



July 17, 2018

Iris Hill  
Town Administrator  
Town of Edisto Beach  
2414 Murray St  
Edisto Beach SC 29438

RE: Groin Mitigation Recommendations [CSE 2416]

Dear Iris,

This letter is written to provide CSE's opinion on potential FEMA-sponsored mitigation of future damage via improvements to certain groin extensions. FEMA representatives have indicated that the Town may be eligible for mitigation funds to reduce the potential for future damage from disasters. Specifically, FEMA is considering improvements to the groin extensions to prevent additional scour or slumping of armor stone along the groins extended by sheetpile in 2017 (groins 1-11, 13, and 14). Several of these extensions suffered slumping of the armor stone during Hurricane Irma in September 2017 (Figure 1). CSE recommended the Town repair the damaged extensions by adding additional armor stone to return the stone profile to the original design. This would require ~500 tons of new stone. Placing new stone will restore the design section of the armor stone scour apron; however, future storms may dislodge the stone and result in additional slumping.

During construction, grout was added to groin extensions 12, and 15-27 to act as a littoral barrier for sand. Sheet pile acted as this barrier for the other groin extensions. Since damage to the extensions was limited to the ungrouted groins, CSE believes that grouting the armorstone may be an effective mitigation alternative to reduce the potential for future damages. Grout solidifies the structures and reduces the opportunity for displacement by waves.

Adding grout to the presently ungrouted extensions would require a contractor placing concrete along the armor stone apron during spring-low tides. Calm weather and waves are also needed to allow time for the concrete to cure before the tide rises. Experience from the 2017 construction project shows that even relatively small waves can quickly wash out concrete before it cures. The cost of grout for the 2017 project was \$650/cy installed. CSE anticipates that unit cost for mitigation work would be similar. CSE estimates that up to 40 cy of grout will need to be added to each groin and a total of 510 cy of grout may required for the complete project. At \$650/cy, the total price for mitigation, not including mobilization or engineering/bidding, is estimated at

\$331,500. In CSE's opinion, mobilization should cost around \$25,000 and engineering/construction admin around \$30,000. The total project cost is estimated to be \$386,500.



**Figure 1.** Post Irma photos of groin damage. Note the slumped stones below the level of the cap leaving the ends of the structures exposed to wave action.



CSE estimates it will take up to two months to complete the work, as the effort will be limited by tide, weather, and concrete availability. Small areas of the beach will need to be closed to allow for equipment operations. Once the project is complete, the structures will be more resistant to damage from storm events. The work will not increase the trapping capacity of the groins, as the elevations and lengths of the repaired structures will not exceed the permitted or installed configurations. CSE recommends any groin repair be completed outside of turtle nesting season to avoid potentially impacting loggerhead sea turtles

Please let me know if you have any questions or need additional information.

Sincerely,

Coastal Science & Engineering (CSE)

A handwritten signature in black ink, appearing to read 'S. Traynum', with a long, sweeping underline.

Steven B Traynum  
Coastal Scientist / Project Manager