

January 17, 2025

District Engineer  
U.S. Army Corps of Engineers, Philadelphia District  
Wanamaker Building  
100 Penn Sq. East  
Philadelphia, Pennsylvania 19107-3390

Project: REQUEST TO ALTER US ARMY CORPS OF ENGINEERS  
CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408  
Dune Modification at Lots 21 and 22  
Sandpiper Village, South Bethany, DE 19930

Dear District Engineer:

On behalf of the homeowners of lots 21 and 22 in Sandpiper Village, South Bethany, DE, we are requesting permission (Section 408 review) to modify the existing federally authorized dune fronting their properties. We have submitted a Coastal Construction Permit application to the local permitting authority/non-federal sponsor, DDNREC (Delaware Department of Natural Resources and Environmental Control) for the project. As a part of the permitting process, we were directed to submit Section 408 review to the District Engineer.

The dune in front of the subject properties has exceeded the USACE design crest elevation of +16 ft NAVD, reaching nearly +24 ft at its peak, as shown in the existing conditions survey (Exhibit A). This increase has led to ongoing maintenance and repair needs for the homeowners, as described in the homeowner hardship summary (Exhibit B).

Therefore, we request permission to modify/lower the existing federal dune fronting Lots 21 and 22 to the USACE design crest elevation of +16 ft NAVD as shown in Exhibit C. To support this, we prepared a coastal floodplain analysis (Exhibit D) using FEMA's methodology for the effective flood study and the revised analysis for the Town-wide Letter of Map Revision (LOMR). The analysis demonstrates that lowering the dune crest to +16 ft NAVD (to match the USACE design crest elevation) will not cause adverse impacts (increased flooding) to adjacent properties.

The dune modification will be performed by a licensed and insured excavation contractor. The contractor will truck the sand south down Ocean Drive to Fenwick Park where it will be unloaded and stockpiled in a location as directed by DNREC. All excavation and stockpile activities will be performed above the High Tide Line (HTL) and Mean High Water (MHW). Once that sand is removed and the dune is graded properly, the dune will be planted with low growing grasses and vegetation to sustain the dune and keep the sand in place.

As mentioned above, all work will be conducted within the uplands, above the High Tide Line

(HTL) and Mean High Water (MHW) Line; therefore, a Section 10/404 review is not required. Work will be limited to private property (Lots 21 and 22) and state-owned property (non-federal sponsor); no federally owned real estate will be used.

The non-federal sponsor DNREC has reviewed the project plans and has provided a Letter of No Objection (Exhibit E). Construction is anticipated to start in March 2025.

Additional supporting details/analysis of the project are included below:

#### **Technical Analysis and Adequacy of Design**

- Geotechnical Evaluation – N/A
- Structural – N/A
- Hydraulic and Hydrology – The Coastal Floodplain Analysis Report demonstrates that the dune modification will not cause increased flooding to the adjacent properties (Exhibit D).
- Operations and Maintenance Requirements – It is anticipated that future maintenance will be required at 5-to-10-year intervals to maintain the +16 ft crest elevation. Grass plantings after the dune modification will aid in stabilizing and maintaining the dune.

#### **Real Estate Analysis**

The project is located on Lots 21 and 22 of Sandpiper Village and partially on state-owned lands (Exhibit F). Access to the site is on state-owned land.

#### **Residual Risk**

The project will not cause increased flood risk to adjacent properties as demonstrated in the Coastal Floodplain Analysis Report (Exhibit D). No other risks have been identified for the project.

#### **Executive Order 11988 Considerations**

N/A

#### **Environmental Protection Compliance**

- National Environmental Policy Act – N/A
- Endangered Species Act – N/A
- Fish and Wildlife Coordination Act – N/A
- Marine Protection, Research and Sanctuaries Act – N/A
- Wild and Scenic Rivers Act – N/A
- Coastal Zone Management Act – N/A
- Clean Air Act – N/A
- Hazardous, Toxic and Radioactive Waste – N/A
- National Historic Preservation Act – N/A
- Noise Control Act – N/A

Please let me know if you need additional information or require any further explanation. Thank you for your time and consideration, and I look forward to hearing from you soon.

Sincerely,



Michael A Giovannozzi, PE  
Senior Engineer  
561-703-5230  
mike@aquaterraci.com

Attachments:

- Exhibit A: Existing Topography and Site Plan
- Exhibit B: Owner Hardship Summary
- Exhibit C: Dune Modification Plans
- Exhibit D: Coastal Floodplain Analysis Report
- Exhibit E: Non-Federal Sponsor's Letter of No Objection
- Exhibit F: Real Estate Ownership Documents

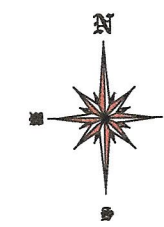
# **Exhibit A**

## **Existing Topography and Site Plan**





BEACH AREA



VICINITY MAP

NOT TO SCALE

#### SITE DATA

- SANDPIPER VILLAGE LOT NOS. 21 THRU 25
- STATE: DELAWARE
- COUNTY: SUSSEX
- HUNDRED: BALTIMORE
- MUNICIPALITY: TOWN OF SOUTH BETHANY
- SCALE: 1"=30'
- CLASS "A" SURVEY
- VERTICAL DATUM- NAVD'88 (1988 NORTH AMERICAN VERTICAL DATUM)
- HORIZONTAL DATUM- NAD'83 (1983 NORTH AMERICAN DATUM)

#### SURVEYOR NOTES

- This plot and survey does not verify the existence or nonexistence of right-of-ways and/or easements pertaining to this property, including but not limited to Tax Ditch Easements.
- No title search provided or stipulated.
- Plot Book Reference: Pb. 23, Pg. 2

#### STANDARD LEGEND

These standard symbols will be found in the drawing

- CONTOUR - MAJOR
- CONTOUR - MINOR
- SPOT ELEVATION
- DNREC BUILDING RESTRICTION LINE
- PROPERTY LINE
- CENTER LINE

FLOOD DATA This property is in Zone "X" DEPTH 2.0' & "Y" BFE 12.0' of the Flood Insurance Rate Map, Community Panel No. 100051-1000520518-K which has an effective date of MARCH 16, 2015 and is in a Special Flood Hazard Area.

Lot No. 29

Lot No. 28

Lot No. 27

Lot No. 26

Lot No. 25

Lot No. 24

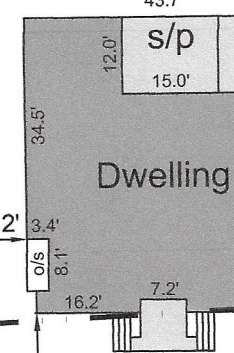
Lot No. 23

Lot No. 22

Lot No. 21

D.N.R.E.C. Building Restriction Line  
Per State of Delaware #15479-19554-B  
Dated: August 1979, Sheet 8 of 35.

Boardwalk  
Elev: 11.5'



SEA SIDE DRIVE

(30' r/w)

centerline

#### SURVEYOR CERTIFICATION

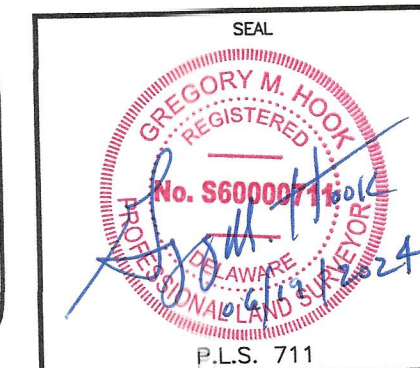
I, GREGORY M. HOOK, registered Professional Land Surveyor in the State of Delaware, hereby certify that the information shown on this plan has been prepared under my supervision and meets the standards of practice as established by the State of Delaware Board of Professional Land Surveyors. Any changes to the property conditions, improvements, boundary or property corners after the date shown hereon shall necessitate a new review and certification for any official or legal use.

GREGORY M. HOOK, PLS. 7111  
Date: 06/19/2024

DATE OF ORIGINAL: JUNE 01, 2021  
REVISION: Elevation data for deck and walkway data captured on October 11, 2016 DATE: JUNE 24, 2021  
REVISION: Topography and Scale DATE: August 10, 2021  
REVISION: Lot No. 21-25 Updated Topography DATE: DECEMBER 07, 2023  
REVISION: Locate Fences & Updated Topography DATE: JUNE 14, 2024  
REVISION: 2023 Topo for Lot No. 21 DATE: JUNE 18, 2024  
REVISION: DATE: DATE: 2024  
REVISION: DATE: DATE: 2024  
Drawn by: MICHAEL LOVELAND Checked by: GREGORY M. HOOK

## TOPOGRAPHICAL SURVEY

LOT NOS. 21 thru 23, SANDPIPER VILLAGE. Situated in the Town of South Bethany. Ref: Plat Book 23, Page. 02.



**SIMPLER SURVEYING & ASSOCIATE, INC.**  
32486 POWELL FARM ROAD, FRANKFORD, DE 19945  
www.delawaresurveyor.com  
PHONE: (302) 539-7873



# **Exhibit B**

## **Owner Hardship Summary**

**14 & 16 Sea Side Dr, South Bethany, DE  
Coastal Floodplain Analysis  
Owner Hardship Summary**

**Below is a summary of the hardships the owners of Lots 21 and 22 have experienced due to the increased dune fronting their properties.**

Harsh Northeastern Winds blow sand across the beach and along the oversized perpendicular dune and up through the wide-open beach access onto the homes located on Lots 21 and 22 constantly throughout the fall/winter/spring seasons during nor-easters and major storms. The excessive height of the dune causes a wind tunnel down the north side of dune and directly onto the house located on Lot 22 causing issues with paint, landscaping, the need for a window replacement, and gas leaks.

- The current landscape contractor at Lot 22 claims that the unusually harsh winds on this side of the home prohibits growth of just about anything they plant there, and that it needs to be replaced annually for this reason, causing the owner undue financial hardship that would normally be a one-time cost with minimal needs for replacement.
- An approximately 30” square window is in need of replacement on the north side of the home due to the seal of the window failing due to constant wind pressure against this window.
- Sharp Energy gas company was at the property located on lot 22 at the end of July, 2024 due to a gas leak which required repairs of the gas equipment on the north side of the house. Sharp Energy informed the homeowner that they will need to completely replace most of the gas equipment on the north side of their home, due to the high winds/sand blasting causing damage to the pipes/meter. Similar repair work was done a little over 5 years ago as well, and the main cause is the harsh high winds that blow through the beach access. This is a major safety hazard, especially since the homeowner is not living there year-round. Should similar leaks occur when no one is currently home, potential major damage to the home and adjacent properties is possible.

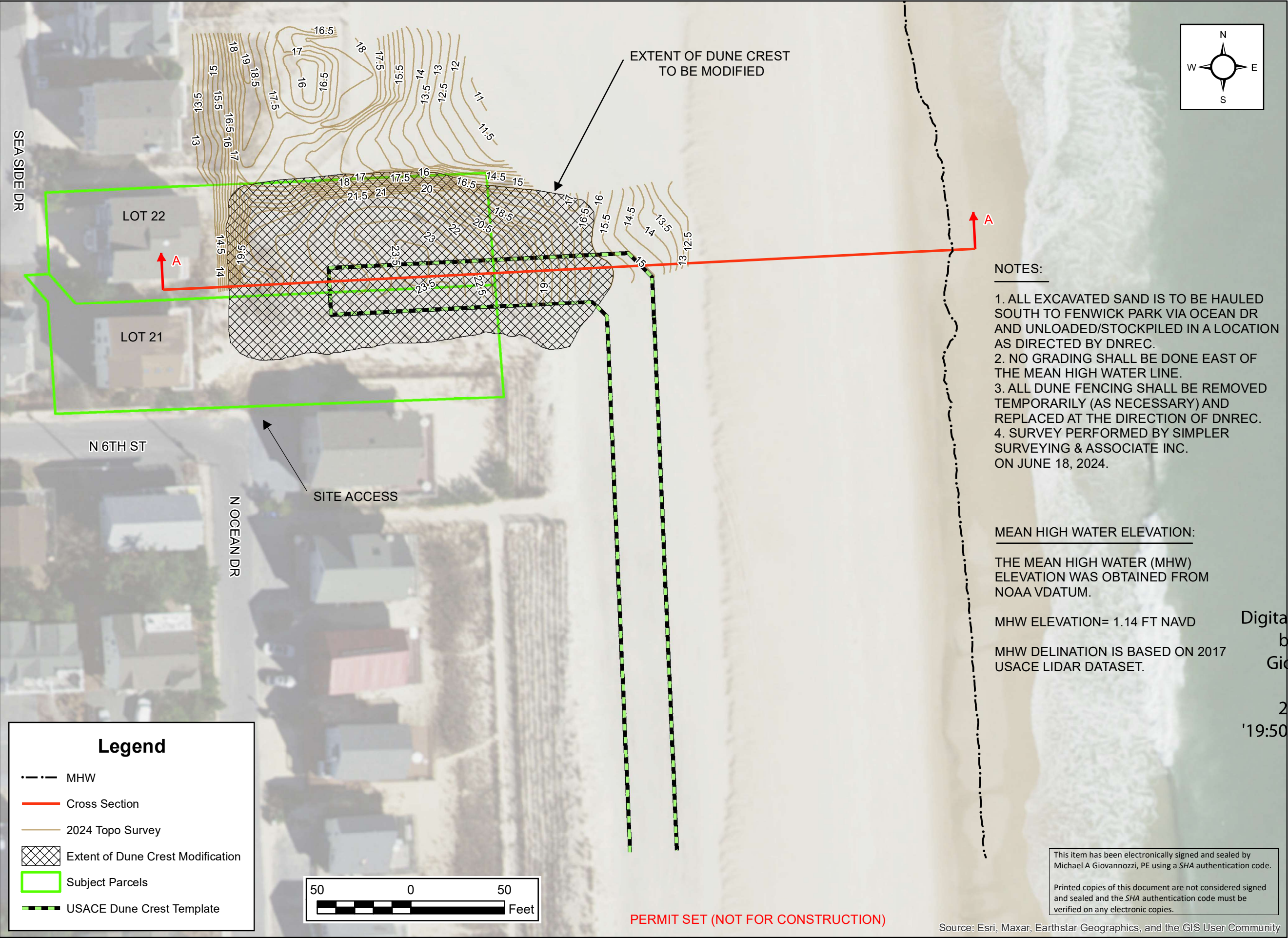
The east sides of the homes located on lots 21 and 22 are continually blasted with sand as well, and the homeowner’s have had issues with keeping their storm shutters clean and operational in recent years because of this. These harsh sand blowing issues as well as the increasing height of the dune causes more and more sand to beat against the homes causing continual need for painting and power washing. The increased sand blasting westward has also caused the outdoor condensing units at both homes to need to be replaced more frequently even though annual maintenance is completed on the outdoor units twice a year. These issues are exacerbated as the dune continues to increase in height.

# **Exhibit C**

## **Dune Modification Plans**







534 28th St  
West Palm Beach, FL 33407  
561-703-5230  
www.aquaterraci.com  
FL CA Lic No: 31695

DESIGNED BY:  
**MAG**

DRAWN BY:  
**EC**

CHECKED BY:  
**MAG**

REVISION HISTORY:

| DATE       | ISSUANCE          |
|------------|-------------------|
| 01/07/2025 | ISSUED FOR PERMIT |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |
|            |                   |

CERTIFICATION:  
I HEREBY CERTIFY THAT THE INFORMATION ON THIS MAP PERTAINING TO THE REMAPPING OF THE FLOOD ZONES REPRESENTS MY BEST EFFORTS TO INTERPRET THE DATA AVAILABLE.  
ALL ELEVATIONS REFERENCED TO NAVD88

ENGINEER'S STAMP:  

Digitally signed  
by Michael  
Giovannozzi  
Date:  
2025.01.07  
'19:50:15 -05'00

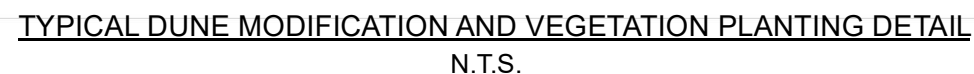
PROJECT NAME:  
**LOTS 21 & 22  
SOUTH BETHANY, DE**

DRAWING TITLE:  
**DUNE MODIFICATION  
SITE PLAN**

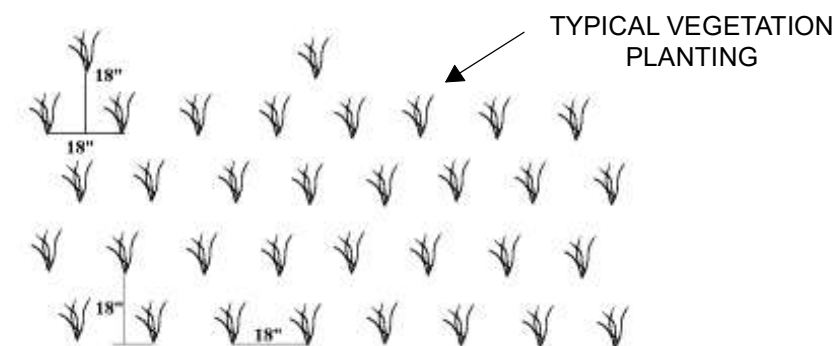
FILE NAME: Dune Mod Plan.MXD

DRAWING SCALE: 1" = 50'

|                   |              |                    |
|-------------------|--------------|--------------------|
| DRAWING #:<br>T-1 | AREA:<br>N/A | SHEET #:<br>2 of 3 |
|-------------------|--------------|--------------------|



N.T.S.



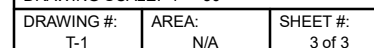
1. CONTRACTOR MAY ATTEMPT TO ACHIEVE A NATURAL LOOK BY NOT PLANTING IN STRAIGHT ROWS AND MODIFY THE SPACING REQUIREMENTS FOR UP TO 25% OF THE PLANTS.

2, CONTRACTOR SHALL PROVIDE PLANTS AND PLANTINGS  
ACCORDING TO TECHNICAL SPECTIONS AND CONTRACT DOCUMENTS.

N.T.S.

Printed copies of this document are not considered signed and sealed and the *SHA* authentication code must be verified on any electronic copies.

PERMIT SET (NOT FOR CONSTRUCTION)



# **Exhibit D**

## **Coastal Floodplain Analysis Report**



**14 & 16 Sea Side Dr, South Bethany, DE  
(Lots 21 & 22)**

Town of South Bethany, Delaware

**Coastal Floodplain Analysis  
Report**

**Prepared By:**



534 28<sup>th</sup> St  
West Palm Beach, FL 33407

January 2025 (rev1)

## TABLE OF CONTENTS

**Section 1      Project Narrative and Analysis Description**

**Section 2      Supporting Calculation Data**

- Owner Hardship Summary
- USACE Beach Nourishment Plan
- Tidal Data
- Stillwater Elevation and Transect Data
- WHAFIS Output Reports
- Wave Runup Output Reports
- Results Comparison Graphs

**Section 3      Mapping and Digital Files**

- Site Survey (existing conditions)
- Modified Dune (proposed conditions)
- Topographic Work Map
- CD of CHAMP Model Files, Digital Mapping and Report Digital Format

Digitally signed  
by Michael  
Giovannozzi  
Date: 2025.01.07  
'19:26:57 -05'00



---

Michael A Giovannozzi, P.E.  
Delaware Reg. No. 20111

This item has been electronically signed and sealed by  
Michael A Giovannozzi, PE using a SHA authentication code.

Printed copies of this document are not considered signed  
and sealed and the SHA authentication code must be  
verified on any electronic copies.

## Section 1

---

### Project Narrative and Analysis Description

## **14 & 16 Sea Side Dr, South Bethany, DE**

### **Coastal Floodplain Analysis**

### **Project Narrative and Analysis Description**

#### **Property Location and Description**

The subject site for this study is located at 14 and 16 Sea Side Drive (Lots 21 & 22), in the Town of South Bethany, Delaware. The subject site is located on the Federal Emergency Management Agency (FEMA) Effective Flood Insurance Rate Map (FIRM) 10005C0518K, with an effective date of March 16, 2015 and is part of the town-wide FEMA Letter of Map Revision (LOMR) Case No 22-03-0643P, with an effective date of April 5, 2022. It is surrounded mostly by existing single-family residential development and the Atlantic Ocean coastline. The approximate property boundaries for Lots 21 & 22 are depicted on the enclosed Topographic Work Map submitted with this report.

#### **Study Area Parameters and Purpose**

The subject site is generally located between the Atlantic Ocean to the east and Coastal Highway (Delaware Route 1) to the west. This area of South Bethany is mainly comprised of residential development. Per the town-wide LOMR (22-03-0643) within effective FIRM #10005C0518K, the subject site is affected by Flood Zone VE (elevation 12 feet NAVD 88). The site is bordered on the west by Sea Side Dr and on the east by a sand beach and dune system along the Atlantic Ocean coast. The site is bordered on the north and south residential development.

The dune and beach system along the shoreline is part of a long-term beach erosion project sponsored by the US Army Corps of Engineers (USACE) and Delaware Department of Natural Resources and Environment Control (DNREC). The federally authorized beach berm has an elevation of +7 ft NAVD and varies in width from 169 ft to 219 ft along the entire beach fill area. The original designed dune has a crest elevation of +16 and a width of 15 ft along the beachfill area, however, the subject site is in a transition area between the federally authorized project and a local beachfill project to the north. Consequently, the dune has a transition that is wider than necessary. That combined with the plan form of the dune transition has caused a dune to increase in height over time due to wind-blown sand. The dune crest exceeds +23 ft based on the 2024 topographic survey. Because of this, the property owners of Lots 21 & 22 are proposing to modify the dune by lowering its crest elevation to +16 ft NAVD (the federally authorized dune crest elevation) due to the hardships associated with the increased dune size (see Summary of Hardships in the attachments).

Due to the property being designated within a Special Flood Hazard Area within the effective flood zone of VE (EL 12), a site-specific wave analysis has been prepared to evaluate the potential impacts of the proposed dune modification (dune lowering/grooming to the federal dune crest height of +16 ft NAVD88) on the wave conditions and water levels during the 1%-annual-chance-event (100-year event). DNREC has requested this analysis to confirm that the proposed dune modification does not cause increased flooding to adjacent properties. To evaluate the impacts of the dune modification a wave analysis was conducted. The following sections of this report provide details on the analysis input data, approach and results.

### **CHAMP Modeling**

The Coastal Hazard Analysis Modeling Program (CHAMP) Version 2.0 was used to perform the coastal wave analysis at the study area. The CHAMP program is a currently FEMA accepted numerical modeling to be used for wave hazard analyses. The Atlantic Ocean is the regulatory flood source for the project area per FEMA FIRM Panel #10005C0518K. To better define the coastal flooding and wave conditions supplementing the Effective FIS within the study area, two transects, paths of a simulated storm-generated wave, were delineated; Transect #1 was delineated from the coastal shoreline through the beach/dune system and subject property (from east to west) and Transect #2 was delineated at an oblique angle through the beach/dune system. Both Transects were analyzed for the existing (current) and proposed (dune modification) conditions.

### **Transect #1**

#### **▪ *Transect General Information:***

To establish the Transect #1 location and data, a transect was aligned seaward of the shoreline, proceeding west through the beach/dune system and the subject property and terminating 600 feet landward of the shoreline. Transect #1 was aligned perpendicular to the shoreline of the property creating a bearing of 268°. Ground elevation for the transect was obtained from the 2017 USACE LiDAR topography (to be consistent with the town-wide LOMR) supplemented with a 2024 topographic survey. The Topographic Work Map, provided in Section 3, shows the location of Transect #1 from the Atlantic Ocean through the subject property.

Tidal data was obtained from NOAA vDatum Program (v4.7) for the subject site. Based upon the vDatum Program, the Mean High Water (MHW) is 1.14 feet (NAVD-88) and the Mean Low Water (MLW) is -2.30 feet (NAVD-88). The vDatum Program output is included within Section 2 of this report.

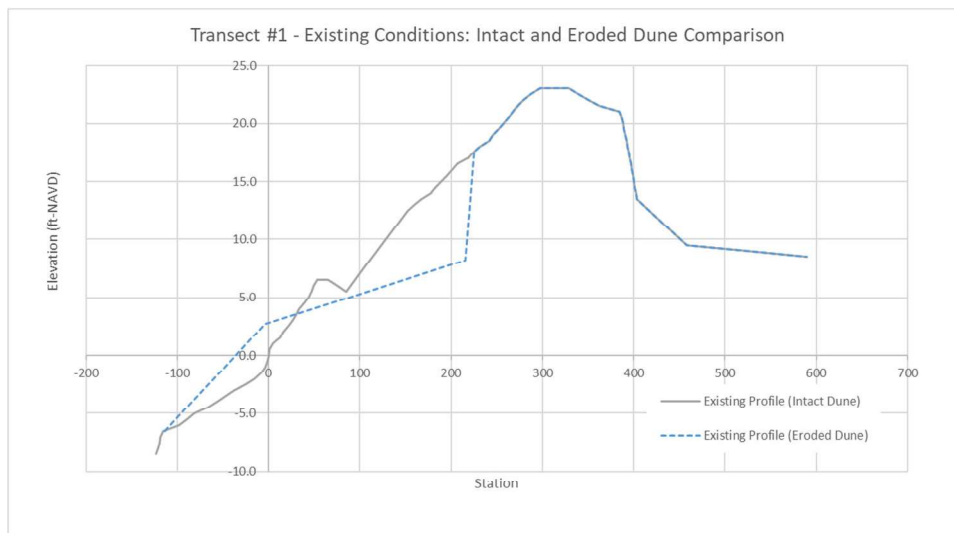
Two topographic scenarios were developed for Transect #1, one to represent pre-project (existing) conditions (Transect #1 – Existing) and one to represent post-project (proposed due modification) conditions (Transect #1 – Proposed). The existing topographic scenario includes elevations representative of the existing conditions on the property. The proposed topographic scenario includes the profile of the proposed dune modification (lowering of the dune crest to match the federal beachfill dune crest of +16 ft NAVD). Copies of the Existing Site Plan and Proposed Dune Modification are included in Section 3 of this report. All the elevations for Transect #1 used for the CHAMP modeling are referenced to the vertical datum NAVD 88.

For the CHAMP modeling of Transect #1, the input for the 1% Annual Chance (100-year) Storm conditions includes the following criteria obtained from the town-wide LOMR for South Bethany (Case No 22-03-0643P, effective April 5, 2022):

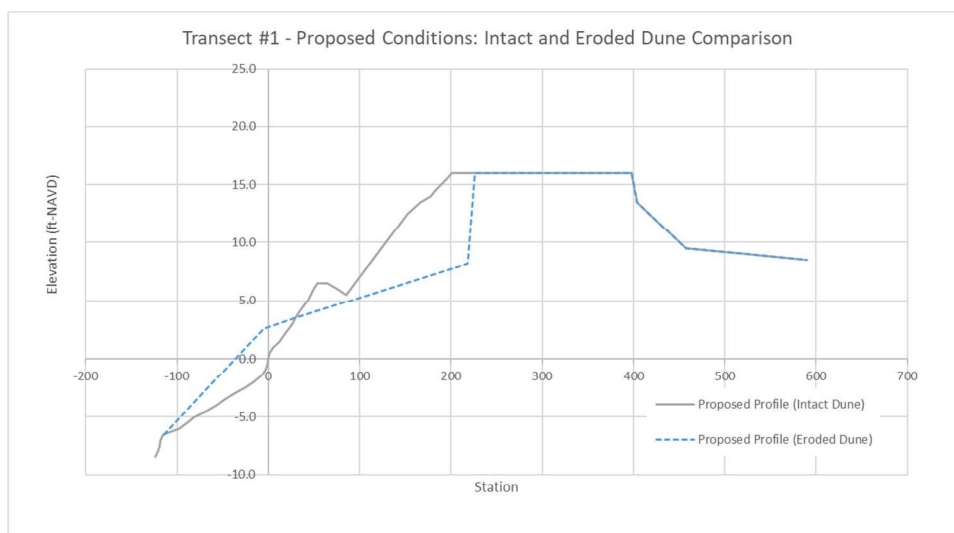
- 1% Annual Chance Stillwater Elevation (SWEL): 6.2 to 8.2 feet NAVD 88;
- 1% Annual Chance Deepwater Wave Height: 16.99 feet;
- 1% Annual Chance Deepwater Wave Period 12.81 seconds;
- 1% Annual Chance Deepwater Wave Set-up: included in 1% SWEL

- **Erosion Assessment – Transect #1**

For conservative purposes, since erosion was considered in the Effective FIS and the town-wide LOMR, it is anticipated that some erosion of the open shoreline would occur during 1% Annual Chance Storm Event. Therefore, an erosion analysis was performed along Transect #1 considering the open shoreline. Based upon review of the 2017 LiDAR topographic data and supplemental 2024 topographic survey, the dune is larger than FEMA’s minimum dune area of 540 sqft/ft. Therefore, the dune was eroded using the dune retreat method. This method is applicable to the dune in this particular area as it is of considerable magnitude larger than the other dunes with the Town of South Bethany (where a modified erosion method was applied to the dunes for the town-wide LOMR). Figure 1 depicts the pre-project intact and eroded dune profiles. Figure 2 depicts the post-project intact and eroded dune profiles.



*Figure 1. Pre-Project Intact and Eroded Dune Profiles.*



*Figure 2. Post-Project Intact and Eroded Dune Profiles.*

- **Wave Height Analysis – Transect #1**

To perform the pertaining WHAFIS routine on the CHAMP program the eroded profile was used and the applicable WHAFIS cards were entered on the respective stations. Inland Fetch (IF) cards were used intermittently along Transect #1. No additional WHAFIS carding was applied in order to remain conservative with the analysis. Both topographic scenarios used the same WHAFIS carding.

- **Wave Run-up Analysis –Transect #1**

A wave run-up analysis was performed using the RUNUP2 module within CHAMP. This method is applicable for this dune as the retreat erosion was applied to the dune. The maximum calculated 2% runup elevation did not overtop the existing or modified dune for Transect 1.

- **Wave Envelope –Transect #1**

The wave envelope is a combination of the potential wave runup elevation and the controlling wave crest elevation profile. The wave crest elevation profile is plotted along a transect (from the zero (0.0 foot) map datum elevation landward) based on the results of the WHAFIS model or other methodology. A horizontal line is extended seaward from the potential wave runup elevation to its intersection with the wave crest profile to obtain the wave envelope, plotted from the zero (0.0 ft) map contour. Figure 3 shows the wave envelope for both the pre- and post-project eroded dune profiles. A large-scale plot wave envelope is included in the attachments.

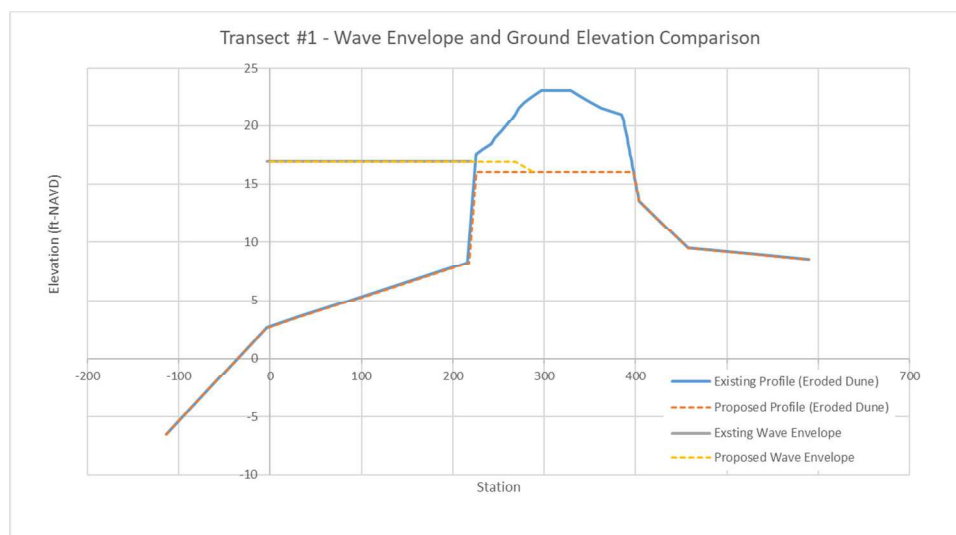


Figure 3. Transect 1 - Wave Envelope and Gound Elevation Comparison for the Pre- and Post-Project Eroded Dune

## **Transect #2**

- **Transect General Information:**

To establish the Transect #2 location and data, a transect was aligned seaward of the shoreline, proceeding southwest through the beach/dune system and the subject property and terminating 850 feet landward of the shoreline. Transect #2 was aligned generally perpendicular to the dune line during the 100-year water level creating a bearing of 210°. Ground elevation for the transect

was obtained from the 2017 USACE LiDAR topography (to be consistent with the town-wide LOMR) supplemented with a 2024 topographic survey. The Topographic Work Map, provided in Section 3, shows the location of Transect #2 from the Atlantic Ocean through the subject property.

Tidal data was obtained from NOAA vDatum Program (v4.7) for the subject site. Based upon the vDatum Program, the Mean High Water (MHW) is 1.14 feet (NAVD-88) and the Mean Low Water (MLW) is -2.30 feet (NAVD-88). The vDatum Program output is included within Section 2 of this report.

Two topographic scenarios were developed for Transect #2, one to represent pre-project (existing) conditions (Transect #2 – Existing) and one to represent post-project (proposed due modification) conditions (Transect #2 – Proposed). The existing topographic scenario includes elevations representative of the existing conditions on the property. The proposed topographic scenario includes the profile of the proposed dune modification (lowering of the dune crest to match the federal beachfill dune crest of +16 ft NAVD). Copies of the Existing Site Plan and Proposed Dune Modification are included in Section 3 of this report. All the elevations for Transect #1 used for the CHAMP modeling are referenced to the vertical datum NAVD 88.

For the CHAMP modeling of Transect #2, the input for the 1% Annual Chance (100-year) Storm conditions includes the following criteria obtained from the town-wide LOMR for South Bethany (Case No 22-03-0643P, effective April 5, 2022):

- 1% Annual Chance Stillwater Elevation (SWEL): 6.2 to 8.2 feet NAVD 88;
- 1% Annual Chance Deepwater Wave Height: 16.99 feet;
- 1% Annual Chance Deepwater Wave Period 12.81 seconds;
- 1% Annual Chance Deepwater Wave Set-up: included in 1% SWEL

▪ ***Erosion Assessment – Transect #2***

For conservative purposes, since erosion was considered in the Effective FIS and the town-wide LOMR, it is anticipated that some erosion of the open shoreline would occur during 1% Annual Chance Storm Event. Therefore, an erosion analysis was performed along Transect #1 considering the open shoreline. Based upon review of the 2017 LiDAR topographic data and supplemental 2024 topographic survey, the dune is larger than FEMA's minimum dune area of 540 sqft/ft. Therefore, the dune was eroded using the dune retreat method. This method is applicable to the dune in this particular area as it is of considerable magnitude larger than the other dunes with the Town of South Bethany (where a modified erosion method was applied to the dunes for the town-wide LOMR). Figure 4 depicts the pre-project intact and eroded dune profiles. Figure 5 depicts the post-project intact and eroded dune profiles.



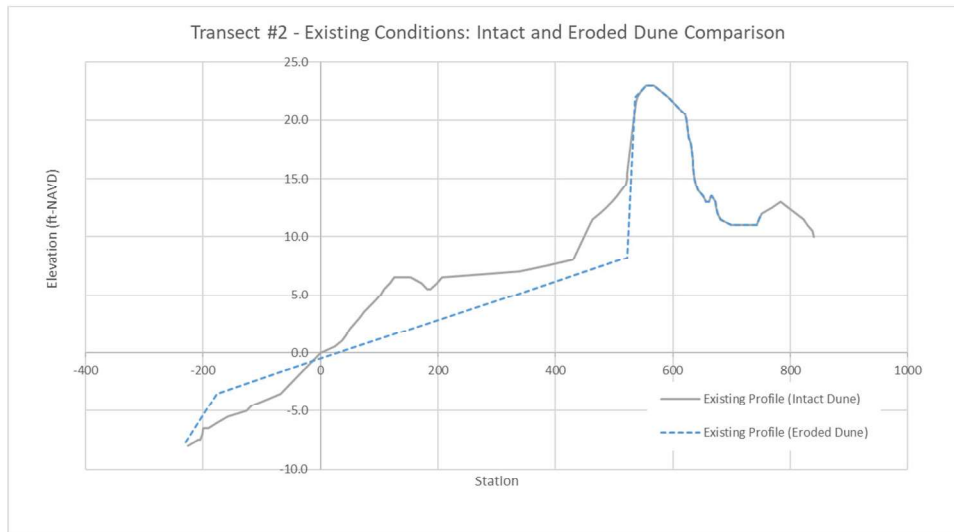


Figure 4. Pre-Project Intact and Eroded Dune Profiles.

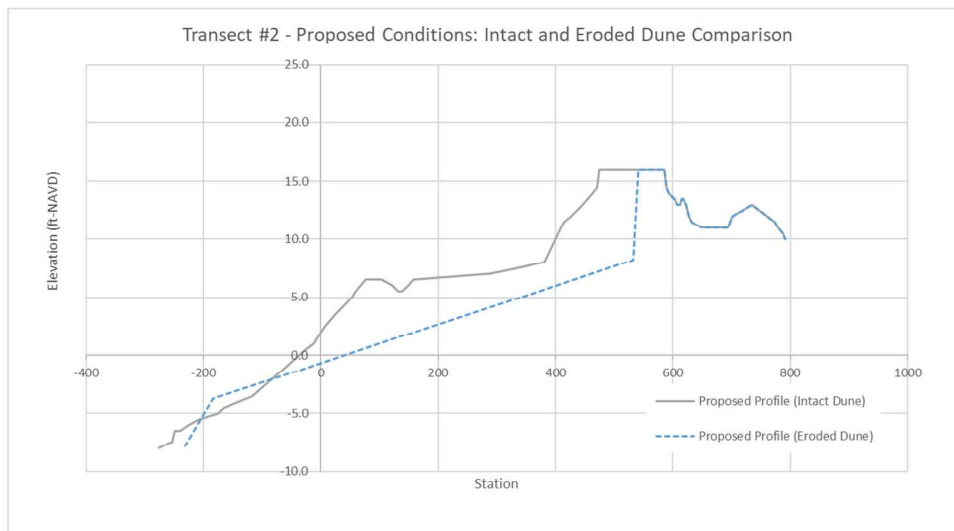


Figure 5. Post-Project Intact and Eroded Dune Profiles.

- **Wave Height Analysis – Transect #2**

To perform the pertaining WHAFIS routine on the CHAMP program the eroded profile was used and the applicable WHAFIS cards were entered on the respective stations. Inland Fetch (IF) cards were used intermittently along Transect #22. No additional WHAFIS carding was applied in order to remain conservative with the analysis. Both topographic scenarios used the same WHAFIS carding.

- **Wave Run-up Analysis –Transect #2**

A wave run-up analysis was performed using the RUNUP2 module within CHAMP. This method is applicable for this dune as the retreat erosion was applied to the dune. The maximum calculated 2% runup elevation did not overtop the existing dune for Transect 2, however it did extend slightly

above the modified dune. A further wave runup analysis (wave runup on a plateau above a low bluff) was performed and it was determined that the runup only extended for 20 ft along the modified dune crest. The modified dune crest had a total width of 110 ft, so the modified dune was not overtopped by the wave runup.

- **Wave Envelope –Transect #2**

The wave envelope is a combination of the potential wave runup elevation and the controlling wave crest elevation profile. The wave crest elevation profile is plotted along a transect (from the zero (0.0 foot) map datum elevation landward) based on the results of the WHAFIS model or other methodology. A horizontal line is extended seaward from the potential wave runup elevation to its intersection with the wave crest profile to obtain the wave envelope, plotted from the zero (0.0 ft) map contour. Figure 6 shows the wave envelope for both the pre- and post-project eroded dune profiles. A large-scale plot wave envelope is included in the attachments. It is noted that the wave envelope at the eroded dune is lower than the wave envelope for the intact dune by 0.1 ft. The wave envelope at the shoreline was found to be 11.7 ft NAVD for the pre-project condition compared to 11.6 ft NAVD for the post-project condition.

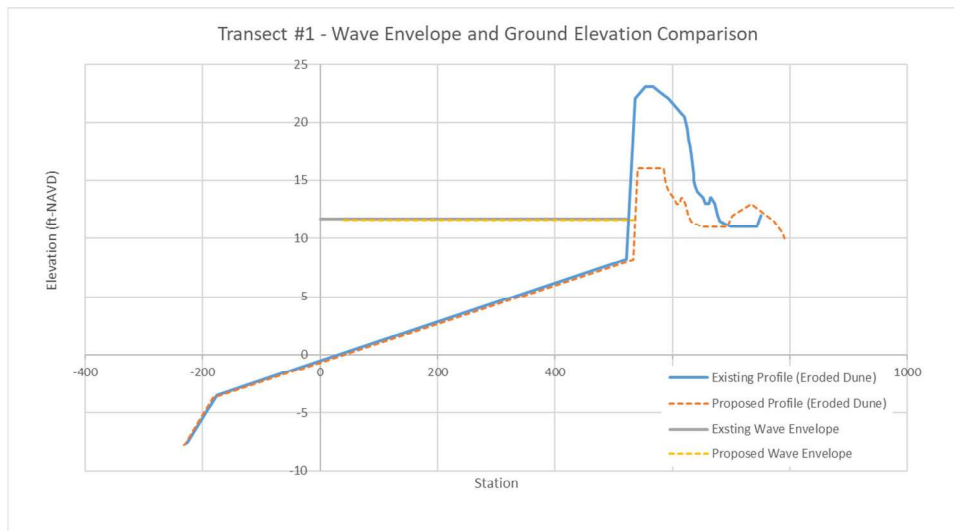


Figure 6. Transect 2 - Wave Envelope and Gound Elevation Comparison for the Pre- and Post-Project Eroded Dune.

### **Wave Analysis Results and Discussion:**

The conducted overland wave and runup analysis evaluated the resulting wave conditions for the existing conditions compared to the proposed conditions. The analysis utilized the FEMA accepted CHAMP program to simulate the 1%-annual-chance event utilizing recent topographic and bathymetric data along with the proposed dune modification.

Based on evaluation of the overland wave propagation and wave runup results between the existing and proposed transects, the results indicate that the proposed dune modification will not cause an increase in flood water elevations to the surrounding properties. In fact, the results for overland wave propagation and wave runup are nearly the same for both the existing and

proposed conditions for both transects based on the results in depicted in Figure 3 and Figure 6. Furthermore, the results for Transect 2 indicated that the dune modification will results in a lowering of the wave envelope elevation by 0.1 ft. Table 1 provides a summary of the wave runup and overtopping analysis for the pre- and post-project conditions for both Transects.

| Transect |              | 100-yr SWEL (ft NAVD) | 2% Wave Runup, R2% (ft NAVD) | R2% Elev (ft NAVD) | 2% Wave Runup, R2%, Elevation Cap (ft NAVD) | Dune Crest Elevation (ft NAVD) | Runup Exceeds Crest? | Dune Overtopping Occurs? | Calculated BFE (ft NAVD) <sup>2</sup> |                            |
|----------|--------------|-----------------------|------------------------------|--------------------|---|--------------------------------|----------------------|--------------------------|---------------------------------------|----------------------------|
|          |              |                       |                              |                    |   |                                |                      |                          | Seaward of the Dune Crest             | Landward of the Dune Crest |
| 1        | Pre-Project  | 8.2                   | 8.7                          | 16.9               | 11.2  | 23                             | no                   | no                       | 11                                    | n/a (X zone)               |
| 1        | Post-Project | 8.2                   | 8.7                          | 16.9               | 11.2  | 16                             | yes <sup>1</sup>     | no                       | 11                                    | n/a (X zone)               |
| 2        | Pre-Project  | 8.2                   | 3.5                          | 11.7               | 11.2  | 23                             | no                   | no                       | 11                                    | n/a (X zone)               |
| 2        | Post-Project | 8.2                   | 3.4                          | 11.6               | 11.2  | 16                             | no                   | no                       | 11                                    | n/a (X zone)               |

<sup>1</sup> Runup exceeds the eroded dune crest, however, the wave runup energy is quickly dissipated along the crest of the dune (within 20ft) per French's (1982) runup on a plateau dissipation method. No wave overtopping occurs.

<sup>2</sup> Base Flood Elevations (BFE's) do not necessary match FEMA's effective FIRM Map. The BFE's were calculated to illustrate that the proposed dune modifications do not increase potential flooding. No changes to FEMA's flood zones or BFE's are proposed within this analysis.

*Table 1. Summary of Results for the Pre- and Post-Project Dunes*

In addition, it is noted that there is no dune overtopping for either condition for the transects analyzed. The AO zone depicted on the effective FIRM in the subject site vicinity is flooding from adjacent areas where the dune is lower and therefore removed (completely eroded) in FEMA's effective study. Lowering the dune crest at the subject site will have no impact on the AE zone behind the dune, nor will it cause any adverse impacts to adjacent properties.

### **Mapping and Attachments**

A certified Topographic Work Map is included within Section 3 of this report, indicating the existing flood zone boundaries and designations, the property boundary site, existing topographic information, existing land features and the proposed seawall. The scale of the Topographic Work Map has been set to provide a clear and detailed: depiction of the study area, and topographic information. A CD containing the digital mapping files, digital copy of this Coastal Wave Analysis Report, coastal modeling files and submittal cover letters has been also included within Section 3 of this report.

## Section 2

---

### Supporting Calculation Data

- Owner Hardship Summary
- USACE Beach Nourishment Plan
- Tidal Data
- Stillwater Elevation and Transect Data
- WHAFIS Output Reports
- Wave Runup Output Reports
- Results Comparison Graphs

# **Owner Hardship Summary**

**14 & 16 Sea Side Dr, South Bethany, DE  
Coastal Floodplain Analysis  
Owner Hardship Summary**

**Below is a summary of the hardships the owners of Lots 21 and 22 have experienced due to the increased dune fronting their properties.**

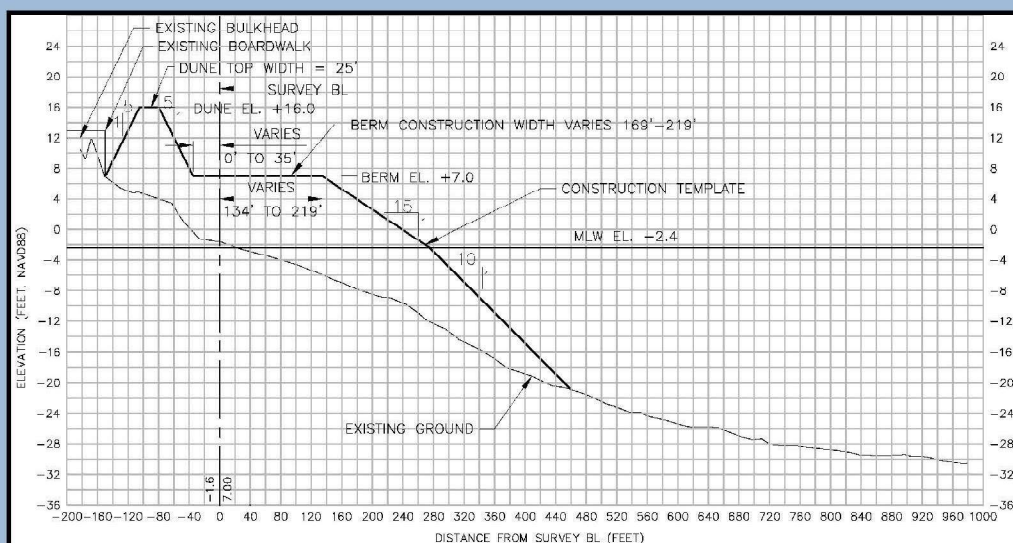
Harsh Northeastern Winds blow sand across the beach and along the oversized perpendicular dune and up through the wide-open beach access onto the homes located on Lots 21 and 22 constantly throughout the fall/winter/spring seasons during nor-easters and major storms. The excessive height of the dune causes a wind tunnel down the north side of dune and directly onto the house located on Lot 22 causing issues with paint, landscaping, the need for a window replacement, and gas leaks.

- The current landscape contractor at Lot 22 claims that the unusually harsh winds on this side of the home prohibits growth of just about anything they plant there, and that it needs to be replaced annually for this reason, causing the owner undue financial hardship that would normally be a one-time cost with minimal needs for replacement.
- An approximately 30” square window is in need of replacement on the north side of the home due to the seal of the window failing due to constant wind pressure against this window.
- Sharp Energy gas company was at the property located on lot 22 at the end of July, 2024 due to a gas leak which required repairs of the gas equipment on the north side of the house. Sharp Energy informed the homeowner that they will need to completely replace most of the gas equipment on the north side of their home, due to the high winds/sand blasting causing damage to the pipes/meter. Similar repair work was done a little over 5 years ago as well, and the main cause is the harsh high winds that blow through the beach access. This is a major safety hazard, especially since the homeowner is not living there year-round. Should similar leaks occur when no one is currently home, potential major damage to the home and adjacent properties is possible.

The east sides of the homes located on lots 21 and 22 are continually blasted with sand as well, and the homeowner’s have had issues with keeping their storm shutters clean and operational in recent years because of this. These harsh sand blowing issues as well as the increasing height of the dune causes more and more sand to beat against the homes causing continual need for painting and power washing. The increased sand blasting westward has also caused the outdoor condensing units at both homes to need to be replaced more frequently even though annual maintenance is completed on the outdoor units twice a year. These issues are exacerbated as the dune continues to increase in height.

# **USACE Beach Nourishment Plan**





## Legend

- Periodic Nourishment Area
- Municipal Boundaries

DELAWARE COASTAL INLETS & BEACHES  
BETHANY & SOUTH BETHANY BEACH  
P2 PROJECT ID: 122972  
UPDATED: JULY 2010

SCALE IN MILES

0 0.25 0.5

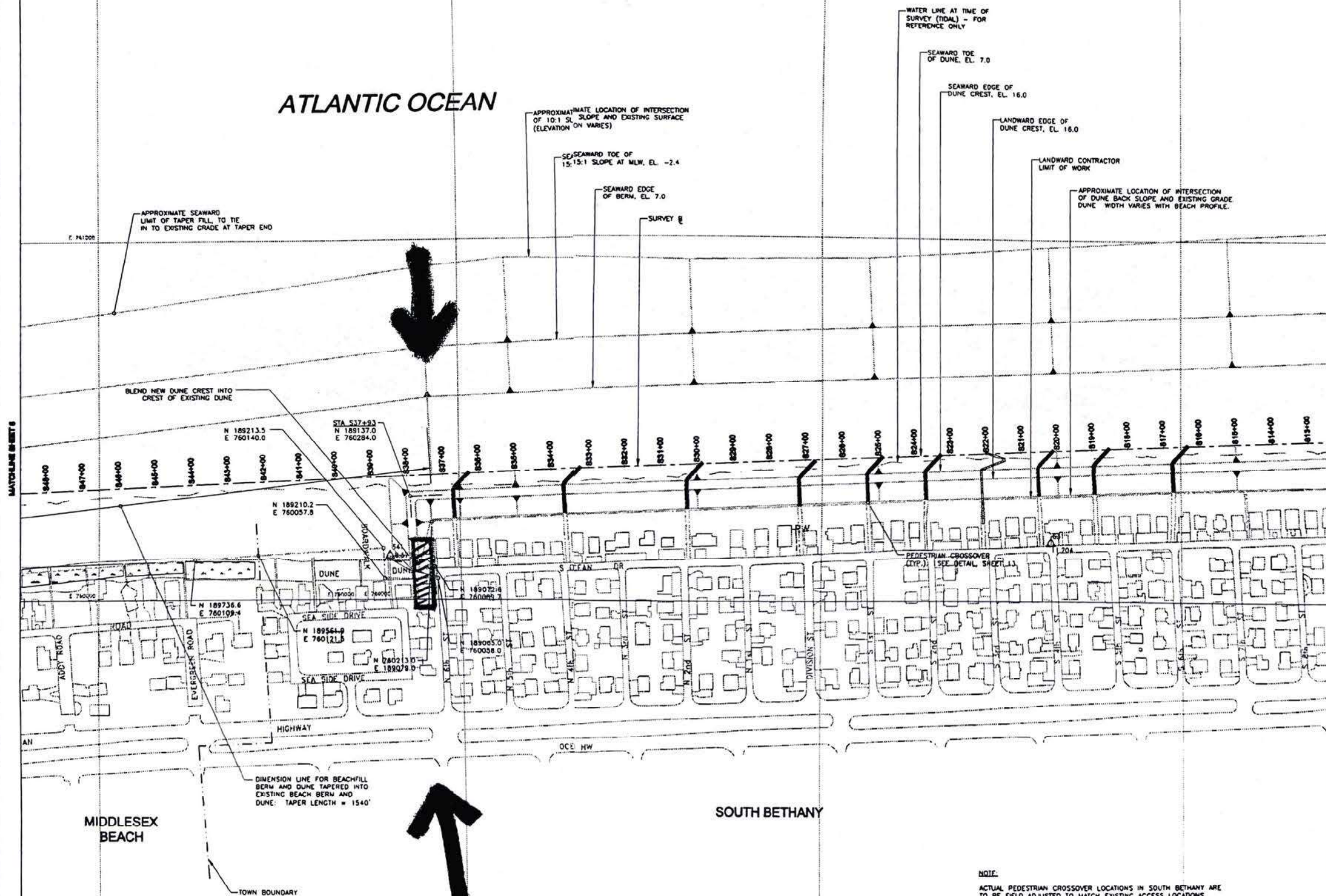
U.S. ARMY ENGINEER DISTRICT, PHILA.



# ATLANTIC OCEAN

MATCHLINE SHEET 6

MATCHLINE SHEET 8



US Army Corps of Engineers  
Philadelphia District

| NO. | DATE    | BY  | CHKD BY | DESCRIPTION |
|-----|---------|-----|---------|-------------|
| 1   | 10/1/00 | ... | ...     | ...         |
| 2   | ...     | ... | ...     | ...         |
| 3   | ...     | ... | ...     | ...         |
| 4   | ...     | ... | ...     | ...         |
| 5   | ...     | ... | ...     | ...         |
| 6   | ...     | ... | ...     | ...         |
| 7   | ...     | ... | ...     | ...         |
| 8   | ...     | ... | ...     | ...         |
| 9   | ...     | ... | ...     | ...         |
| 10  | ...     | ... | ...     | ...         |

|                      |     |        |
|----------------------|-----|--------|
| Prepared by:         | TR  | Rev. 1 |
| Checked by:          | ... | ...    |
| Reviewed by:         | ... | ...    |
| Submitted by:        | ... | ...    |
| Chief, Design Branch | ... | ...    |

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
PHILADELPHIA, PENNSYLVANIA

BETHANY BEACH / SOUTH BETHANY  
SUSSEX COUNTY, DELAWARE  
BEACHFILL  
PLAN - SOUTH BETHANY  
STA S11+75 THROUGH S42+00

Sheet  
reference  
number:  
63033  
Sheet 4 of 20

# Tidal Data

# ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

[Home](#)

[About VDatum](#)

[Download](#)

[Docs & Support](#)

[Contact Us](#)

## Regional Information

\* Region : Chesapeake/Delaware Bay

## Horizontal Information

|                  | Source                           | Target                           |
|------------------|----------------------------------|----------------------------------|
| Reference Frame: | IGS14 - use ITRF2014             | NAD83(2011)                      |
| Coor. System:    | Geographic (Longitude, Latitude) | Geographic (Longitude, Latitude) |
| Unit:            | meter (m)                        | meter (m)                        |
| Zone:            | AL E - 0101                      | AL E - 0101                      |

## Vertical Information

|                  | Source   | Target   |
|------------------|--|--|
| Reference Frame: | MHHW   | NAVD 88  |
| Unit:            | foot (U.S. Survey) (US_ft)   | foot (U.S. Survey) (US_ft)   |
|                  | <input checked="" type="radio"/> Height <input type="radio"/> Sounding | <input checked="" type="radio"/> Height <input type="radio"/> Sounding |
|                  | <input type="checkbox"/> GEOID model: XGEOID20B                        | <input type="checkbox"/> GEOID model: GEOID18                          |

[Point Conversion](#)

[ASCII File Conversion](#)

| Input   |  | Output  |            |   |
|---|--|---|------------|---|
| Latitude:   | <input type="text" value="38.518409"/><br><small>e.g. 33.7586 or 33 45 30.9600</small>     | <input type="button" value="Transform"/>  | Latitude:  | <input type="text" value="38.5184003805"/>  |
| Longitude:  | <input type="text" value="-75.052629"/><br><small>e.g. -118.7691 or -118 46 8.7600</small> | <input type="button" value="Reset"/>  | Longitude: | <input type="text" value="-75.0526246511"/> |
| Height:   | <input type="text" value="0"/><br><small>e.g. 3.037</small>                                | <input type="button" value="DMS"/>  | Height:    | <input type="text" value="1.519"/>          |
| <input type="button" value="Drive to on map"/> <input type="button" value="Reset Map"/> |  | <input type="button" value="Drive to on map"/> <input type="button" value="Reset Map"/> |            |   |

Vertical Uncertainty: ☒ 1 sigma ☐ 95% Confidence

Spatially Varying Uncertainty (+/-): 0.259 US\_ft

☐ Add Observation Vertical Uncertainty

Vertical\_Area: NJVAmab33\_8301:3:3

☒ Valid Tidal area  
 ☒ Non-Tidal area  
 ☒ Non-Valid area  
☒ CRD  
 ☒ IGLD85  
 ☒ SVU area





# ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

[Home](#)
[About VDatum](#)
[Download](#)
[Docs & Support](#)
[Contact Us](#)

## Regional Information

\* Region : Chesapeake/Delaware Bay

## Horizontal Information

|                  | Source  | Target  |
|------------------|---|---|
| Reference Frame: | <span>IGS14 - use ITRF2014</span>             | <span>NAD83(2011)</span>                      |
| Coor. System:    | <span>Geographic (Longitude, Latitude)</span> | <span>Geographic (Longitude, Latitude)</span> |
| Unit:            | <span>meter (m)</span>                        | <span>meter (m)</span>                        |
| Zone:            | <span>AL E - 0101</span>                      | <span>AL E - 0101</span>                      |

## ☒ Vertical Information

|                  | Source   | Target   |
|------------------|--|--|
| Reference Frame: | <span>MHW</span>   | <span>NAVD 88</span>   |
| Unit:            | <span>foot (U.S. Survey) (US_ft)</span>  | <span>foot (U.S. Survey) (US_ft)</span>  |
|                  | <input checked="" type="radio"/> Height <input type="radio"/> Sounding<br><input type="checkbox"/> GEOID model: <span>XGEOID20B</span> | <input checked="" type="radio"/> Height <input type="radio"/> Sounding<br><input type="checkbox"/> GEOID model: <span>GEOID18</span> |

[Point Conversion](#)
[ASCII File Conversion](#)

### Input

Latitude:   
e.g., 33.7586 or 33 45 30.9600

Longitude:   
e.g., -118.7691 or -118 46 8.7600

Height:   
e.g., 3.037

☐ to DMS




### Output

Latitude:

Longitude:

Height:

Vertical Uncertainty: ☒ 1 sigma ☐ 95% Confidence

Spatially Varying Uncertainty (+/-): 0.259 US\_ft

☐ Add Observation Vertical Uncertainty

Vertical\_Area: NJVAmab33\_8301:3:3

☒ Valid Tidal area  
 ☒ Non-Tidal area  
 ☒ Non-Valid area  
☒ CRD  
 ☒ IGLD85  
 ☒ SVU area



# ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

[Home](#)

[About VDatum](#)

[Download](#)

[Docs & Support](#)

[Contact Us](#)

## Regional Information

\* Region :

Chesapeake/Delaware Bay

## Horizontal Information

|                  | Source                           | Target                           |
|------------------|----------------------------------|----------------------------------|
| Reference Frame: | IGS14 - use ITRF2014             | NAD83(2011)                      |
| Coord. System:   | Geographic (Longitude, Latitude) | Geographic (Longitude, Latitude) |
| Unit:            | meter (m)                        | meter (m)                        |
| Zone:            | ALE - 0101                       | ALE - 0101                       |

## Vertical Information

|                  | Source   | Target   |
|------------------|--|--|
| Reference Frame: | MTL  | NAVD 88  |
| Unit:            | foot (U.S. Survey) (US_ft)   | foot (U.S. Survey) (US_ft)   |
|                  | <input checked="" type="radio"/> Height <input type="radio"/> Sounding | <input checked="" type="radio"/> Height <input type="radio"/> Sounding |
|                  | <input type="checkbox"/> GEOID model: XGEOID20B                        | <input type="checkbox"/> GEOID model: GEOID18                          |

[Point Conversion](#)

[ASCII File Conversion](#)

| Input   |   | Output    |   |                |
|---|---|-----------|---|----------------|
| Latitude:   | 38.518409<br><small>e.g. 33.7586 or 33 45 30.9600</small>     | Transform | Latitude:   | 38.5184003805  |
| Longitude:  | -75.052629<br><small>e.g. -118.7691 or -118 46 8.7600</small> | Reset     | Longitude:  | -75.0526246511 |
| Height:   | 0<br><small>e.g. 3.037</small>                                | DMS       | Height:   | -0.581         |
| <input type="checkbox"/> to DMS                               |   |           | <input checked="" type="checkbox"/> Drive to on map |                |
| <input type="checkbox"/> Add Observation Vertical Uncertainty |   |           | <input type="checkbox"/> Reset Map                  |                |

Vertical Uncertainty: ☒ 1 sigma ☐ 95% Confidence

Spatially Varying Uncertainty (+/-): 0.259 US\_ft

Vertical\_Area: NJVAmab33\_8301:3:3

☒ Valid Tidal area
 ☒ Non-Tidal area
 ☒ Non-Valid area
 ☒ CRD
 ☒ IGLD85
 ☒ SVU area





# ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

[Home](#)
[About VDatum](#)
[Download](#)
[Docs & Support](#)
[Contact Us](#)

## Regional Information

\* Region : Chesapeake/Delaware Bay

## Horizontal Information

|                  | Source  | Target  |
|------------------|---|---|
| Reference Frame: | <span>IGS14 - use ITRF2014</span>             | <span>NAD83(2011)</span>                      |
| Coor. System:    | <span>Geographic (Longitude, Latitude)</span> | <span>Geographic (Longitude, Latitude)</span> |
| Unit:            | <span>meter (m)</span>                        | <span>meter (m)</span>                        |
| Zone:            | <span>AL E - 0101</span>                      | <span>AL E - 0101</span>                      |

## ☒ Vertical Information

|                  | Source   | Target   |
|------------------|--|--|
| Reference Frame: | <span>MLW</span>   | <span>NAVD 88</span>   |
| Unit:            | <span>foot (U.S. Survey) (US_ft)</span>  | <span>foot (U.S. Survey) (US_ft)</span>  |
|                  | <input checked="" type="radio"/> Height <input type="radio"/> Sounding<br><input type="checkbox"/> GEOID model: <span>XGEOID20B</span> | <input checked="" type="radio"/> Height <input type="radio"/> Sounding<br><input type="checkbox"/> GEOID model: <span>GEOID18</span> |

[Point Conversion](#)
[ASCII File Conversion](#)

| Input  |  | Output  |            |                             |
|--|--|---|------------|-----------------------------|
| Latitude:  | <span>38.518409</span><br><small>e.g. 33.7586 or 33 45 30.9600</small>     | <span>Transform</span>                              | Latitude:  | <span>38.5184003805</span>  |
| Longitude:   | <span>-75.052629</span><br><small>e.g. -118.7691 or -118 46 8.7600</small> | <span>Reset</span>                                  | Longitude: | <span>-75.0526246511</span> |
| Height:  | <span>0</span><br><small>e.g. 3.037</small>                                | <span>DMS</span>                                    | Height:    | <span>-2.300</span>         |
| <input type="checkbox"/> to DMS<br><span>Drive to on map</span> <span>Reset Map</span> |  | <span>Drive to on map</span> <span>Reset Map</span> |            |                             |

Vertical Uncertainty: ☒ 1 sigma ☐ 95% Confidence

Spatially Varying Uncertainty (+/-): 0.259 US\_ft

☐ Add Observation Vertical Uncertainty

Vertical\_Area: NJVAmab33\_8301:3:3

☒ Valid Tidal area  
 ☒ Non-Tidal area  
 ☒ Non-Valid area  
☒ CRD  
 ☒ IGLD85  
 ☒ SVU area



# ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

[Home](#)

[About VDatum](#)

[Download](#)

[Docs & Support](#)

[Contact Us](#)

## Regional Information

\* Region : Chesapeake/Delaware Bay

## Horizontal Information

|                  | Source                           | Target                           |
|------------------|----------------------------------|----------------------------------|
| Reference Frame: | IGS14 - use ITRF2014             | NAD83(2011)                      |
| Coord. System:   | Geographic (Longitude, Latitude) | Geographic (Longitude, Latitude) |
| Unit:            | meter (m)                        | meter (m)                        |
| Zone:            | AL E - 0101                      | AL E - 0101                      |

## Vertical Information

|                                       | Source   | Target   |
|---------------------------------------|--|--|
| Reference Frame:                      | MLLW   | NAVD 88  |
| Unit:                                 | foot (U.S. Survey) (US_ft)   | foot (U.S. Survey) (US_ft)   |
|                                       | <input checked="" type="radio"/> Height <input type="radio"/> Sounding | <input checked="" type="radio"/> Height <input type="radio"/> Sounding |
| <input type="checkbox"/> GEOID model: | XGEOID20B  | GEOID18  |

[Point Conversion](#)

[ASCII File Conversion](#)

| Input   |   | Output  |            |                |
|---|---|---|------------|----------------|
| Latitude:   | 38.518409<br><small>e.g. 33.7586 or 33 45 30.9600</small>     | Transform   | Latitude:  | 38.5184003805  |
| Longitude:  | -75.052629<br><small>e.g. -118.7691 or -118 46 8.7600</small> | Reset   | Longitude: | -75.0526246511 |
| Height:   | 0<br><small>e.g. 3.037</small>                                | DMS   | Height:    | -2.434         |
| <input type="button" value="Drive to on map"/> <input type="button" value="Reset Map"/> |   | <input type="button" value="Drive to on map"/> <input type="button" value="Reset Map"/> |            |                |

☐ to DMS

Vertical Uncertainty: ☒ 1 sigma ☐ 95% Confidence

Spatially Varying Uncertainty (+/-): 0.259 US\_ft

☐ Add Observation Vertical Uncertainty

Vertical\_Area: NJVAmab33\_8301:3:3

☒ Valid Tidal area ☒ Non-Tidal area ☒ Non-Valid area  
☒ CRD ☒ IGLD85 ☒ SVU area



# Stillwater Elevation and Transect Data





# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT

| COMMUNITY AND REVISION INFORMATION                |   | PROJECT DESCRIPTION   | BASIS OF REQUEST                             |
|---|---|---|--|
| COMMUNITY   | Sussex County<br>Delaware<br>(Unincorporated Areas) | NO PROJECT  | COASTAL ANALYSIS<br>UPDATED TOPOGRAPHIC DATA |
|   | COMMUNITY NO.: 100029                               |   |  |
| IDENTIFIER  | South Bethany Revision (East & West Side)           | APPROXIMATE LATITUDE AND LONGITUDE: 38,518, -75.061<br>SOURCE: Other DATUM: NAD 83                                      |  |
| ANNOTATED MAPPING ENCLOSURES                      |   | ANNOTATED STUDY ENCLOSURES  |  |
| TYPE: FIRM* NO.: 10005C0518K DATE: March 16, 2015 |   | DATE OF EFFECTIVE FLOOD INSURANCE STUDY: June 20, 2018<br><br>TRANSECT DATA TABLE: 9<br>TRANSECT LOCATION MAP FIGURE: 2 |  |

Enclosures reflect changes to flooding sources affected by this revision.

\* FIRM - Flood Insurance Rate Map

### FLOODING SOURCE AND REVISED REACH

Atlantic Ocean - an area on the seaward side of Route 1 and centered approximately 1,530 feet east of the intersection of Rebecca Road and York Road

### SUMMARY OF REVISIONS

| Flooding Source | Effective Flooding | Revised Flooding | Increases | Decreases |
|-----------------|--------------------|------------------|-----------|-----------|
| Atlantic Ocean  | BFEs*              | BFEs             | NONE      | YES       |
|                 | Zone AE            | Zone AO          | NONE**    | NONE**    |
|                 | BFEs               | No BFEs          | NONE      | YES       |
|                 | No Depth           | Depth            | YES       | NONE      |

This LOMR does not revise the flood hazard information as shown in the LOMR (Case No. 21-03-0951P) that was issued on September 27, 2021. Due to an appeal submittal that is now resolved, Case No. 21-03-0951P did not become effective as previously scheduled on February 14, 2022. Therefore, this LOMR (Case No. 22-03-0643P) reissues the same flood hazard information from Case No. 21-03-0951P, and this LOMR (Case No. 22-03-0643P) is effective on issuance.

\* BFEs - Base Flood Elevations, NONE\*\* - Special Flood Hazard Area (SFHA) zone designations modified without a boundary change

### DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panel revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at <https://www.fema.gov/flood-insurance>.

Patrick "Rick" F. Sacbitt, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**OTHER COMMUNITIES AFFECTED BY THIS REVISION**

**CID Number:** 100051      **Name:** Town of South Bethany, Delaware

**AFFECTED MAP PANELS**

TYPE: FIRM      NO.: 10005C0514K      DATE: March 16, 2015  
TYPE: FIRM      NO.: 10005C0518K      DATE: March 16, 2015

**AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT**

DATE OF EFFECTIVE FLOOD INSURANCE STUDY: June 20, 2018  
TRANSECT DATA TABLE : 9  
TRANSECT LOCATION MAP FIGURE: 2

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at <https://www.fema.gov/flood-insurance>.

Patrick "Rick" F. Sacbitt, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

### COMMUNITY INFORMATION

#### APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

#### COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance stillwater elevations computed in the FIS for your community. A comprehensive restudy of your community's flood hazards could establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. April Cummings  
Director, Mitigation Division  
Federal Emergency Management Agency, Region III  
One Independence Mall, Sixth Floor  
615 Chestnut Street  
Philadelphia, PA 19106-4404  
(215) 931-5635

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at <https://www.fema.gov/flood-insurance>.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

### STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at <https://www.fema.gov/flood-insurance>.

A handwritten signature in black ink, appearing to read "Rick F. Sacbabit".

Patrick "Rick" F. Sacbabit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

### PUBLIC NOTIFICATION OF REVISION

This LOMR does not revise the flood hazard information as shown in the LOMR (Case No. 21-03-0951P) issued on September 27, 2021. A notice of the 90-day appeal period for Case No. 21-03-0951P was published in the *Delaware State News* on October 8, 2021 and October 15, 2021, and the appeal period ended on January 10, 2022. Therefore, we will not republish the flood hazard changes in the local newspaper. In addition, a notice of the flood hazard changes for Case No. 21-03-0951P was published in the Federal Register on November 9, 2021. This LOMR (Case No. 22-03-0643P) is effective as of the date of this letter. Your community has the right, at any time, to submit scientific or technical data to improve the flood hazard information shown on an effective FIRM and/or Flood Insurance Study report.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at <https://www.fema.gov/flood-insurance>.

A handwritten signature in black ink, appearing to read "Rick F. Sacbibit".

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration

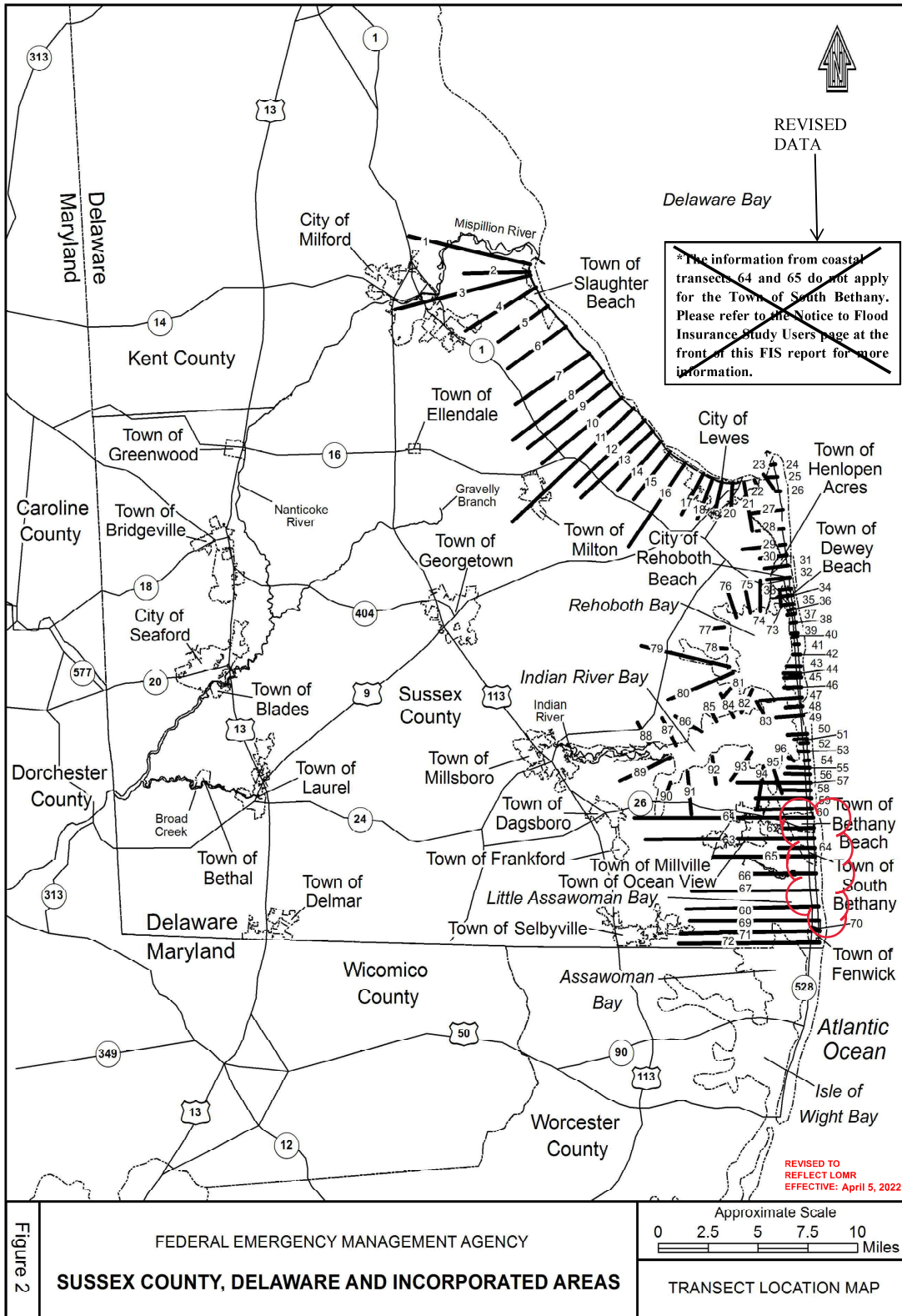


TABLE 9 – TRANSECT DATA (continued)

| Starting Wave Conditions for the<br>1-percent Annual Chance |                 |                           |  |  | Starting Stillwater Elevations (ft NAVD88)<br>Range of Stillwater Elevations*<br>(ft NAVD88) |                               |                               |                                 |
|---|-----------------|---------------------------|--|--|--|-------------------------------|-------------------------------|---------------------------------|
| <u>Flood Source</u>   | <u>Transect</u> | <u>Coordinates</u>        | Significant<br>Wave<br>Height<br><u>H<sub>s</sub> (ft)</u> | Peak<br>Wave<br>Period<br><u>T<sub>p</sub> (sec)</u> | 10-percent<br>Annual<br>Chance   | 2-percent<br>Annual<br>Chance | 1-percent<br>Annual<br>Chance | 0.2-percent<br>Annual<br>Chance |
| Atlantic Ocean  | 1595            | N 38.519691<br>W 75.05225 | 17.05  | 12.72  | 6.7<br>4.5 - 6.7   | 7.7<br>5.9 - 7.7              | 8.2<br>5.9 - 8.2              | 9.4<br>7.5 - 9.4                |
| Atlantic Ocean  | 1610            | N 38.516729<br>W 75.05198 | 16.84  | 13.05  | 6.7<br>4.2 - 6.7   | 7.7<br>5.7 - 7.7              | 8.2<br>6.2 - 8.2              | 9.4<br>7.3 - 9.4                |
| Atlantic Ocean  | 1620            | N 38.514650<br>W 75.05192 | 16.82  | 12.70  | 6.6<br>4.5 - 6.6   | 7.6<br>5.8 - 7.6              | 8.1<br>6.3 - 8.1              | 9.2<br>7.3 - 9.2                |
| Atlantic Ocean  | 1630            | N 38.512594<br>W 75.05184 | 16.80  | 12.72  | 6.6<br>5.0 - 6.6   | 7.6<br>6.2 - 7.6              | 8.0<br>6.6 - 8.0              | 9.2<br>7.6 - 9.2                |
| Atlantic Ocean  | 1640            | N 38.510672<br>W 75.05179 | 16.61  | 12.98  | 6.6<br>3.7 - 6.6   | 7.6<br>5.2 - 7.6              | 8.1<br>5.7 - 8.1              | 9.3<br>6.5 - 9.3                |
| Atlantic Ocean  | 1645            | N 38.510078<br>W 75.05174 | 16.59  | 12.93  | 6.6<br>3.6 - 6.6   | 7.6<br>5.1 - 7.6              | 8.1<br>6.2 - 8.1              | 9.3<br>6.5 - 9.3                |

\* For transects with a constant stillwater elevation, only one number is provided to represent both the starting value and the range.







**WHAFIS Output Report:**  
**Transect #1 (existing)**

5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44

THIS IS A 100-YEAR CASE

[illegible]

-----END OF TRANSECT-----

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

| LOCATION | CONTROLLING<br>WAVE HEIGHT | SPECTRAL PEAK<br>WAVE PERIOD | WAVE CREST<br>ELEVATION |
|----------|----------------------------|------------------------------|-------------------------|
|----------|----------------------------|------------------------------|-------------------------|

NO SURGE CHANGES IN THIS TRANSECT

A 5 EL= 9 25

95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111

194.23

8.50

A 5 EL= 8 25

216.00

8.21

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

# **WHAFIS Output Report: Transect #1 (proposed)**

1 WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08\_2007)  
2 Executed on: Thu Sep 5 16:31:32 2024  
3 Input file: C:\Users\mgiov\Desktop\South Bethany Dune\CHAMP\Lot-22\w1-post.dat  
4 Output file: C:\Users\mgiov\Desktop\South Bethany Dune\CHAMP\Lot-22\w1-post.out

- Transect: 1-post Date: 9/5/2024

THIS IS A 100-YEAR CASE

PART1 INPUT

|       |         |       |       |       |       |        |        |       |       |
|-------|---------|-------|-------|-------|-------|--------|--------|-------|-------|
| IE    | 30.000  | 3.502 | 0.000 | 6.700 | 8.200 | 27.200 | 12.810 | 0.000 | 0.025 |
| 0.000 |         |       |       |       |       |        |        |       |       |
| IF    | 218.000 | 8.200 | 0.000 | 8.200 | 0.000 | 0.000  | 0.000  | 0.000 | 0.025 |
| 0.000 |         |       |       |       |       |        |        |       |       |
| ET    | 0.000   | 0.000 | 0.000 | 0.000 | 0.000 | 0.000  | 0.000  | 0.000 | 0.000 |
| 0.000 |         |       |       |       |       |        |        |       |       |

1

|    | END     | END       | FETCH     | SURGE     | ELEV     | SURGE       | ELEV      | INITIAL | INITIAL |  | BOTTOM | AVERAGE |
|----|---------|-----------|-----------|-----------|----------|-------------|-----------|---------|---------|--|--------|---------|
|    | STATION | ELEVATION | LENGTH    | 10-YEAR   | 100-YEAR | WAVE HEIGHT | W. PERIOD |         |         |  | SLOPE  | A-ZONES |
| IE | 30.000  | 3.502     | 0.000     | 6.700     | 8.200    | 27.200      | 12.810    |         | 0.000   |  | 0.025  | 0.000   |
|    |         |           |           |           |          |             |           |         |         |  |        |         |
|    | END     | END       | NEW SURGE | NEW SURGE |          |             |           |         |         |  | BOTTOM | AVERAGE |
|    | STATION | ELEVATION | 10-YEAR   | 100-YEAR  |          |             |           |         |         |  | SLOPE  | A-ZONES |
| IF | 218.000 | 8.200     | 0.000     | 8.200     | 0.000    | 0.000       | 0.000     | 0.000   | 0.000   |  | 0.025  | 0.000   |

-----END OF TRANSECT-----

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL  
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

| LOCATION | CONTROLLING<br>WAVE HEIGHT | SPECTRAL PEAK<br>WAVE PERIOD | WAVE CREST<br>ELEVATION |
|----------|----------------------------|------------------------------|-------------------------|
|----------|----------------------------|------------------------------|-------------------------|

|    |        |      |       |       |
|----|--------|------|-------|-------|
| IE | 30.00  | 3.63 | 12.81 | 10.74 |
|    | 133.40 | 1.64 | 12.81 | 9.35  |
| IF | 218.00 | 0.01 | 12.81 | 8.21  |

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

| STATION | 10-YEAR SURGE | 100-YEAR SURGE |
|---------|---------------|----------------|
|---------|---------------|----------------|

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

| STATION OF GUTTER | LOCATION OF ZONE |
|-------------------|------------------|
| 62.86             | WINDWARD         |

PART6 NUMBERED A ZONES AND V ZONES

| STATION OF GUTTER | ELEVATION | ZONE DESIGNATION | FHF |
|-------------------|-----------|------------------|-----|
| 30.00             | 10.74     |                  |     |
|                   |           | V 5 EL=11        | 25  |
| 48.01             | 10.50     |                  |     |
|                   |           | V 5 EL=10        | 25  |
| 62.86             | 10.30     |                  |     |
|                   |           | A 5 EL=10        | 25  |
| 122.25            | 9.50      |                  |     |
|                   |           | A 5 EL= 9        | 25  |

95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111

196.22

8.50

A 5 EL= 8 25

218.00

8.21

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

# **WHAFIS Output Report:**

## **Transect #2 (existing)**

1 WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08\_2007)  
2 Executed on: Thu Sep 5 16:49:13 2024  
3 Input file: C:\Users\mgiov\Desktop\South Bethany Dune\CHAMP\Lot-22\w2-pre.dat  
4 Output file: C:\Users\mgiov\Desktop\South Bethany Dune\CHAMP\Lot-22\w2-pre.out

- Transect: 2-pre Date: 9/5/2024

THIS IS A 100-YEAR CASE

PART1 INPUT

|       |         |       |       |       |       |        |        |       |       |
|-------|---------|-------|-------|-------|-------|--------|--------|-------|-------|
| IE    | 30.000  | 0.000 | 0.000 | 6.700 | 8.200 | 27.200 | 12.810 | 0.000 | 0.017 |
| 0.000 |         |       |       |       |       |        |        |       |       |
| IF    | 522.000 | 8.200 | 0.000 | 8.200 | 0.000 | 0.000  | 0.000  | 0.000 | 0.017 |
| 0.000 |         |       |       |       |       |        |        |       |       |
| ET    | 0.000   | 0.000 | 0.000 | 0.000 | 0.000 | 0.000  | 0.000  | 0.000 | 0.000 |
| 0.000 |         |       |       |       |       |        |        |       |       |

1

|    |         |           |           |           |          |        |        |           |         |       |        |         |
|----|---------|-----------|-----------|-----------|----------|--------|--------|-----------|---------|-------|--------|---------|
|    | END     | END       | FETCH     | SURGE     | ELEV     | SURGE  | ELEV   | INITIAL   | INITIAL |       | BOTTOM | AVERAGE |
|    | STATION | ELEVATION | LENGTH    | 10-YEAR   | 100-YEAR | WAVE   | HEIGHT | W. PERIOD |         |       | SLOPE  | A-ZONES |
| IE | 30.000  | 0.000     | 0.000     | 6.700     | 8.200    | 27.200 | 12.810 | 0.000     |         | 0.017 | 0.000  |         |
|    | END     | END       | NEW SURGE | NEW SURGE |          |        |        |           |         |       | BOTTOM | AVERAGE |
|    | STATION | ELEVATION | 10-YEAR   | 100-YEAR  |          |        |        |           |         |       | SLOPE  | A-ZONES |
| IF | 522.000 | 8.200     | 0.000     | 8.200     | 0.000    | 0.000  | 0.000  | 0.000     | 0.000   | 0.017 | 0.000  |         |

-----END OF TRANSECT-----

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL  
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

|          |             |               |            |
|----------|-------------|---------------|------------|
| LOCATION | CONTROLLING | SPECTRAL PEAK | WAVE CREST |
|          | WAVE HEIGHT | WAVE PERIOD   | ELEVATION  |

|    |        |      |       |       |
|----|--------|------|-------|-------|
| IE | 30.00  | 6.30 | 12.81 | 12.61 |
|    | 140.70 | 4.90 | 12.81 | 11.63 |
|    | 245.25 | 3.57 | 12.81 | 10.70 |
|    | 355.95 | 2.15 | 12.81 | 9.70  |
|    | 466.65 | 0.72 | 12.81 | 8.70  |
| IF | 522.00 | 0.01 | 12.81 | 8.21  |

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

|         |               |                |
|---------|---------------|----------------|
| STATION | 10-YEAR SURGE | 100-YEAR SURGE |
|---------|---------------|----------------|

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

|                   |                  |
|-------------------|------------------|
| STATION OF GUTTER | LOCATION OF ZONE |
| 289.46            | WINDWARD         |

PART6 NUMBERED A ZONES AND V ZONES

|                   |           |                  |     |
|-------------------|-----------|------------------|-----|
| STATION OF GUTTER | ELEVATION | ZONE DESIGNATION | FHF |
| 30.00             | 12.61     |                  |     |
|                   |           | V 5 EL=13        | 25  |
| 42.34             | 12.50     |                  |     |
|                   |           | V 5 EL=12        | 25  |
| 155.16            | 11.50     |                  |     |



95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121  
122  
123  
124  
125

267.18

10.50

V 5 EL=11 25

289.46

10.30

V 5 EL=10 25

378.44

9.50

A 5 EL=10 25

489.22

8.50

A 5 EL= 9 25

522.00

8.21

A 5 EL= 8 25

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

**WHAFIS Output Reports:  
Transect #2 (proposed)**

**WHAFIS Output Reports:  
Transect #2 (proposed)**

5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44

THIS IS A 100-YEAR CASE

[illegible]

-----END OF TRANSECT-----

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

| LOCATION | CONTROLLING<br>WAVE HEIGHT | SPECTRAL PEAK<br>WAVE PERIOD | WAVE CREST<br>ELEVATION |
|----------|----------------------------|------------------------------|-------------------------|
|----------|----------------------------|------------------------------|-------------------------|

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

STATION                    10-YEAR SURGE                    100-YEAR SURGE

NO SURGE CHANGES IN THIS TRANSECT

PART6 NUMBERED A ZONES AND V ZONES

| STATION | GUTTER ELEVATION | ZONE DESIGNATION | FHFW |
|---------|------------------|------------------|------|
| 41.00   | 12.61            | V 5 EL=13        | 25   |
| 53.34   | 12.50            | V 5 EL=12        | 25   |
| 166.16  | 11.50            |                  |      |

|     |        |       |                                    |    |
|-----|--------|-------|------------------------------------|----|
| 95  |        |       |                                    |    |
| 96  |        |       | V 5 EL=11                          | 25 |
| 97  |        |       |                                    |    |
| 98  | 278.18 | 10.50 |                                    |    |
| 99  |        |       |                                    |    |
| 100 |        |       | V 5 EL=10                          | 25 |
| 101 |        |       |                                    |    |
| 102 | 300.46 | 10.30 |                                    |    |
| 103 |        |       |                                    |    |
| 104 |        |       | A 5 EL=10                          | 25 |
| 105 |        |       |                                    |    |
| 106 | 389.44 | 9.50  |                                    |    |
| 107 |        |       |                                    |    |
| 108 |        |       | A 5 EL= 9                          | 25 |
| 109 |        |       |                                    |    |
| 110 | 500.22 | 8.50  |                                    |    |
| 111 |        |       |                                    |    |
| 112 |        |       | A 5 EL= 8                          | 25 |
| 113 |        |       |                                    |    |
| 114 | 533.00 | 8.21  |                                    |    |
| 115 |        |       |                                    |    |
| 116 |        |       |                                    |    |
| 117 |        |       |                                    |    |
| 118 |        |       | ZONE TERMINATED AT END OF TRANSECT |    |
| 119 |        |       |                                    |    |
| 120 |        |       |                                    |    |
| 121 |        |       |                                    |    |
| 122 |        |       | PART 7 POSTSCRIPT NOTES            |    |
| 123 |        |       |                                    |    |
| 124 |        |       |                                    |    |
| 125 |        |       |                                    |    |

# **Wave Runup Output Reports**

## **Transect #1 (existing)**



```
1  CLIENT-
ENGINEERED BY
2  PROJECT-
3  RUN 1-pr PAGE 1
4  *****
5  *
6
7
8  CROSS SECTION PROFILE
9
10     LENGTH  ELEV.  SLOPE  ROUGHNESS
11
12     1      -200.0  -10.0
13           50.67  1.00
14     2      -124.0  -8.5
15           5.00   1.00
16     3      -114.0  -6.5
17           12.00  1.00
18     4       -36.0   .0
19           11.85  1.00
20     5        -4.0   2.7
21           40.00  1.00
22     6       216.0   8.2
23           .96   1.00
24     7       225.0  17.6
25           13.33  1.00
26     8       297.0  23.0
27
28     LAST SLOPE 13.00 LAST ROUGHNESS 1.00
29  CLIENT-
ENGINEERED BY
30  PROJECT-
31  RUN 1-pr PAGE 2
32  *****
33  *
34
35
36  OUTPUT TABLE
37  -----
38
39
40
41  INPUT PARAMETERS          RUNUP RESULTS
42  -----
43
44  WATER LEVEL  DEEP WATER          BREAKING SLOPE  RUNUP SLOPE  RUNUP ABOVE  BREAKER
```

|    | ABOVE DATUM<br>(FT.) | WAVE HEIGHT<br>(FT.) | WAVE PERIOD<br>(SEC.) | NUMBER | NUMBER | WATER LEVEL<br>(FT.) | DEPTH<br>(FT.) |
|----|----------------------|----------------------|-----------------------|--------|--------|----------------------|----------------|
| 45 |                      |                      |                       |        |        |                      |                |
| 46 |                      |                      |                       |        |        |                      |                |
| 47 |                      |                      |                       |        |        |                      |                |
| 48 |                      |                      |                       |        |        |                      |                |
| 49 | 8.20                 | 10.10                | 10.30                 | 1      | 6      | 3.84                 | 17.40          |
| 50 |                      |                      |                       |        |        |                      |                |
| 51 | 8.20                 | 10.10                | 10.90                 | 1      | 6      | 3.89                 | 17.74          |
| 52 |                      |                      |                       |        |        |                      |                |
| 53 | 8.20                 | 10.10                | 11.40                 | 1      | 6      | 3.79                 | 18.02          |
| 54 |                      |                      |                       |        |        |                      |                |
| 55 | 8.20                 | 10.60                | 10.30                 | 1      | 6      | 3.76                 | 18.11          |
| 56 |                      |                      |                       |        |        |                      |                |
| 57 | 8.20                 | 10.60                | 10.90                 | 1      | 6      | 3.87                 | 18.46          |
| 58 |                      |                      |                       |        |        |                      |                |
| 59 | 8.20                 | 10.60                | 11.40                 | 1      | 6      | 3.87                 | 18.75          |
| 60 |                      |                      |                       |        |        |                      |                |
| 61 | 8.20                 | 11.20                | 10.30                 | 1      | 6      | 3.86                 | 18.97          |
| 62 |                      |                      |                       |        |        |                      |                |
| 63 | 8.20                 | 11.20                | 10.90                 | 1      | 6      | 4.09                 | 19.32          |
| 64 |                      |                      |                       |        |        |                      |                |
| 65 | 8.20                 | 11.20                | 11.40                 | 1      | 6      | 4.09                 | 19.62          |
| 66 |                      |                      |                       |        |        |                      |                |

# **Wave Runup Output Reports**

## **Transect #1 (proposed)**

```
CLIENT- [REDACTED] ** WAVE RUNUP-VERSION 2.0 **  
[REDACTED]ENGINEERED BY [REDACTED]JOB
```

PROJECT-

[illegible]

```
*****
*****
```

### CROSS SECTION PROFILE

**LENGTH**      ELEV.      SLOPE      ROUGHNESS

|   |        |       |       |      |
|---|--------|-------|-------|------|
| 1 | -200.0 | -10.0 | 50.67 | 1.00 |
| 2 | -124.0 | -8.5  | 5.00  | 1.00 |
| 3 | -114.0 | -6.5  | 12.00 | 1.00 |
| 4 | -36.0  | .0    | 11.92 | 1.00 |
| 5 | -5.0   | 2.6   | 39.82 | 1.00 |
| 6 | 218.0  | 8.2   | 1.03  | 1.00 |
| 7 | 226.0  | 16.0  |       |      |

LAST SLOPE 1.00 LAST ROUGHNESS 1.00

```

CLIENT-***** WAVE RUNUP-VERSION 2.0 **
*****ENGINEERED BY *****JOB

```

PROJECT-

[illegible]

```
*****
*****
```

OUTPUT TABLE

-----

## INPUT PARAMETERS

## RUNUP RESULTS

|             |             |                |             |
|-------------|-------------|----------------|-------------|
| WATER LEVEL | DEEP WATER  | BREAKING SLOPE | RUNUP SLOPE |
| RUNUP ABOVE | BREAKER     |                |             |
| ABOVE DATUM | WAVE HEIGHT | WAVE PERIOD    | NUMBER      |
| WATER LEVEL | DEPTH       |                | NUMBER      |
| (FT.)       | (FT.)       | (SEC.)         |             |
|             |             | (FT.)          | (FT.)       |

|      |               |                |   |   |
|------|---------------|----------------|---|---|
| 8.20 | 10.10<br>3.84 | 10.30<br>17.40 | 1 | 6 |
| 8.20 | 10.10<br>3.89 | 10.90<br>17.74 | 1 | 6 |
| 8.20 | 10.10<br>3.69 | 11.40<br>18.02 | 1 | 6 |
| 8.20 | 10.60<br>3.76 | 10.30<br>18.11 | 1 | 6 |

|    |      |       |       |   |   |
|----|------|-------|-------|---|---|
| 54 |      |       |       |   |   |
| 55 | 8.20 | 10.60 | 10.90 | 1 | 6 |
|    |      | 3.87  | 18.46 |   |   |
| 56 |      |       |       |   |   |
| 57 | 8.20 | 10.60 | 11.40 | 1 | 6 |
|    |      | 3.87  | 18.75 |   |   |
| 58 |      |       |       |   |   |
| 59 | 8.20 | 11.20 | 10.30 | 1 | 6 |
|    |      | 3.86  | 18.97 |   |   |
| 60 |      |       |       |   |   |
| 61 | 8.20 | 11.20 | 10.90 | 1 | 6 |
|    |      | 4.09  | 19.32 |   |   |
| 62 |      |       |       |   |   |
| 63 | 8.20 | 11.20 | 11.40 | 1 | 6 |
|    |      | 4.09  | 19.62 |   |   |
| 64 |      |       |       |   |   |

# **Wave Runup Output Reports**

## **Transect #2 (existing)**

```
1  CLIENT-
ENGINEERED BY
2  PROJECT-
3  RUN 2-pr PAGE 1
4  *****
5  *
6
7
8  CROSS SECTION PROFILE
9
10     LENGTH  ELEV.  SLOPE  ROUGHNESS
11
12     1      -250.0  -10.0
13           6.00   1.00
14     2      -238.0  -8.0
15           30.00  1.00
16     3      -229.0  -7.7
17           12.38  1.00
18     4      -177.0  -3.5
19           58.89  1.00
20     5       -18.0   -.8
21           60.00  1.00
22     6        30.0    .0
23           60.00  1.00
24     7       522.0   8.2
25           .97   1.00
26     8       536.0  22.7
27
28     LAST SLOPE  1.00  LAST ROUGHNESS  1.00
29  CLIENT-
ENGINEERED BY
30  PROJECT-
31  RUN 2-pr PAGE 2
32  *****
33  *
34
35
36  OUTPUT TABLE
37  -----
38
39
40
41  INPUT PARAMETERS          RUNUP RESULTS
42  -----
43
44  WATER LEVEL  DEEP WATER          BREAKING SLOPE  RUNUP SLOPE  RUNUP ABOVE  BREAKER
```

|    | ABOVE DATUM<br>(FT.) | WAVE HEIGHT<br>(FT.) | WAVE PERIOD<br>(SEC.) | NUMBER | NUMBER | WATER LEVEL<br>(FT.) | DEPTH<br>(FT.) |
|----|----------------------|----------------------|-----------------------|--------|--------|----------------------|----------------|
| 45 |                      |                      |                       |        |        |                      |                |
| 46 |                      |                      |                       |        |        |                      |                |
| 47 |                      |                      |                       |        |        |                      |                |
| 48 |                      |                      |                       |        |        |                      |                |
| 49 | 8.20                 | 10.10                | 10.30                 | 2      | 7      | 1.46                 | 16.87          |
| 50 |                      |                      |                       |        |        |                      |                |
| 51 | 8.20                 | 10.10                | 10.90                 | 2      | 7      | 1.46                 | 17.18          |
| 52 |                      |                      |                       |        |        |                      |                |
| 53 | 8.20                 | 10.10                | 11.40                 | 2      | 7      | 1.46                 | 17.44          |
| 54 |                      |                      |                       |        |        |                      |                |
| 55 | 8.20                 | 10.60                | 10.30                 | 2      | 7      | 1.43                 | 17.57          |
| 56 |                      |                      |                       |        |        |                      |                |
| 57 | 8.20                 | 10.60                | 10.90                 | 2      | 7      | 1.54                 | 17.89          |
| 58 |                      |                      |                       |        |        |                      |                |
| 59 | 8.20                 | 10.60                | 11.40                 | 2      | 7      | 1.54                 | 18.16          |
| 60 |                      |                      |                       |        |        |                      |                |
| 61 | 8.20                 | 11.20                | 10.30                 | 2      | 7      | 1.68                 | 18.41          |
| 62 |                      |                      |                       |        |        |                      |                |
| 63 | 8.20                 | 11.20                | 10.90                 | 2      | 7      | 1.79                 | 18.74          |
| 64 |                      |                      |                       |        |        |                      |                |
| 65 | 8.20                 | 11.20                | 11.40                 | 2      | 7      | 1.79                 | 19.01          |
| 66 |                      |                      |                       |        |        |                      |                |

# **Wave Runup Output Reports**

## **Transect #2 (proposed)**



```
1  CLIENT-
ENGINEERED BY
2  PROJECT-
3  RUN 2-po PAGE 1
4  *****
5  *
6
7
8  CROSS SECTION PROFILE
9
10  LENGTH  ELEV.  SLOPE  ROUGHNESS
11
12  1 -250.0 -10.0
13      6.00  1.00
14  2 -238.0 -8.0
15      30.00 1.00
16  3 -232.0 -7.8
17      11.95 1.00
18  4 -183.0 -3.7
19      60.77 1.00
20  5 -25.0 -1.1
21      60.00 1.00
22  6 41.0 .0
23      60.00 1.00
24  7 533.0 8.2
25      1.03 1.00
26  8 541.0 16.0
27
28  LAST SLOPE 1.00 LAST ROUGHNESS 1.00
29  CLIENT-
ENGINEERED BY
30  PROJECT-
31  RUN 2-po PAGE 2
32  *****
33  *
34
35
36  OUTPUT TABLE
37  -----
38
39
40
41  INPUT PARAMETERS  RUNUP RESULTS
42  -----
43
44  WATER LEVEL  DEEP WATER  BREAKING SLOPE  RUNUP SLOPE  RUNUP ABOVE  BREAKER
```

|    | ABOVE DATUM<br>(FT.) | WAVE HEIGHT<br>(FT.) | WAVE PERIOD<br>(SEC.) | NUMBER | NUMBER | WATER LEVEL<br>(FT.) | DEPTH<br>(FT.) |
|----|----------------------|----------------------|-----------------------|--------|--------|----------------------|----------------|
| 45 |                      |                      |                       |        |        |                      |                |
| 46 |                      |                      |                       |        |        |                      |                |
| 47 |                      |                      |                       |        |        |                      |                |
| 48 |                      |                      |                       |        |        |                      |                |
| 49 | 8.20                 | 10.10                | 10.30                 | 2      | 7      | 1.46                 | 16.87          |
| 50 |                      |                      |                       |        |        |                      |                |
| 51 | 8.20                 | 10.10                | 10.90                 | 2      | 7      | 1.46                 | 17.18          |
| 52 |                      |                      |                       |        |        |                      |                |
| 53 | 8.20                 | 10.10                | 11.40                 | 2      | 7      | 1.46                 | 17.44          |
| 54 |                      |                      |                       |        |        |                      |                |
| 55 | 8.20                 | 10.60                | 10.30                 | 2      | 7      | 1.43                 | 17.57          |
| 56 |                      |                      |                       |        |        |                      |                |
| 57 | 8.20                 | 10.60                | 10.90                 | 2      | 7      | 1.54                 | 17.89          |
| 58 |                      |                      |                       |        |        |                      |                |
| 59 | 8.20                 | 10.60                | 11.40                 | 2      | 7      | 1.54                 | 18.16          |
| 60 |                      |                      |                       |        |        |                      |                |
| 61 | 8.20                 | 11.20                | 10.30                 | 2      | 7      | 1.51                 | 18.41          |
| 62 |                      |                      |                       |        |        |                      |                |
| 63 | 8.20                 | 11.20                | 10.90                 | 2      | 7      | 1.62                 | 18.74          |
| 64 |                      |                      |                       |        |        |                      |                |
| 65 | 8.20                 | 11.20                | 11.40                 | 2      | 7      | 1.62                 | 19.01          |
| 66 |                      |                      |                       |        |        |                      |                |

# CALCULATION SHEET

Sheet: 1 / 2

Rev: 0

Project: Lot 22 South Bethany (Verhsel)

Calc By: MAG

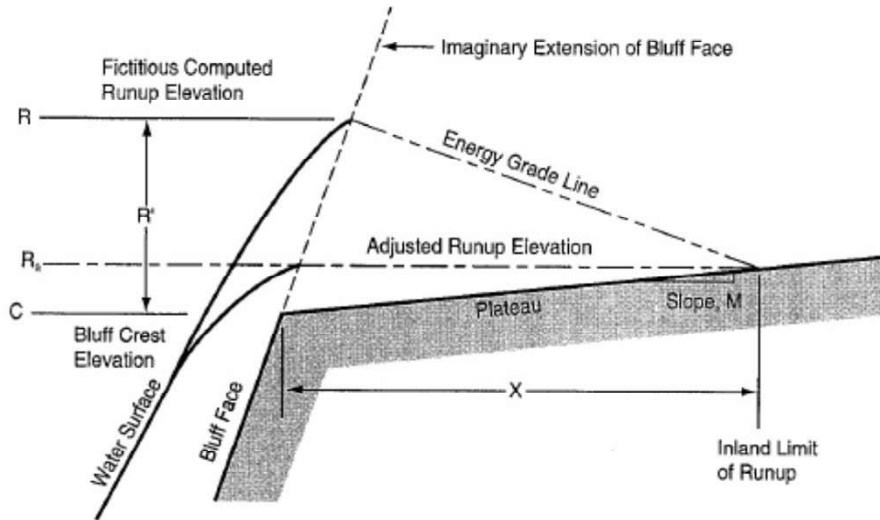
Date: 15-Aug-24

Subject: Wave Runup onto a Plateau above a Low Bluff

Chk By: EIC

Date: 15-Aug-24

Calculation for wave runup above a low bluff using guidance provided in FEMA Guidelines and Specifications for Flood Hazard Mapping Partners



**Figure D.2.8-10. Treatment of Runup onto Plateau above Low Bluff**

## TRANSECT X:

Adjusted Runup,  $R_a$  is defined as:

$$R_a = (C + mX) \quad \text{where } m = \text{slope of the plateau}$$

$C$  is the Bluff Crest Elevation

$$C = 16.0 \text{ ft} \quad (\text{from transect data})$$

$R$  is the fictitious runup which is given as output from the Hughes Runup Calculation

$$R = 16.9 \text{ ft} \quad (1\% \text{ SWEL} + R2\% = 8.2 + 8.7 = 16.9)$$

$R'$  is the difference between  $R$  and  $C \rightarrow R' = R - C$

$$R' = 16.9 - 16.0 = 0.9$$

Assumptions:

use  $m = 0.001$  (essentially flat dune top)

Using Figure D.2.8-11 with  $m = 0.001$  and  $R' = 0.9$ ,  $X = 20 \text{ ft}$  (see figure on page 2)

$$R_a = (C + mX) = (16 + 0.001 \times 20)$$

$$R_a = 16.02 \text{ ft} \rightarrow R_a = 16.0 \text{ ft} \rightarrow \text{BFE} = 16 \text{ ft}$$

The Bluff Crest,  $C$ , is located at Station 226ft, so the adjusted runup elevation will extend to  $X + 20\text{ft}$ ; i.e. Adjusted runup,  $R_a$ , extends inland to Station 246ft, with a BFE of 16ft.

The modified dune (groomed to +16 ft NAVD) with 100-year erosion and storm conditions will not be overtopped.

Therefore, the modified dune will not increase flooding to adjacent properties compared to the unmodified dune

## CALCULATION SHEET

Sheet: 2 / 2

Rev: 0

Project:

Lot 22 South Bethany (Verhsel)

Calc By:

MAG

Date: 15-Aug-24

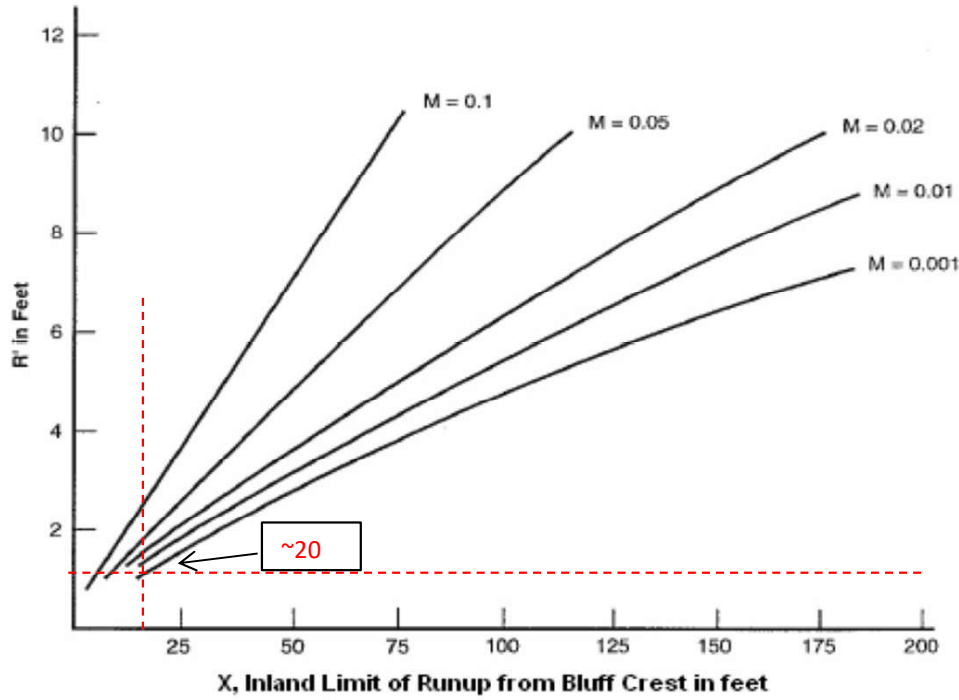
Subject:

Wave Runup onto a Plateau above a Low Bluff

Chk By:

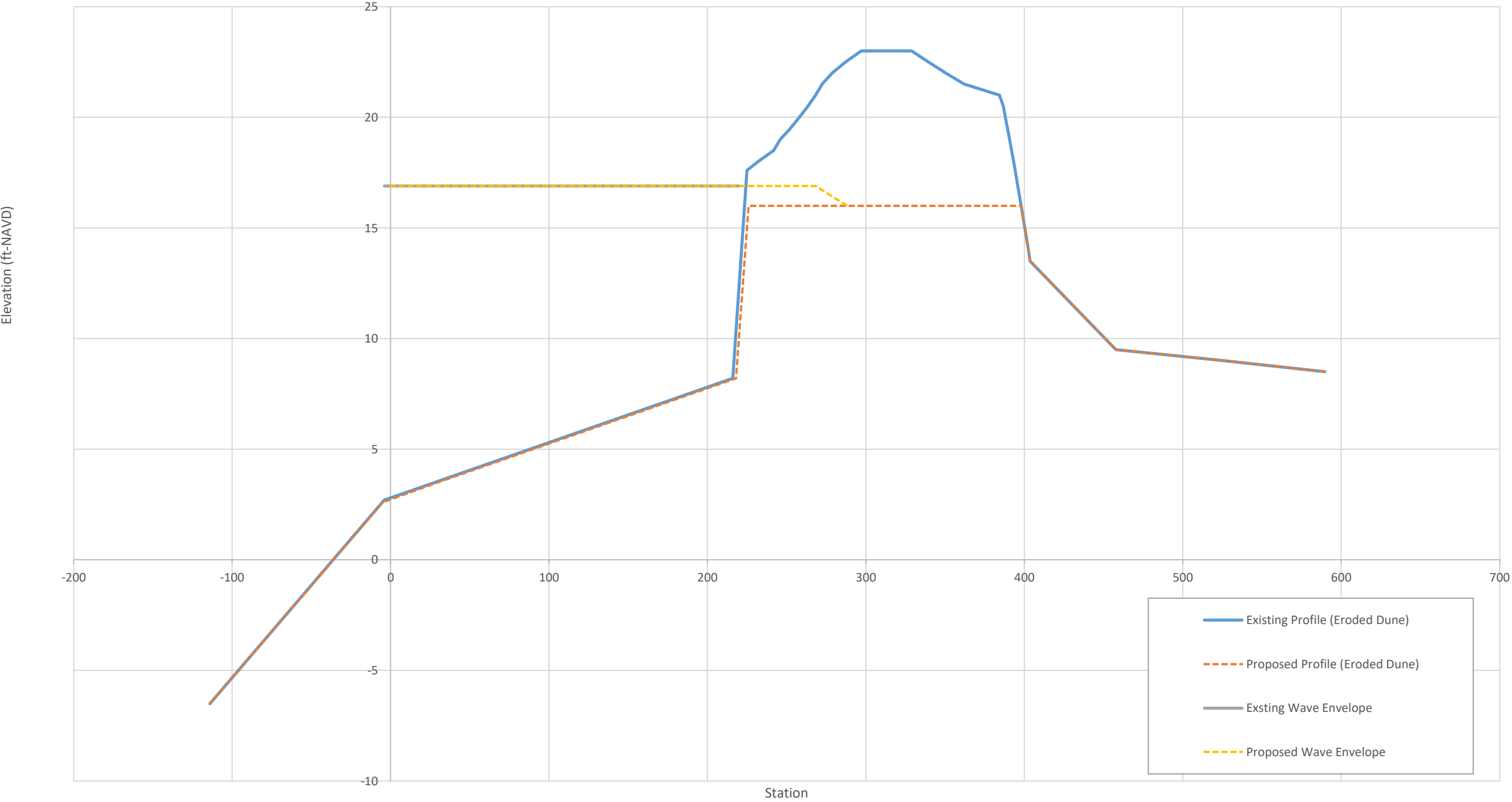
EIC

Date: 45519



# **Results Comparison Graph: Transect 1**

Transect #1 - Wave Envelope and Ground Elevation Comparison

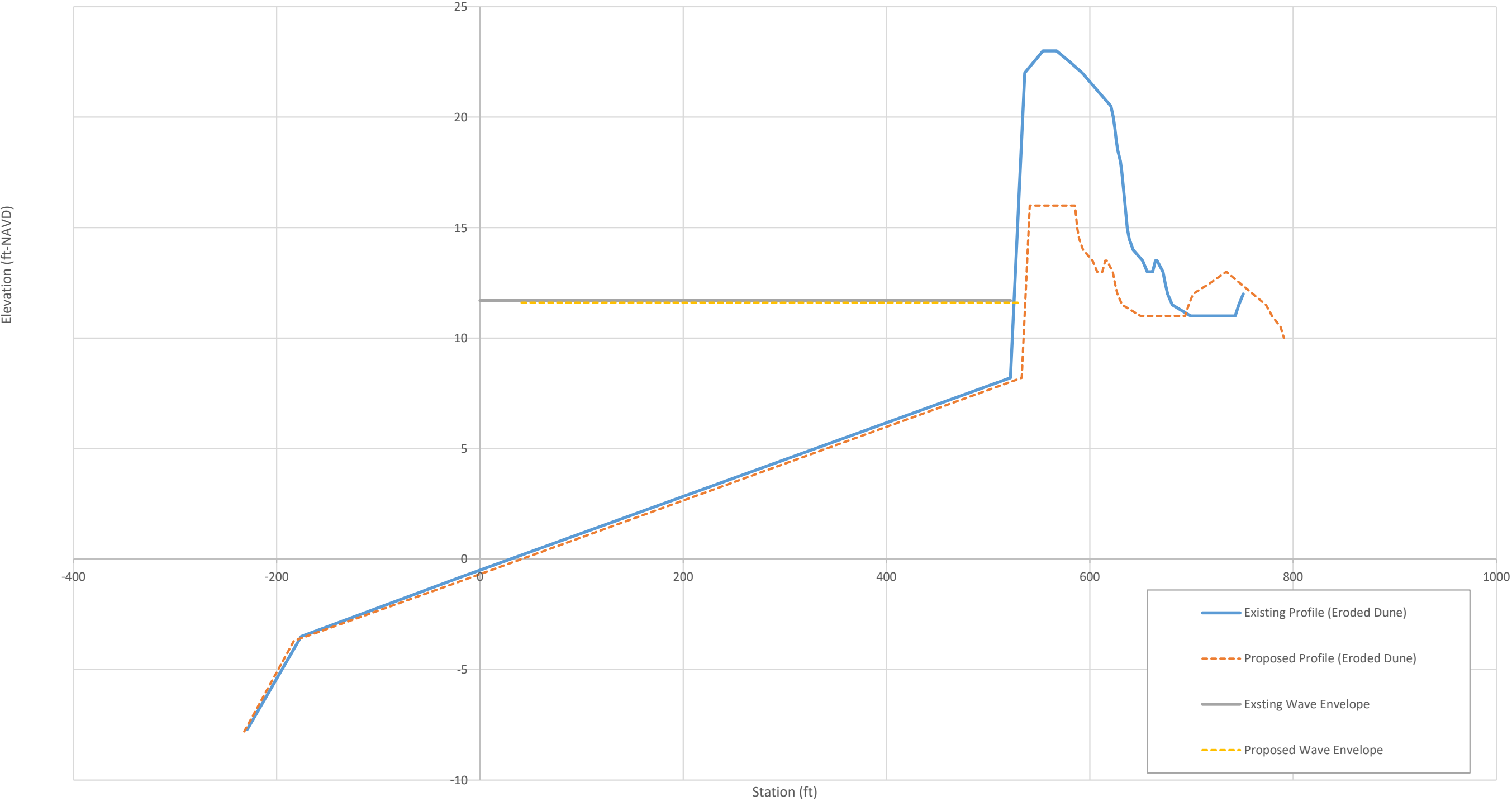


# **Results Comparison Graph:**

## **Transect 2**



Transect #1 - Wave Envelope and Ground Elevation Comparison



## Section 3

---

### Mapping and Digital Files

- Site Survey (existing conditions)
- Modified Dune (proposed conditions)
- Topographic Work Map
- CD of Digital Mapping Files, Report PDF & Coastal Model Files

## **Site Survey (Existing Conditions)**



BEACH AREA



VICINITY MAP

NOT TO SCALE

#### SITE DATA

- SANDPIPER VILLAGE LOT NOS. 21 THRU 25
- STATE: DELAWARE
- COUNTY: SUSSEX
- HUNDRED: BALTIMORE
- MUNICIPALITY: TOWN OF SOUTH BETHANY
- SCALE: 1"=30'
- CLASS "A" SURVEY
- VERTICAL DATUM - NAVD'88 (1988 NORTH AMERICAN VERTICAL DATUM)
- HORIZONTAL DATUM - NAD'83 (1983 NORTH AMERICAN DATUM)

#### SURVEYOR NOTES

- This plot and survey does not verify the existence or nonexistence of right-of-ways and/or easements pertaining to this property, including but not limited to Tax Ditch Easements.
- No title search provided or stipulated.
- Plot Book Reference: Pb. 23, Pg. 2

#### STANDARD LEGEND

These standard symbols will be found in the drawing

- CONTOUR - MAJOR
- CONTOUR - MINOR
- SPOT ELEVATION
- DNREC BUILDING RESTRICTION LINE
- PROPERTY LINE
- CENTER LINE

**FLOOD DATA** This property is in Zone "A0" DEPTH 2.0' & "VE" B.F.E. 12.0' of the Flood Insurance Rate Map, Community Panel No. 100051-100050518-K which has an effective date of MARCH 16, 2015 and is in a Special Flood Hazard Area.

Lot No. 29

Lot No. 28

Lot No. 27

Lot No. 26

Lot No. 25

Lot No. 24

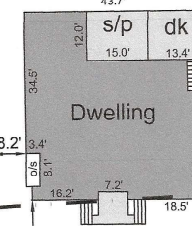
Lot No. 23

Lot No. 21

D.N.R.E.C. Building Restriction Line  
Per State of Delaware #15479-19554-B  
Dated: August 1979, Sheet 8 of 35.

Boardwalk  
Elev: 11.5'

Lot No. 22



SEA SIDE DRIVE

(30' r/w)

centerline

#### SURVEYOR CERTIFICATION

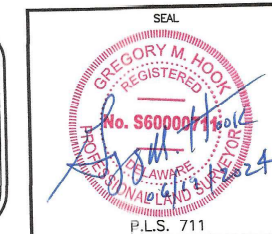
I, GREGORY M. HOOK, registered Professional Land Surveyor in the State of Delaware, hereby certify that the information shown on this plan has been prepared under my supervision and meets the standards of practice as established by the State of Delaware Board of Professional Land Surveyors. Any changes to the property conditions, improvements, boundary or property corners after the date shown hereon shall necessitate a new review and certification for any official or legal use.

GREGORY M. HOOK, PLS 743  
Date 06/19/2024

DATE OF ORIGINAL: JUNE 01, 2021  
REVISION: Elevation data for deck and walkway date captured on October 11, 2016 DATE: JUNE 24, 2021  
REVISION: Topography and Scale DATE: August 10, 2021  
REVISION: Lot No. 21-25 Updated Topography DATE: DECEMBER 07, 2023  
REVISION: Loose Fences & Updated Topography DATE: JUNE 14, 2024  
REVISION: 2023 Topo for Lot No. 21 DATE: JUNE 18, 2024  
REVISION: DATE: DATE: 2024  
REVISION: DATE: DATE: 2024  
Drawn by: MICHAEL LOVELAND Checked by: GREGORY M. HOOK

## TOPOGRAPHICAL SURVEY

LOT NOS. 21 thru 23, SANDPIPER VILLAGE. Situated in the Town of South Bethany. Ref: Plat Book 23, Page. 02.



**SIMPLER SURVEYING & ASSOCIATE, INC.**  
32486 POWELL FARM ROAD, FRANKFORD, DE 19945  
www.delawaresurveyor.com  
PHONE: (302) 539-7873

## **Modified Dune Plan (Proposed Conditions)**

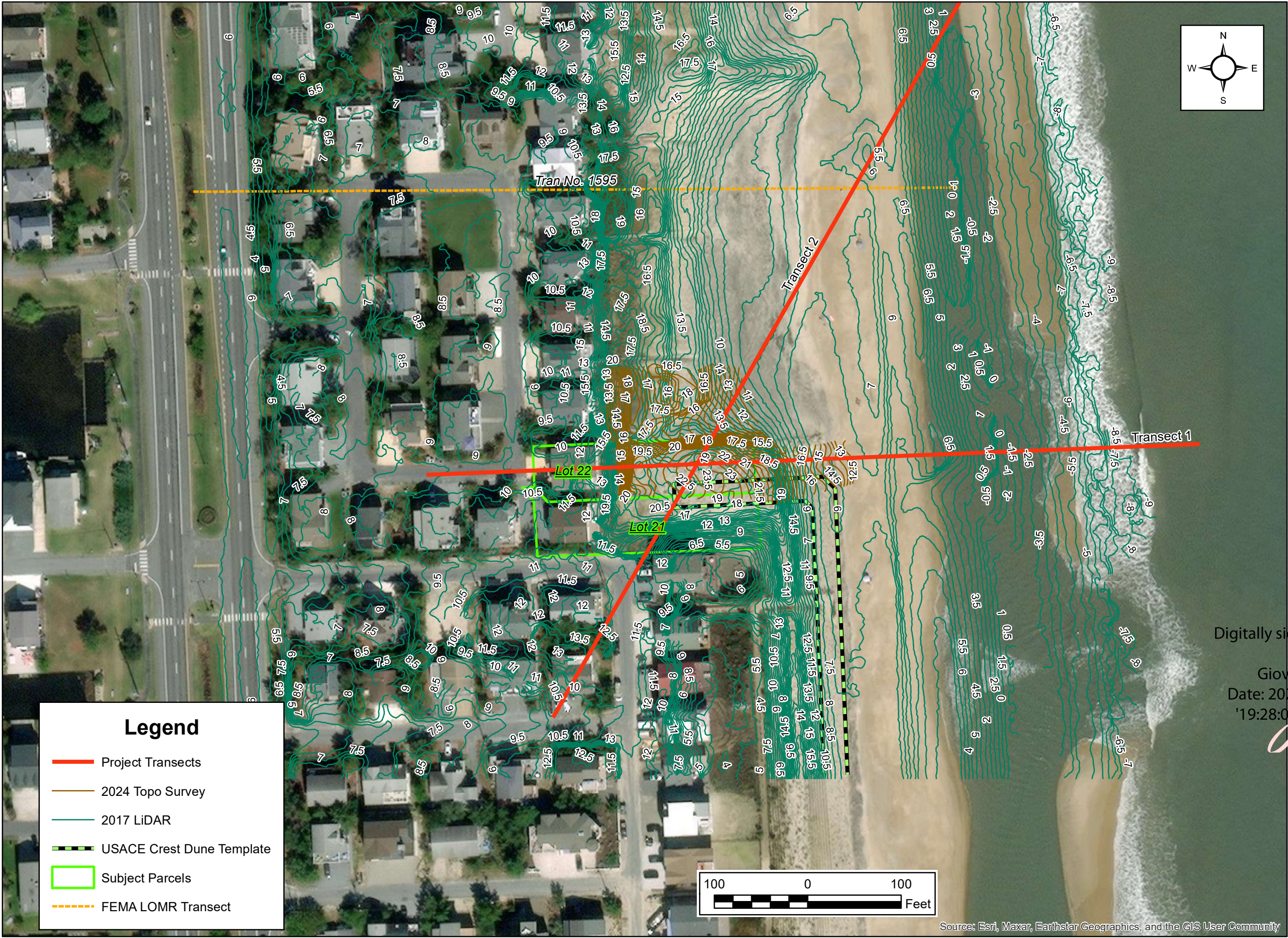






# Topographic Work Map





Legend

Project Transects

2024 Topo Survey

2017 LiDAR

USACE Crest Dune Template

Subject Parcels

FEMA LOMR Transect

AQUATERRA

CONSULTING INTERNATIONAL

534 28th St  
West Palm Beach, FL 33407  
561-703-5230

www.aquaterraci.com  
FL CA Lic No: 31695

DESIGNED BY:  
MAG

DRAWN BY:  
EC

CHECKED BY:  
MAG

REVISION HISTORY:

| DATE       | ISSUANCE |
|------------|----------|
| 10/04/2024 | ISSUED   |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |
|            |          |

CERTIFICATION:  
I HEREBY CERTIFY THAT THE INFORMATION  
ON THIS MAP PERTAINING TO THE REMAPPING  
OF THE FLOOD ZONES REPRESENTS MY BEST  
EFFORTS TO INTERPRET THE DATA AVAILABLE.  
ALL ELEVATIONS REFERENCED TO NAVD88

ENGINEER'S STAMP:

Digitally signed by  
Michael  
Giovannozzi  
Date: 2025.01.07  
'19:28:00 -05'00

MICHAEL A GIOVANNOZZI

LICENSE

No. 20111

DELAWARE

PROFESSIONAL ENGINEER

PROJECT NAME:  
LOTS 21 & 22  
SOUTH BETHANY, DE

DRAWING TITLE:  
TOPOGRAPHIC MAP

FILE NAME: filename - TOPO.MXD

DRAWING SCALE: 1" = 200'

|                   |              |                    |
|-------------------|--------------|--------------------|
| DRAWING #:<br>T-1 | AREA:<br>N/A | SHEET #:<br>1 of 1 |
|-------------------|--------------|--------------------|



# **CD of CHAMP Model Files, Digital Mapping and Report Digital Format**

**Exhibit E**

**Non-Federal Sponsor's Letter of No Objection**



STATE OF DELAWARE  
**DEPARTMENT OF NATURAL RESOURCES AND  
ENVIRONMENTAL CONTROL**

DIVISION OF WATERSHED STEWARDSHIP  
ENTERPRISE BUSINESS PARK  
285 BEISER BOULEVARD, SUITE 102  
DOVER, DELAWARE 19904

**DIRECTOR'S  
OFFICE**

PHONE: (302) 739-9921  
FAX: (302) 739-6724

January 13, 2025

Mr. Robert Youhas, PWS  
Regulatory Branch  
U.S. Army Corps of Engineers - Philadelphia District  
1650 Arch Street, 5<sup>th</sup> Floor  
Philadelphia, PA 19103-2004

RE: Section 408 Evaluation Request – 16 Sea Side Drive, Sandpiper Village

Dear Mr. Youhas:

Under the guidance found in Engineering Circular No. 1165-2-220, the Delaware Department of Natural Resources and Environmental Control (DNREC) submits this letter in reference to the 33 USC 408 (Section 408) evaluation request submitted by AquaTerra Consulting International on January 10, 2025. DNREC has received a copy of the application and does not object to AquaTerra Consulting International's evaluation request being submitted to the United States Army Corps of Engineers (USACE) for a thorough and impartial review of the proposed project. This letter is not intended to convey that DNREC endorses any element of the proposed project or assertions made in the application, nor to suggest any pre-judgement of any element of the proposed project.

DNREC is the non-federal sponsor of multiple potentially-affected federally-authorized civil works projects and is also a regulatory agency with jurisdiction over elements of the proposed project. The proposed activities may affect those federal projects occupying real property owned by the State of Delaware. As such, DNREC recognizes the need to consider potential consequences that could result from the proposed project both now and over the lifetime of the proposed activities.

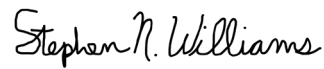
This letter applies only to the application for Section 408 evaluation submitted on behalf of AquaTerra Consulting International on January 10, 2025. DNREC takes no position as to the

Mr. Robert Youhas  
January 13, 2025  
Page 2

accuracy and completeness of the submittal and understands that additional information may be required to supplement the initial application. This letter does not apply to any new applications made by the same applicant. DNREC understands that the USACE is required to continue to coordinate with the non-federal sponsor throughout the review process and ensure that feedback from DNREC is considered prior to rendering a decision pursuant to Section 408.

Please direct future correspondence related to this application and review to Joanna French, Acting Environmental Program Administrator, by phone at 302-608-5500 or by email [Joanna.French@Delaware.gov](mailto:Joanna.French@Delaware.gov).

Sincerely,

A handwritten signature in black ink that reads "Stephen N. Williams". The signature is written in a cursive style with a large, stylized "S" and "W".

Stephen N. Williams, P.G.  
Director

**Exhibit F**

**Real Estate Ownership Documents**



### List of Property Owners Adjacent to Subject Project

| Parcel ID        | Owner Name                      | Parcel Address    |                         |
|------------------|---------------------------------|-------------------|-------------------------|
| 134-17.20-215.00 | YORK CHARLES I LIVING TRUST     | 4 5TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-216.00 | BLAMPHIN JOHN M TRUSTEE         | 4 OCEAN DR N      | BETHANY BEACH, DE 19930 |
| 134-17.20-217.00 | HUTT BRIAN M                    | 404 OCEAN DR N    | BETHANY BEACH, DE 19930 |
| 134-17.20-218.00 | GIRARD EDWARD SCOTT             | 500 OCEAN DR N    | BETHANY BEACH, DE 19930 |
| 134-17.20-219.00 | CRAMPTON JEFFREY NELSON         | 502 OCEAN DR N    | BETHANY BEACH, DE 19930 |
| 134-17.20-220.00 | MALINAK RIA KATHERINE TTEE      | 1 5TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-221.00 | HASTINGS DAVID SCOTT TTEE       | 3 5TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-222.00 | CORNELISON RONALD FRANKLIN      | 5 5TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-227.00 | RUPP JAMES PAUL THERESA         | 6 6TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-228.00 | WEEKS MARIA DEGIORI TTEE        | 4 6TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-229.00 | FRANKS DENIS MD PA              | 2 6TH ST N        | BETHANY BEACH, DE 19930 |
| 134-17.20-230.00 | RPT-MD INVESTMENTS LLC          | 506 OCEAN DR N    | BETHANY BEACH, DE 19930 |
| 134-17.20-230.01 | TROIANO CYNTHIA A TTEE          | 504 OCEAN DR N    | BETHANY BEACH, DE 19930 |
| 134-17.20-247.00 | WEIDNER FRED W TRUSTEE          | 10 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-257.00 | SCHAPIRO SCOTT ALAN             | 19 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-258.00 | CUTRIGHT CATHARYN TEARE TTEE OF | 15 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-259.00 | OLIVER LLOYD E TTEE REV TR      | 12 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-260.00 | GREEN BENJAMIN L TRUSTEE        | 14 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-261.00 | VERSHEL DAVID SCOTT TRUSTEE     | 16 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-262.00 | TYRA KATHERINE NOEL TRUSTEE     | 18 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-263.00 | LEIDIG GILBERT A JR             | 20 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |
| 134-17.20-264.00 | PERDUE JAMES A JANICE M         | 22 SEA SIDE DR DR | BETHANY BEACH, DE 19930 |

## PROPERTIES ADJACENT TO SUBJECT PROJECT



3051

BK: 4088 PG: 253

Tax Map No. 1-34 17.20 260

Return To:  
Sandra P. Gohn, Esquire  
DLA Piper LLP (US)  
6225 Smith Avenue  
Baltimore, MD 21209-3600

DEED

THIS DEED is made and entered into this 31<sup>st</sup> day of December, 2011, by and between BARBARA S. GREEN (the "Grantor") and BARBARA S. GREEN and BENJAMIN L. GREEN, Trustees of the Barbara S. Green Qualified Personal Residence Trust Agreement dated December 31, 2011 (the "Grantee").

WITNESSETH, that, for NO PECUNIARY CONSIDERATION, the Grantor does grant and convey unto the Grantee, in fee simple, her Fifty Percent (50%) undivided tenancy-in-common interest in that certain parcel of land situate in the corporate limits of the Town of South Bethany, Baltimore Hundred, Sussex County and State of Delaware, and more particularly bounded and described as follows:

ALL that certain lot, piece or parcel of land, situate, lying and being in the corporate limits of the Town of South Bethany, Baltimore Hundred, Sussex County and State of Delaware, being known and designated as LOT NUMBER TWENTY-ONE (21) as shown on a Plot of lots entitled "lands of Elizabeth H. Hall, Town of South Bethany, Baltimore Hundred, Sussex County, Delaware", dated March 4, 1981, prepared by J. J. McCann, Inc., Professional Land Surveyors, which said plot was filed for record on March 6, 1981, in the Office of the Recorder of Deeds, in and for Sussex County, Georgetown, Delaware, in Plot Book 22, page 149, which said plot was revised and recorded March 12, 1981, in Plot Book 23, page 2, as reference thereunto being had more fully and at large appear.

TOGETHER with the right to use the common areas in common with all present and future lot owners, pursuant to the "Declaration of Covenants, Conditions and Restrictions".

THE ABOVE LOT AND LAND is subject to the "Declaration of Covenants, Conditions and Restrictions", dated September 8, 1981, as filed for record in the Office of the Recorder of Deeds, in and for Sussex County, at Georgetown, Delaware, in Deed Book 1080, Page 346, and are made a part hereof by express reference thereto, as fully and as effectually as though incorporated herein.

3

CR

BEING the same property as to which, by Deed of even date herewith and recorded (or intended to be recorded) immediately prior hereto, Fifty Percent (50%) tenancy-in-common interest was granted and conveyed by Benjamin L. Green, unto Barbara S. Green, the Grantor herein. Said prior Deed also contains full information regarding Benjamin L. Green's receipt of his interest in the property.

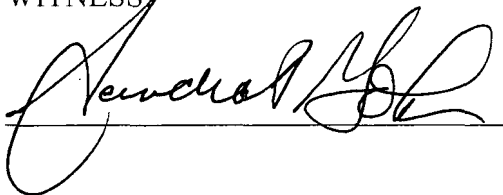
TOGETHER with the buildings and improvements thereon erected, made or being; and all and every, the rights, alleys, ways, waters, privileges, appurtenances and advantages to the same belonging, or in anywise appertaining.

TO HAVE AND TO HOLD the said lot of ground and premises; above described and mentioned, and hereby intended to be conveyed; together with the rights, privileges, appurtenances and advantages thereto belonging or appertaining unto and to the proper use and benefit of the Grantee, its successors and assigns, in fee simple, forever, subject to all of the provisions hereof and of the documents referred to herein

And the Grantor covenants that she will execute such further assurances of the same as may be requisite.

WITNESS the hand and seal of the Grantor.

WITNESS:



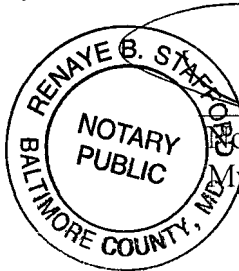
 (SEAL)  
BARBARA S. GREEN

STATE OF MARYLAND )  
COUNTY OF BALTIMORE )

TO WIT:

I HEREBY CERTIFY that on this 11<sup>th</sup> day of April, 2012, before me, the subscriber, a Notary Public, of the State aforesaid, personally appeared BARBARA S. GREEN and acknowledged the foregoing deed to be her act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal



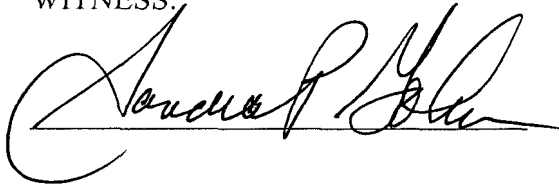
Notary Public

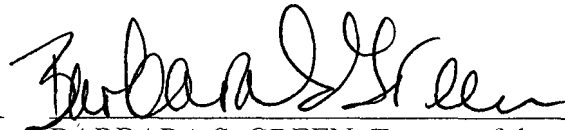
My Commission Expires:

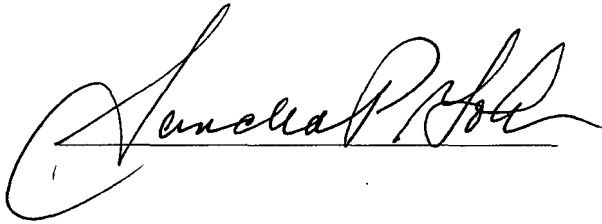
5.25.2015


WITNESS the hand and seal of the Grantees.

WITNESS:



 (SEAL)  
BARBARA S. GREEN, Trustee of the  
Barbara S. Green Qualified Personal  
Residence Trust



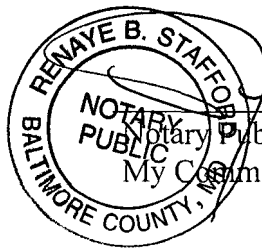
 (SEAL)  
BENJAMIN L. GREEN, Trustee of the  
Barbara S. Green Qualified Personal  
Residence Trust

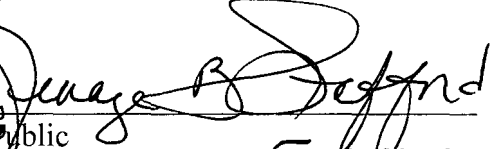
STATE OF MARYLAND )  
COUNTY OF BALTIMORE )

TO WIT:

I HEREBY CERTIFY that on this 11<sup>th</sup> day of April, 2012, before me, the subscriber, a Notary Public, of the State aforesaid, of the State aforesaid, personally appeared BARBARA S. GREEN and acknowledged the foregoing deed to be her act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

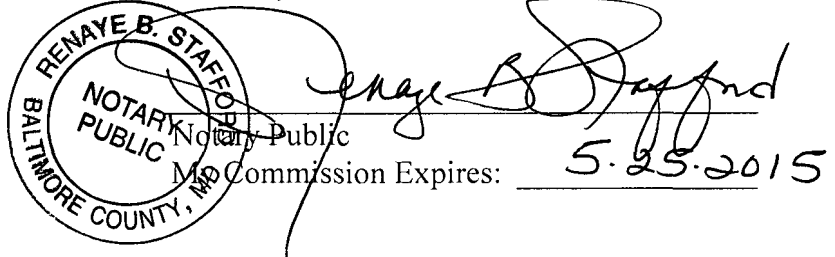


  
My Commission Expires: 5.25.2015

STATE OF MARYLAND )  
 ) TO WIT:  
COUNTY OF BALTIMORE )

I HEREBY CERTIFY that on this 11<sup>th</sup> day of April, 2012, before me, the subscriber, a Notary Public, of the State aforesaid, personally appeared BENJAMIN L. GREEN and acknowledged the foregoing deed to be his act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.



Please send real property tax bills to:

Mr. Benjamin Green  
3514 Anton Farms Road  
Baltimore, Maryland 21208

TOWN OF SOUTH BETHANY  
REALTY TRANSFER TAX

Serial Number 2755  
Amount of City Tax xmpt  
Date Recorded 1/24/13  
By KT

Consideration: .00

County .00  
State .00  
Town Total .00

Received: Sue D Jan 24, 2013

Recorder of Deeds  
Scott Dailey  
Jan 24, 2013 10:32A  
Sussex County  
Doc. Surcharge Paid

**RECEIVED**

JAN 24 2013

- 4 - ASSESSMENT DIVISION  
OF SUSSEX COUNTY

Tax Map No. 1-34-17.20-261.00

PREPARED BY:

Scott and Shuman, LLC  
38017 Fenwick Shoals Boulevard  
West Fenwick, DE 19975-9102  
File No. 09-3407/SR

RETURN TO:

Mr. David Scott Vershel  
6605 Babak Drive  
Frederick, Maryland 21702

DEED

**THIS DEED** is made as of the 15<sup>th</sup> day of October, 2009, between **GARY L. STOVER, JR. REVOCABLE TRUST U/A dated October 21, 2004**, of 2099 S. Dupont Highway, Suite C, Dover, Delaware 19901, party of the first part (hereinafter referred to as "Grantor"), and **DAVID SCOTT VERSHEL, AS TRUSTEE OF THE DAVID SCOTT VERSHEL REVOCABLE TRUST DATED 02/08/06**, of 6605 Babak Drive, Frederick, Maryland 21702, party of the second part (hereinafter referred to as "Grantee").

**WITNESSETH**, that the said party of the first part, for and in consideration of the sum of TEN DOLLARS (\$10.00), lawful money of the United States of America, the receipt whereof is hereby acknowledged, hereby grants and conveys unto the party of the second part, and its successors and assigns, in fee simple, the following described lands, situate, lying and being in Sussex County, State of Delaware:

**ALL THAT CERTAIN** lot, piece or parcel of land situate, lying and being in the corporate limits of the Town of South Bethany, Baltimore Hundred, Sussex County and State of Delaware, being known and designated as **LOT NUMBER TWENTY-TWO (22)** as shown on a plot of lots entitled "Lands of Elizabeth H. Hall, Town of South Bethany, Baltimore Hundred, Sussex County, Delaware", dated March 04, 1981, prepared by J.J. McCann, Inc., Professional Land Surveyors, which said Plot was filed for record on March 05, 1981, in the Office of the Recorder of Deeds in and for Sussex County, at Georgetown, Delaware, in Plot Book 22 at page 149; which said plot was revised and recorded March 12, 1981, in Plot Book 23 at page 002, as reference thereunto being had will more fully and at large appear.



**BEING THE SAME** lands conveyed unto the GARY L. STOVER, JR. REVOCABLE TRUST U/A dated October 21, 2004, by Deed dated May 19, 2006, of GARY L. STOVER, JR., as filed for record in the Office of the Recorder of Deeds, aforesaid, in Deed Book 3316 at page 061.

**TOGETHER WITH THE** right to use the common areas in common with all present and future lot owners, pursuant to the Declaration of Covenants, Conditions and Restrictions.

**THIS CONVEYANCE IS MADE SUBJECT TO** the Declaration of Covenants, Conditions and Restrictions dated September 8, 1981, as filed for record in the Office of the Recorder of Deeds, aforesaid, in Deed Book 1081 at page 346, which are made a part hereof by express reference thereto, as fully and as effectually as though incorporated herein.

**THIS CONVEYANCE IS FURTHER SUBJECT TO** any and all restrictions, reservations, conditions, easements and agreements of record in the Office of the Recorder of Deeds in and for Sussex County, at Georgetown, Delaware.

Consideration: 1,720,000.00

---

|        |       |           |
|--------|-------|-----------|
| County |       | .00       |
| State  |       | 25,800.00 |
| Town   | Total | 25,800.00 |

Received: Faith R Oct 16, 2009

**IN WITNESS WHEREOF**, the said The Gary L. Stover, Jr. Revocable Trust has caused its name to be hereunto set as of the day and year first above written.

**THE GARY L. STOVER, JR. REVOCABLE TRUST**

\_\_\_\_\_  
Witness

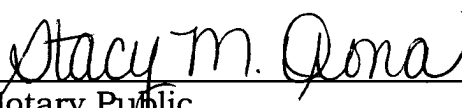
By:  (SEAL)  
Gary L. Stover, Jr., Trustee

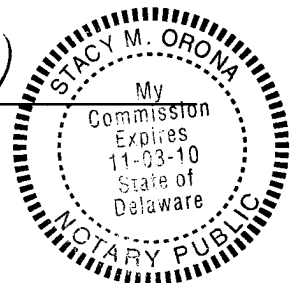
STATE OF Delaware :  
: SS  
COUNTY OF Sussex :

BE IT REMEMBERED, that on this 15<sup>th</sup> day of October, A.D. 2009, personally appeared before me, the Subscriber, a Notary Public for the State and County aforesaid, Gary L. Stover, Jr., Trustee of The Gary L. Stover, Jr. Revocable Trust U/A dated October 21, 2004, party to this Deed, known to me personally to be such, and acknowledged this Deed to be his act and deed and the act and deed of said Trust.

Given under my Hand and Seal of office the day and year aforesaid.

My Commission Expires: 11.3.10

  
Notary Public



**RECEIVED**

OCT 16 2009

**ASSESSMENT DIVISION  
OF SUSSEX COUNTY**

TOWN OF SOUTH BETHANY  
REALTY TRANSFER TAX  
Serial Number 2494  
Amount of City Tax 25,800.00  
Date Recorded 10/16/09  
By DL

Recorder of Deeds  
John F. Brady  
Oct 16, 2009 11:32A  
Sussex County  
Doc. Surcharge Paid