



**Line Report: Proposed Baseline and Setback Line  
Debidue Beach  
October 6, 2017**

**Background**

South Carolina Code of Laws §48-39-280, as amended, requires the Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management (OCRM or Department) to establish and periodically review the position of the two lines of beachfront jurisdiction (the baseline and the setback line) once every seven to ten years. For all oceanfront land that is developed or potentially could be developed, the average annual shoreline change rate, also known as the average long-term erosion rate, is also reviewed during this timeframe. The purpose of these jurisdictional lines is to implement §48-39-280(A), which states:

"A forty-year policy of retreat from the shoreline is established. The department must implement this policy and utilize the best available scientific and historical data in the implementation. The department must establish a baseline which parallels the shoreline for each standard erosion zone and each inlet erosion zone. Subject to Section 48-39-290(D), the baseline established pursuant to this section must not move seaward from its position on December 31, 2017."

The baseline is the more seaward of the two jurisdictional lines. Seaward of the baseline, permitted activities are limited to wooden walkways, small wooden decks, fishing piers, golf courses, normal landscaping, groins, activities authorized by emergency orders, beach renourishment projects, and structures authorized by a special permit. The setback line is the landward line of beachfront jurisdiction. Between the baseline and setback line, the Department exercises regulatory permitting authority for such activities as habitable structures and associated infrastructure, decks, gazebos, other public access structures, and sand dune management. Seaward of the setback line, construction of new shore-parallel erosion control structures (i.e. seawalls, revetments or bulkheads) is prohibited. However, existing erosion control structures may be maintained or repaired with prior authorization by the Department.<sup>1</sup>

As part of the process of delineating these jurisdictional lines, the Department has collected beach survey data statewide since 1988 at monitoring stations that are typically spaced 2,000 feet apart. Sections of the coast that are not likely to be developed, such as Cape Romain National Wildlife Refuge, are not surveyed. Surveys begin landward of the primary oceanfront sand dune, if one exists, and extend down the beach and offshore. In addition to this beach erosion monitoring data, the Department utilizes recent dune field topographic data such as Light Detection and Ranging (LIDAR), elevation measurements collected with a survey-grade GPS unit, vegetation measurements collected with a mapping-grade GPS unit, current and historical aerial photographs dating back at least 40 years that show the shoreline location, and previous shoreline change analysis data or reports. These data were viewed and analyzed using ESRI's Geographic Information System (GIS) software.

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<sup>1</sup> S.C. Code Ann. §48-39-290(A).

## Process for Establishing the Baseline Position

To establish the baseline position, the shoreline must first be classified as an inlet zone or a standard zone. Areas that are close to inlets with non-parallel offshore bathymetric contours and non-parallel historical shoreline positions are classified as inlet zones, while all other areas are classified as standard zones. Inlet zone classifications are further refined as either unstabilized, or stabilized by jetties, groins, or seawalls.

In stabilized inlet zones and standard zones, the baseline is located at the crest of the primary oceanfront sand dune using beach survey data or dune field topographic data such as LIDAR. The primary oceanfront sand dune is defined as a dune with a minimum height of 3 feet, as measured vertically from the crest to the toe of the dune. This dune must also form a continuous line for 500 shore parallel feet.<sup>2</sup> If the shoreline has been altered naturally or artificially by the construction of erosion control devices, groins, or other man-made alterations, the baseline must be established where the crest of the primary oceanfront sand dune would be located if the shoreline had not been altered.<sup>3</sup>

To calculate a dune crest position at an armored<sup>4</sup> location, the volume of sand on the beach seaward of the erosion control structure is determined from survey data and then compared to the volume of sand from a nearby unarmored reference profile that displays a representative sand dune. The reference profile is overlaid on the armored profile in such a way that the measured sand volumes match, and then the dune crest position can be transferred from the reference profile to the armored profile. This calculated dune crest position then becomes the baseline.

In unstabilized inlet zones, the baseline is established at the most landward shoreline position at any time during the past 40 years, unless the best available scientific and historical data of the inlet and adjacent beaches indicate that the shoreline is unlikely to return to its former position. This baseline position is established by analyzing shorelines created from historical aerial photographs or shoreline data collected in the field, and identifying the most landward shoreline position.<sup>5</sup>

## Process for Establishing the Setback Line Position

The setback line position is dependent on the baseline position and the average annual shoreline change rate, also known as the average long-term erosion rate. The shoreline change rate is calculated using available historical shoreline data and GIS software. The setback line is established landward of the baseline a distance which is 40 times the average annual shoreline change rate or not less than 20 feet.<sup>6</sup>

During this line review, the shoreline change rate calculation was performed using AMBUR (Analyzing Moving Boundaries using R), a tool available through the R-forge statistical environment. Shoreline change analysis was performed every 200 feet. Once the shoreline change rates were calculated, they were analyzed and grouped using the ESRI ArcGIS spatial statistics tool called 'Grouping'. The values within each group were averaged to obtain an

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<sup>2</sup> S.C. Code Regs. 30-1(D)(43).

<sup>3</sup> S.C. Code Ann. §48-39-280(A)(1).

<sup>4</sup> S.C. Code Ann. §48-39-250(5).

<sup>5</sup> S.C. Code Ann. §48-39-280(A)(2).

<sup>6</sup> S.C. Code Ann. §48-39-280(B).

annual shoreline change rate. This rate was multiplied by 40 to generate the setback distance from the baseline.

### Debidue Beach Baseline

Debidue Beach is located in Georgetown County between North Inlet to the southwest and Pawleys Island and Pawleys Inlet to the northeast. Debidue Beach is the southernmost of the Grand Strand beaches.

#### *Southern Unstabilized Inlet Zone*

At the southern end of the island from North Inlet to OCRM Monument 4115, the shoreline is classified as an unstabilized inlet zone, and the baseline is set at the most landward point of erosion in the last 40 years. Specifically, the baseline is set at the vegetation line position collected by OCRM staff in November 2016. Where the baseline wraps around the upland, any land or water areas to the south of the wrapped baseline are considered to be located seaward of the baseline.

#### *Central Standard Zone*

Between OCRM Monument 4115 and OCRM Monument 4180, the shoreline is classified as a standard zone. A wooden bulkhead is located along this length of shoreline from a point midway between OCRM Monuments 4125 and 4130 and running north for a distance of approximately 4,500 feet. South of the bulkhead, no primary dunes are present, and the baseline is set at the vegetation line position collected by OCRM staff in November 2016.

For the length of shoreline where this bulkhead is present, the baseline position was calculated using the volume calculation method. Five armored transects were collected between the end of Debordieu Boulevard and Tabby Lane. One reference, unarmored transect was collected at OCRM Monument 4150. It was determined that, if the shoreline were not armored, the primary dune crest would be located landward of the bulkhead by (south to north transect by transect) 178 feet (DEB1), 146 feet (DEB2), 119 feet (DEB3), 127 feet (4130E), and 95 feet (DEB 4). The erosion control structure was buffered by these distances to establish the baseline.

Beach	Profile (Reference or Armored)	Monument # or Other ID	Upper Contour (ft)	Lower Contour (ft)	Calculated Volume (cy/ft)	X-Position to Match Volumes (ft)	X-Position of Dune Crest (ft)	X-Position Difference (ft) = landward offset from wall
<b>Debidue</b>	<b>Armored</b>	<b>DEB1</b>	<b>7.195</b>	<b>-4.953</b>	<b>33.49</b>			<b>178</b>
<b>Debidue</b>	Reference	4150B	3.398	-5.078	34.097	480.563	302.404	
<b>Debidue</b>	<b>Armored</b>	<b>DEB2</b>	<b>8.991</b>	<b>-4.816</b>	<b>42.241</b>			<b>146</b>
<b>Debidue</b>	Reference	4150B	7.272	-4.807	43.418	448.634	302.404	
<b>Debidue</b>	<b>Armored</b>	<b>DEB3</b>	<b>8.074</b>	<b>-5.178</b>	<b>57.33</b>			<b>119</b>
<b>Debidue</b>	Reference	4150B	7.08	-5.078	58.536	421.637	302.404	
<b>Debidue</b>	<b>Armored</b>	<b>4130E</b>	<b>7.968</b>	<b>-4.945</b>	<b>56.007</b>			<b>127</b>
<b>Debidue</b>	Reference	4150B	7.094	-5.078	55.068	429.335	302.404	

Beach	Profile (Reference or Armored)	Monument # or Other ID	Upper Contour (ft)	Lower Contour (ft)	Calculated Volume (cy/ft)	X- Position to Match Volumes (ft)	X- Position of Dune Crest (ft)	X-Position Difference (ft) = landward offset from wall
<b>Debidue</b>	<b>Armored</b>	<b>DEB4</b>	<b>11.437</b>	<b>-4.944</b>	<b>70.774</b>			<b>96</b>
<b>Debidue</b>	Reference	4150B	9.359	-5.078	69.966	398.034	302.404	

North of the bulkhead to OCRM Monument 4180, the baseline is set at the primary dune crest identified in LIDAR data from 2014 and verified in the field by OCRM staff in November 2016 using survey-grade GPS equipment.

### *Northern Unstabilized Inlet Zone*

At the northeastern end of the island between OCRM Monument 4180 and Pawleys Inlet, the shoreline is classified as an unstabilized inlet zone, and the baseline is set at the most landward point of erosion in the last 40 years. Specifically, the baseline position is comprised of vegetation line data collected by OCRM staff in November 2016 and a historical vegetation line position from 2011.

### **Debidue Beach Setback Line**

The following table identifies average annual shoreline change rates, from south to north.

Location Description	Shoreline Change Rate (ft/year) *	Multiplier	Setback Distance (ft)
Wrapping the south end of Debidue for 459 feet	^	N/A	20
Transition north for 344 feet, then north for 231 feet	-1.8225	40	73
Transition north for 187 feet, then north for 339 feet	-4.344	40	174
Transition north for 174 feet, then north for 2,474 feet	-5.308	40	212
Transition north for 185 feet, then north for 531 feet to Eastland Way	-3.9056	40	156
Transition north for 181 feet, then north for 362 feet along Ocean Green Drive	-2.6057	40	104
Transition north for 181 feet, then north for 179 feet to the intersection of Ocean Green Drive and Debordieu Boulevard	-1.2443	40	50
Transition north for 195 feet, then north to the intersection of Vanderbilt Road and Beach Bridge Road	^	N/A	20
Transition north for 244 feet, then north for 1,237 feet	-1.5759	40	63
Transition north for 216 feet, then north for 293 feet along Vanderbilt Road	-4.0016	40	160

\* A negative number indicates erosion.

^ When this symbol is present, it indicates that the minimum setback is required. The shoreline change rate in these areas is between -0.5 and +31.0 ft/year.

### **Final Product**

Once the location of these proposed new beachfront jurisdictional lines is determined, this "line report" is prepared documenting how the new line positions were established. The proposed lines are then released for a 30-day public comment period, and a public hearing is held for public review and comment on the proposed line positions. The proposed lines are also made

available for public review on the South Carolina Beachfront Jurisdiction viewer (<https://gis.dhec.sc.gov/shoreline>). Once the lines are adopted as final, the final versions can also be seen on the South Carolina Beachfront Jurisdiction viewer. The line coordinates are also made available on the DHEC web site in a format that allows them to be downloaded and imported into computer-generated plats by surveyors.