriate resource agencies. All agency notifications will occur within 24 hours and proper documentation will be accomplished in a timely and complete manner. The following information will be provided:

1. Name and telephone number of person reporting;
2. Location of the release;
3. Date and time of release;
4. Type and quantity, estimated size of release;
5. How the release occurred;
6. The type of activity that was occurring around the area of the frac-out;
7. Description of any sensitive areas, and their location in relation to the frac-out;
8. Description of the methods used to clean up or secure the site; and
9. Listing of the current permits obtained for the project.

7.1 Communicating with Regulatory Agency Personnel:

All employees and subcontractors will adhere to the following protocols when permitting Regulatory Agency Personnel arrive on site. Regulatory Agency Personnel will be required to comply with appropriate safety rules. Only the Site Supervisor/Foremen and the safety department are to coordinate communication with Regulatory Agency Personnel.

7.2 Documentation:

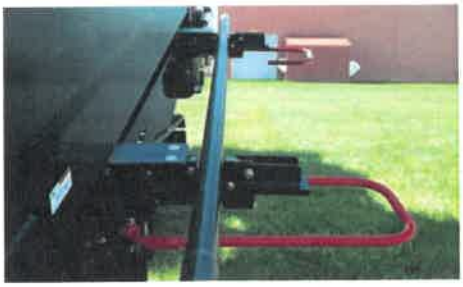
The Site Supervisor/Foremen shall record the frac-out event in his or her daily log. The log will include the following: Details on the release event, including an estimate of the amount of bentonite released, the location and time of release, the size of the area impacted, and the success of the clean-up action. The log report shall also include the: Name and telephone number of person reporting; Date, How the release occurred; The type of activity that was occurring around the area of the free-out: Description of any sensitive areas, and their location in relation to the frac-out: Description of the methods used to clean up or secure the site; and a listing of the current permits obtained for the project.

8.0 Project Completion and Clean-up:

a. All materials and any rubbish-construction debris shall be removed from the construction zone at the end of each workday;
b. Sump pits at bore entry and exits will be filled and returned to natural grade; and
c. All protective measures (fiber rolls, straw bale, silt fence, etc.) will be removed unless otherwise specified by the Site Supervisor/Foremen.

D40x55 S3 NAVIGATOR®
HORIZONTAL DIRECTIONAL DRILL

PREMIUM PERFORMANCE. With 40,000 lb (177.9 kN) of thrust/pullback and 5,500 ft-lb (7,457 Nm) of rotational torque, the D40x55 S3 offers a 10% increase in thrust and rotation over its predecessor, the D36x50 Series II – helping to maximize productivity.



VARIETY OF ROD OPTIONS. The D40x55 S3 is available with a range of drill rod options, including a 10 ft (3 m) length in 2.38 in (6 cm) or a 2.63 in (6.7 cm) diameter, and a 15 ft (4.6 m) length in a 2.63 in (6.7 cm) diameter. A variety of rod options allows the drill to be configured to the specific needs of the contractor.

CLASS-LEADING CYCLE TIMES. The D40x55 S3 features a carriage speed of 188 fpm (57.3 m/min) – which is 7% faster than its predecessor, the D36x50 Series II – helping contractors install more linear feet per day.

SIGNIFICANT SOUND REDUCTION. With a 104 dB(A) guaranteed sound power level and an operator ear rating of 82.9 dB(A) [in-cab rating of 75.7 dB(A)], the D40x55 S3 is significantly quieter than its predecessor – contributing to a quieter working environment with less neighborhood disturbance and easier communication among the crew.

COMFORTABLE CAB. The excavator-style cab provides operators more legroom and greater comfort.

AURORA™ TOUCHSCREEN DISPLAY. Interactive full-color touchscreen display delivers real-time, easy-to-view locate information, bore plans and more that can help increase productivity.

OR APPROVED EQUAL

VERMEER.COM

Vermeer

EQUIPPED TO DO MORE.

D40x55 S3 NAVIGATOR® HORIZONTAL DIRECTIONAL DRILL

GENERAL WEIGHTS AND DIMENSIONS

Min transport length: 20.1 ft (6.1 m)

Min transport width: 89 in (226.1 cm)

Min transport height: 76 in (193 cm)

Height (with cab): 94.5 in (240 cm)

Min weight: 22,380 lb (10,151.4 kg)

Max weight: 26,110 lb (11,843.3 kg)

ENGINE OPTION ONE

Make and model: John Deere Series 4045

Fuel type: Ultra low sulfur diesel

Max engine rpm: 2,400 rpm

Gross horsepower: 140 hp (104 kW)

Emissions rating: Tier 4 Final (EU Stage V)

ENGINE OPTION TWO

Make and model: John Deere Series 4045

Fuel type: Diesel

Max engine rpm: 2,400 rpm

Gross horsepower: 140 hp (104 kW)

Emissions rating: Tier 3 (EU Stage IIIA)

OPERATIONAL

Thrust/Pullback: 40,000 lb (177.9 kN)

Max carriage speed at max engine rpm: 188 ft/min (57.3 m/min)

Max spindle torque (low at max engine rpm): 5,500 ft-lb (7457 Nm)

Max spindle speed at max engine rpm: 227 rpm

Min bore diameter: 4 in (10.2 cm)

Max ground drive speed at max engine rpm (fwd): 3.3 mph (5.3 km/h)

Noise level at operator's ear: 82.9 dB(A)

Noise level at operator's ear (cab) : 75.7 dB(A)

Drill rack angle [10 ft (3 m) rod]: 15.5-20.5° (27.7-37.4%)

Drill rack angle [15 ft (4.6 m) rod]: 12.5-17.5° (22.2-31.5%)

FLUID CAPACITIES

Fuel tank: 44 gal (166.6 L)

Antifreeze tank capacity: 1.6 gal (6 L)

DRILLING FLUID SYSTEM OPTION ONE

Max flow: 50 gpm (189.3 L/min)

Max pressure: 1,050 psi (7.2 MPa)

DRILLING FLUID SYSTEM OPTION TWO

Max flow: 70 gpm (265 L/min)

Max pressure: 1,100 psi (7.6 MPa)

FEATURES

Breakout system: Standard hydraulic vise

Drilling lights: Standard

Flow indicator: Standard

Stakedown system: Standard

Strike alert: Standard

Remote lockout: Standard

DRILL PIPE OPTION ONE

Type: Firestick® drill rod

Length: 10 ft (3 m)

Rod diameter: 2.38 in (6 cm)

Weight: 80 lb (36.3 kg)

Bend radius: 108 ft (32.9 m)

Carrying capacity: 500 ft (152.4 m)

DRILL PIPE OPTION TWO

Type: Firestick drill rod

Length: 10 ft (3 m)

Rod diameter: 2.63 in (6.7 cm)

Weight: 131 lb (59.4 kg)

Bend radius: 145 ft (44.2 m)

Carrying capacity: 450 ft (137.2 m)

DRILL PIPE OPTION THREE

Type: Firestick drill rod

Length: 15 ft (4.6 m)

Rod diameter: 2.63 in (6.7 cm)

Weight: 165 lb (74.9 kg)

Bend radius: 145 ft (44.2 m)

Carrying capacity: 525 ft (160 m)

Vermeer

EQUIPPED TO DO MORE.

02/23

PN 296431556

HYDRAUL-EZ®

OR APPROVED EQUAL

HORIZONTAL DIRECTIONAL DRILLING FLUID - NEW IMPROVED FORMULA

Certified to NSF/ANSI/CAN 60

DESCRIPTION

HYDRAUL-EZ is a high-yield, 230 bbl yield (minimum), 200 mesh sodium bentonite, with a special dry polymer additive. This new improved formula is designed to maintain borehole integrity in horizontally drilled boreholes. HYDRAUL-EZ is certified to NSF/ANSI/CAN Standard 60, Drinking Water Treatment Chemicals - Health Effects.

RECOMMENDED USE

HYDRAUL-EZ is specially designed for conditions encountered in angle and horizontal drilling. It can be used for all types of freshwater mud rotary drilling and as a jacking lubricant.

CHARACTERISTICS

- Concentrated for high yield
- Eliminates clay and shale swelling, bit balling, and sticking problems
- Forms a tight, thin filter cake in unstable formations
- Maintains borehole integrity in horizontal and vertically drilled holes
- Mixes quickly
- Requires less material due to low fluid loss properties

MIXING AND APPLICATION

Mixing ratios are based on the use of freshwater. Water purity will affect bentonite performance. For best results, make-up water should be pre-treated with SODA ASH to a pH of 8.5-9.5. HYDRAUL-EZ should be added slowly through a jet/hopper mixer.

DRILLING FLUID HYDRAUL-EZ mixing ratios in lbs (kg) per 100 gallons (1 m^3) of water

Condition	Lbs of HYDRAUL-EZ	% Solids
Normal Conditions	15 - 25 lbs (18 - 28 kg)	1.8 - 2.9%
Sand and Gravel	25 - 35 lbs (28 - 42 kg)	2.9 - 4.0%
Fluid loss Control	35 - 40 lbs (40 - 47 kg)	4.0 - 4.6%

BULK DENSITY

54 lbs/ft^3 (0.86 kg/L)

PACKAGING

~50 lbs (~22.7 kg) bags, 48 per pallet. All pallets are plastic-wrapped.

North America: 847.851.1800 | 800.527.9948 | www.CETCO.com

UPDATED: JANUARY 2022

FORM: TDS_HYDRAUL-EZ - NEW IMPROVED FORMULA_AM_EN_202201