

DEMLR USE ONLY		
Date Received	Fee Paid	Permit Number
Applicable Rules: <input type="checkbox"/> Coastal SW - 1995 <input type="checkbox"/> Coastal SW - 2008 <input type="checkbox"/> Ph II - Post Construction (select all that apply) <input type="checkbox"/> Non-Coastal SW- HQW/ORW Waters <input type="checkbox"/> Universal Stormwater Management Plan <input type="checkbox"/> Other WQ Mgmt Plan: _____		

State of North Carolina
Department of Environment and Natural Resources
Division of Energy, Mineral and Land Resources

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

This form may be photocopied for use as an original

I. GENERAL INFORMATION

1. Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):

Midgard Point Harbor - Self Storage Expansion

2. Location of Project (street address):

9050 Caratoke Highway

City: Point Harbor

County: Currituck

Zip: 27964

3. Directions to project (from nearest major intersection):

Beginning at the intersection of NC-158 and NC-12, head west on NC-158, head east for 5.4 miles to reach 9050 Caratoke Highway, which will be on your left as you proceed north along NC-158

4. Latitude: 36° 04' 58.08" N Longitude: 75° 48' 2.44" W of the main entrance to the project.

II. PERMIT INFORMATION:

1. a. Specify whether project is (check one): New Modification Renewal w/ Modification[†]

[†]Renewals with modifications also requires SWU-102 – Renewal Application Form

b. If this application is being submitted as the result of a **modification** to an existing permit, list the existing permit number SW7981007, its issue date (if known) August 2009, and the status of construction: Not Started Partially Completed* Completed* *provide a designer's certification

2. Specify the type of project (check one):

Low Density High Density Drains to an Offsite Stormwater System Other

3. If this application is being submitted as the result of a **previously returned application** or a **letter from DEMLR requesting a state stormwater management permit application**, list the stormwater project number, if assigned, n/a and the previous name of the project, if different than currently proposed, n/a.

4. a. Additional Project Requirements (check applicable blanks; information on required state permits can be obtained by contacting the Customer Service Center at 1-877-623-6748):

CAMA Major Sedimentation/Erosion Control: 1.95 ac of Disturbed Area

NPDES Industrial Stormwater 404/401 Permit: Proposed Impacts _____

b. If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit: n/a

n/a

5. Is the project located within 5 miles of a public airport? No Yes

If yes, see S.L. 2012-200, Part VI: <http://portal.ncdenr.org/web/lr/rules-and-regulations>

III. CONTACT INFORMATION

1. a. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

Applicant/Organization: Sylvie Germana

Signing Official & Title:

b. Contact information for person listed in item 1a above:

Street Address: 755 Commerce Dr Ste 800

City: Decatur State: GA Zip: 30030

Mailing Address (if applicable):

City: State: Zip:

Phone: (754) 245-7992 Fax: ()

Email:

c. Please check the appropriate box. The applicant listed above is:

The property owner (Skip to Contact Information, item 3a) APPLICANT/AGENT

Lessee* (Attach a copy of the lease agreement and complete Contact Information, item 2a and 2b below)

Purchaser* (Attach a copy of the pending sales agreement and complete Contact Information, item 2a and 2b below)

Developer* (Complete Contact Information, item 2a and 2b below.)

2. a. Print Property Owner's name and title below, if you are the lessee, purchaser or developer. (This is the person who owns the property that the project is located on):

Property Owner/Organization: Midgard Point Harbor LLC

Signing Official & Title: Matt Garcia - Director of Development - mgarcia@reliant-mgmt.com

b. Contact information for person listed in item 2a above:

Street Address: 1146 Canton St

City: Roswell State: GA Zip: 30075

Mailing Address (if applicable):

City: State: Zip:

Phone: (770) 609-8276 Fax: ()

Email:

3. a. (Optional) Print the name and title of another contact such as the project's construction supervisor or other person who can answer questions about the project:

Other Contact Person/Organization: Contineo Group, LLC (Civil Engineer)

Signing Official & Title: Ken Haertel - Project Manager

b. Contact information for person listed in item 3a above:

Mailing Address: 755 Commerce Drive, Suite 800

City: Decatur State: GA Zip: 30030

Phone: (678) 481-1498 Fax: ()

Email: kenh@thecontineogroup.com

4. Local jurisdiction for building permits: Currituck County

Point of Contact: Dylan Lloyd / Donna Voliva Phone #: ()

*** Report only that amount of existing BUA that will remain after development. Do not report any existing BUA that is to be removed and which will be replaced by new BUA.

11. How was the off-site impervious area listed above determined? Provide documentation. n/a

Projects in Union County: Contact DEMLR Central Office staff to check if the project is located within a Threatened & Endangered Species watershed that may be subject to more stringent stormwater requirements as per 15A NCAC 02B .0600.

V. SUPPLEMENT AND O&M FORMS

The applicable state stormwater management permit supplement and operation and maintenance (O&M) forms must be submitted for each BMP specified for this project. The latest versions of the forms can be downloaded from <http://portal.ncdenr.org/web/wq/ws/su/bmp-manual>.

VI. SUBMITTAL REQUIREMENTS

Only complete application packages will be accepted and reviewed by the Division of Energy, Mineral and Land Resources (DEMLR). A complete package includes all of the items listed below. A detailed application instruction sheet and BMP checklists are available from http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs. The complete application package should be submitted to the appropriate DEMLR Office. (The appropriate office may be found by locating project on the interactive online map at <http://portal.ncdenr.org/web/wq/ws/su/maps>.)

Please **indicate that the following required information have been provided by initialing** in the space provided for each item. All original documents **MUST** be signed and initialed in **blue ink**. **Download the latest versions for each submitted application package** from http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs.

- | | Initials |
|--|---------------|
| 1. <i>Original and one copy</i> of the Stormwater Management Permit Application Form. | <u>KH</u> |
| 2. <i>Original and one copy</i> of the signed and notarized Deed Restrictions & Protective Covenants Form. (if required as per Part VII below) | <u>N/A</u> |
| 3. <i>Original</i> of the applicable Supplement Form(s) (<u>sealed, signed and dated</u>) and O&M agreement(s) for <u>each</u> BMP. | <u>KH</u> |
| 4. Permit application processing fee of \$505 payable to NCDENR. (For an Express review, refer to http://www.envhelp.org/pages/onestopexpress.html for information on the Express program and the associated fees. Contact the appropriate regional office Express Permit Coordinator for additional information and to schedule the required application meeting.) | <u>KH</u> |
| 5. A detailed narrative (one to two pages) describing the stormwater treatment/management | for <u>KH</u> |
| 6. A USGS map identifying the site location. If the receiving stream is reported as class SA or the receiving stream drains to class SA waters within ½ mile of the site boundary, include the ½ mile radius on the map. | <u>KH</u> |
| 7. Sealed, signed and dated calculations (one copy). | <u>KH</u> |
| 8. Two sets of plans <u>folded to 8.5" x 14"</u> (sealed, signed, & dated), including: | <u>KH</u> |
| a. Development/Project name. | |
| b. Engineer and firm. | |
| c. Location map with named streets and NCSR numbers. | |
| d. Legend. | |
| e. North arrow. | |
| f. Scale. | |
| g. Revision number and dates. | |
| h. Identify all surface waters on the plans by delineating the normal pool elevation of impounded structures, the banks of streams and rivers, the MHW or NHW line of tidal waters, and any coastal wetlands landward of the MHW or NHW lines. <ul style="list-style-type: none"> • Delineate the vegetated buffer landward from the normal pool elevation of impounded structures, the banks of streams or rivers, and the MHW (or NHW) of tidal waters. | |
| i. Dimensioned property/project boundary with bearings & distances. | |
| j. Site Layout with all BUA identified and dimensioned. | |
| k. Existing contours, proposed contours, spot elevations, finished floor elevations. | |
| l. Details of roads, drainage features, collection systems, and stormwater control measures. | |
| m. Wetlands delineated, or a note on the plans that none exist. (Must be delineated by a qualified person. Provide documentation of qualifications and identify the person who made the determination on the plans. | |
| n. Existing drainage (including off-site), drainage easements, pipe sizes, runoff calculations. | |
| o. Drainage areas delineated (included in the main set of plans, not as a separate document). | |

- p. Vegetated buffers (where required).
9. Copy of any applicable soils report with the associated SHWT elevations (Please identify elevations in addition to depths) as well as a map of the boring locations with the existing elevations and boring logs. Include an 8.5" x 11" copy of the NRCS County Soils map with the project area clearly delineated. For projects with infiltration BMPs, the report should also include the soil type, expected infiltration rate, and the method of determining the infiltration rate. **(Infiltration Devices submitted to WiRO: Schedule a site visit for DEMLR to verify the SHWT prior to submittal, (910) 796-7378.)** KH _____
10. A copy of the most current property deed. Deed book: 443 Page No: 697 KH _____
11. For corporations and limited liability corporations (LLC): Provide documentation from the NC Secretary of State or other official documentation, which supports the titles and positions held by the persons listed in Contact Information, item 1a, 2a, and/or 3a per 15A NCAC 2H.1003(e). The corporation or LLC must be listed as an active corporation in good standing with the NC Secretary of State, otherwise the application will be returned. N/A _____
<http://www.secretary.state.nc.us/Corporations/CSearch.aspx>

VII. DEED RESTRICTIONS AND PROTECTIVE COVENANTS

For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. If lot sizes vary significantly or the proposed BUA allocations vary, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded from http://portal.ncdenr.org/web/lr/state-stormwater-forms_docs. Download the latest versions for each submittal.

In the instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the NC DEMLR, and that they will be recorded prior to the sale of any lot.

VIII. CONSULTANT INFORMATION AND AUTHORIZATION

Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and/or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

Consulting Engineer: Ron Crump, P.E.

Consulting Firm: Contineo Group, LLC

Mailing Address: 755 Commerce Drive, Suite 800

City: Decatur State: GA Zip: 30030

Phone: (404) 556-7721 Fax: ()

Email: ronc@thecontineogroup.com

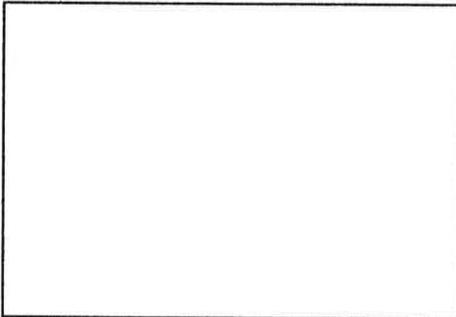
IX. PROPERTY OWNER AUTHORIZATION (if Contact Information, item 2 has been filled out, complete this section)

I, (print or type name of person listed in Contact Information, item 2a) MATT GARCIA, certify that I own the property identified in this permit application, and thus give permission to (print or type name of person listed in Contact Information, item 1a) SYLVIE GERMANA with (print or type name of organization listed in Contact Information, item 1a) SYLVIE GERMANA to develop the project as currently proposed. A copy of the lease agreement or pending property sales contract has been provided with the submittal, which indicates the party responsible for the operation and maintenance of the stormwater system.

As the legal property owner I acknowledge, understand, and agree by my signature below, that if my designated agent (entity listed in Contact Information, item 1) dissolves their company and/or cancels or defaults on their lease agreement, or pending sale, responsibility for compliance with the DEMLR Stormwater permit reverts back to me, the property owner. As the property owner, it is my responsibility to notify DEMLR immediately and submit a completed Name/Ownership Change Form within 30 days; otherwise I will be operating a stormwater treatment facility without a valid permit. I understand that the operation of a stormwater treatment facility without a valid permit is a violation of NC General Statute 143-215.1 and may result in appropriate enforcement action including the assessment of civil penalties of up to \$25,000 per day, pursuant to NCGS 143-215.6.

Signature: _____ Date: _____

I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this ___ day of _____, _____, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal, _____



SEAL

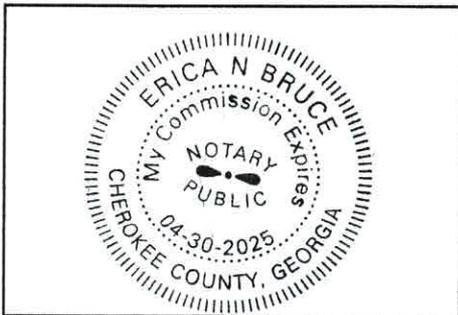
My commission expires _____

X. APPLICANT'S CERTIFICATION

I, (print or type name of person listed in Contact Information, item 1a) SYLVIE GERMANA certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable stormwater rules under 15A NCAC 2H .1000 and any other applicable state stormwater requirements.

Signature:  _____ Date: 2/21/2023

I, Erica N. Bruce, a Notary Public for the State of Georgia, County of Cherokee, do hereby certify that Sylvie Germana personally appeared before me this 21 day of February, 2023, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,  _____



SEAL

My commission expires 04/30/2025



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.



Major Stormwater Plan Form SW-002

OFFICIAL USE ONLY:

Permit Number: _____

Date Filed: _____

Date Approved: _____

Contact Information

APPLICANT:

Name: Ken Haertel
Address: 755 Commerce Drive, Suite 800
Decatur, GA 30030
Telephone: 754-245-7992
E-Mail Address: kenh@thecontineogroup.com

PROPERTY OWNER:

Name: Midgard Point Harbor NC, LLC
Address: 1146 Canton Street
Roswell, GA 30075
Telephone: 770-609-8276
E-Mail Address: mgarcia@reliant-mgmt.com

Property Information

Physical Street Address: 9050 Caratoke Highway, Point Harbor NC

Parcel Identification Number(s): PIN# 9846-54-2081

FEMA Flood Zone Designation: X

Request

Project Description: Expansion of an existing self storage facility (19,500-sf climate-controlled s.f.)

Total land disturbance activity: 97,000 sf Calculated volume of BMPs: 71,500-CF sf

Maximum lot coverage: 223,680 sf Proposed lot coverage: 184,230 sf

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.

Property Owner(s)/Applicant

3/21/23
Date

Major Stormwater Plan Design Standards Checklist

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: _____

Applicant/Property Owner: _____

Minor Stormwater Plan Design Standards Checklist		
General		
1	Property owner name and address.	
2	Site address and parcel identification number.	
3	North arrow and scale to be 1" = 100' or larger.	
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.	
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.	
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.	
8	Limits of all proposed fill, including the toe of fill slope and purpose of fill.	
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.	
10	Existing and proposed drainage patterns, including direction of flow.	
11	Location, capacity, design plans (detention, retention, infiltration), and design discharge of existing and proposed stormwater management features.	
12	Elevation of the seasonal high water level as determined by a licensed soil scientist.	
13	Plant selection.	
Permits and Other Documentation		
14	NCDENR stormwater permit application (if 10,000sf or more of built upon area).	
15	NCDENR erosion and sedimentation control permit application (if one acre or more of land disturbance).	
16	NCDENR coastal area management act permit application, if applicable.	
17	Stormwater management narrative with supporting calculations.	
18	Rational Method Form SW-003 or NRCS Method Form SW-004	
19	Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable	
20	Design spreadsheets for all BMPs (<i>Appendix F – Currituck County Stormwater Manual</i>).	
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: 2/21/2023 Owner/Agent: Sylvie Germana

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: _____

Applicant/Property Owner: _____

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



CONTINEO GROUP

February 14, 2023

Contineo Group
Ken Haertel
755 Commerce Drive, Suite 800
Decatur, GA 30030
kenh@thecontineogroup.com
678-481-1498

Hydrology Analysis
Project Address: 9050 Caratoke Highway
Project Name: Midgard Point Harbor, NC – Self Storage Expansion
Original Submission Date: February 14, 2023

Dear Currituck County,

This letter summarizes our calculations comparing the pre-developed 2-year 24-hour storm event versus the 5-year 24-hour storm event for the post developed condition. The disturbed acreage is 1.95 acres. Therefore, we utilized the Rational Method, Form SW-003.

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3.1 Pre-Developed Wooded Condition Curve Number 6

3.2 Runoff Depth..... 6

3.2 Runoff Volume 6

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Appendix 8

1.0 Existing Conditions Analysis

The existing site consists of two parcels serving as a self-storage facility. A lot combination is planned for the existing 4.89 acre parcel and 2.9 acre parcels, resulting in a total property acreage of 7.87 acres. See Exhibit 1 below for an illustration of the existing conditions:

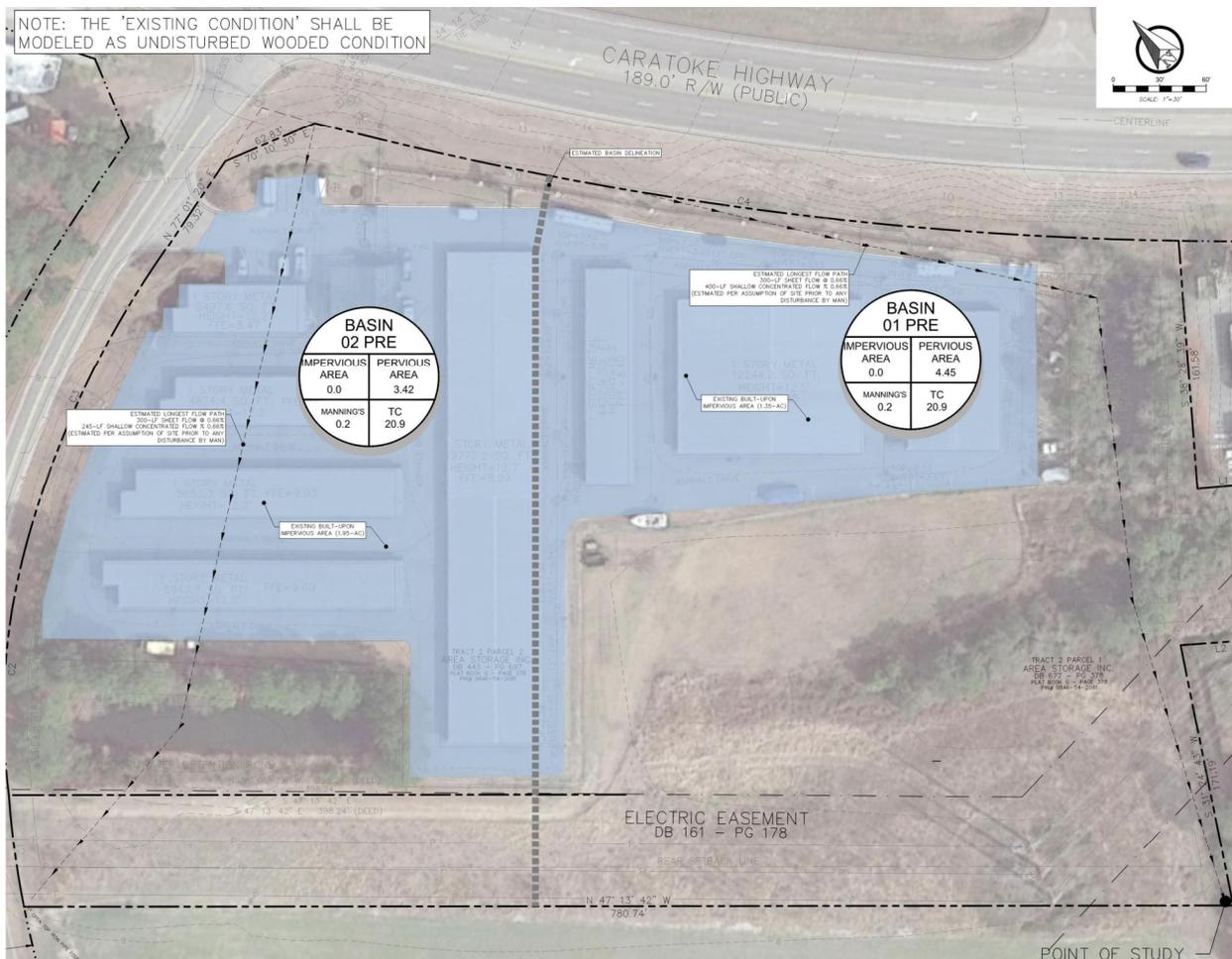


Exhibit 01: Map of Existing Conditions



The 7.87 acre lot appears to be split into two basins, which matches Stormwater Permit number SW7981007, issued in August, 2009. Since the site appears to be the low point in the area, this basin delineation is simply to preserve the status of the existing pond to the west. See Table 01 below, which summarizes the land conditions and acreages for Basin 01 and Basin 02:

	Existing Built-Upon Area	Existing Pervious Area	Manning's n Value	Time of Concentration
Basin 01	1.35-ac	3.1-ac	0.2 (assumed for wooded condition)	47.50 minutes
Basin 02	1.95-ac	1.50-ac	0.2 (assumed for wooded condition)	45.05 minutes

Table 01: Existing Conditions Land Use Breakdown

Using the data in Table 01, the Time of Concentration and Pre-developed Peak Flow were calculated. See the equations below for the mathematics performed:

1.1 Sheet Flow

$$T_{c1} = \frac{0.42 (nL)^{0.8}}{P^{0.5} S^{0.4}}$$

$$T_{c1} = \frac{0.42 (0.2 \times 300)^{0.8}}{4^{0.5} \times 0.0066^{0.4}} = \frac{0.42 \times 26.555}{2 \times 0.134} = \frac{11.153}{0.268} = 41.61 \text{ min}$$

1.2 Shallow Concentrated Flow

$$T_{c2} = \frac{L}{V}$$

$$T_{c2} = \frac{400}{972 \times S^{0.53}} = \frac{400}{972 \times 0.069} = \frac{400}{67.92} = 5.89 \text{ min}$$

1.3 Channel Flow

- No channel flow observed for the existing condition.

Total $T_c = 47.50$ minutes



See Table 02 for a breakdown of the land use, Time of Concentration, and Manning's n-values for each basin:

	Existing Built-Upon Area	Proposed Pervious Area	Proposed Built-Upon Area	Manning's n Value	Time of Concentration
Basin 01	1.35-ac	2.18-ac	0.92	0.57	43.73 minutes
Basin 02	1.95-ac	1.50-ac	0.0-ac	0.57	45.05 minutes

Table 02: Proposed Conditions Land Use Breakdown

Using the data in Table 02, the Time of Concentration and Post-developed Peak Flow were calculated. See the equations below for the mathematics performed:

2.1 Sheet Flow

$$T_{c1} = \frac{0.42 (nL)^{0.8}}{P^{0.5} S^{0.4}}$$

$$T_{c1} = \frac{0.42 (0.85 \times 100)^{0.8}}{5^{0.5} \times 0.01^{0.4}} = \frac{0.42 \times 34.95}{2.23 \times 0.158} = \frac{14.679}{0.352} = 41.66 \text{ min}$$

2.2 Shallow Concentrated Flow

$$T_{c2} = \frac{L}{V}$$

$$T_{c2} = \frac{25}{1302 \times S^{0.53}} = \frac{25}{972 \times 0.087} = \frac{25}{67.92} = 0.295 \text{ min}$$

2.3 Channel Flow

$$\text{Hydraulic Radius} = R = \frac{A}{W_p} = \frac{0.785}{1.37} = 0.5$$



$$\text{Channel Velocity} = V = 1.49 \times \frac{R^{0.67} \times S^{0.5}}{n} = \frac{0.628 \times 0.070}{0.012} = 3.08 \text{ CFS}$$

$$T_{c3} = \frac{L}{60 \times V} = \frac{330}{184.8} = 1.78 \text{ min}$$

$$\text{Total } T_c = 43.73 \text{ minutes}$$

2.4 Rational Method Calculations

$$Q = C \times i \times A$$

$$Q = 0.57 \times 0.201 \times 7.9 = \mathbf{0.905 \text{ CFS}}$$

3.0 Storage Volume Calculations

3.1 Pre-Developed Wooded Condition Curve Number

The Hydrologic Soil Type for the subject property is A/D per soil mapping provided by the U.S.D.A. Due to the high water table, the typically type A soil is considered highly impervious (Type D). Using this, the anticipated Curve Number is 84, per table 2-6.

3.2 Runoff Depth

$$\text{Runoff Depth} = Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

$$Q = \frac{(5 - 0.2 \times 1.9)^2}{(5 + 0.8 \times 1.9)} = \frac{21.33}{6.52} = 3.27 \text{ inches}$$

3.2 Runoff Volume

$$\text{Runoff Volume} = V_r = \frac{Q}{12} \times A$$



$$V_r = \frac{3.27}{12} \times 7.9 = 2.11 \text{ Acre} - \text{feet}$$

3.3 Required Storage Volume

$$\text{Required Storage Volume} = V_s = 1613.33 \times V_r \times \left(1 - \frac{Q_{2\text{-pre}}}{Q_{5\text{-post}}}\right)$$

$$\begin{aligned} V_s &= 1613.33 \times 2.11 \times \left(1 - \frac{0.246}{0.905}\right) = 3,404 \times 0.728 \\ &= 2,478.71 \text{ Cubic Yards} = \mathbf{66,925 \text{ Cubic Feet}} \end{aligned}$$

The proposed site is designed to provide a total of **71,500 cubic feet**. See the volume breakdown for each pond on sheet C300. Therefore, the proposed 3 ponds on-site should be more than sufficient to manage run-off on-site.

Sincerely,

Ken Haertel
678-481-1498
kenh@tcg.engineer

Ron Crump, P.E.
404-556-7721
ronc@thecontineogroup.com



CONTINEO GROUP

Appendix



Stormwater BMP Inspection Checklist Wet Detention Basin

Development Name: _____

Address: _____

Inspector Name: _____

Signature: _____ Date: _____

BMP Feature	Potential Problem	Maintenance Needed	✓
The entire BMP	Trash or debris is present	Remove trash/debris.	<input type="checkbox"/>
The perimeter of the BMP	Exposed soil and/or gullies are present	Regrade soil if necessary to remove gully, then plant ground cover and water until established. Provide lime and one-time fertilizer application.	<input type="checkbox"/>
	Vegetation is less than 4 inches or greater than 8 inches	Mow vegetation to height of approximately 6 inches.	<input type="checkbox"/>
The inlet device (pipe or swale)	Sediment accumulation exceeds 6 inches	Search for the sediment source and correct problem if possible. Remove accumulated sediment and dispose of it in a location where it will not impact the BMP.	<input type="checkbox"/>
	Pipe has become full with sediment and/or debris	Unclog the affected area and remove sediment and/or debris off-site.	<input type="checkbox"/>
	Any portion of the pipe is crushed or damaged	Make any necessary repairs or replace if the damage is too large for repair.	<input type="checkbox"/>
	Erosive gullies have formed	Regrade swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems.	<input type="checkbox"/>
	Stone verge is clogged or covered in sediment	Remove sediment and clogged stone and replace with clean stone.	<input type="checkbox"/>
	The flow splitter device is clogged	Unclog the conveyance and dispose of any sediment off-site.	<input type="checkbox"/>
	The flow splitter is damaged	Make any necessary repairs or replace if damage is too large to repair.	<input type="checkbox"/>
	Turf reinforcement is damaged or riprap is rolling downhill	Study the site to see if a larger bypass channel is needed (enlarge if necessary). After this, replace the erosion control material.	<input type="checkbox"/>
	The level lip is cracked, settled, undercut, eroded, or otherwise damaged	Repair or replace the level lip.	<input type="checkbox"/>
	There is erosion around the end of the level spreader that shows stormwater has bypassed it	Regrade the soil to create a berm that is higher than the level lip, and then plant a ground cover and water until established. Provide lime and a one-time fertilizer application.	<input type="checkbox"/>
The pretreatment area or forebay (if applicable)	Sediment has accumulated to a depth greater than the original design sediment storage depth	Search for the sediment source and correct problem if possible. Remove accumulated sediment and dispose of it in a location where it will not impact the BMP.	<input type="checkbox"/>
	Erosive gullies have formed and/or flow is bypassing pretreatment area	Regrade if necessary to smooth over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems.	<input type="checkbox"/>

APPENDIX C. MAINTENANCE REQUIREMENTS

	Weeds are present	Remove weeds, preferably by hand. If an herbicide is used, wipe it on plants rather than spraying.	<input type="checkbox"/>
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage depth	Search for the sediment source and correct problem if possible. Remove accumulated sediment and dispose of it in a location where it will not impact the BMP.	<input type="checkbox"/>
	Algal growth covers over 50% of the area	Consult a professional to remove and control algal growth.	<input type="checkbox"/>
	Cattails, phragmites, and other invasive plants cover 50% of the area	Remove plants by wiping them with an herbicide (do not spray).	<input type="checkbox"/>
	Plants are dead, diseased, or dying	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace the plants. Provide a one-time fertilizer application to establish the plants if soil tests indicate it is necessary.	<input type="checkbox"/>
	Weeds are present	Remove weeds, preferably by hand. If an herbicide is used, wipe it on plants rather than spraying.	<input type="checkbox"/>
	Plants need regular pruning to maintain optimal plant health	Prune according to best professional practices.	<input type="checkbox"/>
	The embankment (if applicable)	Shrubs have started to grow on the embankment	Remove shrubs immediately.
Evidence of beaver or muskrat activity is present		Use traps to remove muskrats and consult a professional to remove beavers.	<input type="checkbox"/>
Trees have started to grow on the embankment		Consult a dam safety specialist to remove trees.	<input type="checkbox"/>
The outlet device (pipe or swale)	Pipe has become full with sediment and/or debris	Unclog the affected area and remove sediment and/or debris off-site.	<input type="checkbox"/>
	Any portion of the pipe is crushed or damaged	Make any necessary repairs or replace if the damage is too large for repair.	<input type="checkbox"/>
	Erosive gullies have formed	Regrade swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems.	<input type="checkbox"/>
	Grass is too short or too long	Maintain grass to height of approximately 3 - 6 inches.	<input type="checkbox"/>
	Sediment is building up on the filter strip	Remove the sediment and restabilize the soil with vegetation if necessary. Provide lime and one-time fertilizer application.	<input type="checkbox"/>
	Plants are desiccated	Provide additional irrigation and fertilizer as needed	<input type="checkbox"/>
	Plants are dead, diseased, or dying	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace the plants. Provide a one-time fertilizer application to establish the plants if soil tests indicate it is necessary.	<input type="checkbox"/>
	Nuisance vegetation is choking out desirable species	Remove vegetation by hand if possible. If herbicide is used, do not allow it to get into receiving waters.	<input type="checkbox"/>
The receiving water	Erosion or other signs of damage have occurred at the outlet	Consult a professional.	<input type="checkbox"/>

Comments



North Carolina Department of Environment and Natural Resources
Division of Water Quality

Beverly Eaves Perdue
Governor

Coleen H. Sullins
Director

Dee Freeman
Secretary

August 10, 2009

Mr. Michael Burnette
9050 Caratoke Highway
Point Harbor, NC 27964

**Subject: Stormwater Permit No. SW7981007
Area Storage, Phases 1-3
High Density Stormwater Project
Currituck County**

Dear Mr. Burnette:

The Washington Regional Office received your request to renew the subject Stormwater Management Permit on May 26, 2009. Staff review of the plans and specifications has determined that the project, as proposed, will comply with the Stormwater Regulations set forth in Title 15A NCAC 2H.1000. We are forwarding Permit No. SW7981007 dated August 10, 2009 for the subject project.

This permit replaces all previous stormwater permits for this site, and shall be effective from the date of issuance until August 10, 2019, and shall be subject to the conditions and limitations as specified therein. Please pay special attention to the Operation and Maintenance requirements in this permit and in the submitted application. Failure to establish an adequate system for operation and maintenance of the stormwater management system will result in future compliance problems.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, P.O. Drawer 27447, Raleigh, NC 27611-7447. Unless such demands are made this permit shall be final and binding.

North Carolina Division of Water Quality
943 Washington Square Mall
Washington, NC 27889

Internet: www.ncwaterquality.org
Phone: 252-946-6481
FAX 252-946-9215

One
North Carolina
Naturally

Mr. Michael Burnette
August 10, 2009
Page Two

If you have any questions, or need additional information concerning this matter,
please contact either Bill Moore, or me at (252) 946-6481.

Sincerely,

A handwritten signature in black ink, appearing to read 'Al Hodge', with a horizontal line extending to the right.

Al Hodge
Regional Supervisor
Surface Water Protection Section

cc: ✓ Currituck County Planning/Inspections
Washington Regional Office
Central Files

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WATER QUALITY

STATE STORMWATER MANAGEMENT PERMIT

HIGH DENSITY DEVELOPMENT

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations

PERMISSION IS HEREBY GRANTED TO

Mr. Michael Burnette
Area Storage
Currituck County

FOR THE

construction, operation and maintenance of (2) wet detention basins in compliance with the provisions of 15A NCAC 2H .1000 (hereafter referred to as the "stormwater rules") and the approved stormwater management plans and specifications and other supporting data as attached and on file with and approved by the Division of Water Quality and considered a part of this permit for Burnette Area Storage Facility, Phases 1-3 located at 9050 Caratoke Highway in Point Harbor, NC.

This permit replaces all previous stormwater permits for this site, and shall be effective from the date of issuance until August 10, 2019, and shall be subject to the following specified conditions and limitations:

I. DESIGN STANDARDS

1. This permit is effective only with respect to the nature and volume of stormwater described in the application and other supporting data.
2. This stormwater system has been approved for the management of stormwater runoff as described in Section I.6 on page 4 of this permit. The stormwater controls have been designed to handle the runoff from Phases 1-3, and include 3.29 acres of impervious area.
3. All stormwater collection and treatment systems must be located in either dedicated common areas or recorded easements. The final plats for the project will be recorded showing all such required easements, in accordance with the approved plans and permit.

4. The tract will be limited to the amount of built-upon area indicated on page 4 of this permit, and per approved plans.
5. The runoff from all built-upon area within the permitted drainage areas of this project must be directed into the permitted stormwater control system.
6. The following design criteria have been provided for the infiltration basins and must be maintained at design condition:

a.	Total Site Area:	4.89 acres
b.	Total Impervious Surfaces: (includes Phases 1-3)	3.29 acres
c.	Design Storm:	1.0 - inch
d.	Basin Depth:	4.0 ft - Pond 1 4.5 ft - Pond 2
e.	TSS removal efficiency:	85 %
f.	Permanent Pool Surface Area Provided:	6965 sf - Pond 1 4550 sf - Pond 2
g.	Permanent Storage Volume Provided:	27,949 cf - Pond 1 26,630 cf - Pond 2
h.	Storage Elevation, FMSL:	6.5 ft overflow
i.	Small Diameter Controlling Orifice:	N/A
j.	Receiving Stream/River Basin:	UT-Albemarle Sound
k.	Classification of Water Body:	SB

II. SCHEDULE OF COMPLIANCE

1. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface.
2. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.
3. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Plans must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:

- a. Semiannual scheduled inspections (every 6 months).
 - b. Sediment removal.
 - c. Mowing and revegetation of slopes and the vegetated filter.
 - d. Immediate repair of eroded areas.
 - e. Maintenance of all slopes in accordance with approved plans and specifications.
 - f. Debris removal and unclogging of bypass structure, filter media, flow spreader, catch basins, piping and vegetated filter.
 - g. A clear access path to the bypass structure must be available at all times.
4. Records of maintenance activities must be kept and made available upon request to authorized personnel of DWQ. The records will indicate the date, activity, name of person performing the work and what actions were taken.
 5. The facilities shall be constructed as shown on the approved plans. This permit shall become voidable unless the facilities are constructed in accordance with the conditions of this permit, the approved plans and specifications, and other supporting data.
 6. Upon completion of construction, prior to issuance of a Certificate of Occupancy, and prior to operation of this permitted facility, a certification must be received from an appropriate designer for the system installed certifying that the permitted facility has been installed in accordance with this permit, the approved plans and specifications, and other supporting documentation. Any deviations from the approved plans and specifications must be noted on the Certification. A modification may be required for those deviations.
 7. If the stormwater system was used as an Erosion Control device, it must be restored to design condition prior to operation as a stormwater treatment device, and prior to occupancy of the facility.
 8. Access to the stormwater facilities shall be maintained via appropriate easements at all times.
 9. The permittee shall submit to the Director and shall have received approval for revised plans, specifications, and calculations prior to construction, for any modification to the approved plans, including, but not limited to, those listed below:
 - a. Any revision to any item shown on the approved plans, including the stormwater management measures, built-upon area, details, etc.
 - b. Project name change.
 - c. Transfer of ownership.
 - d. Redesign or addition to the approved amount of built-upon area or to the drainage area.
 - e. Further subdivision, acquisition, lease or sale of all or part of the project area. The project area is defined as all property owned by the permittee, for which Sedimentation and Erosion Control Plan approval or a CAMA Major permit was sought.
 - f. Filling in, altering, or piping of any vegetative conveyance shown on the approved plan.

10. The permittee shall submit final site layout and grading plans for any permitted future areas shown on the approved plans, prior to construction.
11. A copy of the approved plans and specifications shall be maintained on file by the Permittee at all times.
12. 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 revised plans and certification in writing to the Director that the changes have been made.
13. This permit shall be effective from the date of issuance until August 10, 2019. Application for permit renewal shall be submitted 180 days prior to the expiration date of this permit and must be accompanied by the processing fee.

III. GENERAL CONDITIONS

1. This permit is not transferable except after notice to and approval by the Director. In the event of a change of ownership, or a name change, the permittee must submit a formal permit transfer request to the Division of Water Quality, accompanied by a completed name/ownership change form, documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request will be considered on its merits and may or may not be approved. The permittee is responsible for compliance with all permit conditions until such time as the Division approves the transfer request.
2. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the Division of Water Quality, in accordance with North Carolina General Statute 143-215.6A to 143-215.6C.
3. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.
4. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by this Division, such as the construction of additional or replacement stormwater management systems.
5. The permittee grants DENR Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.
6. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and reissuance or termination does not stay any permit condition.

7. Unless specified elsewhere, permanent seeding requirements for the stormwater control must follow the guidelines established in the North Carolina Erosion and Sediment Control Planning and Design Manual.
8. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of the permit. A copy of the approved plans and specifications shall be maintained on file by the Permittee for the life of the project.
9. The permittee shall notify the Division of any name, ownership or mailing address changes within 30 days.

Permit issued this the 10 th day of August, 2009.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____ for
Coleen H. Sullins, Director
Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number SW7981007

Stormwater Permit No. SW7981007
Burnette Area Storage Facility, Phases 1-3
(2) Wet Detention Pond Systems
Currituck County

Designer's Certification

I, _____, as a duly registered
_____ in the State of North Carolina, having been
authorized to observe (periodically/ weekly/ full time) the construction of the
project,

(Project)

for _____ (Project Owner) hereby state that,
to the best of my abilities, due care and diligence was used in the observation of
the project construction such that the construction was observed to be built within
substantial compliance and intent of the approved plans and specifications.

Note: The checklist on the following page must be included with this
Certification. Any changes or deviations from the approved plans and
specifications must be explained in detail, and may require a permit modification.
The certification forms should be submitted to the Division of Water Quality at the
appropriate Regional office.

SEAL

Signature _____

Registration Number _____

Date _____

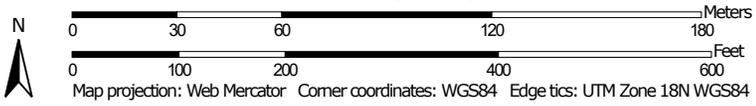
Complete this checklist for each system and include with Certification:

- ____ 1. The drainage area to the system contains approximately the permitted acreage.
- ____ 2. The drainage area to the system contains no more than the permitted amount of built-upon area.
- ____ 3. All the built-upon area associated with the project is graded such that the runoff drains to the system.
- ____ 4. All roof drains are located such that the runoff is directed into the system.
- ____ 5. The bypass structure elevations are per the approved plan.
- ____ 6. The bypass structure is located per the approved plans.
- ____ 7. A Trash Rack is provided on the outlet/bypass structure.
- ____ 8. All slopes are grassed with permanent vegetation.
- ____ 9. Vegetated slopes are no steeper than 3:1.
- ____ 10. The inlets are located per the approved plans and do not cause short-circuiting of the system.
- ____ 11. The permitted amounts of surface area and/or volume have been provided.
- ____ 12. All required design depths are provided.
- ____ 13. All required parts of the system are provided.
- ____ 14. The required system dimensions are provided per the approved plans.

Soil Map—Currituck County, North Carolina



Map Scale: 1:2,150 if printed on A landscape (11" x 8.5") sheet.



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 22, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2020—Oct 7, 2020

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	5.8	61.8%
Ds	Dragston loamy fine sand	3.6	38.2%
Totals for Area of Interest		9.4	100.0%

Currituck County, North Carolina

Ds—Dragston loamy fine sand

Map Unit Setting

National map unit symbol: 3rnm

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

Dragston, drained, and similar soils: 45 percent

Dragston, undrained, and similar soils: 40 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dragston, Drained

Setting

Landform: 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 6 inches: loamy fine sand

E - 6 to 10 inches: loamy fine sand

Bt - 10 to 42 inches: sandy loam

2Cg - 42 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High
(1.98 to 5.95 in/hr)

Depth to water table: About 12 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A/D

Hydric soil rating: No

Description of Dragston, Undrained

Setting

Landform: 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 6 inches: loamy fine sand
E - 6 to 10 inches: loamy fine sand
Bt - 10 to 42 inches: sandy loam
2Cg - 42 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Hydric soil rating: No

Minor Components

Portsmouth, undrained

Percent of map unit: 3 percent
Landform: Depressions on marine terraces, flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Nimmo, undrained

Percent of map unit: 2 percent
Landform: Flats on marine terraces, depressions on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Currituck County, North Carolina
Survey Area Data: Version 22, Sep 8, 2022



Rational Method Peak Flow Form SW-003

Basin 01

Project Information

Project Location: 9050 Caratoke Highway, Point Harbor NC

Parcel Identification Number(s): 0131000092G0000

Drainage area: 7.9 ac

Average Slope: 0.66 %

Maximum Slope Length: 775 ft

Calculations

*The Rational Method may only be used where development will impact less than 10 acres

Time of Concentration (Tc) (Use additional sheets if necessary)			
	Pre-	Post-	
<u>Sheet Flow</u>			
Manning's roughness, n (Table 2-4)	0.2	0.85	
2-year, 24-hour Rainfall, P	4.0	6.0 5	in
Slope, S	0.66%	0.66%	ft/ft
Length of Sheet Flow, L (<=300 feet)	300	150	ft
Total Time for Sheet Flow	41.4	35.29	min
<u>Shallow Concentrated Flow</u>			
Surface Paved (P) or Unpaved (U)	Unpaved	Unpaved	
Length of flow, L	400	25	ft
Slope, S	0.66%	1.0%	ft/ft
Average Velocity, V (Table 2-3)	67.9	67.9	ft/min
Total Time for Shallow Concentrated Flow	6.0	0.29	min
<u>Channel Flow</u>			
Pipe (P) or Channel (C)	-	P	
If pipe: Diameter, D	-	12	in
If channel: Bottom Width, w	-	-	ft
If channel: side slope 1 (__:1)	-	-	
If channel: side slope 2 (__:1)	-	-	
Cross sectional flow area, A	-	-	sq ft
Wetted perimeter, Wp	-	0.78	ft
Hydraulic radius, R = A/Wp	-	0.5	ft

5-year 24-hour Rainfall equals 5 inches per Table 2.7

Time of Concentration (Tc) (Use additional sheets if necessary)			
	Pre-	Post-	
Channel slope, S	-	0.5%	ft/ft
Manning's roughness, n (Table 2-4)	-	0.012	
Channel velocity	-	3.08	ft/sec
Length of Flow, L	-	330	ft/sec
Total Time for Channel Flow	-	1.78	min
Total Time of Concentration, Tc	47.4	37.36	min

Pre-development Conditions			
Land Use Description	C	Area (acres)	C*A
Woods	0.2	7.9	1.58
Total			

Intensity for 2-year, 24-hour storm (Table 2-5) 0.156 in/hr

Pre-development peak flow, Q = CiA 0.246 cfs

Post-development Conditions			
Land Use Description	C	Area (acres)	C*A
Commercial	0.85	4.2	3.66
Open Space	0.25	3.7	0.90
Totals		7.9	4.56

Area-weighted C: 5-year 24-hour storm 0.57

Intensity for ~~10~~ 5-year, 24-hour storm (Table 2-5) 0.201 in/hr

Post-development peak flow, Q = CiA 0.905 cfs

Minimum Storage Volume Required – Refer to Section 2.4.4 for Volume Calculations		
Storage Volume, V _s	<u>66,925</u>	ft ³

Applicant _____

Date _____



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.



Rational Method Peak Flow Form SW-003

Basin 01

Project Information

Project Location: 9050 Caratoke Highway, Point Harbor NC

Parcel Identification Number(s): 0131000092G0000

Drainage area: 7.9 ac

Average Slope: 0.66 %

Maximum Slope Length: 775 ft

Calculations

*The Rational Method may only be used where development will impact less than 10 acres

Time of Concentration (Tc) (Use additional sheets if necessary)			
	Pre-	Post-	
<u>Sheet Flow</u>			
Manning's roughness, n (Table 2-4)	0.2	0.85	
2-year, 24-hour Rainfall, P	4.0	6.0 5	in
Slope, S	0.66%	0.66%	ft/ft
Length of Sheet Flow, L (<=300 feet)	300	150	ft
Total Time for Sheet Flow	41.61	41.66	min
<u>Shallow Concentrated Flow</u>			
Surface Paved (P) or Unpaved (U)	Unpaved	Unpaved	
Length of flow, L	400	25	ft
Slope, S	0.66%	1.0%	ft/ft
Average Velocity, V (Table 2-3)	67.9	67.9	ft/min
Total Time for Shallow Concentrated Flow	5.89	0.29	min
<u>Channel Flow</u>			
Pipe (P) or Channel (C)	-	P	
If pipe: Diameter, D	-	12	in
If channel: Bottom Width, w	-	-	ft
If channel: side slope 1 (__:1)	-	-	
If channel: side slope 2 (__:1)	-	-	
Cross sectional flow area, A	-	-	sq ft
Wetted perimeter, Wp	-	0.78	ft
Hydraulic radius, R = A/Wp	-	0.5	ft

5-year 24-hour Rainfall equals 5 inches per Table 2.7

Time of Concentration (Tc) (Use additional sheets if necessary)			
	Pre-	Post-	
Channel slope, S	-	0.5%	ft/ft
Manning's roughness, n (Table 2-4)	-	0.012	
Channel velocity	-	3.08	ft/sec
Length of Flow, L	-	330	ft/sec
Total Time for Channel Flow	-	1.78	min
Total Time of Concentration, Tc	47.50	43.73	min

Pre-development Conditions			
Land Use Description	C	Area (acres)	C*A
Woods	0.2	7.9	1.58
Total			

Intensity for 2-year, 24-hour storm (Table 2-5) 0.156 in/hr

Pre-development peak flow, Q = CiA 0.246 cfs

Post-development Conditions			
Land Use Description	C	Area (acres)	C*A
Commercial	0.85	4.2	3.66
Open Space	0.25	3.7	0.90
Totals		7.9	4.56

Area-weighted C: 5-year 24-hour storm 0.57

Intensity for ~~10~~-year, 24-hour storm (Table 2-5) 0.201 in/hr

Post-development peak flow, Q = CiA 0.905 cfs

Minimum Storage Volume Required – Refer to Section 2.4.4 for Volume Calculations		
Storage Volume, V _s	<u>66,925</u>	ft ³

Sylvie Germana
Applicant

2/21/2023
Date