WETLANDS AND SUBAQUEOUS LANDS SECTION PERMIT APPLICATION FORM

For Subaqueous Lands, Wetlands, Marina and 401 Water Quality Certification Projects

State of Delaware
Department of Natural Resources and Environmental Control
Division of Water

Wetlands and Subaqueous Lands Section

APPLICATION FOR APPROVAL OF
SUBAQUEOUS LANDS, WETLANDS, MARINA
AND WATER QUALITY CERTIFICATION PROJECTS

Last Revised on: March 28, 2017

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

Application Instructions:

1. Complete each section of this basic application and appropriate appendices as thoroughly and accurately as possible. Incomplete or inaccurate applications will be returned.

2. All applications must be accompanied by a scaled plan view and cross-section view plans that show the location and design details for the proposed project. Full construction plans must be submitted for major projects.

3. All applications must have an original signature page and proof of ownership or permitted land use agreement.

4. Submit an original and two (2) additional copies of the application (total of 3) with the appropriate application fee and public notice fee* (prepared in separate checks) to:

Department of Natural Resources and Environmental Control
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901

*Application and public notice fees are non-refundable regardless of the Permit decision or application status.

5. No construction may begin at the project site before written approval has been received from this office.

Helpful Information:

1.	Tax Parcel Information:	New Castle County	(302) 395-5400
		Kent County	(302) 736-2010
		Sussex County	(302) 855-7878
2.	Recorder of Deeds:	New Castle County	(302) 571-7550
		Kent County	(302) 744-2314
		Sussex County	(302) 855-7785

3. A separate application and/or approval may be required through the Army Corps of Engineers. Applicants are strongly encouraged to contact the Corps for a determination of their permitting requirements. For more information, contact the Philadelphia District Regulator of the Day at (215) 656-6728 or visit their website at: http://www.nap.usace.army.mil/Missions/Regulatory.aspx.

4. For questions about this application or the Wetlands and Subaqueous Lands Section, contact us at (302) 739-9943 or visit our website at: http://www.dnrec.delaware.gov/wr/Services/Pages/WetlandsAndSubaqueousLands.aspx. Office hours are Monday through Friday 8:00 AM to 4:30 PM, except on State Holidays.

APPLICANT'S REVIEW BEFORE MAILING

DID YOU COMPLETE THE FOLLOWING?

X	Yes	BASIC APPLICATION
X	Yes	SIGNATURE PAGE (Page 3)
X	Yes	APPLICABLE APPENDICES
X	Yes	SCALED PLAN VIEW
X	Yes	SCALED CROSS-SECTION OR ELEVATION VIEW PLANS
X	Yes	VICINITY MAP
X	Yes	COPY OF THE PROPERTY DEED & SURVEY
	Yes	THREE (3) COMPLETE COPIES OF THE APPLICATION PACKET
N/A	Yes	APPROPRIATE APPLICATION FEE & PUBLIC NOTICE FEE (Separate checks made payable to the State of Delaware)

Submit 3 complete copies of the application packet to:

Department of Natural Resources and Environmental Control
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901

Before signing and mailing your application packet, please read the following:

The Department requests that the contractor or party who will perform the construction of your proposed project, if other than the applicant, sign the application signature page along with the applicant in the spaces provided. When the application is signed by the contractor as well as the applicant, the Department will issue the Permit to both parties. For Leases, the contractor will receive a separate construction authorization that will make them subject to all of the terms and conditions of the Lease relating to the construction

Section 1: Applicant Identification

1. Applicant's Name: Town of Bethany Beach
   Mailing Address: 214 Garfield Parkway
   Bethany Beach, DE 19930
   Telephone #: 302.539.1996
   Fax #: _____
   E-mail: ttieman@townofbethanybeach.com

2. Consultant's Name: McCormick Taylor
   Mailing Address: 1501 South Clinton Street, Suite 1150
   Baltimore MD 21224
   Company Name: McCormick Taylor
   Telephone #: 667.219.3899
   Fax #: _____
   E-mail: adtatone@mccormicktaylor.com

3. Contractor's Name: _____
   Mailing Address: _____
   Company Name: _____
   Telephone #: _____
   Fax #: _____
   E-mail: _____

Section 2: Project Description

4. Check those that apply:
   X New Project/addition to existing project? ☐ Repair/Replace existing structure? (If checked, must answer #16)

5. Project Purpose (attach additional sheets as necessary):
   The lake Bethany Living Shoreline Project consists of 490 feet of living shoreline to be constructed along the lake side of the land strip located between Lake Bethany and the Bethany Beach Loop Canal. The existing shoreline has a height of 1-2 feet and has naturalized in some areas with native vegetation while other areas are actively eroding, threatening the long-term resiliency of the land strip's interior shoreline.

6. Check each Appendix that is enclosed with this application:

	A. Boat Docking Facilities		G. Bulkheads		N. Preliminary Marina Checklist
	B. Boat Ramps	X	H. Fill		O. Marinas
	C. Road Crossings		I. Rip-Rap Sills and Revetments		P. Stormwater Management
	D. Channel Modifications/Dams	X	J. Vegetative Stabilization		Q. Ponds and Impoundments
	E. Utility Crossings		K. Jetties, Groins, Breakwaters		R. Maintenance Dredging
	F. Intake or Outfall Structures		M. Activities in State Wetlands		S. New Dredging

Section 3: Project Location

7. Project Site Address: Loop Canal
   Town of Bethany Beach
   County: ☐ N.C. ☐ Kent X Sussex
   Site owner name (if different from applicant): _____
   Address of site owner: _____

8. Driving Directions: Head west on Garfield Parkway for 1.2 miles from Town Hall. Turn right onto Lakeview Drive and then a left on Sandbar Court. Access to the site is adjacent to 985 Sandbar Court.
   (Attach a vicinity map identifying road names and the project location)

9. Tax Parcel ID Number: 134-13.00-97.00
   Subdivision Name: _____

WSLS Use Only: **Permit #s:** _____ _____ _____ _____

Type **SP** ☐ **SL** ☐ **SU** ☐ **WE** ☐ **WQ** ☐ **LA** ☐ **SA** ☐ **MP** ☐ **WA** ☐

Corps Permit: SPGP 18 ☐ **20** ☐ **Nationwide Permit #:** _____ **Individual Permit #**_____
Received Date: _____ **Project Scientist:** _____
Fee Received? Yes ☐ **No** ☐ **Amt: $**_____ **Receipt #:** _____
Public Notice #: _____ **Public Notice Dates: ON** _____ **OFF**_____

Section 3: Project Location (Continued)

10. Name of waterbody at Project Location: Lake Bethany waterbody is a tributary to: Loop Canal

11. Is the waterbody: ☒ Tidal ☐ Non-tidal Waterbody width at mean low or ordinary high water ~380'

12. Is the project: ☒ On public subaqueous lands? ☐ On private subaqueous lands?*
☐ In State-regulated wetlands? ☐ In Federally-regulated wetlands?

*If the project is on private subaqueous lands, provide the name of the subaqueous lands owner:

(Written permission from the private subaqueous lands owner must be included with this application)

13. Present Zoning: ☐ Agricultural ☐ Residential ☐ Commercial ☐ Industrial ☒ Other

Section 4: Miscellaneous

14. A. List the names and complete mailing addresses of the immediately adjoining property owners on all sides of the project (attach additional sheets as necessary):
See supporting documents

B. For wetlands and marina projects, list the names and complete mailing addresses of property owners within a 1,000 foot radius of the project (attach additional sheets as necessary):

15. Provide the names of DNREC and/or Army Corps of Engineers representatives whom you have discussed the project with:
Matt Jones, Michael Yost, Mike Snyder
Rebecca Bobola, Christine Garcia

A. Have you had a State Jurisdictional Determination performed on the property? ☐ Yes ☐ No
B. Has the project been reviewed in a monthly Joint Permit Processing Meeting? ☒ Yes ☐ No
*If yes, what was the date of the meeting?

16. Are there existing structures or fill at the project site in subaqueous lands? ☐ Yes ☒ No
*If yes, provide the permit and/or lease number(s):

*If no, were structures and/or fill in place prior to 1969? ☐ Yes ☒ No

17. Have you applied for or obtained a Federal permit from the Army Corps of Engineers?
☐ No ☐ Pending ☒ Issued ☐ Denied Date: 11-20-2025

Type of Permit: NW 54 Living Shorelines Federal Permit or ID #: NAP-2025-00292-85

18. Have you applied for permits from other Sections within DNREC?
☒ No ☐ Pending ☐ Issued ☐ Denied Date: _____ Permit or ID #: _____

Type of permit (circle all that apply): Septic Well NPDES Storm Water

Other: MTA 2023 Bethany Beach Loop Canal - SCRP

Section 5: Signature Page

19. Agent Authorization:

If you choose to complete this section, all future correspondence to the Department may be signed by the duly authorized agent. In addition, the agent will become the primary point of contact for all correspondence from the Department.

I do not wish to authorize an agent to act on my behalf ☐

I wish to authorize an agent as indicated below ☒

I, Clifford Graviet (Name of Applicant), hereby designate and authorize Adam Tatone (Name of Agent) to act on my behalf in the processing of this application and to furnish any additional information requested by the Department.

Authorized Agent's Name: Adam Tatone
Mailing Address: 1501 South Clinton Street, Suite 1150
Baltimore MD 21224

Telephone #: 667.219.3899
Fax #:
E-mail: ADTatone@mccormicktaylor.com

20. Agent's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Agent's Signature

8-1-2025
Date

21. Applicant's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application. I grant permission to authorized Department representatives to enter upon the premises for inspection purposes during working hours.

Applicant's Signature

8.1.25
Date

Clifford Graviet
Print Name

22. Contractor's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge, and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Contractor's Name

Date

Print Name

FILL

Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

1. How many linear feet will the fill extend channelward of the:
   a. Tidal waters: mean high water line? **0-12** ft.
      mean low water line? **0** ft.
   b. Non-tidal waters: ordinary high water line? **0** ft.

2. What is the area of fill that will be located:
   a. on subaqueous land (channelward of mean high water) **4,050** sq. ft.
   b. on vegetated wetlands? **6.5** sq. ft.

3. What is the source of the fill?
   TBD Hauled in from upland sources: What is the source company/location/parcel number?
   _____ Obtained from dredged material: Complete Dredging Appendix.

4. What is the total volume of fill? **150** cubic yards
   a. What is the total fill per running foot of shoreline? **0.31** cubic yards

5. What method will be used to place the fill?

   Means and methods of fill placement to be determined by contractor.

6. State the type and composition percentage of the fill material (e.g. sand 80%, silt 5%, clay 15%, etc.)

   The proposed fill material is 100% sand.

7. How will the fill be retained? Complete appropriate appendix.

   Oyster bags, 20" coir log sills, and vegetative stabilization (See Appendix J).

8. What type of vegetation or ground cover will be provided for the filled area(s) to prevent soil erosion and help keep sediment from reaching State waters?

   Plugs of *Spartina alterniflora* will be installed within the sand fill at a spacing of 1.5 feet on center, and *Morella cerifera* and *Clethra alnifolia* are proposed to be planted at 8 feet on center just above the mean high water (MHW) mark, where backshore slopes allow. Additional tree, shrub and native herbaceous plantings are proposed in upland areas within the limits of construction.

9. Describe the type(s) of structure(s) to be erected on the filled area (if any). Complete appropriate appendix.

   No structures are proposed.

Vegetative Stabilization

- Please make sure that all answers in this appendix correspond to information on the application drawing

1. Submit a brief description of the proposed activity

The Lake Bethany Living Shoreline project consists of 490 feet of living shoreline to be constructed along the lake side of the land strip located between Lake Bethany and the Bethany Beach Loop Canal. The existing shoreline has a height of 1-2 feet and is naturalized in some areas with native vegetation, while other areas are actively eroding, which threatens the long-term resiliency of the land strip's interior shoreline.

The design for the Lake Bethany Living Shoreline targets the creation of a low marsh habitat through the installation of oyster bags, 20" coir logs, and sand fill. Oyster bags will be placed at the Mean Low Water (MLW) elevation and will act as a structural support for the coir logs placed in single or double rows depending on existing foreshore slopes. Sand will be imported and used as fill material behind the coir log sills, at an approximate slope of 10:1 (H:V). Plugs of Spartina alterniflora will be installed within the sand fill at a spacing of 1.5 feet on center, and Morella cerifera and Clethra alnifolia are proposed to be planted at 8 feet on center just above the mean high water (MHW) mark, where backshore slopes allow. Additional tree, shrub and native herbaceous plantings are proposed in upland areas within the limits of construction. Four distinct coir sill structures are proposed. Existing fallen trees and native near-bank vegetation are to be preserved as habitat elements and worked into the coir log sill structures.

2. Is grading of bank and/or placement of fill part of this project? (Yes) No
   If yes complete Appendix H

3. Indicate the area of proposed planting that is channelward of the:
   a. Tidal Waters: mean high water line? **2902** ft^2
      mean low water line? **0** ft^2
   b. Non-tidal waters: ordinary high water line? **0** ft^2

4. What will the water depth of the plantings be relative to the: (provide the range if it varies)
   a. Tidal Waters: **below** mean high water line? **0.6 (avg)** f **(0.1' to 1.1')**
      mean low water line? **n/a** ft
   b. Non-tidal waters: ordinary high water line? **0** ft

5. Provide the list of plant species that will be utilized.

Coastal Upland Zone: ***Pinus taeda, Prunus serotina, Morella caroliniensis, Panicum virgatum, and Solidago sempervirens.***

Coastal Fringe Zone: ***Morella cerifera and Clethra alnifolia***

Low Marsh: ***Spartina alternifolia***

6. Describe the sequence of construction and planting.

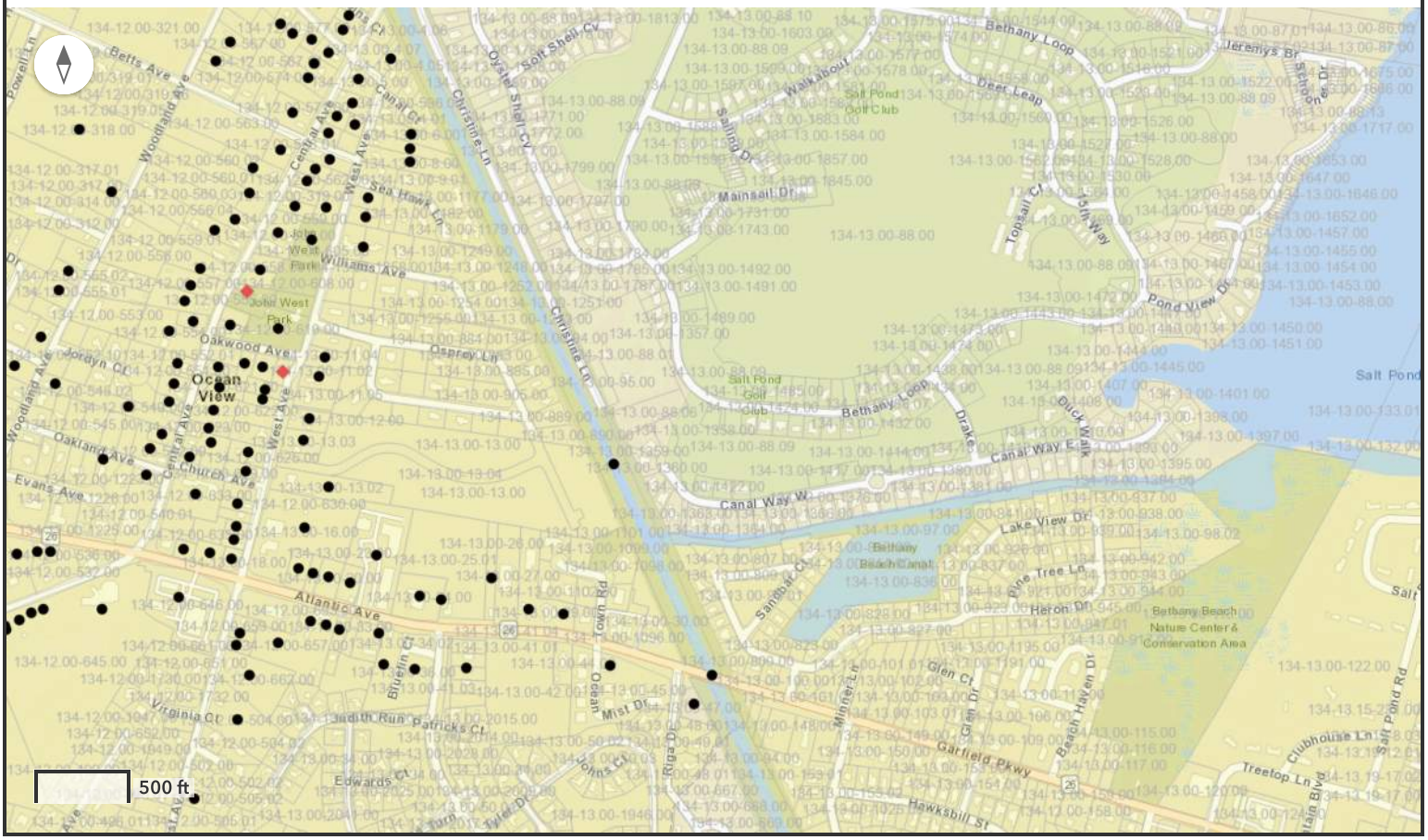
1. Attend pre-construction meeting.
2. Mobilize crew(s), equipment, and materials to the site.
3. Install required environmental and erosions and sedimentation controls.
4. Establish limits of construction for the Living Shoreline.
5. Install oyster bags, 20" coir logs sill, and sand fill while integrating existing fallen trees and native vegetation into the structure, as shown within the Project's Construction Plan.
6. Prepare seed bed using appropriate soil amendments (lime, fertilizer, etc.)
7. Install plantings as shown within the Project's Landscape Plan.
8. Restore all disturbed areas using seed and mulch as shown within the Project's Landscape and Erosion and Sediment Control Plans.

7. Describe the maintenance and monitoring plan for the vegetation.

The monitoring plan will focus on structure stability, planting survival, shoreline position, and vegetative productivity. Please see Appendix A for the detailed monitoring plan.
The contractor will commence a 1-year maintenance period immediately following restoration and planting to ensure the establishment and viability of vegetation and stability of oyster bags/coir log sills.

Bethany Beach - Lake Bethany Living Shoreline				
Address	**Owner Street1**	**Owner Street2**	**Owner City, St**	**Owner Zip**
985 SANDBAR CT	7800 FOXHOUND RD		MCLEAN VA	22102
983 SANDBAR CT	2826 LINDEN LN		FALLS CHURCH VA	22042
981 SANDBAR CT	5 BEECH HILL DR		NEWARK DE	19711
979 SANDBAR CT	979 SANDBAR CT		BETHANY BEACH DE	19930
977 SANDBAR CT	109 FALCON LN		WILMINGTON DE	19808
975 SANDBAR CT	14 ELDERBERRY CT		HOCKESSIN DE	19707
973 SANDBAR CT	4347 FARM HOUSE LN		FAIRFAX VA	22032-1613
971 SANDBAR CT	12103 HAYLAND FARM WAY		ELLICOTT CITY MD	21042
931 LAKE VIEW DR	931 LAKE VIEW DR		BETHANY BEACH DE	19930
933 LAKE VIEW DR	1274 MORSE ST NE		WASHINGTON DC	20002
935 LAKE VIEW DR	935 LAKE VIEW DR		BETHANY BEACH DE	19930
937 LAKE VIEW DR	PO BOX 1004		BETHANY BEACH DE	19930
939 LAKE VIEW DR	939 LAKE VIEW DR		BETHANY BEACH DE	19930
941 LAKE VIEW DR	2929 EXCELSIOR SPRINGS CT		ELLICOTT CITY MD	21042
943 LAKE VIEW DR	943 LAKE VIEW DR		BETHANY BEACH DE	19930
945 LAKE VIEW DR	9811 VERTAIN CT		FAIRFAX VA	22032
947 LAKE VIEW DR	3440 REEDY DR		ANNANDALE VA	22003
949 LAKE VIEW DR	2302 VELVET VALLEY WAY		OWINGS MILLS MD	21117
951 LAKE VIEW DR	2302 VELVET VALLEY WAY		OWINGS MILLS MD	21117
953 LAKE VIEW DR	821 EMERALD DR		ALEXANDRIA VA	22308
955 LAKE VIEW DR	955 LAKE VIEW DR		BETHANY BEACH DE	19930
957 LAKE VIEW DR	8302 WOODMONT AVE	APT 505	BETHESDA MD	20814
952 LAKE VIEW DR	952 LAKE VIEW DR		BETHANY BEACH DE	19930
953 LAKE VIEW DR	821 EMERALD DR		ALEXANDRIA VA	22308
954 LAKE VIEW DR	54 GRAHAM ST		JERSEY CITY NJ	07307
955 LAKE VIEW DR	955 LAKE VIEW DR		BETHANY BEACH DE	19930
956 LAKE VIEW DR	10405 DERBY DR		LAUREL MD	20723
957 LAKE VIEW DR	8302 WOODMONT AVE	APT 505	BETHESDA MD	20814
959 LAKE VIEW DR	6152 N 11TH RD		ARLINGTON VA	22205
961 LAKE VIEW DR	1931 HILLTOP RD		JENKINTOWN PA	19046
963 LAKE VIEW DR	544 S RED FOX CIR		MIDDLETOWN DE	19709
965 LAKE VIEW DR	965 LAKE VIEW DR		BETHANY BEACH DE	19930
967 LAKE VIEW DR	522 SCHOOL LN		REHOBOTH BEACH DE	19971
969 LAKE VIEW DR	2218 MONKTON RD		MONKTON MD	21111

Bethany Beach Living Shoreline



Delaware FirstMap, Esri, HERE, Garmin, INCREMENT P, Intermap, NGA, USGS | Delaware Office of State Planning Coordination

HistoricProperty_Public

National Register-listed · determined eligible · National Historic Landmark · Other

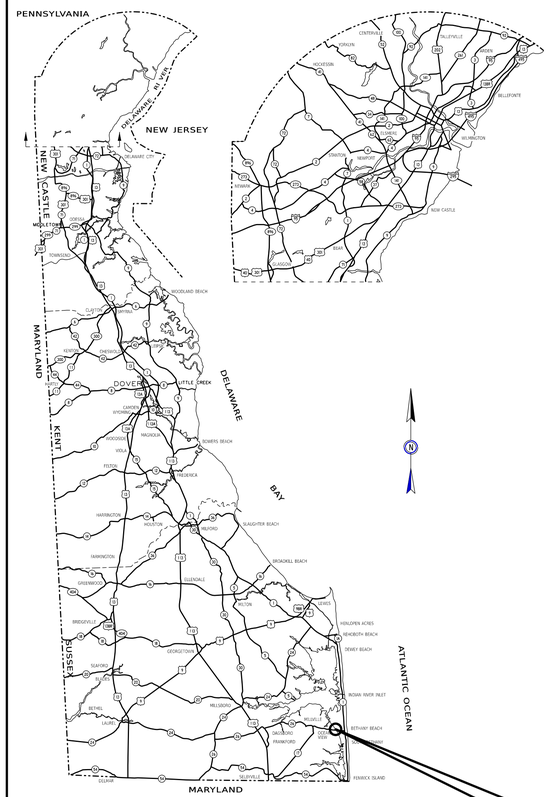
National Register Districts

National Register Lines

DE_StateParcels

State Parcels

DE_Boundaries - Municipalities



U.S. CUSTOMARY UNITS

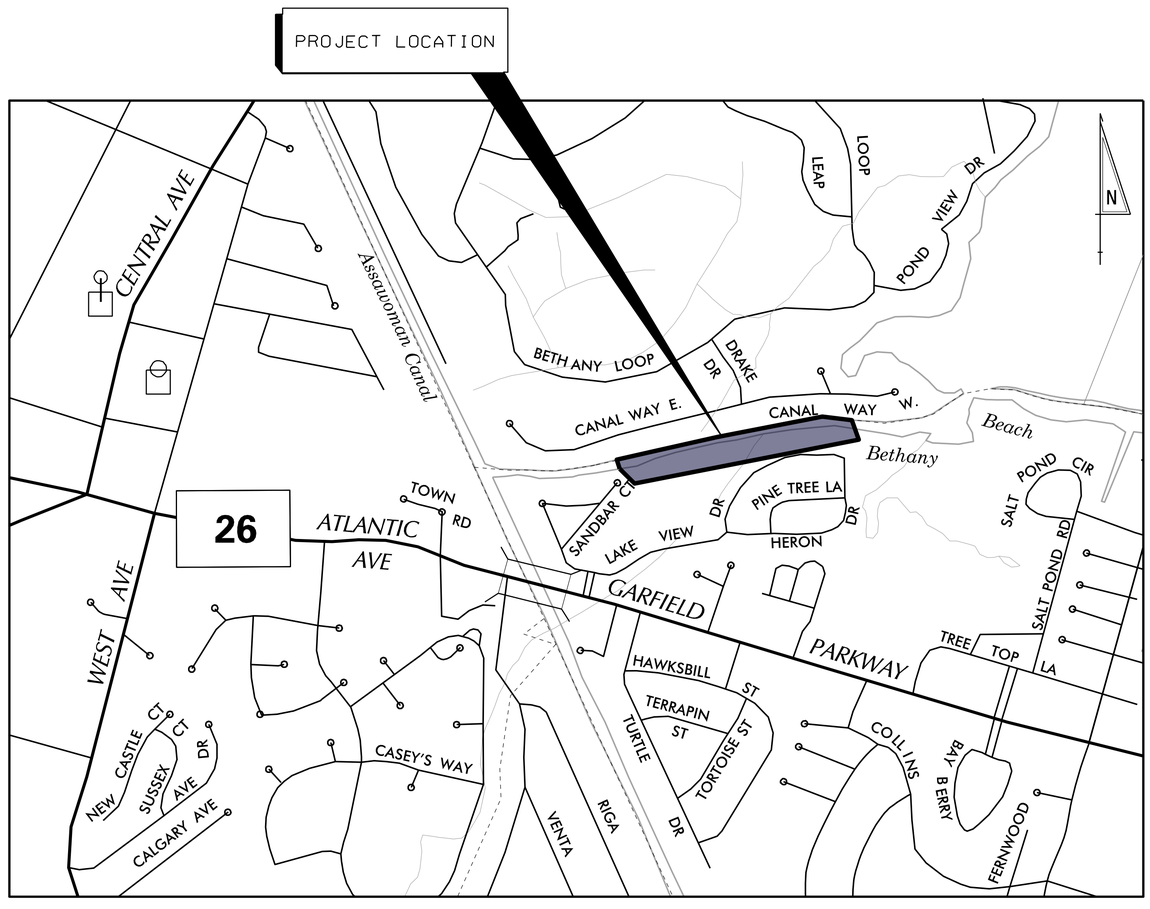
BETHANY BEACH LOOP CANAL

LAKE BETHANY LIVING SHORELINE

MT JOB NO. 10294.001
TOWN OF BETHANY BEACH
SUSSEX COUNTY

ADDENDA / REVISIONS

ASSOCIATED CONTRACTS	
CONTRACT NO.	CONTRACT NAME
----------	----------
----------	----------
----------	----------
----------	----------
----------	----------
----------	----------



LOCATION MAP
SCALE: 1" = 500'

PROJECT NARRATIVE

THE LAKE BETHANY LIVING SHORELINE PROJECT CONSISTS OF 490 FEET OF LIVING SHORELINE TO BE CONSTRUCTED ALONG THE LAKE SIDE OF THE LAND STRIP LOCATED BETWEEN LAKE BETHANY AND THE BETHANY BEACH LOOP CANAL. THE EXISTING SHORELINE HAS A HEIGHT OF 1-2 FEET AND HAS NATURALIZED IN SOME AREAS WITH NATIVE VEGETATION, WHILE OTHER AREAS ARE ACTIVELY ERODING, THREATENING THE LONG-TERM RESILIENCY OF THE LAND STRIP'S INTERIOR SHORELINE. THE PROJECT AIMS TO STABILIZE THE SHORELINE BY CREATING A LOW MARSH HABITAT THROUGH THE INSTALLATION OF OYSTER BAGS, 20" COIR LOGS, AND SAND FILL.

NO TREE REMOVALS ARE REQUIRED AS PART OF THIS PROJECT.

NO NEW IMPERVIOUS AREA IS PROPOSED AS PART OF THIS PROJECT.

SITE DATA

1.	PARCEL:	134-13.00-97.00
2.	ADDRESS:	LOOP CANAL N/F TOWN OF BETHANY BEACH
3.	EARTHWORK ESTIMATE:	CUT: 0 CY FILL: 150 CY
4.	DISTURBED AREA:	0.39 ACRES
5.	OWNER/DEVELOPER:	TOWN OF BETHANY BEACH P.O. BOX 109 214 GARFIELD PARKWAY BETHANY BEACH, DE 19930 PHONE: 302-539-1996
6.	ENGINEER:	MCCORMICK TAYLOR 1501 S. CLINTON STREET SUITE 1150 BALTIMORE, MD 21224 PHONE: 410-662-7400

PREPARED BY

NATHANIEL H. LEHIGH LICENSE No. 21381 DELAWARE PROFESSIONAL ENGINEER

SIGNATURE — DATE: 10/14/2025 — SEAL

CERTIFICATION OF OWNERSHIP

I, THE UNDERSIGNED, HEREBY THAT ALL LAND CLEARING, CONSTRUCTION AND DEVELOPMENT SHALL BE DONE PURSUANT TO THE APPROVED STANDARD PLAN AND THAT RESPONSIBLE PERSONNEL (I.E., BLUE CARD HOLDER) INVOLVED IN THE LAND DISTURBANCE WILL HAVE A CERTIFICATION OF TRAINING PRIOR TO INITIATION OF THE PROJECT, AT A DNREC SPONSORED OR APPROVED TRAINING COURSE FOR THE CONTROL OF EROSION AND SEDIMENT DURING CONSTRUCTION. IN ADDITION, I GRANT THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY THE RIGHT TO CONDUCT ON-SITE REVIEWS.

SIGNATURE: _____ DATE: _____

NAME: _____ TITLE: _____ PHONE: _____

FIRM: _____ ADDRESS: _____

CERTIFICATION OF PLAN ACCURACY

I, THE UNDERSIGNED, HEREBY CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER WITH A BACKGROUND IN CIVIL ENGINEERING IN THE STATE OF DELAWARE AND THAT ALL OF THE INFORMATION ON THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY ACCEPTED SURVEYING STANDARDS AND PRACTICES AND BY THE SUSSEX COUNTY UNIFIED DEVELOPMENT CODE.

SIGNATURE: _____ DATE: 10/14/2025

NAME: Nathaniel Lehigh TITLE: Manager PHONE: 667-219-3320

FIRM: MCCORMICK TAYLOR, INC. ADDRESS: 1501 S. CLINTON ST. SUITE 1150 BALTIMORE, MD 21224

13-OCT-2025
15:32
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\EnvironmentalTC01.dgn

GENERAL NOTES

1. ANY ITEMS THAT ARE DAMAGED WHEN RELOCATED OR RESET BY THE CONTRACTOR, AT THE DISCRETION OF THE ENGINEER, SHALL BE REPAIRED AND/OR REPLACED IN KIND AT THE CONTRACTOR'S EXPENSE.

2. THE CONTRACTOR SHALL PROVIDE RESIDENTS WITH 72 HOUR PRIOR WRITTEN NOTICE FOR ALL PHASES OF THE CONTRACT WORK. THIS NOTICE SHALL BE GIVEN TO ALL RESIDENTS WHOSE PROPERTY IS ADJACENT TO THE STREET ON WHICH WORK IS TO BE PERFORMED. THIS WILL BE ACCOMPLISHED BY THE CONTRACTOR PREPARING AND DISTRIBUTING A STANDARD FORM LETTER. THIS LETTER WILL BE SUBJECT TO APPROVAL BY THE ENGINEER. FAILURE TO GIVE PROPER NOTICE WILL RESULT IN A SUSPENSION OF WORK UNTIL PROPER NOTICE IS PROVIDED.

3. THE DETERMINATION OF SUBSURFACE CONDITIONS, INCLUDING THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL ALLOWANCE WILL BE MADE FOR ANY SUBSURFACE CONDITION FOUND TO EXIST. NOT WITHSTANDING ANY OTHER PROVISION OF THIS CONTRACT, THE CONTRACTOR SHALL NOT PROCEED WITH WORK UNTIL CONFERRING WITH THE ENGINEER, THE UTILITY COMPANIES AND THE MUNICIPAL AUTHORITIES IN AN EFFORT TO SECURE EXACT LOCATIONS. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION AROUND OR IMMEDIATELY ADJACENT TO UTILITIES WITHOUT NOTIFYING THEIR OWNER AT LEAST 48 HOURS IN ADVANCE.

4. BEFORE ANY EARTHWORK OR EXCAVATION TAKES PLACE, THE CONTRACTOR SHALL CALL MISS UTILITY AT 811 OR 1-800-282-8555 AT LEAST 48 HOURS PRIOR TO THE CONSTRUCTION TO HAVE ALL EXISTING UTILITIES MARKED ONSITE.

5. NO WORK MAY BE COMPLETED BETWEEN MARCH 1ST AND AUGUST 30TH EACH YEAR DUE TO HERON NESTING.

6. THE CONTRACTOR WILL COMMENCE A 1-YEAR MAINTENANCE PERIOD IMMEDIATELY FOLLOWING RESTORATION AND PLANTING TO ENSURE THE ESTABLISHMENT AND VIABILITY OF VEGETATION, AND STABILITY OF OYSTER BAGS/COIR LOG SILLS.

7. DURING SITE MOBILIZATION, IF LIMIT OF CONSTRUCTION (LOC) IS DEEMED TO BE LARGER THAN NECESSARY TO COMPLETE WORK, THE CONTRACTOR SHOULD REDUCE LOC TO NECESSARY AREA TO MINIMIZE IMPACTS TO ADJACENT NATURAL RESOURCES, WITH SPECIAL ATTENTION TO AREAS SURROUNDING THE EXISTING WETLAND. THE CONTRACTOR SHALL AVOID TREE IMPACTS WHEREVER POSSIBLE. IF A TREE WITHIN THE LOC DOES NOT NEED TO BE REMOVED TO PERFORM THE PROPOSED WORK, IT SHOULD BE SAVED, WITH CARE TAKEN TO MINIMIZE DAMAGE TO IT DURING WORK, AND BRANCHES PRUNED UNDER THE SUPERVISION OF A TRAINED ARBORIST OR THE PROJECT ENGINEER IF DAMAGE DOES OCCUR. ON-SITE STAGING AND STOCKPILING IS THE BE MINIMIZED TO THE GREATEST EXTENT PRACTICABLE. MATERIALS WHICH MUST BE STAGED AND STOCKPILED ON SITE SHOULD BE PLACED IN AREAS OUTSIDE OF THE DRIP LINE OF EXISTING TREES, OR PLACED ON MATTING TO MINIMIZE COMPACTION AND PHYSICAL DAMAGE TO SURFACE ROOTS.

SEQUENCE OF CONSTRUCTION

SPECIFIC ACTIVITIES CONDUCTED BY THE CONTRACTOR TO COMPLETE THE WORK INCLUDE, BUT ARE NOT LIMITED TO:

1. CONDUCT FIELD INVESTIGATIONS OR EVALUATIONS TO CONFIRM SITE CONDITIONS AS DEEMED NECESSARY.
2. PREPARE AND SUBMIT FINAL WORK PLANS AND ALL OTHER PRE-CONSTRUCTION SUBMITTALS.
3. ATTEND A PRE-CONSTRUCTION MEETING WITH THE OWNER'S REPRESENTATIVE. MEETING SHALL BE ATTENDED BY THE CONTRACTOR, SUB-CONTRACTOR(S), AND THE OWNER. DURING PRE-CONSTRUCTION MEETING, INVESTIGATE LOC FOR OPPORTUNITIES FOR LOC RECUTION TO MINIMIZE IMPACTS, DISCUSS POTENTIAL TREE SAVES WITHIN LOC, AND DISCUSS STAGING AND STOCKPILE LOCATIONS IN LINE WITH GENERAL NOTE #7.
4. MOBILIZE CREWS, FACILITIES, EQUIPMENT, AND MATERIALS REQUIRED TO THE SPECIFIED STAGING AREA(S) AND/OR CONTRACTOR IDENTIFIED BOAT LAUNCH/ACCESS TO COMPLETE THE WORK.
5. INSTALL AND MAINTAIN THE REQUIRED ENVIRONMENTAL AND EROSION AND SEDIMENTATION CONTROLS.
6. ESTABLISH LIMITS OF WORK FOR LIVING SHORELINE AT THE SPECIFIED LOCATION(S) IDENTIFIED IN THIS DESIGN PACKAGE. IDENTIFY AND ESTABLISH PROPER STAGING OF EQUIPMENT AND MATERIALS REQUIRED PER THE CONTRACT DOCUMENTS.
7. INSTALL LIVING SHORELINE.
8. INSTALL PLANTINGS ACCORDING TO LANDSCAPE PLAN.
9. RESTORE ACCESS PATH, GRAVEL WALKWAY, AND UPLAND LOCATION(S), WHERE APPLICABLE, TO PRE-CONSTRUCTION CONDITIONS IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS

SUSSEX CONSERVATION DISTRICT STANDARD PLAN SEDIMENT AND STORMWATER GENERAL NOTES

A. THE SUSSEX CONSERVATION DISTRICT SEDIMENT AND STORMWATER PROGRAM MUST BE NOTIFIED IN WRITING FIVE (5) DAYS PRIOR TO COMMENCING WITH CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.

B. REVIEW AND/OR APPROVAL OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE REQUIREMENTS OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS IN THE APPROVED PLAN.

C. IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY THE SUSSEX CONSERVATION DISTRICT.

D. FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED FOR ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES, AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE WITHIN 14 CALENDAR DAYS UNLESS MORE RESTRICTIVE FEDERAL REQUIREMENTS APPLY.

E. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

F. AT ANY TIME A DEWATERING OPERATION IS USED, IT SHALL BE PREVIOUSLY APPROVED BY THE AGENCY CONSTRUCTION SITE REVIEWER FOR A NON-EROSIVE POINT OF DISCHARGE, AND A DEWATERING PERMIT SHOULD BE APPROVED BY THE DNREC WELL PERMITTING BRANCH.

G. APPROVAL OF A SEDIMENT AND STORMWATER MANAGEMENT PLAN DOES NOT GRANT OR IMPLY A RIGHT TO DISCHARGE STORMWATER RUNOFF. THE OWNER/DEVELOPER IS RESPONSIBLE FOR ACQUIRING ANY AND ALL AGREEMENTS, EASEMENTS, ETC., NECESSARY TO COMPLY WITH STATE DRAINAGE AND OTHER APPLICABLE LAWS.

H. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHALL BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENT FROM LEAVING THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR ALTER MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.

I. BEST AVAILABLE TECHNOLOGY (BAT) SHALL BE EMPLOYED TO MANAGE TURBID DISCHARGES IN ACCORDANCE WITH REQUIREMENTS OF 7. DEL C. CH 60, REGULATIONS GOVERNING THE CONTROL OF WATER POLLUTION, SECTION 9.102, KNOWN AS SPECIAL CONDITIONS FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, AND DNREC POLICIES, PROCEDURES, AND GUIDANCE.

ADDENDA / REVISIONS		NOT TO SCALE	LAKE BETHANY LIVING SHORELINE	MT JOB NO. 10294.001	BRIDGE NO.	INDEX OF SHEETS AND NOTES	SHEET NO. 002
				COUNTY SUSSEX	DESIGNED BY: OJB/JSH		TOTAL SHEETS 013
					CHECKED BY: CTC/ADT		

17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\ISD1.dgn

MANMADE ROADSIDE FEATURES

FEATURE DESCRIPTION	EXISTING	PROPOSED	ID
BOLLARD - STEEL POLE			
BOLLARD - WOOD POST			
CURB, TYPE 1 AND TYPE 3	CURB, TYPE "X"		
CURB, TYPE 2			
CURB & GUTTER, TYPE 1			C XXX
CURB & GUTTER, TYPE 2	C&G, TYPE "X"		
CURB & GUTTER, TYPE 3			
CURB OPENING - SUMP / ON GRADE			C O
CURB OPENING WITH SIDEWALK			CO SW
FENCE - CHAINLINK OR STRANDED			F XXX
FENCE - STOCKADE OR SPLIT RAIL			
FLAG POLE	F.P.		
GUARDRAIL - STEEL BEAM, TYPE 1			
GUARDRAIL - STEEL BEAM, TYPE 2			
GUARDRAIL - STEEL BEAM, TYPE 3			
GUARDRAIL - WIRE ROPE			
GUARDRAIL - END ANCHORAGE			GR XXX
GUARDRAIL - END TREATMENT, TYPE 1			
GUARDRAIL - END TREATMENT, TYPE 2			
GUARDRAIL - END TREATMENT, TYPE 3			
GUARDRAIL - IMPACT ATTENUATOR			
LAMP AND POST - RESIDENTIAL	LAMP		
MAILBOX	MB	MB	
PARKING METER AND POST	P.M.		
PAVEMENT - FLEXIBLE			
PAVEMENT - RIGID			
PILE - BRIDGE			
PILLAR OR MISCELLANEOUS POST			
TRAFFIC SIGN AND POST			
WALL - BRICK OR BLOCK			
WALL - STONE			

DRAINAGE FEATURES

FEATURE DESCRIPTION	EXISTING	PROPOSED	ID
BIOFILTRATION SWALE		BFS	
DITCH OR STREAM CENTERLINE			
DIRECTIONAL STREAM FLOW ARROW			
DRAINAGE INLET	C.B. / D.I.		DI XXX
DRAINAGE JUNCTION BOX	J.B.		JB XXX
DRAINAGE MANHOLE	D		MH XXX
DRAINAGE PIPE AND FLOW ARROW	SIZE/TYPE LABEL		P XXX
FLARED END SECTION			FES XXX
RIPRAP - AREA FEATURE			RR XXX
RIPRAP - LINEAR FEATURE			
SAFETY END SECTION			SES XXX
UNDERDRAIN			UD XXX
UNDERDRAIN OUTLET			UDO XXX

UTILITY FEATURES

FEATURE DESCRIPTION	EXISTING	PROPOSED
CABLE TV DISTRIBUTION BOX	TV	
COMMUNICATIONS - UNDERGROUND	COMM(A)	COMM
ELECTRIC - UNDERGROUND	E(A)	E
ELECTRIC MANHOLE	E	
ELECTRIC METER	EM	
ELECTRIC TRANSFORMER	E	
GAS - UNDERGROUND	G(A)	G
GAS MANHOLE	G	
GAS METER	G.M.	
GAS VALVE	G.V.	
GAS PUMP - SERVICE STATION	G.P.	
IRRIGATION - UNDERGROUND	IR(A)	IR
ITMS - UNDERGROUND	ITMS(A)	ITMS
LIGHTING - UNDERGROUND	LI(A)	LI
LUMINAIRE - POLE MOUNTED		
MANHOLE - UNDETERMINED OWNER	?	
RAILROAD TRACKS		
SANITARY - UNDERGROUND	S(A)	S
SANITARY SEWER MANHOLE	S	
SANITARY SEWER VALVE	S.V.	
SANITARY SEWER CLEANOUT OR VENT	S.C.O.	
SEPTIC DRAIN FIELD	S.D.F.	
SIGNALIZATION - UNDERGROUND	SIG(A)	SIG
SOIL BORING LOCATION		
TELEPHONE BOOTH	B	
TELEPHONE MANHOLE	T	
TELEPHONE TEST POINT	T	
TRAFFIC - CONDUIT JUNCTION WELL	J.W.	
TRAFFIC - LIGHT POLE AND BASE		
TRAFFIC - PEDESTRIAN POLE & BASE		
TRAFFIC - SIGNAL CABINET & BASE		
TRAFFIC - SIGNAL POLE AND BASE		
UTILITY BOX	U	
UTILITY MARKER	UM	
UTILITY POLE GUY WIRE ANCHOR		
UTILITY POLE		
UTILITY TEST HOLE LOCATION		
WATER - UNDERGROUND	W(A)	W
WATER - FIRE HYDRANT	F.H.	F.H.
WATER METER	W.M.	
WATER VALVE	WV	WV
WELL HEAD	WELL	

PAVEMENT SECTION(S)

OVERLAY PAVEMENT - SEE TYPICAL SECTIONS FOR MATERIALS AND DEPTHS	
RECONSTRUCTED PAVEMENT - SEE TYPICAL SECTIONS FOR MATERIALS AND DEPTHS	
DRIVEWAY AND ENTRANCE PAVEMENT - SEE NOTES FOR MATERIALS AND DEPTHS	

NATURAL ROADSIDE FEATURES

FEATURE DESCRIPTION	EXISTING	PROPOSED
HEDGEROW OR THICKET		
MARSH BOUNDARY LINE		
TREE - CONIFEROUS		
TREE - DECIDUOUS		
TREE STUMP		
SHRUBBERY		
WETLAND BOUNDARY - DELINEATED	WL	
WOODS LINE BOUNDARY		
EXISTING CONTOUR MAJOR		
EXISTING CONTOUR MINOR		
MEAN HIGH WATER LINE (DNREC OBSERVED)	MHW	

RIGHT-OF-WAY FEATURES

FEATURE DESCRIPTION	EXISTING	PROPOSED
DENIAL OF ACCESS	DA	DA
EASEMENT - OTHERS	EASEMENT TYPE	
PERMANENT EASEMENT	PE	PE
PROPERTY LINE		
PROPERTY MARKER - CONCRETE	C.M.	
PROPERTY MARKER - IRON PIPE	I.P.	
RIGHT-OF-WAY BASELINE	100+00	100+00
RIGHT-OF-WAY LINE		R/W
RIGHT-OF-WAY BY PE		
RIGHT-OF-WAY & DENIAL OF ACCESS	R/W-DA	R/W-DA
RIGHT-TO-ENTER		RTE
TEMPORARY CONSTRUCTION EASEMENT		TCE

SURVEY CONTROL & MONUMENTATION

FEATURE DESCRIPTION	EXISTING
POINT OF CURVATURE OR TANGENCY	
POINT OF INTERSECTING TANGENTS	
SURVEY BENCHMARK LOCATION	B.M.
SURVEY NGS POINT LOCATION	
SURVEY TIE POINT LOCATION	T.P.
SURVEY TRAVERSE POINT	

MISCELLANEOUS FEATURES

FEATURE DESCRIPTION	PROPOSED
BARRIER, DOUBLE-FACED, PERMANENT	
BARRIER, SINGLE-FACED, PERMANENT, TEST LEVEL 4 / TEST LEVEL 5	
BRICK PATTERNED SURFACE	
BUTT JOINT	
CLEAR ZONE	CZ
CONSTRUCTION BASELINE	100+00
LATERAL OFFSET	LO
LIMIT OF CONSTRUCTION	LOC
PAVEMENT PATCH	
PAVEMENT REMOVAL - TOPSOIL, SEED AND MULCH	
P.C.C. SIDEWALK - 4"	
P.C.C. SIDEWALK - 6" (USE 8" DEPTH FOR CHANNELIZATION ISLANDS.)	

IDENTIFIERS

FEATURE DESCRIPTION	ID
ABANDON BY CONTRACTOR	AB C
ABANDON BY OTHERS	AB O
ADJUST BY CONTRACTOR	A C
ADJUST BY OTHERS	A O
BEST MANAGEMENT PRACTICE	BMP XXX
BUS STOP PAD / TYPE	BSP X
BUS STOP WITH SHELTER PAD / TYPE	BSSP X
CONCRETE SAFETY BARRIER	B XXX
CONVERT TO JUNCTION BOX	CJB XXX
CONVERT TO DRAINAGE MANHOLE	CMH XXX
DO NOT DISTURB	DND
ENERGY DISSIPATOR	ED XXX
FILL WITH FLOWABLE FILL	FF C
LANDSCAPE PLANTINGS	LS XXX
PEDESTRIAN CONNECTION / TYPE	PC XX
PEDESTRIAN CONNECTION / TYPE WITHOUT DETECTABLE WARNING SYSTEM	PC-N XXX
RELOCATE BY CONTRACTOR	RL C
RELOCATE BY OTHERS	RL O
RELOCATE BY PROPERTY OWNER	RL PO
REMOVE BY CONTRACTOR	RM C
REMOVE BY OTHERS	RM O
REMOVE BY TRAFFIC CONTRACTOR	RM TC
RIGHT-OF-WAY MONUMENT	M XXX

UTILITY COMPANY FACILITIES

DP-E	DELMARVA POWER - ELECTRIC
MC-C	MEDIACOM
TW-W	TIDEWATER
SC-S	SUSSEX COUNTY - SEWER
VER-C	VERIZON

EROSION & SEDIMENT CONTROL

CFL	COMPOST FILTER LOG
CFL	COMPOST FILTER LOG / LENGTH
DWBAG	DEWATERING BAG
DWB	DEWATERING BASIN
ED	EARTH DIKE
	INLET SEDIMENT CONTROL
	PERIMETER DIKE/SWALE
PST	PORTABLE SEDIMENT TANK
SBD	SANDBAG DIKE
SB	SANDBAG DIVERSION
	STONE CHECK DAM
SCE	STABILIZED CONSTRUCTION ENTRANCE
SF	SILT FENCE / LENGTH
SF	SILT FENCE
RSF	REINFORCED SILT FENCE / LENGTH
RSF	REINFORCED SILT FENCE
SSF	SUPER SILT FENCE / LENGTH
SSF	SUPER SILT FENCE
SP	SUMP PIT
ST	SEDIMENT TRAP / NUMBER
ST	SEDIMENT TRAP
ST	SEDIMENT TRAP WITH INLET AS OUTLET
ST	SEDIMENT TRAP PIPE OUTLET
SW	STILLING WELL
	TEMPORARY SWALE
TSD	TEMPORARY SLOPE DRAIN
T XXX	TURBIDITY CURTAIN / LENGTH
TC-(1/2/3)	TURBIDITY CURTAIN

CONSTRUCTION PHASING & M.O.T

	BARRICADE, TYPE 3
	CONCRETE SAFETY BARRIER - PORTABLE
CSF XXX	CONSTRUCTION SAFETY FENCE / LENGTH
CSF	CONSTRUCTION SAFETY FENCE
	CONSTRUCTION WARNING SIGN LOCATION
END ROAD WORK	CONSTRUCTION WARNING SIGN
	CRASH CUSHION ARRAY
	DRUM - TRAFFIC CONTROL
	FLAGGER LOCATION
PHASE 1	PHASING TRAFFIC FLOW ARROW
	TEMPORARY CONSTRUCTION
	TEMPORARY PAVEMENT MARKING ARROW
	TRUCK WITH MOUNTED ATTENUATOR
	WORK AREA - ACTIVE PHASE

ADDENDA / REVISIONS

NOT TO SCALE

LAKE BETHANY LIVING SHORELINE

MT JOB NO.	BRIDGE NO.	SHEET NO.
10294.001		003
COUNTY	DESIGNED BY: OJB/JSH	TOTAL SHEETS
SUSSEX	CHECKED BY: CTC/ADT	013

LEGEND

LAST REVISED: 09/02/2020
17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADDPlan_Set\Environmental\LG01.dgn

ADDENDA / REVISIONS	

SCALE
0 30 60 90
FEET

LAKE BETHANY LIVING SHORELINE

MT JOB NO.	BRIDGE NO.	
10294.001	DESIGNED BY:	OJB/JSH
COUNTY		
SUSSEX	CHECKED BY:	CTC/ADT

EXISTING CONDITIONS SHEET

SHEET NO.
004
TOTAL SHEETS
013

17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\F501.dgn

ADDENDA / REVISIONS	

SCALE
0 30 60 90
FEET

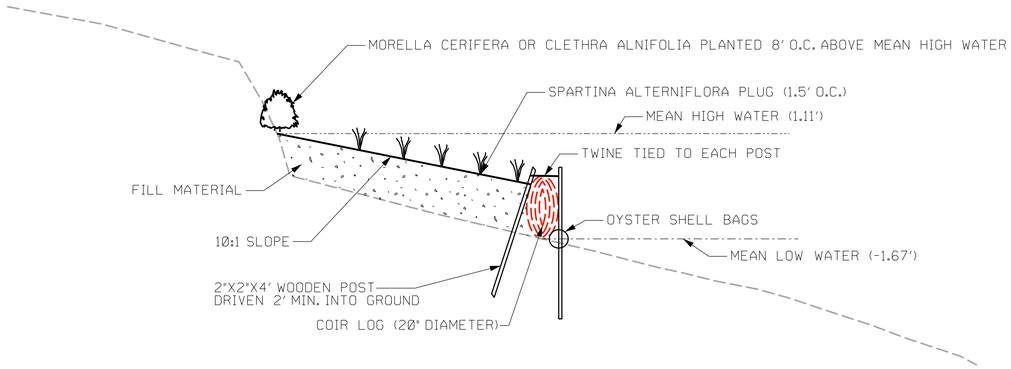
LAKE BETHANY LIVING SHORELINE

MT JOB NO.	10294.001	BRIDGE NO.	
COUNTY	SUSSEX	DESIGNED BY:	OJB/JSH
		CHECKED BY:	CTC/ADT

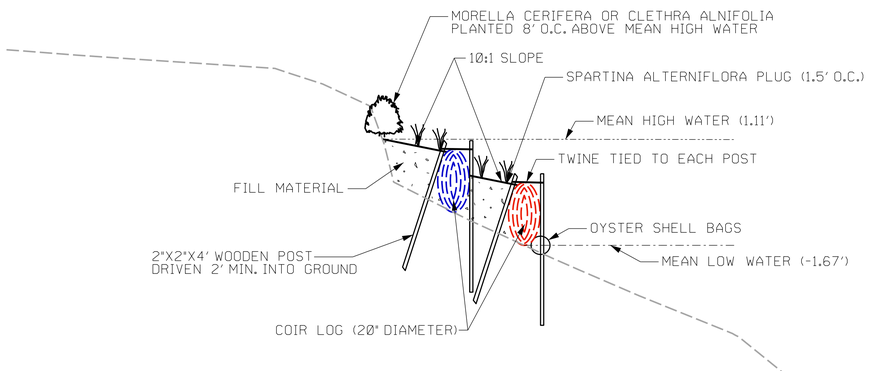
CONSTRUCTION PLAN SHEET

SHEET NO.	
005	
TOTAL SHEETS	
013	

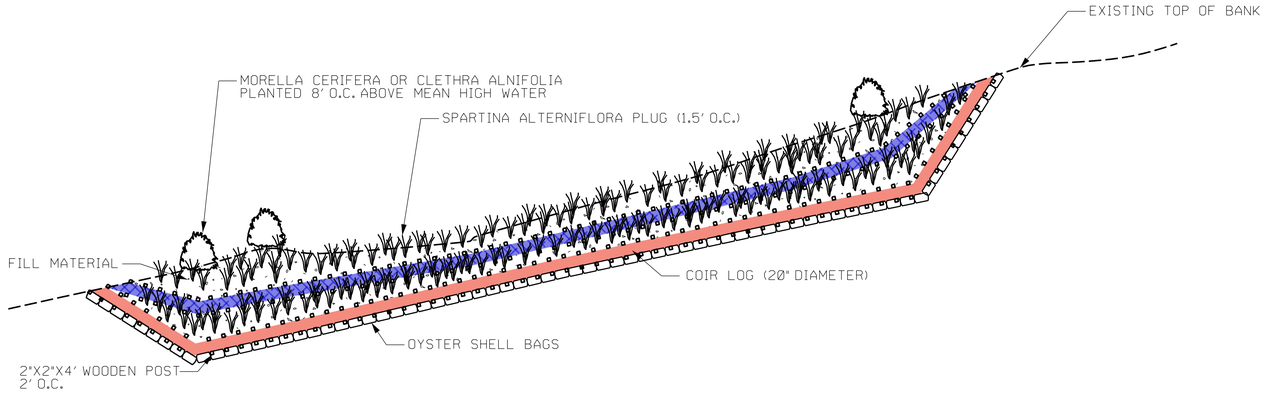
17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_Town\Beth\Bch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\CP01.dgn



TYPICAL SECTION
COIR LOG - SINGLE LAYER
NOT TO SCALE



TYPICAL SECTION
COIR LOG - DOUBLE LAYER
NOT TO SCALE

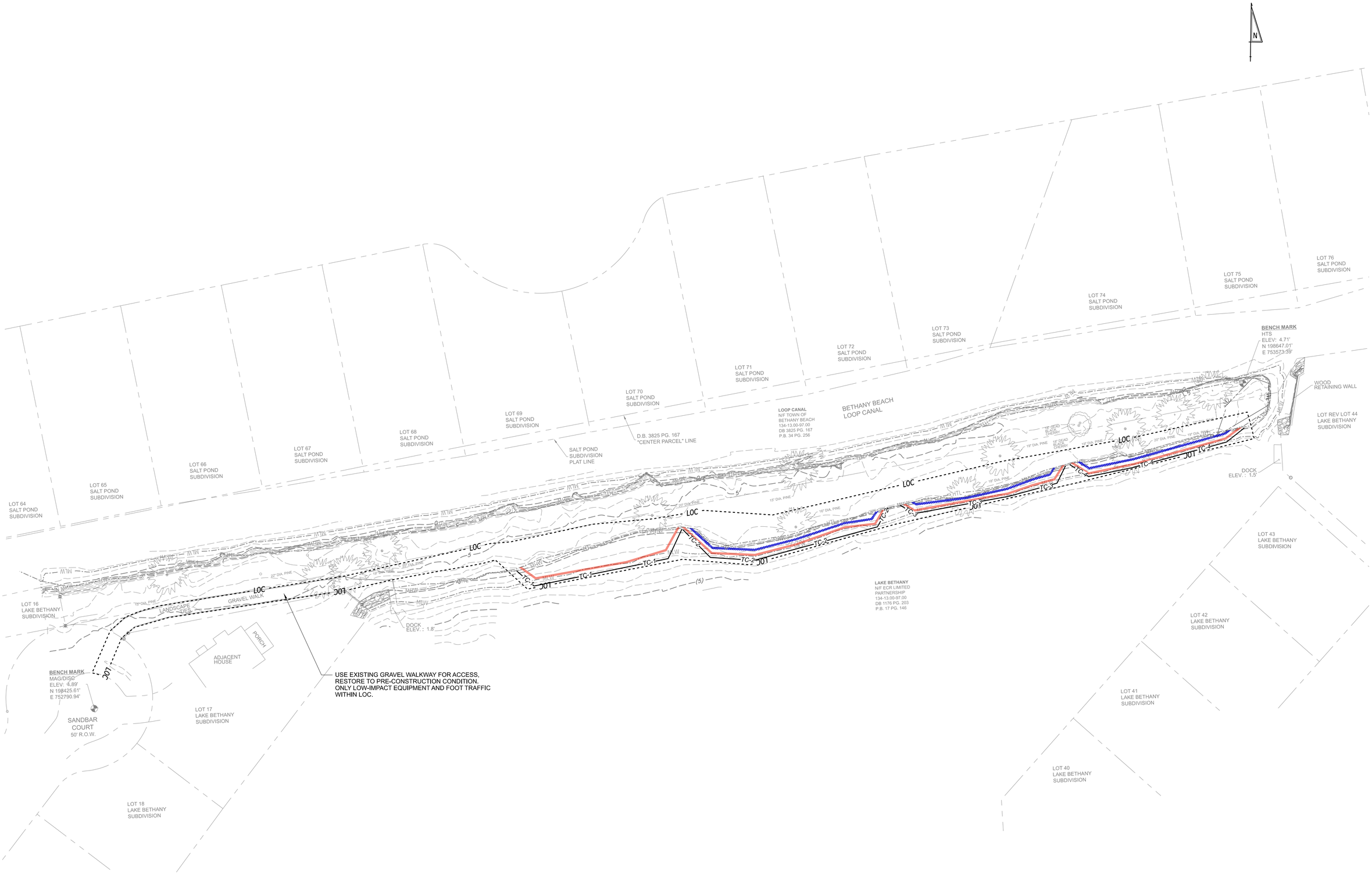


PLAN VIEW
COIR LOG SILL
NOT TO SCALE

NOTE: EXISTING FALLEN TREES AND WOODY DEBRIS TO BE ENCORPORATED INTO COIR LOG SILLS

ADDENDA / REVISIONS						
			LAKE BETHANY LIVING SHORELINE	MT JOB NO. 10294.001	BRIDGE NO.	STRUCTURE DETAILS
				COUNTY SUSSEX	DESIGNED BY: OJB/JSH	SHEET NO. 006
					CHECKED BY: CTC/ADT	TOTAL SHEETS 013

17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_Town\BethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\DE01.dgn



ADDENDA / REVISIONS	

SCALE
0 30 60 90
FEET

LAKE BETHANY LIVING SHORELINE

MT JOB NO.	10294.001
COUNTY	SUSSEX
BRIDGE NO.	
DESIGNED BY:	OJB/JSH
CHECKED BY:	CTC/ADT

EROSION & SEDIMENT CONTROL PLAN

SHEET NO.	007
TOTAL SHEETS	013

17-OCT-2025
11:13
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\EnvironmentalES01.dgn

Construction Site Pollution Prevention

Delaware NPDES Discharge Permit
General Permit for Discharge of Stormwater from Construction Activities

((Project Name))

((NOI Permit Number))

((Agency Plan Approval ID))

((Contact Name & Number for Additional Site Information))

((Contact Name & Number to Obtain Copy of Approved Plan))

If you observe indicators of stormwater pollutants
in the discharge or in the receiving waterbody, call the
DNREC Spill Notification 24 HR Hotline at

1-800-662-8802

Example Construction General Permit (CGP) Signage

NOTES:
1. Minimum sign size 2' x 2'
2. Minimum text size 1"
3. Sign must be posted at a safe, publicly accessible location close to construction site
4. Sign must be visible from the public road nearest the active construction site
5. Signs posted within a DelDOT or other public road right-of-way (ROW) must be in accordance with all local and/or State requirements in regards to safety, location, orientation, etc.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 1 of 4 Effective July 2023

Construction Site Pollution Prevention

Notes:

The Construction Site Pollution Prevention Plan includes the following elements:

1. **Material Inventory**

   Document the storage and use of the following materials:
   a. Concrete
   b. Detergents
   c. Paints (enamel and latex)
   d. Cleaning solvents
   e. Pesticides
   f. Wood scraps
   g. Fertilizers
   h. Petroleum based products

2. **Good housekeeping practices**
   a. Store only enough product required to do the job.
   b. Store all materials in a neat, orderly manner in their original labeled containers and covered.
   c. Do not mix different substances.
   d. When possible, use all of a product prior to disposal of the container.
   e. Manufacturers' instructions for disposal should be strictly adhered to.
   f. Designate someone to inspect all BMPs daily.

3. **Waste management practices**
   a. Collect and store all waste materials in securely lidded dumpsters in a location that does not drain to a waterbody.
   b. Salvage and/or recycle waste materials whenever possible.
   c. The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 2 of 4 Effective July 2023

Construction Site Pollution Prevention

Notes (cont.)

   d. Dispose of all trash in accordance with all applicable Delaware laws.
   e. Littering is strictly prohibited. Trash cans should be placed at all lunch spots and recycle bins should be placed near the construction trailer.
   f. If fertilizer bags can not be stored in a weather-proof location, they should be kept on a pallet and covered with plastic sheeting which is overlapped and anchored.

4. **Equipment maintenance practices**
   a. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
   b. If performed on-site, wash vehicles with high-pressure water spray without detergents in an area contained by an impervious berm.
   c. Use drip pans for all equipment maintenance.
   d. Inspect equipment for leaks on a daily basis.
   e. Direct washout from concrete trucks into a temporary pit for hardening and proper disposal.
   f. Equip fuel nozzles with automatic shut-off valves.
   g. Dispose of all used products such as oil, antifreeze, solvents and tires in accordance with manufacturers' recommendations and local, state and federal laws and regulations.

5. **Spill prevention practices**
   a. Identify potential spill areas and contain them in covered areas with no connection to the storm drain system.
   b. Post warning signs in hazardous material storage areas.
   c. Perform preventive maintenance on all tanks, valves, pumps, pipes and other equipment as necessary.
   d. Prioritize low or non-toxic substances for use.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 3 of 4 Effective July 2023

Construction Site Pollution Prevention

Notes (cont.)

   e. Prominently post contact information for reporting spills through the DNREC 24-Hour Toll Free Number.

6. **Education**
   a. Include Best Management Practices (BMPs) for construction site pollution control as part of regular progress meetings.
   b. Information regarding waste management, equipment maintenance and spill prevention should be prominently posted in the construction trailer.

CONTACT INFORMATION

DNREC 24-Hour Toll Free Number	800-**662-8802**
DNREC Solid & Hazardous Waste Management Section	302-739-9403

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 4 of 4 Effective July 2023

Vegetative Stabilization

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Mix #	Species[5]	Seeding Rate		Optimum Seeding Dates [1] O = Optimum Planting Period. A = Acceptable Planting Period							Planting Depth[3]
				Coastal Plain			Piedmont			All	
	Certified Seed	lb/Ac [4]	lb/1000 sq.ft.	2/1-4/30	[2] 5/1-8/14	8/15-10/31	3/1-4/30	[2] 5/1-7/31	8/1-10/31	10/31-2/1	
1	Barley	125	4	O	A	O	O	A	O		1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O		0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7		O			O			0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		O			O			0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
5. Warm season grasses such as Millet may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 1 of 4 Effective July 2023

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES

Mix No.	Seeding Mixtures Certified Seed[3] Well Drained Soils	Seeding Rate[1] lb/Ac	 lb/1000 sq.ft.	Optimum Seeding Dates [2] O = Optimum Planting Period A = Acceptable Planting Period Coastal Plain 2/1-4/30	 5/1-8/14	 8/15-10/31	 Piedmont 3/1-4/30	 5/1-7/31	 8/1-10/31	 All[4] 10/31-2/1	Remarks
1	Tall Fescue Canada Wild Rye	140 10	3.2 0.23	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Good for droughty sites
2	Deertongue Sheep Fescue White Clover	30 30 10	0.69 0.69 0.35	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Legume that fixes atmospheric N into soil
3	Tall Fescue (Turf-type) **or** Strong Creeping Red Fescue **or** Perennial Ryegrass **plus** Flatpea[5]	50 50 50 15	1.15 1.15 1.15 0.34	O	A*	O	O	A*	O	Add 100 lbs./ac Winter Rye	Good erosion control mix Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation.
4	Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass **or** Redtop **plus** White Clover[5]	100 70 15 5 3	2.3 1.61 0.35 0.11 0.07	O	A*	O	O	A*	O	Add 100 lbs./ac Winter Rye	Suitable waterway mix. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
5	Switchgrass[6,7] **or** Coastal Panicgrass Big Bluestem Little Bluestem Indian Grass	10 10 5 5 5	0.23 0.23 0.11 0.11 0.1		O			O			Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant. Poor shade tolerance. N fertilizer discouraged - weeds
6	Tall Fescue (turf-type) (Blend of 3 cultivars)	150	3.5	O	A*	O	O	A*	O		Managed filter strip for nutrient uptake.
7	Tall Fescue Ky. Bluegrass (Blend) Perennial Ryegrass	150 20 20	3.5 0.46 0.46	O	A*	O	O	A*	O		Three cultivars of Kentucky Bluegrass. Traffic tolerant.
8	Big Bluestem[7] Indian Grass[7] Little Bluestem[7] Creeping Red Fescue **plus one of:** Partridge Pea Bush Clover Wild Indigo Showy Tick-Trefoil	10 10 8 30 5 3 3 2	0.23 0.23 0.18 0.69 0.11 0.07 0.07 0.05	O	A*			O	A*		All species are native. Indian Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 2 of 4 Effective July 2023

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES (cont.)

Mix No.	Seeding Mixtures Certified Seed[3] Poorly Drained Soils	Seeding Rate[1] lb/Ac	 lb/1000 sq.ft.	Optimum Seeding Dates [2] O = Optimum Planting Period A = Acceptable Planting Period Coastal Plain 2/1-4/30	 5/1-8/14	 8/15-10/31	 Piedmont 3/1-4/30	 5/1-7/31	 8/1-10/31	 All[4] 10/31-2/1	Remarks
9	Redtop Creeping Bentgrass Sheep Fescue Rough Bluegrass	75 35 30 45	1.72 0.8 0.69 1	O	A*	O	O	A*	O	Add 100 lbs./ac. Winter Rye	Quick stabilization of disturbed sites and waterways
10	Switchgrass[6]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue Perennial Ryegrass Kentucky Bluegrass Blend	100 25 30	2.3 0.57 0.69	O	A*	O	O	A*	O		High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
12	Tall Fescue Perennial Ryegrass Sheep Fescue	100 25 25	2.3 0.57 0.57	O	A*	O	O	A*	O		Moderate value, low maintenance, traffic tolerant.
13	Creeping Red Fescue Chewings Fescue Rough Bluegrass Kentucky Bluegrass	50 50 20 20	1.15 1.15 0.4 0.4	O	A*	O	O	A*	O		Shade tolerant, moderate traffic tolerance, moderate maintenance.
14	Creeping Red Fescue Rough Bluegrass **or** Chewings Fescue	50 90	1.15 2.1	O	A*	O	O	A*	O		Shade tolerant, moisture tolerant.
15	K-31 Tall Fescue	150	3.5	O	A*	O	O	A*	O		Monoculture, but performs well alone in lawns. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Chapter 15, Title 3 of the Delaware Code.
4. Turf-type species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. It is recommended that all leguminous seed be inoculated.
6. Warm season grass mix and Switchgrass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate and will remain dormant until then.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 3 of 4 Effective July 2023

Vegetative Stabilization

Construction Notes:

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Final grading and shaping is not necessary for temporary seedings.

2. Seedbed Preparation

   It is important to prepare a good seedbed to ensure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.

3. Soil Amendments
   a. Lime - Apply liming materials based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.
   b. Fertilizer - Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.

4. Seeding
   a. For **temporary stabilization**, select a mixture from **Sheet 1** . For a **permanent stabilization**, select a mixture from **Sheet 2** or **Sheet 3** depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
   b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
   c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.

5. Mulching

   All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

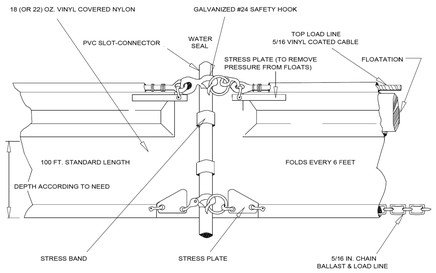
Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 4 of 4 Effective July 2023

ADDENDA / REVISIONS		NOT TO SCALE	LAKE BETHANY LIVING SHORELINE	MT JOB NO.	BRIDGE NO.		EROSION & SEDIMENT CONTROL DETAILS	SHEET NO.
				10294.001				008
				COUNTY	DESIGNED BY:	OJB/JSH		TOTAL SHEETS
				SUSSEX	CHECKED BY:	CTC/ADT		013

17-OCT-2025
11:14
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\EE01.dgn

Standard Detail & Specifications

Turbidity Curtain



Typical Section - Type 2

DATA

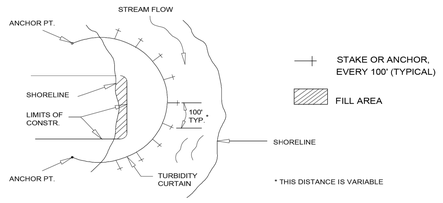
Curtain type (1, 2, or 3)
Layout (Std. or Alt.)

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 2 of 8 Effective July 2023

Standard Detail & Specifications

Turbidity Curtain

NOTE: The standard layout shown is intended for use in streams, ponds and other non-tidal waters



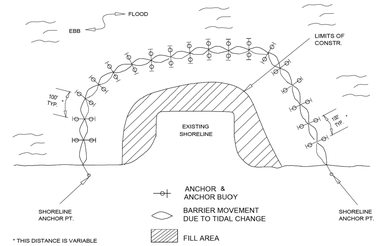
Plan - Std. Layout

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 4 of 8 Effective July 2023

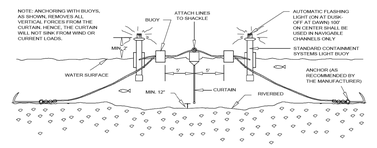
Standard Detail & Specifications

Turbidity Curtain

NOTE: The alternative layout shown is intended for tidal waters and/or heavy wind and wave action



Plan - Alt. Layout



Additional Requirements for Navigable Waters

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 5 of 8 Effective July 2023

Standard Detail & Specifications

Turbidity Curtain

Construction Notes:

1. **Materials**
   a. Barriers should be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.
   b. The curtain fabric shall meet manufacturer's recommendations for the application.
   c. Seams in the fabric shall be either vulcanized welded or sewn and shall develop the full strength of the fabric.
   d. Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface level.
   e. Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a break strength in excess of 10,000 pounds. The supplemental (bottom) load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connection to load lines in adjacent sections as shown in the detail.
   f. External anchors may consist of wooden or metal stakes (2- x 4-inch or 2-1/2-inch minimum diameter wood or 1.33 lbs/linear foot steel) when Type I installation is used; when Type II or Type III installations are used, bottom anchors should be used.
   g. Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line should then run from the buoy to the to load line of the curtain. When used with Type III installations, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and potential wind and wave action; manufacturer's recommendations should be followed. See detail for orientation of external anchors and anchor buoys for tidal installations.

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 6 of 8 Effective July 2023

Standard Detail & Specifications

Turbidity Curtain

Construction Notes (cont.)

2. **Installation**
   a. In the calm water of lakes or ponds (Type I installation) it is usually sufficient to set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furled condition out and attach it to the stakes or anchor points. Following this, any additional stakes or buoyed anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. Only then shall the furling lines be cut to allow the curtain skirt to drop.
   b. In rivers or in other moving waters (Type II and Type III installations) it is important to set all curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions, prior to putting the furled curtain into the water. Anchor buoys should be employed on all anchors to prevent the current from submerging the flotation at the anchor points. If the curtain is being installed into tidal areas which would be subject to currents in both directions, anchors should be provided on both sides of the curtain. This will minimize curtain movement and prevent the curtain from overrunning the anchors during tide reversals. After the anchors have been secured, the furled curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. Before unfurling, the "lay" of the curtain should be assessed and any necessary adjustments made to the anchors. Once the location has been deemed adequate, the furling lines may be cut to allow the skirt to drop.
   c. Anchor lines should be attached to the flotation device, not to the bottom of the curtain. The anchoring line attached to the flotation device on the downstream side will provide support for the curtain. Attaching the anchors to the bottom of the curtain could cause premature failure of the curtain due to the stresses imparted on the middle section of the curtain.
   d. Turbidity curtain shall not be installed across channel flows unless there is a danger of causing sediment deposition to occur in the middle of a watercourse, thereby blocking access or creating a sand bar. In such situations, the curtain may be installed so as to form a long-sided, sharp "V" to deflect clean water around a work site, confining most of the silt-laden water to the work area inside the "V" and directing it to the shoreline. In no case shall the curtain be installed perpendicular to the channel flow.

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 7 of 8 Effective July 2023

Standard Detail & Specifications

Turbidity Curtain

Construction Notes (cont.)

3. **Maintenance**
   a. The individual(s) identified on the plan as responsible for maintenance of the curtain shall do so for the duration of the project in order to ensure the continuous protection of the watercourse.
   b. Should repairs to the geotextile fabric become necessary, repair kits are generally available from the manufacturer. The manufacturer's instructions must be followed to ensure the adequacy of the repair.
   c. When the curtain is no longer required as determined by the inspector, the curtain and related components shall be removed in such a manner as to minimize turbidity. Remaining sediment shall be sufficiently settled before removing the curtain. Sediment may be removed and the original depth (or plan elevation) restored. Any spoils must be taken to an approved upland disposal area and stabilized in accordance with the approved plan.

4. **Removal**
   a. Care shall be taken to protect the skirt from damage as the turbidity curtain is dragged from the watercourse.
   b. The site selected to bring the curtain ashore should be free of sharp rocks, broken cement, debris, etc. so as to minimize damage when hauling the curtain over the area.
   c. If the curtain has a deep skirt, it can be further protected by running a small boat along its length with a crew installing furling lines before attempting to remove the curtain from the water.

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 8 of 8 Effective July 2023

ADDENDA / REVISIONS		NOT TO SCALE	LAKE BETHANY LIVING SHORELINE	MT JOB NO. 10294.001	BRIDGE NO.	EROSION & SEDIMENT CONTROL DETAILS	SHEET NO. 009
				COUNTY SUSSEX	DESIGNED BY: OJB/JSH		TOTAL SHEETS 013
					CHECKED BY: CTC/ADT		

17-OCT-2025
11:14
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\EnvironmentalTitleED02.dgn

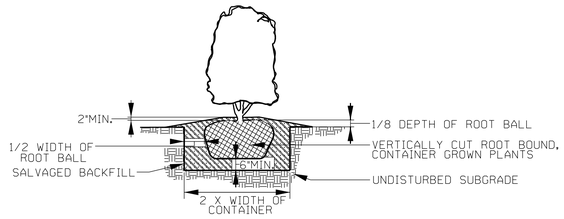
PERMANENT SEED MIX

ZONE	BOTANICAL NAME	COMMON NAME	PERCENT MIX	TOTAL MIX (LBS)
Coastal Upland, Coastal Fringe Shrub	*Sorghastrum nutans*	Indiangrass	39.7	
	Rudbeckia hirta	Blackeyed Susan	3.0	
	Elymus virginicus	Virginia Wildrye	23.0	
	Heliopsis helianthoides	Oxeye Sunflower	2.0	
	Panicum virgatum	Switchgrass	18.0	
	Panicum rigidulum	Redtop Panicgrass	10.0	
	Asclepias incarnata	Swamp Milkweed	1.0	
	Vernonia noveboracensis	New York Ironweed	0.9	
	Solidago rugosa	Wrinkleleaf Goldenrod	0.8	
	Helianthus angustifolius	Narrowleaf Sunflower	0.8	
	Eupatorium perfoliatum	Boneset	0.8	
Total				19.0

*SEED SOWING RATE TO BE APPLIED AT 100 LBS/AC WITH A COVER CROP OF TEMPORAY SEED AT 125 LBS/AC

PLANTING SCHEDULE

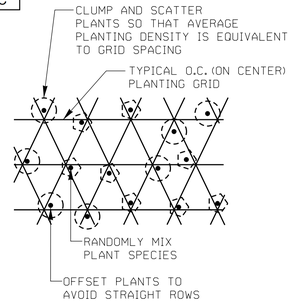
Zone	Botanical Name	Common Name	Size	Comment	Quantity
Coastal Upland	*Pinus taeda*	Loblolly Pine	1" Caliper	Plant 20' O. C.	6
	Quercus phellos	Willow Oak	1" Caliper	Plant 20' O. C.	6
	Quercus falcata	Southern Red Oak	1" Caliper	Plant 20' O. C.	6
	Morella caroliniensis	Small Bayberry	3' Height min	Plant 8' O. C.	12
	Panicum virgatum	Switchgrass	1 Gal. Containter	Plant 6' O. C.	10
	Solidago sempervirens	Seaside Goldenrod	1 Gal. Containter	Plant 6' O. C.	10
Coastal Fringe Shrub	*Morella cerifera*	Southern Bayberry	3' Height min	Plant 15' O. C.	19
	Clethra Alnifolia	Coastal Sweetpepperbush	3' Height min	Plant 15' O. C.	19
Low Marsh	*Spartina alterniflora*	Saltmarsh Cordgrass	5" Deep x 2" Dia Plug	Plant 1.5' O.C.	1490



SHRUB PLANTING DETAIL

CONTAINER GROWN
(NOT TO SCALE)

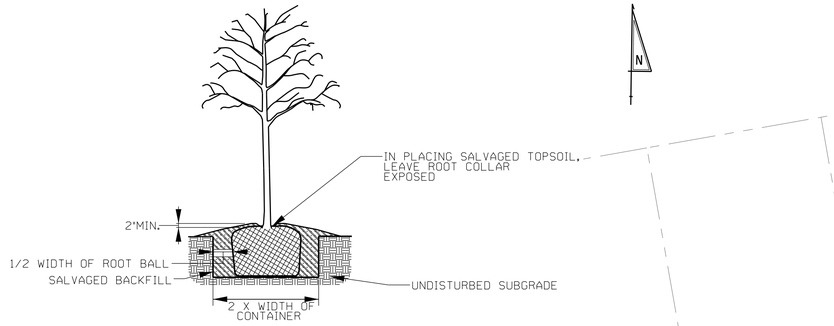
NOTE:
1. ALL TREES AND SHRUBS SHALL HAVE A MINIMUM OF ONE BRANCHED GROWTH AT TIME OF PLANTING



RANDOM PLANTING PATTERN

NOT TO SCALE

NOTE:
ACCOUNT FOR LOCATION OF EXISTING TREES IN PLANT SPACING.



TREE PLANTING DETAIL

CONTAINER GROWN
(NOT TO SCALE)

NOTE:
1. ALL TREES AND SHRUBS SHALL HAVE A MINIMUM OF ONE BRANCHED GROWTH AT TIME OF PLANTING

2. ONLY TREES WITH SINGLE LEADER ARE ACCEPTABLE

LEGEND	
COASTAL UPLAND ZONE	
COASTAL FRINGE SHRUB ZONE	
LOW MARSH ZONE	

ADDENDA / REVISIONS	

SCALE
0 30 60 90
FEET

LAKE BETHANY LIVING SHORELINE

MT JOB NO.	BRIDGE NO.	
10294.001	DESIGNED BY:	OJB/JSH
COUNTY	CHECKED BY:	CTC/ADT
SUSSEX		

LANDSCAPE PLAN

SHEET NO.
010
TOTAL SHEETS
013

17-OCT-2025
11:15
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\LS01.dgn

WETLAND IMPACTS			
ID	*HABITAT TYPE*	*AREA (S.F.)*	
		TEMP.	*PERM.*
W-1	Estuarine Wetland (forest)	135	0

WATERCOURSE IMPACTS			
ID	*HABITAT TYPE*	*AREA (S.F.)*	
		TEMP.	*PERM.*
R-1 (waterward of MHW)	Estuarine Substrate (sand/shell)	3,058	3,682

IMPACTS LEGEND
WETLAND (PERM./TEMP.)
WATERCOURSE (PERM./TEMP.)

ADDENDA / REVISIONS	

SCALE
0 30 60 90
FEET

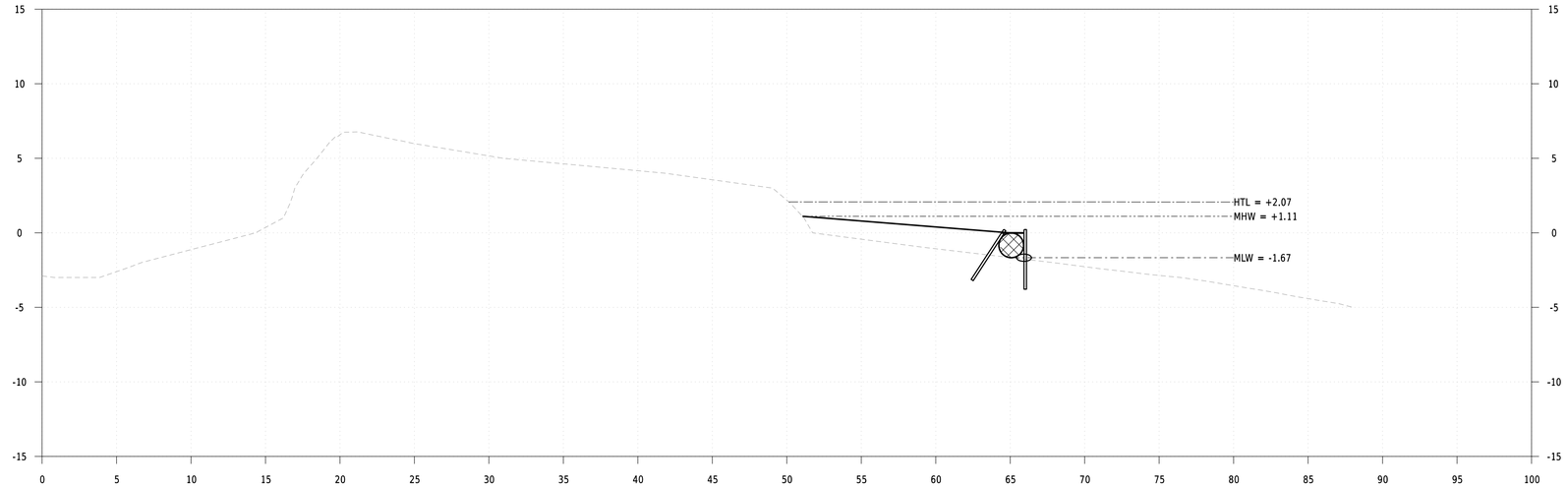
LAKE BETHANY LIVING SHORELINE

MT JOB NO.	BRIDGE NO.	
10294.001	DESIGNED BY:	OJB/JSH
COUNTY	CHECKED BY:	CTC/ADT
SUSSEX		

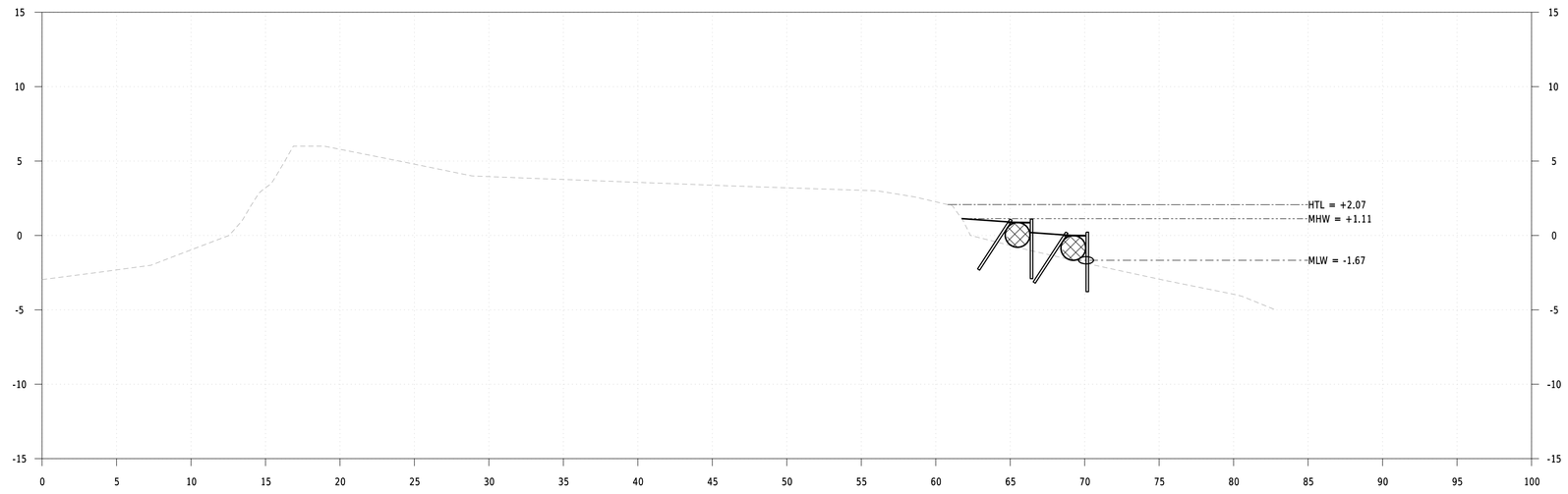
IMPACTS SHEET

SHEET NO.
011
TOTAL SHEETS
013

$DATE$
$TIME$
$FILE$



CROSS SECTION A



CROSS SECTION B

LEGEND	
EXISTING GROUND	
PROPOSED GRADE	
MEAN LOW WATER (MLW) LEVEL	
MEAN HIGH WATER (MHW) LEVEL	
OBSERVED HIGH TIDE LINE (HTL), AVG. EL.	

ADDENDA / REVISIONS	

SCALE
0 5 10 15
FEET

LAKE BETHANY LIVING SHORELINE

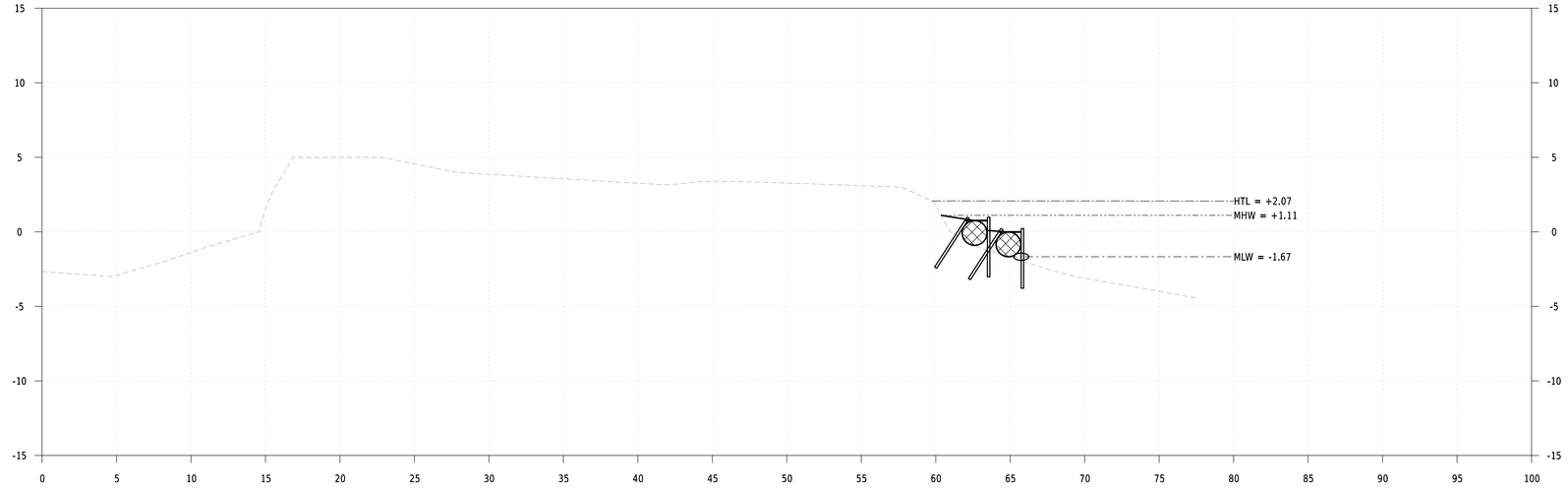
MT JOB NO.	10294.001
COUNTY	SUSSEX

BRIDGE NO.	
DESIGNED BY:	OJB/JSH
CHECKED BY:	CTC/ADT

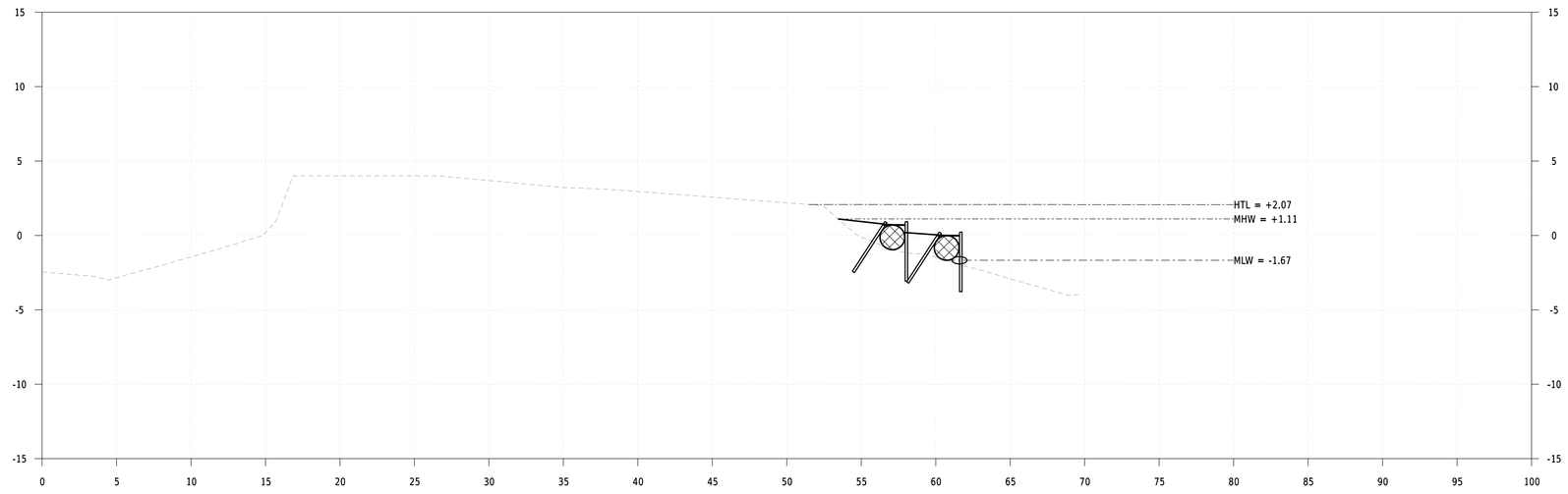
CROSS SECTIONS SHEET

SHEET NO.	012
TOTAL SHEETS	013

17-OCT-2025
11:15
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\pHC-0000_BethanyLivingShoreline.dgn



CROSS SECTION C



CROSS SECTION D

LEGEND	
EXISTING GROUND	
PROPOSED GRADE	
MEAN LOW WATER (MLW) LEVEL	
MEAN HIGH WATER (MHW) LEVEL	
OBSERVED HIGH TIDE LINE (HTL), AVG. EL.	

ADDENDA / REVISIONS	

SCALE
0 5 10 15
FEET

LAKE BETHANY LIVING SHORELINE

MT JOB NO.	10294.001
COUNTY	SUSSEX
BRIDGE NO.	
DESIGNED BY:	OJB/JSH
CHECKED BY:	CTC/ADT

CROSS SECTIONS SHEET

SHEET NO.	013
TOTAL SHEETS	013

17-OCT-2025
11:15
\\192.0.0.34\nwk_projects\10294_DE_TownofBethBch_AsNeeded\001_Bethany_Living_Shoreline_Design\300_CADD\Plan_Set\Environmental\pHC-0000_BethanyLivingShoreline.dgn

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

In Reply Refer To: 08/01/2025 15:20:08 UTC
Project Code: 2025-0130206
Project Name: Lake Bethany Living Shoreline Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

PROJECT SUMMARY

Project Code: 2025-0130206
Project Name: Lake Bethany Living Shoreline Project
Project Type: Bulkhead - New Construction
Project Description: The Town of Bethany Beach requested McCormick Taylor (MT) to develop engineering design and permitting 850 feet of bulkhead along the Bethany Loop Canal and 650 feet of living shoreline located along the northern shore of Lake Bethany adjacent to the Loop Canal. The goal of this project is to meet the town's objectives of reducing erosion Lake Bethany shoreline. The living shoreline project will be designed with the intent to be permitted as a standalone project following the approval of the bulkhead design.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.544663799999995,-75.07757838368339,14z

Counties: Sussex County, Delaware

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER POND

- PUBHx

IPAC USER CONTACT INFORMATION

Agency: McCormick Taylor
Name: Hannah Deane
Address: 1501 S Clinton Street, Suite 1150
City: Baltimore
State: MD
Zip: 21224
Email hgdeane@mccormicktaylor.com
Phone: 4106627400

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Bethany Beach town

Carson, Craig T.

From: Garcia, Christine Faith (DNREC) <christinefaith.garcia@delaware.gov> on behalf of EnvReview, DNREC (MailBox Resources) <DNREC_EnvReview@delaware.gov>
Sent: Thursday, June 5, 2025 2:58 PM
To: Carson, Craig T.
Subject: RE: Town of Bethany Beach

Great, thanks for letting me know! In that case, a site visit is not required. If the work gets postponed to a date within that TOYR or if you have any additional questions, please let me know.

Thank you,

Faith Garcia (she/her)
Environmental Review Coordinator
Division of Fish and Wildlife, DNREC
89 Kings Highway
Dover, DE 19901
Phone: (302) 735-8665
Cell: (302) 443-3812

From: Carson, Craig T. <CTCarson@mccormicktaylor.com>
Sent: Thursday, June 5, 2025 2:34 PM
To: EnvReview, DNREC (MailBox Resources) <DNREC_EnvReview@delaware.gov>
Subject: RE: Town of Bethany Beach

Thank you!

We are planning to work outside of the TOYR and would start approximately October.

Thanks,

Craig
Craig Carson
Assistant Director
O 410.662.7400 | D 667.219.3267 | C 240.344.3738
CTCarson@mccormicktaylor.com

McCormick Taylor | 1501 South Clinton Street, Suite 1150 | Baltimore, MD 21224
Facebook | **Twitter** | **LinkedIn** | **Instagram** | www.mccormicktaylor.com

We've moved! Save our new office address listed above.

From: Garcia, Christine Faith (DNREC) <christinefaith.garcia@delaware.gov> **On Behalf Of** EnvReview, DNREC (MailBox Resources)
Sent: Thursday, June 5, 2025 2:19 PM
To: Carson, Craig T. <CTCarson@mccormicktaylor.com>
Subject: RE: Town of Bethany Beach

Good afternoon Craig,

I have talked with our coastal waterbird biologist, and she would like to request a site visit if you are planning to start work before the end of the TOYR for colonial waterbirds (**March 1st and August 30th**). However, if you are planning to conduct the work outside of that time, then a site visit would not be needed. Can you please let me know when work is planned to occur for your project?

Thank you!

Faith Garcia (she/her)
Environmental Review Coordinator
Division of Fish and Wildlife, DNREC
89 Kings Highway
Dover, DE 19901

Phone: (302) 735-8665
Cell: (302) 443-3812

From: Carson, Craig T. <CTCarson@mccormicktaylor.com>
Sent: Wednesday, June 4, 2025 10:10 AM
To: Robinson, Samantha (DNREC) <samantha.robinson@delaware.gov>
Cc: EnvReview, DNREC (MailBox Resources) <DNREC_EnvReview@delaware.gov>; Christie, Katherine (DNREC) <katherine.christie@delaware.gov>
Subject: RE: Town of Bethany Beach

Thank you!

Craig Carson
Assistant Director
O 410.662.7400 | D 667.219.3267 | C 240.344.3738
CTCarson@mccormicktaylor.com

McCormick Taylor | 1501 South Clinton Street, Suite 1150 | Baltimore, MD 21224
Facebook | **Twitter** | **LinkedIn** | **Instagram** | www.mccormicktaylor.com

We've moved! Save our new office address listed above.

From: Robinson, Samantha (DNREC) <samantha.robinson@delaware.gov>
Sent: Wednesday, June 4, 2025 10:04 AM
To: Carson, Craig T. <CTCarson@mccormicktaylor.com>
Cc: EnvReview, DNREC (MailBox Resources) <DNREC_EnvReview@delaware.gov>; Christie, Katherine (DNREC) <katherine.christie@delaware.gov>
Subject: Re: Town of Bethany Beach

Good morning Craig,

Thank you for reaching out. I am no longer involved with our environmental review program, however I'm copying our environmental review email and coastal waterbird biologist to help you with your request.

Many thanks,
Sam

Sam Robinson (she/her)
Wildlife Action Plan Coordinator
Wildlife Section
Division of Fish and Wildlife, DNREC
89 Kings Highway
Dover, DE 19901

Phone: (302) 735-8667
Mobile: (302) 505-2936
Email: samantha.robinson@delaware.gov

From: Carson, Craig T. <CTCarson@mccormicktaylor.com>
Sent: Wednesday, June 4, 2025 8:21 AM
To: Robinson, Samantha (DNREC) <samantha.robinson@delaware.gov>
Subject: Town of Bethany Beach

Sam,

Good morning!

In 2023 you visited the heron rookery located between Lake Bethany and the Loop Canal and attached are the comments for reference. The Town is working on a small living shoreline design on the Lake Bethany side to help protect the land strip and nest habitat. We had a JPP meeting in April and recommended that we have the Avian Specialist visit the site. I wanted to reach out to confirm if a new visit is required or if the 2023 documentation is still valid.

Take care,

Craig

Craig Carson

Assistant Director

O 410.662.7400 | D 667.219.3267 | C 240.344.3738

CTCarson@mccormicktaylor.com

McCormick Taylor | 1501 South Clinton Street, Suite 1150 | Baltimore, MD 21224

Facebook | **Twitter** | **LinkedIn** | **Instagram** | www.mccormicktaylor.com

We've moved! Save our new office address listed above.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

In Reply Refer To: 08/01/2025 15:37:52 UTC
Project code: 2025-0130206
Project Name: Lake Bethany Living Shoreline Project

Federal Nexus: no
Federal Action Agency (if applicable):

Subject: Record of project representative's no effect determination for 'Lake Bethany Living Shoreline Project'

Dear Hannah Deane:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on August 01, 2025, for 'Lake Bethany Living Shoreline Project' (here forward, Project). This project has been assigned Project Code 2025-0130206 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the **Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (Dkey)**, invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat and/or Tricolored Bat

Based upon your IPaC submission and a standing analysis, your project has reached the following effect determinations:

Species	Listing Status	Determination

Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	No effect

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate.

To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Proposed Threatened

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the species covered by this key. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions

occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the Chesapeake Bay Ecological Services Field Office and reference Project Code 2025-0130206 associated with this Project.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Lake Bethany Living Shoreline Project

2. Description

The following description was provided for the project 'Lake Bethany Living Shoreline Project':

> The Town of Bethany Beach requested McCormick Taylor (MT) to develop engineering design and permitting 850 feet of bulkhead along the Bethany Loop Canal and 650 feet of living shoreline located along the northern shore of Lake Bethany adjacent to the Loop Canal. The goal of this project is to meet the town's objectives of reducing erosion Lake Bethany shoreline. The living shoreline project will be designed with the intent to be permitted as a standalone project following the approval of the bulkhead design.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.544663799999995,-75.07757838368339,14z

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the species covered by this determination key. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

   Automatically answered
   No

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

   Automatically answered
   No

4. Does the proposed action involve wind or solar energy?

   No

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Note for projects in Pennsylvania: Projects requiring authorization under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act would be considered as having a federal nexus. Since the U.S. Army Corps of Engineers (Corps) has issued the Pennsylvania State Programmatic General Permit (PASPGP), which may be verified by the PA Department of Environmental Protection or certain Conservation Districts, the need to receive a Corps authorization to perform the work under the PASPGP serves as a federal nexus. As such, if proposing to use the PASPGP, you would answer ‘yes’ to this question.

   No

6. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

   Automatically answered
   No

7. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

   No

8. Will the action cause effects to a bridge?

   Note: Covered bridges should be considered as bridges in this question.

   No

9. Will the action result in effects to a culvert or tunnel at any time of year?

   No

10. Are trees present within 1000 feet of the action area?

    Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    Yes

11. Does the action include the intentional exclusion of bats from a building or building-like structure? **Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

    No

12. Does the action involve removal, modification, or maintenance of a human-made building-like structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    No

13. Will the action cause construction of one or more new roads open to the public?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

14. Will the action include or cause any construction or other activity that is reasonably certain to increase average night-time traffic permanently or temporarily on one or more existing roads? **Note:** For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    No

15. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

16. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

    Note: For information regarding NSF/ANSI 60 please visit https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects

    No

17. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

18. Will the action include drilling or blasting?

    No

19. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

    No

20. Will the proposed action involve the use of herbicides or other pesticides other than herbicides (e.g., fungicides, insecticides, or rodenticides)?

    No

21. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

    Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

    Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    No

22. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable northern long-eared bat or tricolored bat roosting habitat?

    Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    No

23. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    No

24. Will the proposed action result in the use of prescribed fire?

    Note: If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

    No

25. Does the action area intersect the tricolored bat species list area?

    Automatically answered
    Yes

26. [Semantic] Is the action area located within 0.5 miles of radius of an entrance/opening to any known tricolored bat hibernacula? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    Automatically answered
    No

27. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats? **Note:** The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    Automatically answered
    No

28. Has a presence/probable absence bat survey targeting the tricolored bat and following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines been conducted within the project area?

    No

29. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities?
    (If unsure, answer ""Yes."")

    Note: If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (Tillandsia usneoides), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see Appendix A in the Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines.

    Yes

30. Do you have any documents that you want to include with this submission?

    No

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: McCormick Taylor
Name: Hannah Deane
Address: 1501 S Clinton Street, Suite 1150
City: Baltimore
State: MD
Zip: 21224
Email hgdeane@mccormicktaylor.com
Phone: 4106627400

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
RICHARDSON & ROBBINS BUILDING
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

DIRECTOR'S OFFICE

PHONE
(302) 739-9910

March 28, 2023

Jamie Pavona
McCormick Taylor
1818 Market Street
16th Floor
Philadelphia, PA 19103

Re: MTA 2023 Bethany Beach Loop Canal Bulkhead, Tax Parcel # 134-13.00-97.00

Dear Jamie:

Thank you for contacting the Species Conservation and Research Program (SCRP) about information on rare, threatened and endangered species, unique natural communities, and other significant natural resources as they relate to the above referenced project.

State Natural Heritage Site
A review of our database indicates that there are currently no records of state-rare or federally listed plants, animals or natural communities at this project site. As a result, at present, this project does not lie within a State Natural Heritage Site, nor does it lie within a Delaware National Estuarine Research Reserve which are two criteria used to identify "Designated Critical Resource Waters" in the Army Corps of Engineers (ACOE) Nationwide Permit General Condition No. 22. A copy of this letter shall be included in any permit application or pre-construction notification submitted to the Army Corps of Engineers for activities on this property.

Colonial Waterbirds
A small colony of great blue heron (*Ardea herodias*) nest in close proximity to the proposed work site. Breeding colonies of great blue heron are very rare within the state and they are listed as a Tier 2 Species of Greatest Conservation Need (SGCN) in the Delaware Wildlife Action Plan.

In order to avoid disturbance of breeding herons, work should be avoided from March 1st to August 30th. It is understood that the proposed work would have the long-term benefit of protecting the trees in which the herons currently nest. Therefore, if the conditions necessary to conduct the work are such that it must be accomplished during the time period noted above, the

SCRP would be amenable to the work being conducted between March 1st and August 30th provided that:

1. A SCRP-approved biologist is present at the beginning of the work to observe the reactions of the nesting herons to the construction activity.

2. If the SCRP-approved biologist determines that the construction activity is causing disturbance to the heronry to the point that breeding activities are disrupted, the work will cease immediately until such a time that the work can be modified to avoid disruption or all nesting activity has ended for the season.

We also would like to request a site visit during the great blue heron breeding season to evaluate the colony. Please contact Sam Robinson, Program Manager – Avian Conservation, at (302) 735-8667to discuss ways that impacts to the nesting colony can be minimized, and if a site visit will be allowed.

Fisheries
The Division of Fish and Wildlife does not have fish community data for the project location. However, it is unlikely that habitat occurs in the project site that would support anadromous fish species. No time of year restrictions or other measures are requested for these species or for resident gamefish species.

We are continually updating our records on Delaware's rare, threatened and endangered species, unique natural communities and other significant natural resources. If the start of the project is delayed more than a year past the date of this letter, please contact us again for the latest information.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,

Danielle Ellis
Environmental Review Coordinator
Phone: (302) 223-2446
6180 Hay Point Landing Road
Smyrna, DE 19977

(See invoice on next page)

TAX PARCEL NUMBER: P/O 1-34 13.00 97.00 & P/O 1-34-13-88
PREPARED BY/RETURN TO:
Hudson, Jones, Jaywork & Fisher
309 Rehoboth Ave
Rehoboth Beach, DE 19971

DEED

THIS DEED, Made this 27th day of August, in the year of our Lord 2010

BETWEEN KENNETH A. SIMPLER, of 11 Venetian Drive, Rehoboth Beach DE 19971 and **C. E. RUPERT SMITH, III**, of 30560 Topside Court, Ocean View DE 19937, as Tenants in Common, parties of the first part,

- AND -

TOWN OF BETHANY BEACH, a municipal corporation of the State of Delaware, party of the second part.

WITNESSETH, that the said party of the first part, for and in consideration of the sum of ONE DOLLAR ($1.00) and other good and valuable consideration, Current Lawful Money of the United States of America, the receipt whereof is hereby acknowledged, hereby grants and conveys unto the said party of the second part, its successors and assigns:

Parcel No. 1 ("Center Parcel" – Bethany Beach Improvement Canal bed from Assawoman Canal to "waters of the Salt Pond"): ALL that certain parcel of land known as the "Center Parcel", more particularly described in "Exhibit A" attached hereto and incorporated herein by reference. Parcel 1 being a part of the lands and premises conveyed unto Salt Pond Associates, LLC by deed of Salt Pond Associates, GP, dated August 21st, 2006 and of record in Deed Book 3353, page 61 in the Sussex County, Delaware Recorder of Deeds Office.

Parcel No. 2 ("South Parcel" – lands lying and abutting south side of Bethany Beach Improvement Company Canal bed): ALL that certain parcel of land known as the "South Parcel", more particularly described in "Exhibit B" attached hereto and incorporated herein by reference. EXCEPTING THEREFROM the following parcels of land previously conveyed to others by Salt Pond Associates, GP:

(a) By deed dated 11/18/1991 from Salt Pond Associates, GP to Peter A. Derosier and Janet Cook, 1136 sq. ft. being an extension of Lot 50, Phase II, Section II Lake Bethany, Deed Book 1824, page 299.

(b) By deed dated 11/18/1991 from Salt Pond Associates, GP to Paul H. and Jeanne E. Boswell, 1010 sq. ft. being an extension of Lot 48, Phase II, Section II Lake Bethany, Deed Book 1831, page 50..

(c) By deed dated 6/29/92 from Salt Pond Associates, GP to Richard L. and Rosemary E. Engle, 1100 sq. ft. being an extension of Lot 51, Lake Bethany, Deed Book 1855, page 051.

(d) By deed dated 12/29/1992 from Salt Pond Associates, GP to Robert F. and Hilda M. Grahm, 1068 sq. ft. being an extension of Lot 12, Lake Bethany, Deed Book 1898, page 316.

(e) By deed dated 1/19/1994 deed from Salt Pond Associates, GP to John R. and Marie A. Doyle for 1,163 sq. ft. being an extension of Lot 49, Lake Bethany, Deed Book 1960, page 13.

(f) By deed dated 1/19/1994 from Salt Pond Associates, GP to Robert F. Donald Oles, 1102 sq. ft. being an extension of Lot 13, Lake Bethany, Deed Book 1960, page 016.

(g) By deed dated 11/8/1993 from Salt Pond Associates, GP to Willard B. and Ann R. Munson, 1152 sq. ft. being an extension of Lot 44, Lake Bethany, Deed Book 1945, page 058.

(h) By deed dated 5/8/1995 from Salt Pond Associates, GP to Willard B. and Ann R. Munson, 85.47 sq. ft. being an extension of Lot 44, Lake Bethany, Deed Book 2049, page 148.

(i) By deed dated 3/14/1996 from Salt Pond Associates, GP to William T. and Winifred E. Daley, 4496 sq. ft. being an extension of Lot 16, Lake Bethany, Phase I, Deed Book 2117, page 019.

(j) By deed dated 6/27/1997 from Salt Pond Associates, GP to Dorothy K. Barrett, Trustee, 581 sq. ft. being an extension of Lot 53, Lake Bethany, Deed Book 2212, page 049.

(k) By deed dated 11/3/98 from Salt Pond Associates, GP to Peter M. Coghill and Charmian A Coghill, 1408 sq. ft. being an extension of Lot 45, Lake Bethany, Phase II, Section 1, Deed Book 2352, page 214.

(l) By deed dated 5/11/2001 from Salt Pond Associates, GP to Gary Hitch, 945 sq. ft. being an extension of Lot 46, Lake Bethany, Deed Book 2590, page 098.

Parcel 2 being a part of the lands and premises conveyed unto Salt Pond Associates, LLC by deed of Salt Pond Associates, GP, dated August 21st, 2006 and of record in Deed Book 3353, page 61, in the Sussex County, Delaware Recorder of Deeds Office.

Parcel No. 3. (Western portion of the bed of the "Salt Pond"): **ALL** that certain parcel of land identified as "Tract No. 1" on that certain "Revised And Corrected Plot of Lands of Salt Pond

Investment Company" prepared by Purdum & Jeschke Consulting Engineers and Land Surveyors, revised May 6th, 1986, and of record in Plot Book 34, page 256 in the Sussex County, Delaware Recorder of Deeds Office, and being further described as "Tract 1" in that certain deed dated December 27th, 1978 from Realty Growth Investors to Salt Pond Investment Company as of record in Deed Book 930, page 180 in the Sussex County, Delaware Recorder of Deeds Office, consisting of 39.92 acres (+/-) and more particularly described in "Exhibit C" attached hereto and incorporated herein by reference. EXCEPTING THEREFROM any portion(s) of such 39.92 acres as may have heretofore been previously conveyed of record to others by the Grantor or Grantor's predecessors-in-title. Parcel 3 being a part of the lands and premises conveyed unto the Grantor herein by deed of Salt Pond Associates, a Delaware General Partnership, dated August 21st, 2006 as of record in Deed Book 3353, page 65 in the Sussex County, Delaware Recorder of Deeds Office.

Grantor hereby further grants and quitclaims unto Grantees all of Grantor's remaining right, title, and interest , *if any*, in and to:

(a) the "North Parcel" as more fully described in that certain deed dated April 6th, 1984 from Jane Errett Vincenti *et al*, Receivers in Dissolution for the Bethany Beach Improvement Company, a dissolved Delaware corporation to Salt Pond Investment Company, as of record in Deed Book 1253, page 332 in the Sussex County Delaware Recorder of Deeds Office; and being a part of the lands conveyed unto the Grantor herein by deed of Salt Pond Associates, GP dated August 21st, 2006 as of record in Deed Book 3353, page 65 in the Sussex County Delaware Recorder of Deeds Office. By this quitclaim conveyance, Grantor intends and does hereby convey to Grantee any piece, portion, or parcel constituting a part of the "North Parcel" remaining titled in its name as the result of not being previously out-conveyed by Grantor or its predecessors-in-title to any other person or entity, including the purchaser of any lot in the Salt Pond subdivision fronting on the north side of the Bethany Beach Improvement Company Canal, the Salt Pond Home Owners Association, Sussex County, or the State of Delaware.

(b) all remaining portions of the Bethany Beach Improvement Company Canal (also referred to as the "Bethany Beach Loop Canal" or "Loop Canal") from the easternmost terminus of the lands hereinabove-described as "Parcel 1" (the "Center Parcel") to and including the easternmost terminus of said canal abutting the western (rear) boundary of Lot 1, Block 6 and Lot 2, Block 3, said lots fronting on Pennsylvania Avenue in the Town of Bethany Beach.

SUBJECT, however, to the reservations, restrictions, conditions and covenants of record and subject to such state of facts as an accurate survey and/or inspection of the lands and premises will disclose, the operation and effect of any zoning laws and building restrictions imposed by public authority, and easements and public utility grants of record.

SUBJECT, FURTHER, HOWEVER, to the right of possession and use by those Sub-Aqueous Land Lessees identified on Exhibit D, attached hereto and incorporated herein by reference.

BEING part of the same lands and premises conveyed to Salt Pond Associates, LLC by Deed

of Salt Pond Associates, a Delaware General Partnership, dated August 21, 2006, and recorded in the Office of the Recorder of Deeds in and for Sussex County, Delaware, in Deed Book 3353, page 065.

Being the same lands covey unto the above-named Grantors by deed of Salt Pond Associates, bearing even date herewith and of record in the Office of the Recorder of Deeds, in and for Sussex County in Deed Book _____, at page ____.

IN WITNESS WHEREOF, the said party of the first part has hereunto set its hand and seal the day and year aforesaid.

WITNESS:

_____ _____(SEAL)
Kenneth A. Simpler

_____ _____(SEAL)
C. E. Rupert Smith, III

STATE OF DELAWARE)
) SS:
COUNTY OF SUSSEX)

BE IT REMEMBERED, that on this 27th day of August, A.D. 2010, personally appeared before me, the Subscriber, a Notary Public for the State and County aforesaid, Kenneth A. Simpler, party to this Indenture, known to me personally to be such, and he acknowledged this Indenture to be his act and deed.

GIVEN under my Hand and Seal of Office, the day and year aforesaid.

NOTARY PUBLIC

DENNIS L. SCHRADER
NOTARIAL OFFICER PURSUANT TO
29 DEL. CODE SECT. 4323
ATTORNEY AT LAW
DELAWARE

STATE OF DELAWARE)
) SS:
COUNTY OF SUSSEX)

BE IT REMEMBERED, that on this 27th day of August, A.D. 2010, personally appeared before me, the Subscriber, a Notary Public for the State and County aforesaid, Kenneth A. SimpleSimpler and Smith to r, party to this Indenture, known to me personally to be such, and he acknowledged this Indenture to be his act and deed.

GIVEN under my Hand and Seal of Office, the day and year aforesaid.

NOTARY PUBLIC

DENNIS L. SCHRADER
NOTARIAL OFFICER PURSUANT TO
29 DEL. CODE SECT. 4323
ATTORNEY AT LAW
DELAWARE

EXHIBIT A

"CENTER PARCEL"

BEGINNING for the same at a point on the east side of the Assawoman Canal distant South 24 degrees 53 minutes 26 seconds East 35.00 feet from the northern boundary of the Bethany Beach Improvement Company Canal and the southwesternmost corner of that parcel of land which by deed dated October 16, 1979 and recorded in the Office of the Recorder of Deeds in and for Sussex County, Delaware, at Georgetown in Deed Book 977 at Page 10 was granted and conveyed by Lloyd W. Sherman and Elenore M. Sherman, his wife, to Salt Pond Investment Company and running thence with the meanders of the waters on the northern side of the Bethany Beach improvement Company Canal the six (6) following courses and distances, viz.:

(1) South 85 degrees 00 minutes 00 seconds East 375.00 feet,
(2) North 78 degrees 30 minutes 00 seconds East 620.00 feet,
(3) North 79 degrees 00 minutes 00 seconds East 400.00 feet;
(4) North 80 degrees 00 minutes 00 seconds East 625.00 feet,
(5) North 88 degrees 00 minutes 00 seconds East 155.00 feet, and
(6) South 88 degrees 00 minutes 00 seconds East 381.21 feet to the waters of the Salt Pond and to the easternmost line of a survey by J.J. McCann dated July 25, 1972, and running thence with a part of said line South 00 degrees 39 minutes 31 seconds East 35.91 feet to the waters on the southern side of the aforesaid Bethany Beach Improvement Company Canal, thence with the meanders of the waters the four (4) following courses and distances, viz.:

(1) North 89 degrees 23 minutes 00 seconds West 482.66 feet.
(2) South 80 degrees 00 minutes 00 seconds West 1,275.00 feet;
(3) South 78 degrees 00 minutes 00 seconds West 425.00 feet, and
(4) North 84 degrees 30 minutes 00 seconds West 355.00 feet to the east side of the aforementioned Assawoman Canal, thence with said east side North 24 degrees 53 minutes 26 seconds West 43.29 feet to the point of beginning, containing 2.476 acres of land more or less.

EXHIBIT B
"SOUTH PARCEL"

BEGINNING for the same at a point on the east side of the Assawoman Canal distant South 24 degrees 53 minutes 26 seconds East 78.29 feet from the northern boundary of the Bethany Beach Improvement Company Canal and the southwesternmost corner of that parcel of land which by deed dated October 16, 1979 and recorded in the Office of the Recorder of Deeds in and for Sussex County, Delaware at Georgetown in Deed Book 977 at Page 10 was granted and conveyed by Lloyd W. Sherman and Elenore M. Sherman, his wife, to Salt Pond Investment Company and running thence with the meanders of the waters on the southern side of the Bethany Beach Improvement Company Canal the four (4) following courses and distances, viz.:

(1) South 84 degrees 30 minutes 00 seconds East 355.00 feet,
(2) North 78 degrees 00 minutes 00 seconds East 425.00 feet,
(3) North 80 degrees 00 minutes 00 seconds East 1,275.00 feet, and
(4) South 89 degrees 28 minutes 00 seconds East 483.66 feet to the waters of the Salt Pond and to the easternmost line of a survey by J.J. McCann dated July 25, 1972, said point being also the north lines of J.J. McCann survey dated January 1972 and revised November 12, 1973 and running thence binding along said north lines the three (3) following courses and distances, viz.:

(1) South 89 degrees 20 minutes 29 seconds West 477.51 feet,
(2) South 79 degrees 05 minutes 17 seconds West 1,702.72 feet, and
(3) North 84 degrees 25 minutes 42 seconds West 349.07 feet to the east side of the aforementioned Assawoman Canal, thence with said east side North 24 degrees 53 minutes 26 seconds West 25.00 feet to the point of beginning, containing 1.108 acres of land more or less.

EXHIBIT C
Western Portion of "Salt Pond"

TRACT NO. 1: ALL THAT certain Tract, piece or parcel of subaqueous land situate, lying and being in Baltimore Hundred. Sussex County. Delaware, generally known as a portion of "Salt Pond", and more particularly bounded and described as Parcel No. 1 of a survey made November, 1969, by Purdum & Jeschke. Land Surveyors, now of record in the Office of the Recorder of Deeds, in and for Sussex County, at Georgetown, Delaware, in Plot Book 8, page 151, as follows, to wit: BEGINNING for the same at a point on the West edge of the Salt Pond, said point being at the end of the Second or South 71 3/4° East line of a parcel of land which by deed dated September 30, 1965, and recorded in the Office of the Recorder of Deeds, in and for Sussex County, Delaware, at Georgetown, in Deed Book 594, page 122, was granted and conveyed by Norman E. Calhoun, Sr., and Sallie L. Calhoun, his wife, to Gerald W. Wilgus and Allen L. Grimes, said point also being South 25° 03' 51" East 18.68 feet: from a concrete marker found at the edge of the Salt Pond; thence, for a new line of division across the lands of the grantors. South 80° 49' 39" East 598.12 feet to a point in the Salt Pond, said point being distant North 72° 57' 15" West 200.00 feet from a point in the Third or North 25° East 874 feet line of a parcel of land which by deed dated July 2, 1927, and recorded in the Office of the Recorder of Deeds, in and for Sussex County, Delaware, at Georgetown; in Deed Book 264 at folio 359 was granted and conveyed by William P. Short, et al, to The State of Delaware; thence, by three (3) lines of division as now drawn southwesterly, parallel to and 200.00 feet distant from the Third, Second and First lines of the lastly abovementioned parcel of land, viz: (1) South 17° 02' 45" West 736.27 feet; (2) South 25° 02' 45" West 1035.72 feet; and (3) South 25 ° 55' 45" West 236.65 feet to the north side of the Bethany Beach Improvement Company Canal; thence, with said north side of the canal the two (2) following courses and distances, viz: (1) North 82° 01' 48" West 440.80 feet; and (2) South 58° 04' 01" West 338.68 feet to the Salt Pond; thence with the meanders of said Salt Pond and with the lands of Lloyd W, Sherman and wife, and the lands of Wilgus and Grimes, the eighteen (18) following courses and distances, viz: (1) North 78° 02' 36" West 106.88 feet; (2) North 65° 57' 21" West 71.18 feet; (3) North 45° 12' 24" East 195.87 feet; (4) North 24° 43' 28" West 236.70 feet; (5) North 56° 26' 58" West 113.99 feet; (6) North 82° 01' 24" West 158.53 feet; (7) South 44° 04' 44" West 219.94 feet; (8) North 22° 50' 01" West 103.08 feet; (9) North 32° 49' 42" East 110.68 feet; (10) North 65° 27' 55" East 366.05 feet; (11) North 85° 16' 39" East 230.78 feet; (12) North 37° 17' 22" East 300.41 feet; (13) North 20° 24' 26" East 496.14 feet; (14) North 08° 37' 38" East 146.66 feet; (15) North 61° 48' 39" East 173.59 feet; (16) North 39° 21' 45" East 165.56 feet; (17) North 45° 00' 00" East 212.13 feet; and (18) North 18° 52' 24" East 178.90 feet to the point of BEGINNING, containing 39.92 acres of land more or less;

EXHIBIT D
Sub-aqueous Land Lease Lessees

(a) 10/16/2000 from Salt Pond Associates to S. Jerome Allen for Lot 75 (Canal Way West) Salt Pond.(Deed Book 2536/77).

(b) 8/18/2010 from Salt Pond Associates to Nancy E. Straus, Trustee of the Nancy E. Straus Declaration of Trust dated December 15, 2004 for Lot 57 (Canal Way West) Salt Pond.

(c) 8/12/2008 from Salt Pond Associates to Kenneth A. Simpler for Lot 60 (Canal Way West) Salt Pond.

(d) 8/15/2008 from Salt Pond Associates to C. Rupert Smith III for Lot 59 (Canal Way West) Salt Pond.

(e) 4/12/2000 from Salt Pond Associates to Donald Lydick for Lot 81 (Canal Way East) Salt Pond .

(f) 4/12/2000 from Salt Pond Associates to Thomas Anfinson for Lot 83 (Canal Way East) Salt Pond .

(g) 4/12/2000 from Salt Pond Associates to Charles and Cynthia Cole for Lot 84 (Canal Way East) Salt Pond .

(h) 12/8/2000 from Salt Pond Associates to Walter G. Kealy, Jr. for Lot 97 (Canal Way East) Salt Pond .

(i) 5/8/2001 from Salt Pond Associates to Paul Larson for Lot 140 (Pond View Drive) Salt Pond .

(j) 1/24/2008 from Salt Pond Associates to Mary Jo and James T. Chandler for Lot E, 33 Schooner Village, Salt Pond (of record in Deed Book 3547, page 196, Sussex County, Delaware Recorder of Deeds Office).

(k) 5/24/2002 from Salt Pond Associates to Ellen Parker. for Lot 150 (Pond View Drive) Salt Pond .

(l) 1/27/2000 from Salt Pond Associates to Michael C. Middleton. for Lot 141 (Pond View Drive) Salt Pond .

TOWN OF BETHANY
REALTY TRANSFER TAX
Serial Number 3691
Amount of City Tax Exempt
Date Recorded 9-23-10
By DS

HCA
DELAWARE HISTORICAL & CULTURAL AFFAIRS

Delaware Division of Historical & Cultural Affairs
29 N. State St., Dover, Delaware 19901
Tel. (302) 736-7400 | Fax. (302) 739-5660
history.delaware.gov

November 25, 2025

Adam Tatone
McCormick Taylor
1501 South Clinton Street, Suite 1150
Baltimore, MD 21224

Subject: **Town of Bethany Beach Lake Bethany Living Shoreline**
SHPO Project No. 2025.10.13.02

Dear Mr. Tatone:

We understand from your letter that the applicant, the Town of Bethany Beach, is seeking a permit from the US Army Corps of Engineers (USACOE) for the proposed undertaking at Lake Bethany. The applicant is proposing to stabilize the existing shoreline with coir logs, oyster shell bags, and vegetation. Because of the need for authorization from the USACOE, the project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended).

There are no previously identified archaeological sites or historic properties within the area of potential effect (APE). Our Office has previously advocated for the survey and evaluation of the Bethany Beach Canal as a potential historic property. While we support this as a planning effort for future undertakings, this proposed undertaking is minimal in nature and not likely to have an adverse effect on the Canal if it were to be an eligible property. Therefore, no above-ground survey is necessary at this time. There are two known archaeological sites within a half-mile radius of the APE. Due to the limited nature of the proposed undertaking and the distance to known archaeological sites, there is no anticipated impact to these properties. Historic aerials show the APE has been previously disturbed by the construction of the existing canal so there is low potential for any intact archaeological sites.

Our Office finds there to be No Historic Properties Affected by the proposed undertaking. Please feel free to contact me if you have any questions at (302) 736-7431 or sarah.carr@delaware.gov.

Sincerely,

Sarah Carr
Environmental Specialist
cc: Gwen Davis, Deputy SHPO

SURVEY LEGEND

	BENCHMARK
	IRON PIPE FOUND
	IRON ROD FOUND
	IRON ROD/W CAP FOUND
	APPROXIMATE BOUNDARY/R.O.W.
RB-SB	WETLAND LINE/FLAG LABEL
10	CONTOUR ABOVE ELEVATION 0.00'
(10)	CONTOUR BELOW ELEVATION 0.00'
+ 4.7	SPOT GRADE ABOVE ELEVATION 0.00'
+ (4.7)	SPOT GRADE BELOW ELEVATION 0.00'
	BLACK CHERRY (MARKED TREES)
	LOBLOLLY PINE (MARKED TREES)
	HATCH RIP-RAP

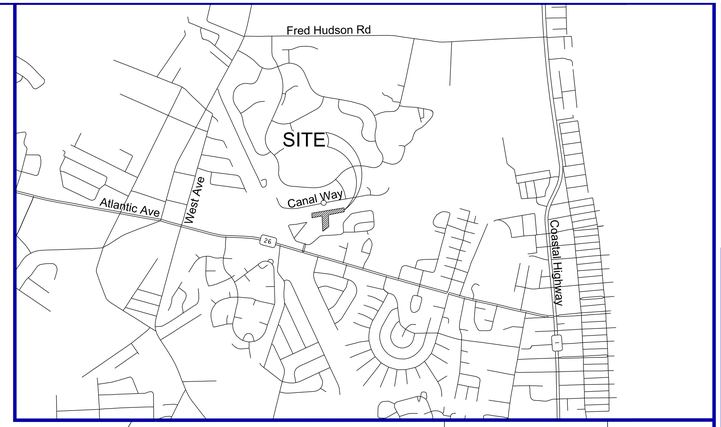
GRAPHIC SCALE

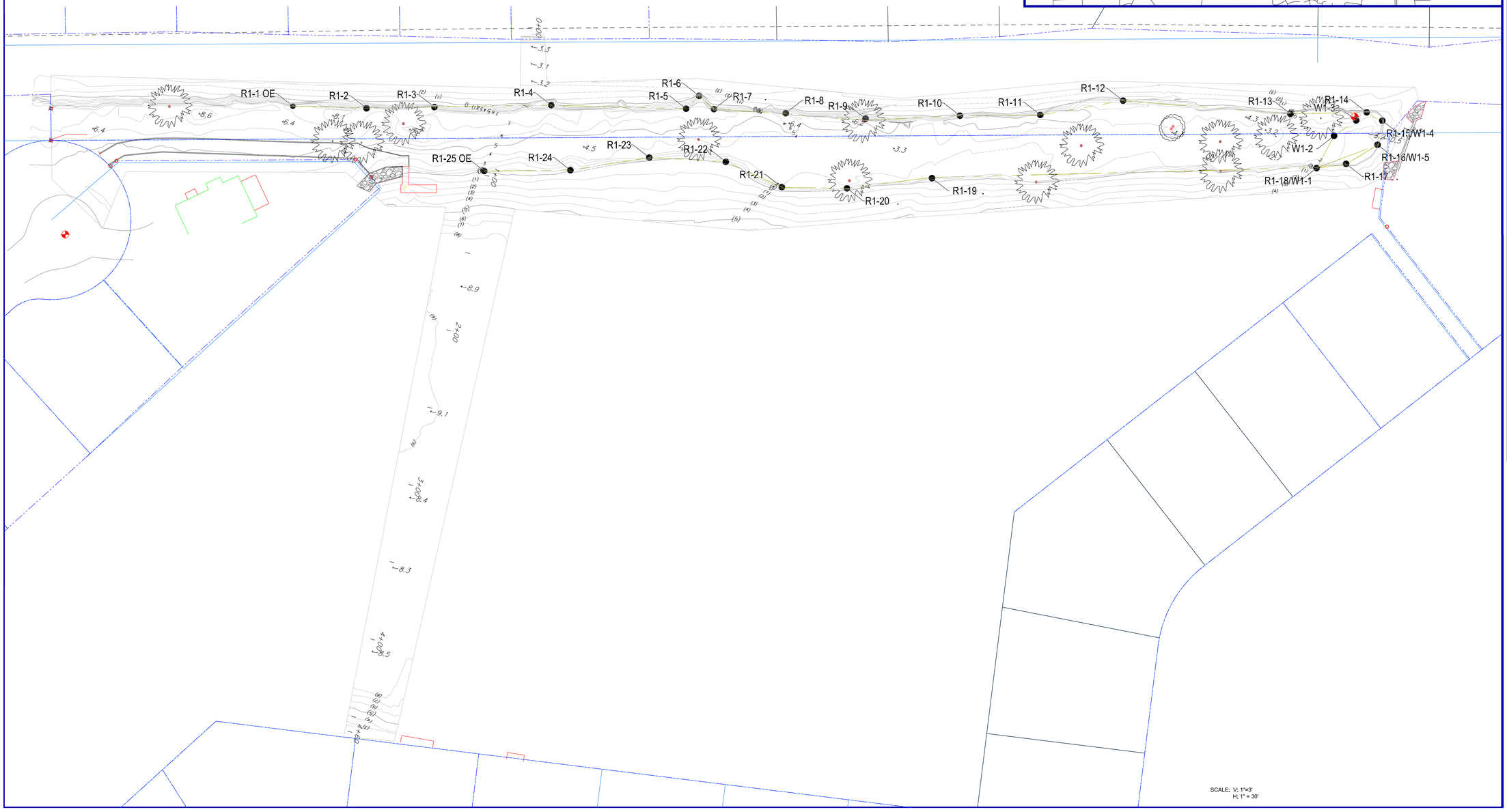
30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

SITE DATA:

1. OWNER: TOWN OF BETHANY
   SOURCE OF TITLE: DB. 3825 PG. 167
   T.M.: 134-13.00-97.00
   TOWN OF BETHANY BEACH
   SUSSEX COUNTY, DELAWARE
2. THE PURPOSE OF THIS SURVEY IS TO SHOW THE TOPOGRAPHIC FEATURES OF THE PENINSULA OF LAND AND ADJACENT SHORE LINE USED AS A NATURE WALK.
3. NOT ALL EXISTING IMPROVEMENTS WITHIN THE EXHIBIT AREA ARE SHOWN. THIS IS NOT A BOUNDARY SURVEY.
4. OTHER THAN SHOWN, THIS EXHIBIT DOES NOT VERIFY THE EXISTENCE OR NON-EXISTENCE OF RIGHTS OF WAY, EASEMENTS OR LEASES ON OR ADJACENT TO THIS PROPERTY. NO TITLE SEARCH WAS PROVIDED FOR OUR USE.
5. HORIZONTAL DATUM DE STATE GRID NAD '83
   VERTICAL DATUM NAVD '88
   DERIVED FROM VRS GPS OBSERVATIONS
6. WETLAND FLAGS WERE LABELED BY OTHERS.





PLANS ISSUED FOR:
REVIEW

REVISIONS:

No.	Revision/Issue:	Date

BETHANY BEACH LIVING SHORES & LOOP CANAL BULKHEAD

BETHANY BEACH

134-13.00-97.00 & 134-13.00-94.00
TOWN OF BETHANY BEACH - SUSSEX COUNTY - DELAWARE

Civil Engineers
Land Planners
Landscape Architects
Surveyors

Atlantic Group & Associates, Inc.

10044 Old Ocean City Boulevard
Berlin, Maryland 21811
Ph: (410) 629-1160
Fax: (410) 629-1710
www.the-atlanticgrp.com

TOPOGRAPHIC SURVEY

PROJECT:	22-115	DATE:	10/11/2022
DRAWN BY:	SPT	SCALE:	Noted

SHEET:
V - 100

Final Design Report

Lake Bethany Living Shoreline Project

Prepared for:

Town of Bethany Beach, Delaware
214 Garfield Parkway
Bethany Beach, DE 19930

Prepared by:

1501 S Clinton Street
Suite 1150
Baltimore, MD 21224

August 2025

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

The Lake Bethany Living Shoreline project consists of 490 feet of living shoreline to be constructed along the lake side of the land strip located between Lake Bethany and the Bethany Beach Loop Canal. The existing shoreline has a height of 1-2 feet and is naturalized in some areas with native vegetation, while other areas are actively eroding, which threatens the long-term resiliency of the land strip's interior shoreline.

Figure 1. Project Location

2.0 SITE SETTING

Lake Bethany is located in Sussex County, Delaware. The project site is located along a strip of land which begins at the end of Sandbar Court, adjacent to 985 Sandbar Court and extends approximately 625 feet between the canal and the lake. The parcel that the site is located has an ID number of 134-13.00-97.00 (Tax Map 1-34-13.97), and the listed owner is the Town of Bethany Beach.

Upon examination of historic aerials of the site location, Lake Bethany first appears in the 1963 aerial as a water body alongside, but disconnected from, the Bethany Beach Canal. In aerial photography taken before this, the area within the existing lake's footprint appears to oscillate between agricultural and forested land use. The existing breach between the lake and the canal is first visible in the 2007 aerial, indicating that before this, the lake's water level may have been controlled by a piped outfall.

Site geomorphology, flora, and fauna were investigated, with special attention given to the submerged, shore/bank, and upland areas of the project site. The submerged areas of the site consist of soft-bottomed fine silt and sand. The shoreline/bank areas are often near-vertical and raw, although there are some isolated areas which support marsh grasses. The upland areas of the site along the land strip host sandy soils, and relatively dense wooded conditions consisting of Loblolly Pine (*Pinus taeda*), Black Cherry (*Prunus serotina*), and Southern Red Oak (*Quercus falcata*). The project area is an active heron rookery with a nesting time of restriction period for colonial waterbirds of March 1st – August 30th. Shade sources are limited and the site is south-facing, with good sun exposure. Several fallen trees were observed along the project shoreline, likely fallen due to bank retreat.

The project shoreline is oriented approximately S, with short fetch exposures to the SE, SSE, S, SSW, and SW of 265, 401, 383, 417, and 787 feet, respectively. The average fetch is 451 feet, and the longest fetch is 787 feet (SW). The project site is not exposed to strong erosional forces from wind and wave energy, and tidal connection for Lake Bethany is through a narrow passage from the Bethany Beach Loop Canal.

3.0 DESIGN GOALS

- Vegetatively stabilize shoreline to improve resiliency of the land strip's interior shoreline. and protect existing trees providing rookery habitat for colonial waterbirds
- Expand low marsh vegetative community behind coir sill structures
- Improve shoreline aquatic and terrestrial habitat for fauna (human and otherwise)

4.0 DESIGN STRATEGY

The design for the Lake Bethany Living Shoreline targets the creation of a low marsh habitat through the installation of oyster bags, 20" coir logs, and sand fill. Oyster bags will be placed at the Mean Low Water (MLW) elevation and will act as a structural support for the coir logs placed in single or double rows depending on existing foreshore slopes. Sand will be imported and used as fill material behind the coir log sills, at an approximate slope of 10:1 (H:V). Plugs of Spartina alterniflora will be installed within the sand fill at a spacing of 1.5 feet on center, and Morella cerifera and Clethra alnifolia are proposed to be planted at 8 feet on center just above the mean high water (MHW) mark, where backshore slopes allow. Additional tree, shrub and native herbaceous plantings are proposed in upland areas within the limits of construction.

Four distinct coir sill structures are proposed. Existing fallen trees and native near-bank vegetation are to be preserved as habitat elements and worked into the coir log sill structures.

TABLE 1. MONITORING METRIC TABLE

Goal	***Objective***	***Metric***	***Method***
Structure stability	Installed sills to remain functionally stable	Structural integrity of coir logs, anchor stakes, and oyster bags	Photo documentation, record LF of unstable coir log, number of unstable stakes, and number of unstable or missing oyster bags. Map observations.
Planting survival	>85% Planting survival	Survival tally	Tally shrub survival, approx. plug % coverage
Shoreline position	Vegetative edge moves waterward from original position	Visual documentation	Photos of consistent direction from monumented vegetative monitoring locations
		Horizontal position of vegetated edge	Measurement from monumented shoreline monitoring locations, measured perpendicular to shore
		Vertical position of vegetated edge	Laser level measurement from monumented shoreline monitoring location, measured at a location on the constructed marsh sill perpendicular to shore
		Foreshore slope	Laser level height relative to position of monumented shoreline monitoring location, measured at high and low water levels
Vegetative productivity	Expand low marsh vegetative community behind coir sill structures	Visual documentation	Photos of consistent direction from monumented vegetative monitoring locations
		Vegetation structure	Stems per square meter
		Vegetative diversity	List of species found at site
		Nuisance species	Presence/absence

Note: Minimum of 3, max of 5 monumented monitoring locations for shoreline position and vegetative productivity.

TABLE 2. MONITORING TIMELINE TABLE

Collection Window	***Monitoring Stage***	***Goal evaluated***
Late Summer 2025	Baseline	1. Position of shoreline
Fall 2025	As-Built	1. Position of shoreline 2. Structural integrity of materials
Spring 2026, 2027, 2028	Spring After-Built 1, 2, 3	1. Position of shoreline 2. Structure integrity of materials
Late Summer 2026, 2027, 2028	Summer After-Built 1, 2, 3	1. Vegetative productivity 2. Planting Survival

TOWN OF BETHANY BEACH

Wetland Delineation Report

for

Bethany Beach Living Shoreline Project
Town of Bethany Beach, Sussex County
Delaware

Prepared for:

The Town of Bethany Beach
24 Garfield Parkway
Bethany Beach, DE 19930

Prepared by:

McCormick Taylor, Inc.
700 East Gate Drive, Suite 201
Mount Laurel, New Jersey 08054

December 2022

WETLAND DELINEATION REPORT

Bethany Beach Living Shoreline Project
Town of Bethany Beach, Sussex County
Delaware

Table of Contents

List of Appendices

List of Figures

List of Tables

Bethany Beach Living Shoreline Project
Town of Bethany Beach, Sussex County, Delaware

1. Introduction

The Town of Bethany Beach has requested that McCormick Taylor, Inc. permit and design 850 feet of erosion control for bulkhead along the Bethany Loop Canal and 650 feet of living shoreline located along the northern shore of Lake Bethany adjacent to the Loop Canal. The proposed erosion controls would maintain the existing peninsula separating the canal from Lake Bethany and continue to support the heron/egret rookery.

McCormick Taylor was retained by the Town of Bethany Beach to perform a wetland delineation to identify and document the location, extent, and characteristics of regulated wetlands and waterways in the project area. The project area is shown on the attached figures and wetland delineation map. A description of each wetland area is provided along with an evaluation of each wetland's values and functions.

2. Property Description

The subject property, consisting of approximately 0.97 acres, is located in the Town of Bethany Beach, Sussex County, Delaware and is referred to as Parcels 134-13.00-97.00 (Tax Map 1-34-13.97). The property in question is bounded by Loop Canal to the north, Lake Bethany to the south, and Lake View Drive and residential development to the west. The subject property is currently an undeveloped peninsula with mixed deciduous/coniferous woodlands. The property is a known rookery for a variety of herons and egrets.

3. Background Information

Prior to performing our site inspection, several sources of information were reviewed to determine the likelihood of freshwater wetlands/waters occurring on the subject property. These sources include the U.S. Geological Survey map, the County Soil Survey and State/Federal wetlands data. These sources are outlined below:

3.1 U.S. Geological Survey Map

The subject property appears on the Bethany Beach, DE Quadrangle of the U.S. Geological Survey (USGS) Map (Appendix A). The USGS Map depicts the property undeveloped land (***Figure 1***).

3.2 Soil Survey

The National Cooperative Soil Survey, consisting of the U.S. Department of Agriculture (USDA) and other federal, state, and local agencies published soil surveys for the Delaware. These soil surveys contain information on soil types and their properties that can be used in land planning. Specifically, we reviewed the USDA NRCS Web Soil Survey (***Figure 2***). Based on the web site data, the site is underlain by the following soil types:

Soil Type	Drainage Class	Depth to Water Table
Dredge Channel, 1 to 4 meter water depth (WDc2)	Subaqueous	0 inches
Klej loamy sand, 0 to 2 percent slopes	Somewhat Poorly Drained	12 inches

Table 1. Soil Types

3.3 State Wetland Maps

The subject property is located on the Delaware Department of Natural Resources and Environmental Control (DNREC) State Wetland Map Number 24. The map depicts no wetlands within the project area. Any work within a state delineated wetland would require a permit through DNREC (***Figures 3 & 5***).

3.4 Federal Wetland Maps

The United States Fish and Wildlife Service National Wetland Inventory Mapper depicts the following wetland types on the subject property

Code	Description
E1UBLx	Estuarine and Marine Deepwater, Subtidal, Unconsolidated Bottom, Excavated
PUBHx	Freshwater Pond, Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated

Due to the nexus to the Loop Canal, Assawoman Canal and Indian River Bay all wetlands on the property will be under United States Army Corps of Engineers Jurisdiction (***Figure 4***).

4. Wetland Delineation Methodology

The purpose of this study is to satisfy the requirements of state and federal agencies having jurisdictional authority over Waters of the U.S. and the Subaqueous Lands of Delaware, including wetlands. These agencies are:

- USACE as mandated by Section 404 of the Clean Water Act (CWA) & the Clean Water Rule: Definition of "Waters of the United States"
- DNREC as mandated by the Subaqueous Lands Act (Title 7 Del. Code, Chapter 72) & Regulations Governing the Use of Subaqueous Lands (Title 7 DE Admin. Code 7504) and the Delaware Wetlands Act (Title 7 Del. Code, Chapter 66) & the Wetlands Regulations (Title 7 DE Admin. Code 7502).

A. Watercourses

Project area watercourses (Waters of the U.S.) were preliminarily identified using available USGS mapping. Field investigations were conducted on August 30, 2022, to identify watercourses within the project study area. Waters of the U.S., as it applies to the jurisdictional limits of the authority of the Army Corps of Engineers under the Clean Water Act (CWA), have been delineated by using the Ordinary High Water Mark (OHWM) as defined by 33 CFR § 328.3. Delaware defines subaqueous lands as submerged lands and tidelands within Title 7 Del. Code, Chapter 72 § 7202(g). As per Title 7 Del. Code, Chapter 72 § 7202(h)(2), submerged lands are "lands lying below the plane of the ordinary high water mark of nontidal rivers, streams, lakes, ponds, bays and inlets within the boundaries of the State as established by law;". One watercourses was identified on the subject property. Photographs of the Subject Property are provided in ***Appendix B***.

B. Wetlands

Potential wetland areas were preliminarily identified through a combination of secondary resources and field surveys. Sources include the U.S. Fish and Wildlife Services (USFWS) National Wetlands Inventory (NWI) mapping, USGS Quadrangle Mapping, DNREC Wetland Mapping, and the Soil Surveys covering Sussex County, Delaware published by the United States Department of Agriculture (USDA). Following background research, detailed field investigations were conducted on August 30, 2022, in order to determine if any potential wetland areas possessed the necessary hydrologic, vegetative, and soil characteristics to be considered a wetland as outlined in the USACE 1987 Wetland Delineation Manual. The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) was utilized in delineating wetland boundary.

The presence and extent of hydric soils was determined through a series of soil borings taken using a 3-inch soil auger. The depth of each horizon was established up to 18 inches (46 cm) below the ground surface, where possible. Soil color at each horizon identified was characterized using Munsell Soil Color Charts. Field indicators of hydric soil conditions, such as gleying or low-chroma soils, redox features (depletions/concretions), organic streaking in sandy soils, aquic or peraquic moisture regime, or the presence of a histic epipedon or a hydrogen sulfide odor were also noted when observed. According to the Regional Supplement, only one (1) indicator must be present in order to classify the soil as hydric.

The dominant vegetation and plant community composition was determined by conducting a vegetation inventory at a representative sample location within the wetland area. Dominant species were identified for each vegetative stratum and each species wetland indicator status was noted. Plant wetland indicator status was

determined using the U.S. Army Corps of Engineer's The National Wetland Plant List – Atlantic and Gulf Coastal Plain 2016 Final Regional Wetland Plant List. If more than 50% of the dominant species were classified as obligate (OBL), facultative wetland (FACW), and/or facultative (FAC) or the Prevalence Index was less than or equal to 3.0, a hydrophytic vegetative community was considered present.

Wetland hydrology was considered to be present with evidence of inundation or soil saturation sufficient enough to develop hydric soils and support hydrophytic vegetation. Only one (1) primary indicator needs to be present to conclude the presence of wetland hydrology. If no primary indicators are present then two (2) or more secondary indicators must be present in order to conclude that wetland hydrology is present. Primary hydrologic indicators include (but are not limited to) inundation, saturation, watermarks, drift deposits, morphological adaptations of vegetation, water-stained leaves, and/or oxidized root channels. Secondary hydrologic indicators include (but are not limited to) drainage patterns, crayfish burrows, FAC-neutral test, and moss trim lines.

Areas were delineated as wetlands if they possessed indicators for all three categories described above; hydric soils, hydrophytic vegetative community, and hydrology or under atypical/problem area conditions they possessed sufficient conditions to be considered wetlands (e.g. floodplain soils). One (1) wetland was identified and delineated.

5. Wetland Delineation Results

Field investigations identified the presence of one (1) wetland cover types within the subject property (***Appendix C – Delineation Plans***). Photographs of the identified watercourses are included in ***Appendix B*****.**

Wetland ID	Photo Number	Latitude / Longitude	Wetland type	Agencies with Jurisdiction
W-1	5-6	38.544875/-75.077121	Estuarine Forested Wetland	USACE/DNREC

Wetland 1

Wetland 1 consists of a Estuarine Forested Wetland with a mixed coniferous/deciduous cover type. Wetland 1 is located at the far east end of the project area at the end of the peninsula. Dominant vegetation, soil characteristics and signs of hydrology within Wetland 1 are outlined below:

Vegetation

Tree Stratum

- Loblolly pine (*Pinus taeda*)- FAC

Sapling/Shrub Stratum

- Groundseltree (*Baccharis halimifolia*) – FAC

Herb Stratum

- Common reed (*Phragmites australis*)-FACW

The vegetation found within wetland one pass the Dominance Test provided by the USACE Regional Supplement indicating that hydrophytic vegetation is present.

Soil Characteristics

Soils within Wetland 1 consist of low chroma soils with a depleted. The soil characteristics observed on the project site meet the Depleted Matrix (F3) hydric soil indicators as outlined in the USACE Regional Supplement.

Wetland Hydrology

Hydrology was observed within Wetland 1 and the following USACE Regional Supplement hydrology indicators were met:

- Geographic Position (D2)
- FAC-Neutral Test (D5)

Following the delineation, Wetland 1 has met the vegetation, soil and hydrology parameters to be identified as a wetland. Wetland 1 will be regulated by the USACE. ***See Photos 5-6***.

Watercourse ID	Photo Number	Latitude / Longitude	Watercourse type	Agencies with Jurisdiction
R-1	1-5,7-10	38.544964/-75.07645	Tidal/Perennial	USACE/DNREC

Watercourse 1 (Lake Bethany & Loop Canal)

Watercourse 1 is located north east and south of the project area and consists of Lake Bethany and the Loop Canal. The watercourse originates from Assawoman Canal and Indian River Bay located outside of the project study area. The watercourse had no vegetation growing throughout. However, there were some shrubs (Groundseltree) and herbaceous vegetation (River bulrush, Common reed) growing along its banks.

This watercourse flows perennially and has a defined bed, bank, and OHWM. It also contributes to water that flows directly to a traditionally navigable waterway (TNW). As a result, Watercourse 1 meets the current USACE classification of a RPW and is regulated under the CWA. In addition, DNREC regulates this watercourse as a subaqueous land per Title 7 Del. Code, Chapter 72 § 7202 (h)(2).

6. Recommendations/Conclusions

The Town of Bethany Beach has proposed to control the erosion along a peninsula north of Lake Bethany and south of the Loop Canal by installing bulkhead on the north side and a living shoreline on the south. One wetland was observed on the eastern tip of the project area.

A DNREC Subaqueous Lands Permit will be required due to impacts to Watercourse 1 (Loop Canal and Lake Bethany). In addition, USACE has jurisdiction of both the wetland and watercourse on the project site due to Watercourse 1 being a traditionally navigable waterway. In order to access the project area and implement the erosion controls to the loop canal side and Lake Bethany side of the peninsula, impacts to the watercourse are inevitable. Therefore, USACE permitting will be required.

7. References

1. Cowardin, L.M. et al. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Northern Prairie Wildlife Research Center, Jamestown, North Dakota. 1979.
2. United States Army Corps of Engineers, Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), November 2010.
3. Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melven. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.
4. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov
5. United States Department of Interior, U.S. Geology Survey. 7.5 Minute Topographic Quadrangle St. Georges, DE
6. United States Army Corps of Engineers, Jurisdiction Determination Form Instructional Guidebook. May 30, 2007
7. State of Delaware, Delaware Environmental Navigator. State Wetland Mapping Project (SWMP) for USGS Topographic Quadrangle St. Georges, DE

Appendix A- Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bethany Beach Living Shoreline Project City/County: Sussex Sampling Date: 08/30/2022

Applicant/Owner: Town of Bethany Beach State: DE Sampling Point: WET 1

Investigator(s): SPM, RJP, KEH Section, Township, Range: Town of Bethany Beach

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-5%

Subregion (LRR or MLRA): 153D Lat: 38.54496 Long: -75.07611 Datum: NAD 83

Soil Map Unit Name: Dredge Channel, 1-4 meters water depth (WDc2) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

-PFO

-Far east end of the rookery/project study area

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

-Wetland 1 receives hydrology from Watercourse 1

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET 1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Loblolly pine (Pinus taeda)	70	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Sapling/Shrub Stratum (Plot size: 15')			
1. Groundseltree (Baccharis halimifolia)	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 5')			
1. Common reed (Phragmites australis)	80	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WET 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	90	7.5YR 4/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bethany Beach Living Shoreline Project City/County: Sussex Sampling Date: 08/30/2022

Applicant/Owner: Town of Bethany Beach State: DE Sampling Point: UPL 1

Investigator(s): SPM, RJP, KEH Section, Township, Range: Town of Bethany Beach

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 0-5%

Subregion (LRR or MLRA): 153D Lat: 38.54490 Long: -75.07659 Datum: NAD 83

Soil Map Unit Name: Dredge Channel, 1-4 meters water depth (WDc2) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

-West of Wetland 1

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL 1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Black Cherry (Prunus serotina)	15	No	FACU
2. Loblolly (Pinus taeda)	80	Yes	FAC
3. Southern Red Oak (Quercus falcata)	10	No	FACU
4.			
5.			
6.			
7.			
8.			
	105	= Total Cover	

50% of total cover: 52.5 20% of total cover: 21

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size: 30')			
1. Greenbrier (Smilax rotundifolia)	10	Yes	FAC
2.			
3.			
4.			
5.			
	10	= Total Cover	

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UPL 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 4/4	100	-	-	-	-	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Appendix B- Site Mapping and Photographs

Figure 1 Project Location Map 12/9/2022 10:44:24 AM

Project Location Map (USGS)

Bethany Beach Living Shoreline Project
Bethany Beach
Sussex County, Delaware

N
W
E
S

0 250 500 1,000 Feet

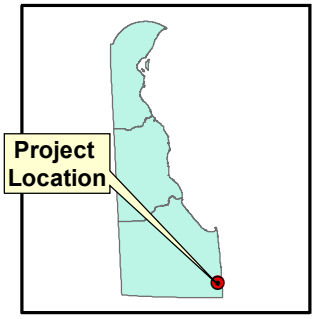
McCORMICK TAYLOR

Legend

Project Study Area

Figure 1

Figure 2 NRCS Soils Map 12/9/2022 10:54:53 AM



NRCS Soils Map

Bethany Beach Living Shoreline Project
Bethany Beach
Sussex County, Delaware

N
W
E
S

0 37.5 75 150 Feet

McCORMICK TAYLOR

Legend

- Klej loamy sand, 0 -2% slopes (KsA)
- Dredge Channel, 1-4 meter water depth (WDc2)
- Project Study Area

Figure 2

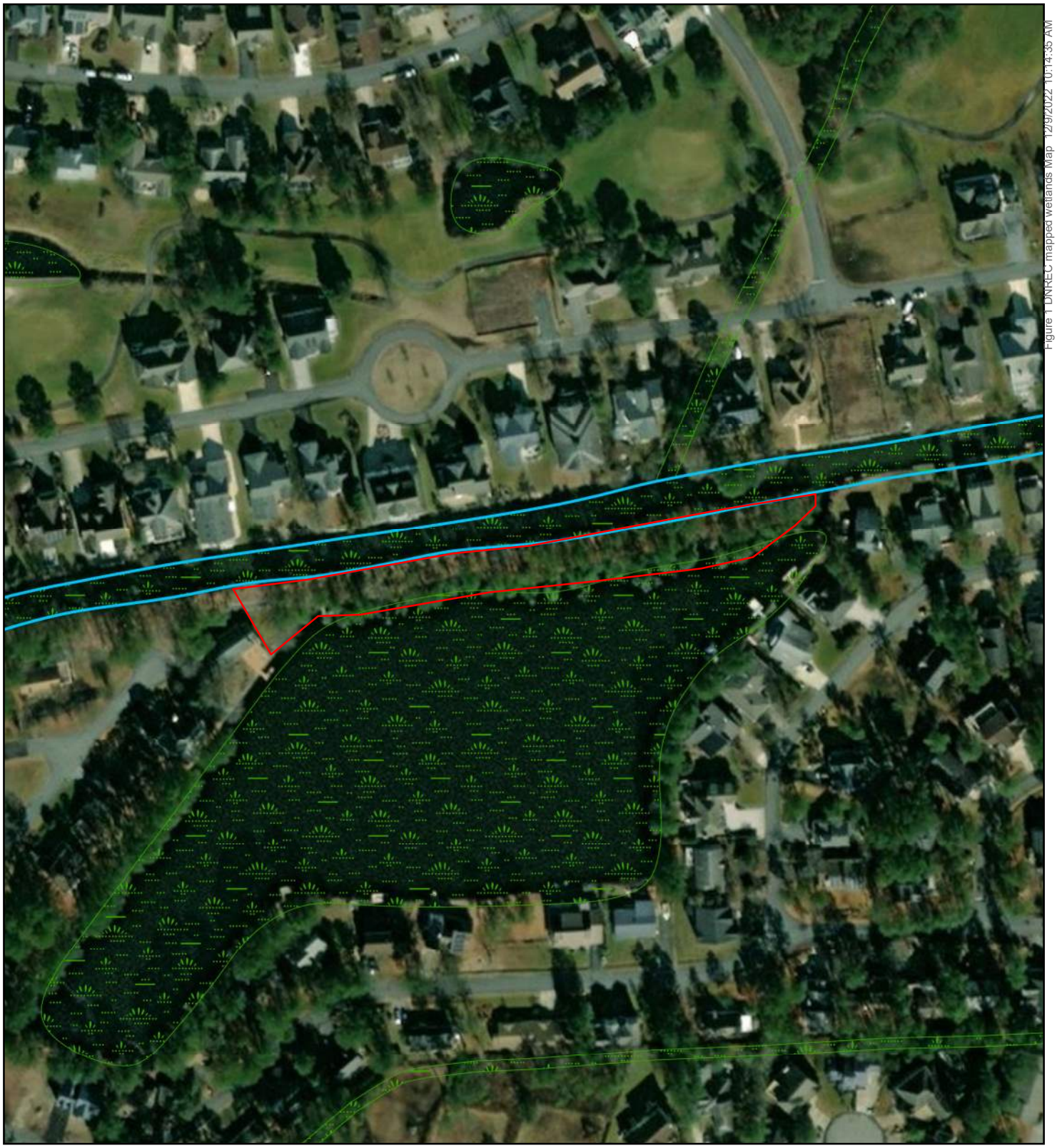
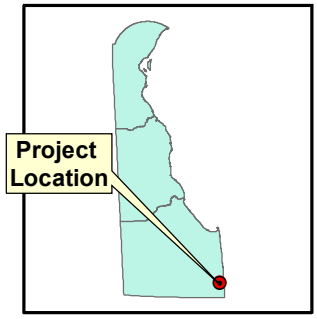


Figure 1 DNREC mapped wetlands Map 12/9/2022 10:14:35 AM



DNREC-Mapped Wetlands

Bethany Beach Living Shoreline Project
Bethany Beach
Sussex County, Delaware

N
W E
S

0 62.5 125 250 Feet

McCORMICK TAYLOR

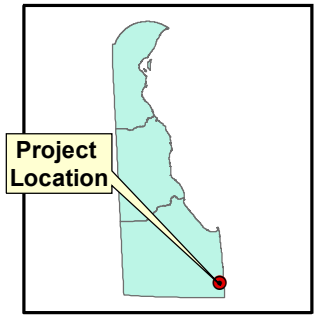
Legend

2017 High Water Mark

2017 Wetlands

Project Study Area

Figure 3



NWI-Mapped Wetlands Map

Bethany Beach Living Shoreline Project
Bethany Beach
Sussex County, Delaware

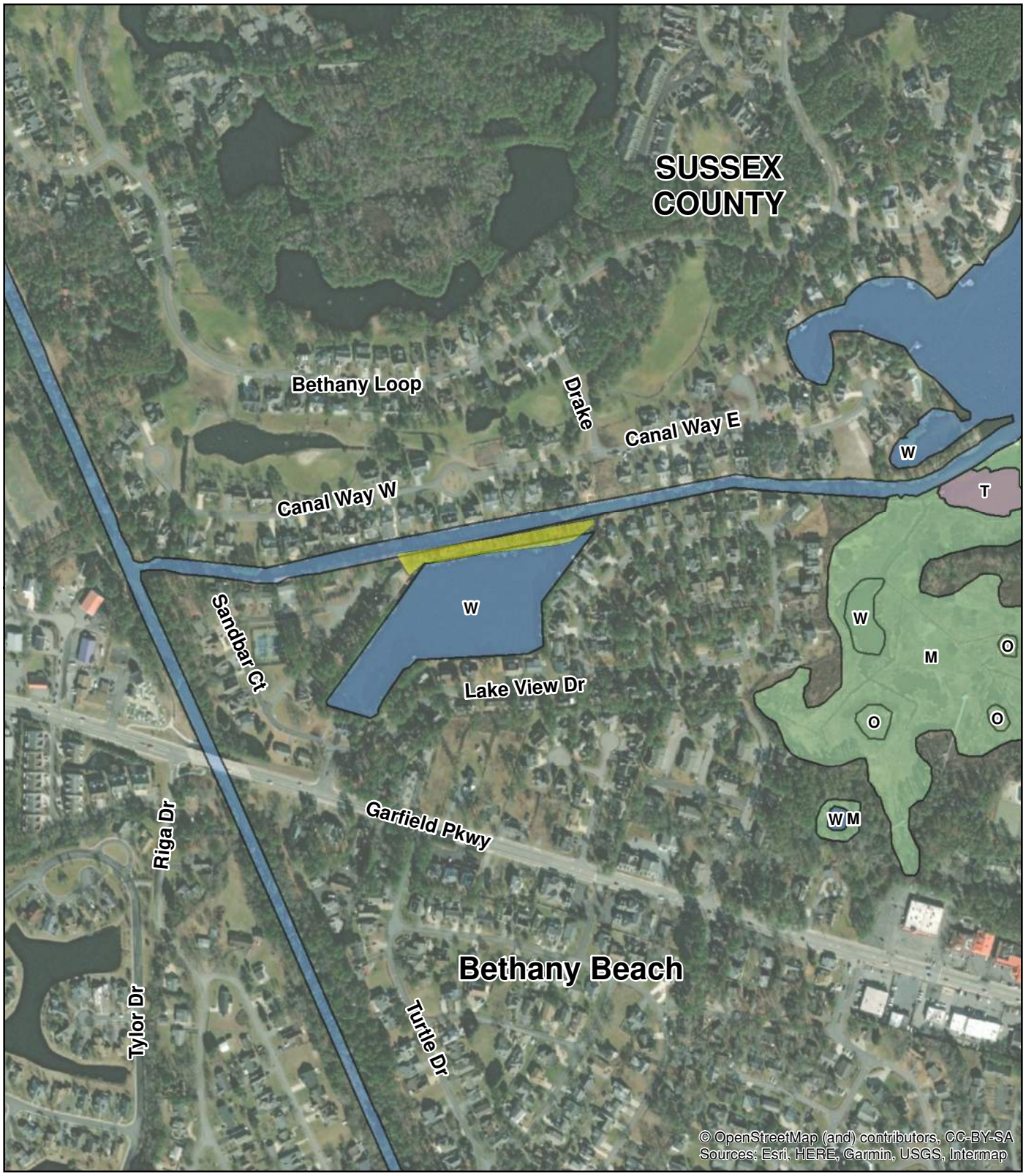
0 37.5 75 150 Feet

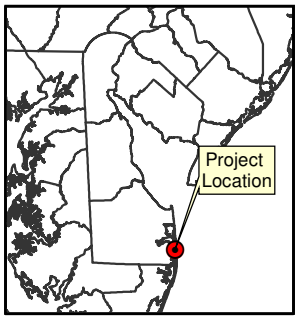
McCORMICK TAYLOR

Legend

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Project Study Area

Figure 4





Tidal Wetlands Map

Bethany Beach Living Shoreline Project

Bethany Beach, Sussex County
Delaware

Legend

- Project Location
- M: Marsh
- S: Tidal Scrub - Shrub Swamps
- T: Tidal Mudflats
- W: Water
- O: Other (Upland or Non-Tidal Wetlands Less than 400 Acres)

N
W E
S

0 125 250 500
Feet

McCORMICK TAYLOR

Figure 5

Photo 1: Facing northeast showing the north side of Watercourse 1 on the canal side.

Photo 2: Facing northwest showing the north side of Watercourse 1 on the canal side.

Photo 3: Facing west showing the north side of Watercourse 1 on the canal side.

Photo 4: Facing east showing the north side of Watercourse 1 on the canal side.

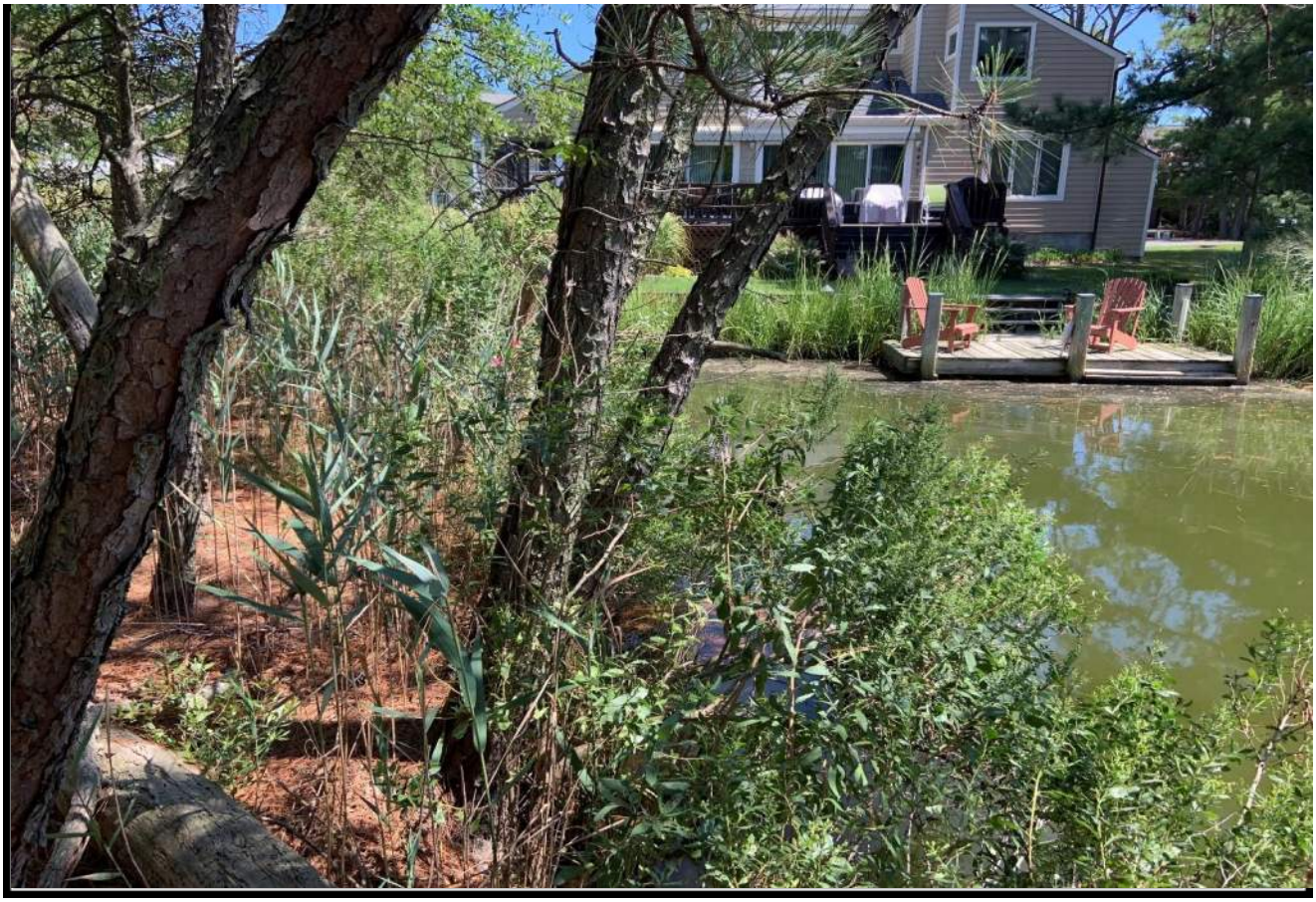


Photo 5: Facing east showing Wetland 1 adjacent to Watercourse 1 on the Lake Bethany side.

Photo 6: Facing east showing Wetland 1 dominated by Common reed and Groundseltree.

Photo 7: Facing west showing Watercourse 1 on the Lake Bethany side.

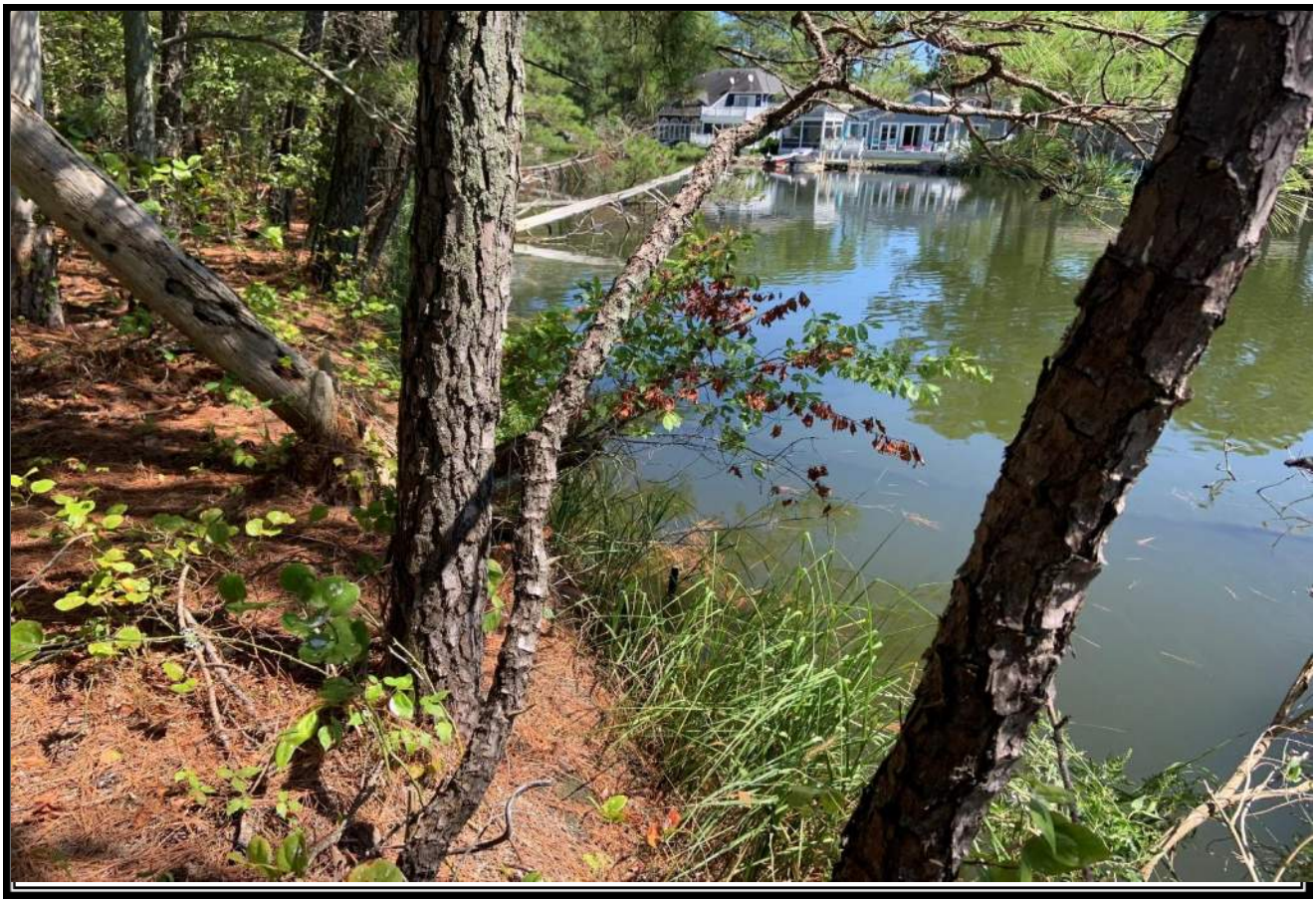


Photo 8: Facing east showing Watercourse 1 on the Lake Bethany side.

Photo 9: Western view Watercourse 1 on the Lake Bethany side showing Loblolly pines, Common reed, and River bulrush.

Photo 10: View of Watercourse 1 on the Lake Bethany side showing River bulrush, Common reed, and Common greenbrier.

Appendix C- Wetland Delineation Map

SURVEY LEGEND

	BENCHMARK
	IRON PIPE FOUND
	IRON ROD FOUND
	IRON ROD/W CAP FOUND
	APPROXIMATE BOUNDARY/R.O.W.
RB-SB	WETLAND LINE/FLAG LABEL
10	CONTOUR ABOVE ELEVATION 0.00'
(10)	CONTOUR BELOW ELEVATION 0.00'
+ 4.7	SPOT GRADE ABOVE ELEVATION 0.00'
+ (4.7)	SPOT GRADE BELOW ELEVATION 0.00'
	BLACK CHERRY (MARKED TREES)
	LOBLOLLY PINE (MARKED TREES)
	HATCH RIP-RAP

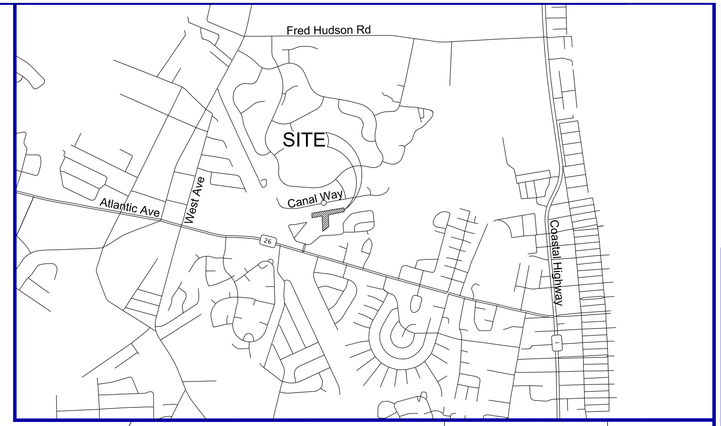
GRAPHIC SCALE

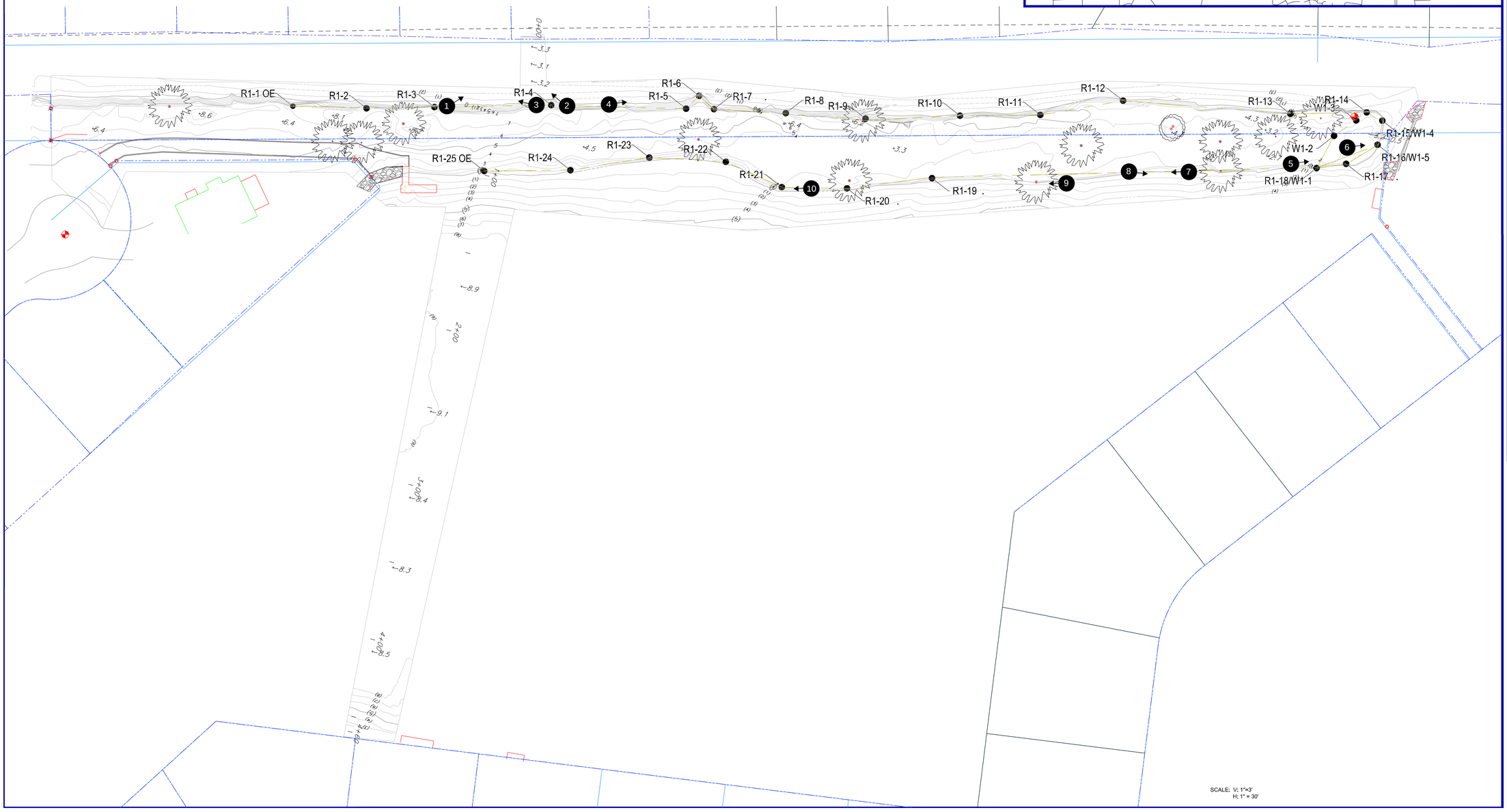
30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

SITE DATA:

1. OWNER: TOWN OF BETHANY
   SOURCE OF TITLE: DB. 3825 PG. 167
   T.M.: 134-13.00-97.00
   TOWN OF BETHANY BEACH
   SUSSEX COUNTY, DELAWARE
2. THE PURPOSE OF THIS SURVEY IS TO SHOW THE TOPOGRAPHIC FEATURES OF THE PENINSULA OF LAND AND ADJACENT SHORE LINE USED AS A NATURE WALK.
3. NOT ALL EXISTING IMPROVEMENTS WITHIN THE EXHIBIT AREA ARE SHOWN. THIS IS NOT A BOUNDARY SURVEY.
4. OTHER THAN SHOWN, THIS EXHIBIT DOES NOT VERIFY THE EXISTENCE OR NON-EXISTENCE OF RIGHTS OF WAY, EASEMENTS OR LEASES ON OR ADJACENT TO THIS PROPERTY. NO TITLE SEARCH WAS PROVIDED FOR OUR USE.
5. HORIZONTAL DATUM DE STATE GRID NAD '83
   VERTICAL DATUM NAVD '88
   DERIVED FROM VRS GPS OBSERVATIONS
6. WETLAND FLAGS WERE LABELED BY OTHERS.





PLANS ISSUED FOR:
REVIEW

REVISIONS:

No.	Revision/Issue:	Date

BETHANY BEACH LIVING SHORES
&
LOOP CANAL BULKHEAD

BETHANY BEACH
134-13.00-97.00 & 134-13.00-94.00
TOWN OF BETHANY BEACH - SUSSEX COUNTY - DELAWARE

Civil Engineers
Land Planners
Landscape Architects
Surveyors

Atlantic Group
& Associates, Inc.

10044 Old Ocean City Boulevard
Berlin, Maryland 21811
Ph: (410) 629-1160
Fax: (410) 629-1710
www.the-atlanticgrp.com

TOPOGRAPHIC SURVEY

PROJECT:	22-115	DATE:	10/11/2022
DRAWN BY:	SPT	SCALE:	Noted

SHEET:
V - 100