



Coastal Management
ENVIRONMENTAL QUALITY

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March 27, 2018

MEMORANDUM

CRC-18-15

TO: Coastal Resources Commission
FROM: Ken Richardson, *Shoreline Management Specialist*
SUBJECT: Review of Ocean Hazard AEC Setback Lines

Ocean Hazard AEC:

The Ocean Hazard Setback for development is measured in a landward direction from the vegetation line, the static vegetation line, or the measurement line. Setback distance is calculated by multiplying a Setback Factor (a.k.a. “erosion rate”) times a graduated variable that is dependent on size of the proposed structure (*see Table 1*). The Setback Factor represents the statistically smoothed and blocked average annual long-term shoreline change rates, which are updated approximately every 5 years. For purposes of establishing a minimum construction setback, “2” is the default minimum Setback Factor, which includes those areas with erosion rates less than 2 feet/year and areas where accretion is measured.

Oceanfront Setback Factors were established by the Coastal Resources Commission (CRC) under the Coastal Area Management Act (CAMA) in 1979 to minimize losses of life and property resulting from storms and long-term erosion, while also preventing encroachment of permanent structures on public beach areas, preserving the natural ecological conditions of the barrier dune and beach systems, and reducing the public costs of inappropriately-sited development. To accomplish this, Setback Factors serve two purposes: 1) to site oceanfront development, and; 2) to determine the landward-most extent of the Ocean Erodible Area of Environmental Concern (OEA) - the area where there is a substantial possibility of excessive shoreline erosion.

Table 1. Setback Factors & graduated setback.

Structure Size	Setback (feet)	<i>example “setback factor = 2”</i>
< 5,000 sqft.	Minimum 60 feet, or 30 x setback factor	<i>2 x 30 = 60 feet</i>
≥ 5,000 sqft.	Minimum 120 feet, or 60 x setback factor	<i>2 x 60 = 120 feet</i>
≥10,000 sqft.	Minimum 130 feet or 65 x setback factor	<i>2 x 65 = 130 feet</i>
≥20,000 sqft.	Minimum 140 feet or 70 x setback factors	<i>2 x 70 = 140 feet</i>
≥40,000 sqft.	Minimum 150 feet or 75 x setback factor	<i>2 x 75 = 150 feet</i>
≥60,000 sqft.	Minimum 160 feet or 80 x setback factor	<i>2 x 80 = 160 feet</i>
≥80,000 sqft.	Minimum 170 feet or 85 x setback factor	<i>2 x 85 = 170 feet</i>
≥100,000 sqft.	Minimum 180 feet or 90 x setback factor	<i>2 x 90 = 180 feet</i>

North Carolina’s oceanfront shoreline changes rates have historically been calculated using the End-Point method since the first study conducted in 1979. This method uses the earliest and most current shoreline data points where they intersect at any given shore-perpendicular transect. The distance between the two shorelines (shore-transect intersect) is then divided by the time, or number of years, between the two shorelines. Since the current method used to calculate shoreline change rates has been consistent since 1979, it provides the CRC with results that can be generally compared to those from previous studies. With the advancement of mapping technology and a greater inventory of shoreline data, results from methods that can incorporate multiple (more than two) shorelines will be compared during the 2018-2019 update.

Additionally, because setbacks can help preserve spaces that can serve as undeveloped buffer areas for storms, the U.S. Federal Emergency Management Administration (FEMA) currently uses North Carolina’s erosion rate updates to award Community Rating System (CRS) points to qualified coastal communities. The CRS is used by FEMA to assess flood insurance rates for these communities. FEMA’s current policy allows North Carolina’s oceanfront erosion rate update to account for fifty (50) CRS points only if the state’s erosion rates are updated once every five years. Loss of these points could potentially result in increased flood insurance rates for certain coastal communities.

Setback Lines:

Oceanfront Setback Lines for development are measured in a landward direction from the vegetation line, the static vegetation line, or the measurement line.

The Vegetation Line, or First Line of Stable & Natural Vegetation (FLSNV): is the primary reference feature for measuring oceanfront setbacks. This line represents the boundary between the normal dry-sand beach, and the more stable uplands. If the vegetation has been planted, it may be considered stable when most of the plant stems are from continuous rhizomes rather than

planted individual root sets. Planted vegetation may be considered natural when most of the plants are mature and additional species native to the region have been recruited, providing stem and rhizome densities that are like adjacent areas that are naturally occurring.

While the vegetation line has been used as an oceanfront setback measurement line since 1979, the CRC has previously determined that the vegetation on nourished beaches often did not meet the standard to be considered “stable and natural” and should not be used for measuring oceanfront setbacks. In 1995 the CRC codified a method of measuring setbacks on nourished beaches that utilizes the surveyed pre-project existing vegetation line, which became known as the “Static Vegetation Line.”

The Static Vegetation Line (SVL): is established in areas within the boundaries of a large-scale beach fill project (>300,000 cubic yards), and represents the vegetation line that existed within one year prior to the onset of project construction. A static line is established in coordination with the Division of Coastal Management. Once a static line is established, setbacks are measured from either the static line or the vegetation line, whichever is more landward.

The CRC’s static line rule was based on three primary issues: 1) evidence that nourished beaches can have higher erosion rates than natural beaches, 2) no assurance that funding for future nourishment projects would be available for maintenance work as the original project erodes away, and 3) structures could be more vulnerable to erosion damage since their siting was tied to an artificially-forced system. The intent of the static line provisions has been to recognize that beach nourishment is an erosion response necessary to protect existing development, but should not be a stimulus for new development on sites that are not otherwise suitable for building. Once a static line is established it does not expire.

Prior to 2009, a community that completed construction of a large-scale beach fill project was required to measure construction setbacks from the static line or the vegetation, whichever was more landward. Over time, the Commission found that some communities had demonstrated a long-term commitment to beach nourishment and maintenance of their nourished beaches. Due to this long-term commitment, the vegetation had become stable and migrated oceanward of the static line. In many cases, proposed development on lots within these communities could meet the required setback from the natural vegetation line, but could not be permitted since they did not meet the setback from the static vegetation line.

To recognize local government efforts to address erosion through a documented long-term commitment to beach nourishment and offer relief from the static line requirements, the CRC adopted Static Vegetation Line Exception Procedures in 2009. These procedures require local communities to petition the CRC for an exception to the static line that allows property owners within that community to measure construction setbacks from the vegetation line instead of the static line, under specific conditions.

In 2016, the Commission provided a second alternative to the Static Line by promulgating the Development Line procedures. The Development Line allows use of the vegetation line for setback determinations, with local governments setting the oceanward limit of structures. Unlike with the Static Line Exception, there is no requirement for a long-term commitment to beach nourishment.

- 1) **Static Vegetation Line Exception** for a community to measure setbacks from vegetation line rather than the static line. The following conditions are required:
 - a. Authorized by the CRC, and then reauthorized every 5 years
 - b. Petitioner must provide a beach management plan that describes the project area and design; identify sediment sources; identify funding sources to maintain the initial large-scale project, and; provide an update on project effectiveness and how it will continue to be maintained. The plan must be updated and presented to the CRC every 5 years.
 - c. Development must meet setback from vegetation line
 - d. No portion of the building or structure can be oceanward of landward-most adjacent neighbor. When configuration of lot prevents this condition, an average line of construction is determined by the DCM
 - e. No swimming pools seaward of static line

- 2) **Development Line (DVL)** is established by local governments and allows a community to measure setbacks from the vegetation line rather than the static line. The following conditions are required:
 - a. Development line is mapped by the community using an average line of construction, and must be referenced in local ordinance(s).
 - b. Represents the seaward-most allowable limit of oceanfront development.
 - c. Must be approved by the CRC. Once approved, only the community can request a change.
 - d. Development must meet setback from the vegetation line
 - e. No swimming pools seaward of the static line

Currently there are twenty communities with a static line, eight of those have CRC-authorized Static Vegetation Line Exceptions, and four communities have CRC-approved Development Lines (*see Table 2*).

Table 2. List of Communities with Static Vegetation Lines, SVL Exceptions and Development Lines.

Community	SVL	SVL Exception	DVL
Ocean Isle	Yes	Yes	No
Oak Island	Yes	No	Yes
Caswell Beach	Yes	No	No
Bald Head Island	Yes	No	No
Kure Beach	Yes	No	Yes
Carolina Beach	Yes	Yes	Yes
Wrightsville Beach	Yes	Yes	No
Figure Eight Island	No	No	Yes
Topsail Beach	Yes	No	No
North Topsail Beach	Yes	No	No
Emerald Isle	Yes	Yes	No
Indian Beach	Yes	Yes	No
Salter Path	Yes	Yes	No
Pine Knoll Shores	Yes	Yes	No
Atlantic Beach	Yes	Yes	No
Buxton	Yes	No	No
Rodanthe	Yes	No	No
Yes	Yes	No	No
Kill Devil Hills	Yes	No	No
Kitty Hawk	Yes	No	No
Southern Shores	Yes	No	No

Measurement Line: Represents the post-storm location of a vegetation line if a storm causes overwash or a loss of vegetation so that not enough vegetation exists to determine oceanfront setbacks. This line is located using most current pre-storm aerial photography to map the pre-storm vegetation line, and then moving it landward a distance equal to the average width of the beach recession. Measurement lines are temporary until the vegetation is re-established to the point where it can once again be used for determining oceanfront setbacks.

Appendix: Oceanfront Development Setback Reference (will be provided as handout)

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Oceanfront Development Setback

Siting of oceanfront construction is based on a graduated setback (see Table 1). Setbacks are measured from one of three reference features: #1) *First Line of Stable & Natural Vegetation (FLSNV)*, #2) *Static Vegetation Line (SVL)*, or #3) *Measurement Line* (for unvegetated beaches).

Structure Size	Setback (feet)	example “minimum setback factor = 2”
< 5,000 sqft.	Minimum 60 feet, or 30 x setback factor	$2 \times 30 = 60 \text{ feet}$
≥ 5,000 sqft.	Minimum 120 feet or 60 x setback factor	$2 \times 60 = 120 \text{ feet}$
≥10,000 sqft.	Minimum 130 feet or 65 x setback factor	$2 \times 65 = 130 \text{ feet}$
≥20,000 sqft.	Minimum 140 feet or 70 x setback factor	$2 \times 70 = 140 \text{ feet}$
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≥100,000 sqft.	Minimum 180 feet or 90 x setback factor	$2 \times 90 = 180 \text{ feet}$

Table 3. “Setback Factors” are based on average annual long-term shoreline change rates. The default minimum is 2 where actual erosion rates are less than or equal to 2 feet/year, or where accretion is measured. For more details refer to 15A NCAC 07H .0306

Question: FLSNV or SVL - does community have a Static Line(SVL)?

- **Answer - No.** Community does not have SVL
 - Setbacks are measured from FLSNV
- **Answer - Yes.** Community does have SVL
 - **If a community has a SVL, they may choose from one of three alternatives:**
 1. Only measure setbacks from SVL; or
 2. Only measure setbacks from FLSNV - with a CRC authorized SVL Exception; or
 - Only measure setbacks from FLSNV - with a CRC approved Development Line.

Definition of Terms:

1. **Vegetation Line.** Refers to the *First Line of Stable & Natural Vegetation (FLSNV)*, which is the primary reference feature for measuring oceanfront setbacks. The line represents the boundary between the normal dry-sand beach, and the more stable uplands. While the *Vegetation Line* can fluctuate due to waves, tides, storms and wind, it is generally located oceanward of the seaward toe of the frontal dune.
2. **Static Vegetation Line.** In areas within the boundaries of a large-scale beach fill project (>300,000 cubic yards), the static line is the vegetation line that existed within one year prior to the onset of initial project construction. A static line is a surveyed line that is established in coordination with the Division of Coastal Management. Once a static line is established, setbacks will be measured either from the static line or the vegetation line, whichever is more landward, unless the community successfully petitions the CRC for a static line exception or a development line.

3. **Static Vegetation Line Exception.** *A community that has a static line, and that can demonstrate a long-term (30 years or more) commitment to beach nourishment, including a reliable source of sand and a funding mechanism, may petition the CRC for a static line exception. Once approved, a community can measure setbacks from the vegetation line instead of the static line new construction cannot be sited any further oceanward than the landward-most adjacent neighbor. A Static Vegetation Line Exception is required to be reauthorized by the CRC once every five years. For more details refer to 15A NCAC 07H .0306(a) (12)*

4. **Development Line.** *Established by local governments and approved by the CRC, a development line is an alternative to the Static Line Exception, and represents the seaward-most allowable limit of oceanfront development. Communities do not have to demonstrate a long-term commitment to beach nourishment; providing evidence of a sand source and a funding mechanism is not required for the CRC to approve a development line request. Communities with a CRC-approved development line can measure setbacks from the vegetation line instead of the static line, but new construction cannot be sited seaward of the development line. Once approved by the CRC, a Development Line does not expire, and changes can only be requested by the community. For more details refer to 15A NCAC 07J. 1300*

5. **Measurement Line.** *Though rare, the CRC may designate oceanfront areas devoid of stable & natural vegetation as Unvegetated Beach Areas of Environmental Concern. This line is usually established by the Commission after storms and is repealed once the vegetation has re-established itself to the point it can be used for setback determinations. For areas so designated, DCM uses aerial photography and other techniques to establish a measurement line to be used in place of the vegetation line for measuring setbacks.*

Key Differences	SVL Exception	DVL
Approved by CRC	✓	✓
Measure Setbacks from FLSNV (not SVL)	✓	✓
Mapped & Managed by Community	✗	✓
CRC Reauthorization Required	✓	✗
Structures could potentially move seaward of adjacent structure	✗	✓
Beach Management Plan Required	✓	✗
Swimming Pools Seaward of SVL	✗	✗
Eliminates Static Vegetation Line	✗	✗

Table 4. Comparison of differences between Static Vegetation Line Exception and Development Line.