U.S. Army Corps of Engineers
Charleston District

APPENDIX M2

CHARLESTON HARBOR POST 45

CHARLESTON, SOUTH CAROLINA

404(b)(1) Assessment (Nearshore Reef)

May 2015

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SECTION 404(b)(1) EVALUATION
CHARLESTON HARBOR NAVIGATION
IMPROVEMENT PROJECT (POST 45)
SCDNR CHARLESTON NEARSHORE REEF ROCK
PLACEMENT

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SECTION 404 (b)(1) EVALUATION
CHARLESTON HARBOR NAVIGATION
IMPROVEMENT PROJECT (POST 45)
SCDNR CHARLESTON NEARSHORE REEF ROCK PLACEMENT

1.0 INTRODUCTION.

1.1. Background. Section 404 (b)(1) of the Clean Water Act (CWA) of 1972 requires that any proposed discharge of dredged or fill material into waters of the United States must be evaluated using the guidelines developed by the Administrator of the U.S. Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army. These guidelines are located in Title 40, Part 230 of the Code of Federal Regulations (Guidelines). The following 404(b)(1) evaluation is prepared in accordance with the Guidelines and follows the recommended format contained in ER 1105-2-100, of December 28, 1990. This Section 404 (b)(1) evaluation analyzes all activities associated with the Charleston Harbor Navigation Improvement Project (here after referred to as the Post 45 project) that involve the discharge of dredged or fill material into waters of the United States for the South Carolina Department of Natural Resources (SCDNR) Nearshore Reef Rock Placement activity, including both construction and long-term maintenance requirements (Figure 1). Section 404 of the Clean Water Act (33 CFR Parts 328.4 Limits of Jurisdiction) defines "waters of the United States" as *traditional navigable waters; interstate waters, including interstate wetlands; the territorial seas;* …Territorial seas are defined by this section as "*The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles.* (See 33 CFR 329.12)". Therefore this Section 404(b)(1) analysis is applicable only for the proposed discharge of dredge or fill material in "Waters of the United States" (i.e., within 3 nautical miles).

The Charleston District, USACE is proposing the beneficial use of dredge material from the Post 45 project. About 240,000 cubic yards (cy) of rock dredged from the deepening of the Fort Sumter reach (in the entrance channel) may be placed in a 25 acre site located within the authorized South Carolina Department of Natural Resources (SCDNR) Charleston Nearshore Reef (Figure 2). The purpose of this action is to enhance fish habitat within the nearshore area. The SCDNR Charleston Nearshore Reef is located within "Waters of the United States" (i.e., three nautical miles). Therefore rock placed in the SCDNR Charleston Nearshore Reef will require a separate Section 404(b)(1) analysis from the proposed discharge associated with Charleston Harbor Navigation Improvement Project (Post 45). This Section 404(b)(1) analysis deals only with the placement of rock dredged from the entrance channel into the SCDNR Charleston Nearshore Reef.

1.2 Scope of 404(b)(1) Analysis. The evaluation requirements of Section 404 of the CWA are guidelines developed by the U.S. Environmental Protection Agency (USEPA) in conjunction with the USACE and codified in 40 CFR Part 230. Under Subpart B of the Guidelines, the USACE's evaluation of the Post 45 Project is required to address the following four tests in order to be in compliance with these guidelines.

- **40 CFR 230.10 (a):** Whether there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. The alternative identified by this test is referred to as the *least*

environmentally damaging practicable alternative or the LEDPA. The evaluation of the proposed Post 45 Project with respect to this compliance test is found in Section 4.1, "Finding of Practicable Alternatives."

- **40 CFR 230.10 (b):** Whether the discharge would violate any applicable state water quality standards, Section 307 of the CWA, the Endangered Species Act (ESA), or federal laws concerning marine sanctuaries. The evaluation of the proposed Post 45 Project with respect to this compliance test is found in Section 4.2, "Restrictions on Discharge."
- **40 CFR 230.10 (c):** Whether the discharge would cause or contribute to significant degradation of waters of the U.S. The evaluation of the proposed Post 45 Project with respect to this compliance test is found in Section 4.3, "Finding of No Significant Degradation."
- **40 CFR 230.10 (d):** Whether appropriate and practicable steps have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem. The evaluation of the proposed Post 45 Project with respect to this compliance test is found in Section 4.4, "Minimization of Potential Adverse Impacts."

Evaluation of a proposed discharge under all four of the tests listed above constitutes a determination of compliance with the Guidelines. While making a compliance determination, the USACE may gather information sufficient to support and make its decisions by soliciting comments from other federal, tribal, state, and local resource agencies and the public. However, the USACE is solely responsible for reaching a decision on the Section 404(b)(1) analysis.

1.3 Authority. Based on the Section 905(b) (WRDA 86) Analysis, Charleston Harbor Navigation Improvement Project, Charleston, South Carolina, dated July 2010, a study to analyze and evaluate improvements to Charleston Harbor has been completed. Preliminary data suggests that there are additional National Economic Development (NED) benefits associated with Harbor modifications.

1.4 National Environmental Policy Act.

The proposed deepening of the existing Charleston Harbor is a major Federal action and therefore the USACE, Charleston District has prepared an final Environmental Impact Statement (DEIS) required pursuant to the National Environmental Policy Act (NEPA). According to the Guidelines, the NEPA alternative and impact analysis should provide sufficient information to evaluate compliance with the Guidelines. As stated in the Guidelines:

For actions subject to NEPA, the analysis of alternatives required for NEPA environmental documents, including supplemental Corps NEPA documents, will in most cases provide the information for the evaluation of alternatives under these Guidelines.

Alternatives were developed to incorporate the Least Environmentally Damaging Practicable Alternative (LEDPA), and no additional alternatives will need to be developed as part of the USACE's Guidelines evaluation process. Notably, this final Guidelines evaluation is not intended to replace any of the findings or conclusions in the Final Integrated Feasibility Report / Environmental Impact Statement (IFR/EIS). Rather, this final Guidelines evaluation document builds on the alternatives and impact analysis developed within the Final IFR/EIS, with a focus on the specific decision-making framework required by the Guidelines.

This final Guidelines evaluation relies on the findings and conclusions in the Final IFR/EIS. The Final IFR/EIS establishes the range of reasonable alternatives to the USACE, Charleston Districts proposed project. These alternatives provide a starting point for the District's practicability analysis under the Guidelines. The Final IFR/EIS also analyzes the potential direct, indirect, and cumulative impacts

associated with the Post 45 Project under each of the Final IFR/EIS action alternatives. This analysis serves as the starting point for the USACE's evaluation of the impact of alternatives and alternative components on waters of the U.S. and special aquatic sites. Information from the Final IFR/EIS is incorporated extensively into this final Guidelines evaluation both by reference and by direct use of information contained therein

2.0 PROJECT DESCRIPTION.

2.1 Background. The project location, general description of the existing project (including maintenance dredging), and the Post 45 Project Description (Charleston Harbor Improvements and maintenance of the deepened harbor) remains the same and is thoroughly described within the Section 404 (b)(1) Evaluation for the Charleston Harbor Navigation Improvement Project (Post 45). In order to reduce the overall length of this Section 404(b)(1) evaluation, the referenced sections will not be duplicated.

2.2 Beneficial Use of Dredged Material. Off the coast of South Carolina, the majority of the continental shelf is covered with sand several feet deep, while a small percent of the bottom has the appropriate geological makeup to allow for the formation of a reef community (SCDNR 2003). To enhance recreational fishing and sport diving opportunities in coastal waters, the creation of additional man-made, or artificial reefs increases the amount of productive hard-bottom habitat available overall. This is accomplished by placing suitable long-lived, stable and environmentally safe materials on a selected area of ocean bottom.

Artificial reef development (SCDNR 2003) in South Carolina's coastal and offshore waters is managed through the South Carolina Department of Natural Resources, Marine Resources Division (MRD). The state's Marine Artificial Reef Program, first established in 1973, is a part of the MRD's Office of Fisheries Management (OFM). Individual reef construction sites range from small areas to one square mile in size, with multiple reef structures placed within the boundaries of each area. All sites are located on flat featureless sand bottom which offered little interest to divers or fishermen prior to the placement of reef materials. Reef construction sites are selected to provide easy access to users while attempting to avoid possible conflicts with any other use of the bottom or waters near the permitted areas. Most reef sites are buoyed to assist in their location.

Marine artificial reefs are constructed in South Carolina primarily to enhance saltwater fishing opportunities for recreational anglers, and to provide additional locations of interest for the growing number of sport divers in the state. Nearly 20 square miles of ocean bottom have been permitted by the OFM for this purpose with the added benefits of adding to the amount of highly productive hard bottom off the coast as well as potentially enhancing fish stocks which are critically linked to this type of habitat. Thousands of resident and nonresident anglers and sport divers take advantage of the numerous artificial reefs off the state each year. They pursue a wide range of year-round fishing and diving activities which might not be available off South Carolina were it not for artificial reefs. In the pursuit of their interests these individuals generate nearly 20 million dollars in total economic benefit to the state each year. While not the primary reason for building the state's marine artificial reefs, this economic benefit from their existence adds significant weight to the overall cost-effectiveness of the efforts involved in maintaining a reef system.

SCDNR has designated and constructed the Charleston Nearshore Reef, which is located 2.5 nautical miles from the Charleston Harbor jetty (Figure 2) at Latitude North 32 42.615 and Longitude West 079 45.688. Currently SCDNR has placed concrete rubble, Cooper River Bridge rubble, missile ballast cans, missile motor cradles, and seven barges in the Nearshore Reef.

While the Post 45 project entrance channel (Fort Sumter reach) is deepened, the USACE proposes to place about 240,000 cubic yards (cy) of rock material within the SCDNR Charleston Nearshore Reef. Table 1 in rows 4 and 8 describes the quantities and methods used to accomplish this proposal. Table 2 shows the probability matrix for encountering rock based upon historical data (taken from the Geo Technical Appendix B in the Final IFR/EIS), which indicates a high probability of encountering rock in segments 4, 5, 7, 10, 11, 8, 9, 12, and 13 of the entrance channel. Table 3 shows the maximum dimensions of the rock found in the aforementioned entrance channel segments. This rocky material would be placed in an approximately 25 acre site within the SCDNR Charleston Nearshore Reef. The depth of the placement area would be at minus 35 feet MLLW. The top of the proposed rock mound would be at 25 feet MLLW. Either a rock cutter head pipeline dredge or a mechanical clam shell with rock bucket would deepen the entrance channel and place the rock material in barges. The barges would then be towed to the site and placed within the designated 25 acre site in the SCDNR Charleston Nearshore Reef.

Table 1. New work material from Charleston Post 45 project channel deepening and widening distributed between the Charleston Harbor ODMDS, and upland confined disposal areas (CDFs). Berthing areas compliance to be sought by SCSPA.

52'/48' Project with Max Wideners					
Channel Reach	Dredge Plant Type	# of Dredges	Placement Area	Deepening Dredge Quantity in Cubic Yards (CY)	Duration (Months)
Fort Sumter Reach EC1	Large Hopper	2	ODMDS	4,085,505	3.98
Fort Sumter Reach EC1	Medium Hopper	2	ODMDS	2,199,888	4.11
Fort Sumter Reach EC1	Rock cutter	1	ODMDS Berm	2,503,169	11.57
Fort Sumter Reach EC1	Rock cutter	1	DNR Site	60,000	0.28
Fort Sumter Reach EC1	Rock cutter	1	Reef Placement	420,000	1.81
Ft. Sumter - Reach EC1	Clamshell with bucket	1	ODMDS Berm	660,000	4.34
Ft. Sumter - Reach EC1	Clamshell w/ rock bucket	1	Mitigation Site	360,000	2.52
Ft. Sumter - Reach EC1	Clamshell w/ rock bucket	1	DNR Site	180,000	1.26
Fort Sumter Reach EC2	Large Hopper	2	ODMDS	3,644,084	3.85
Fort Sumter Reach EC2	Medium Hopper	2	ODMDS	1,214,695	2.46
Fort Sumter Reach EC2	Rock cutter	1	ODMDS Berm	3,371,033	13.73
Fort Sumter Reach EC2	Rock cutter	1	Reef Placement	420,000	1.81
Fort Sumter Reach EC2	Clamshell w/ rock bucket	1	Reef Placement	1,080,000	7.69
Mount Pleasant Reach	Clamshell	1	ODMDS	840,083	0.76
Rebellion Reach	Clamshell	1	ODMDS	1,081,341	0.98
Bennis Reach	Clamshell	2	ODMDS	1,942,858	1.12
Horse Reach	Clamshell	2	ODMDS	364,070	0.27
Hog Island Reach	Clamshell	2	ODMDS	2,096,920	1.46
Wando River Lower Reach	Clamshell	2	ODMDS	1,769,070	1.02
Wando River Upper Reach	Clamshell	2	ODMDS	636,251	0.52
Wando River Turning Basin	Clamshell	2	ODMDS	3,284,633	1.81
Segment 1 Total				**32,213,600**	**67.33**
Drum Island Reach	Clamshell	2	ODMDS	917,473	0.72
Myers Bend	Clamshell	2	ODMDS	853,689	0.60
Daniel Island Reach	Pipeline	2	Daniel Island	2,211,957	1.65
Segment 2 Total				**3,983,119**	**2.97**
Daniel Island Bend	Pipeline	2	Daniel Island	74,551	0.21
Clouter Creek Reach	Pipeline	2	Daniel Island	583,150	0.98
Navy Yard Reach	Pipeline	2	Clouter Creek	358,816	0.60
North Charleston Reach	Pipeline	2	Clouter Creek	532,693	0.50
Filbin Creek Reach	Pipeline	2	Yellowhouse	405,420	0.61
Port Terminal Reach	Pipeline	2	Yellowhouse	192,068	0.43
Ordnance Reach	Pipeline	2	Yellowhouse	118,091	0.26
Ordnance Reach Turning Basin	Pipeline	2	Yellowhouse	1,549,313	1.21
Segment 3 Total				**3,814,102**	**4.80**
North Charleston Terminal Berthing Area Dredging	Pipeline	1	Yellowhouse	41,001	0.16
Navy Base Terminal Berthing Area Dredging	Pipeline	1	Daniel Island	474,551	0.73
Wando Terminal Berthing Area Dredging	Pipeline	1	Daniel Island	157,633	0.24
Berthing Areas Total				**673,185**	**1.13**
Total Construction				**40,684,006**	**76.23**

Figure 1. Charleston Harbor Entrance Channel Overview

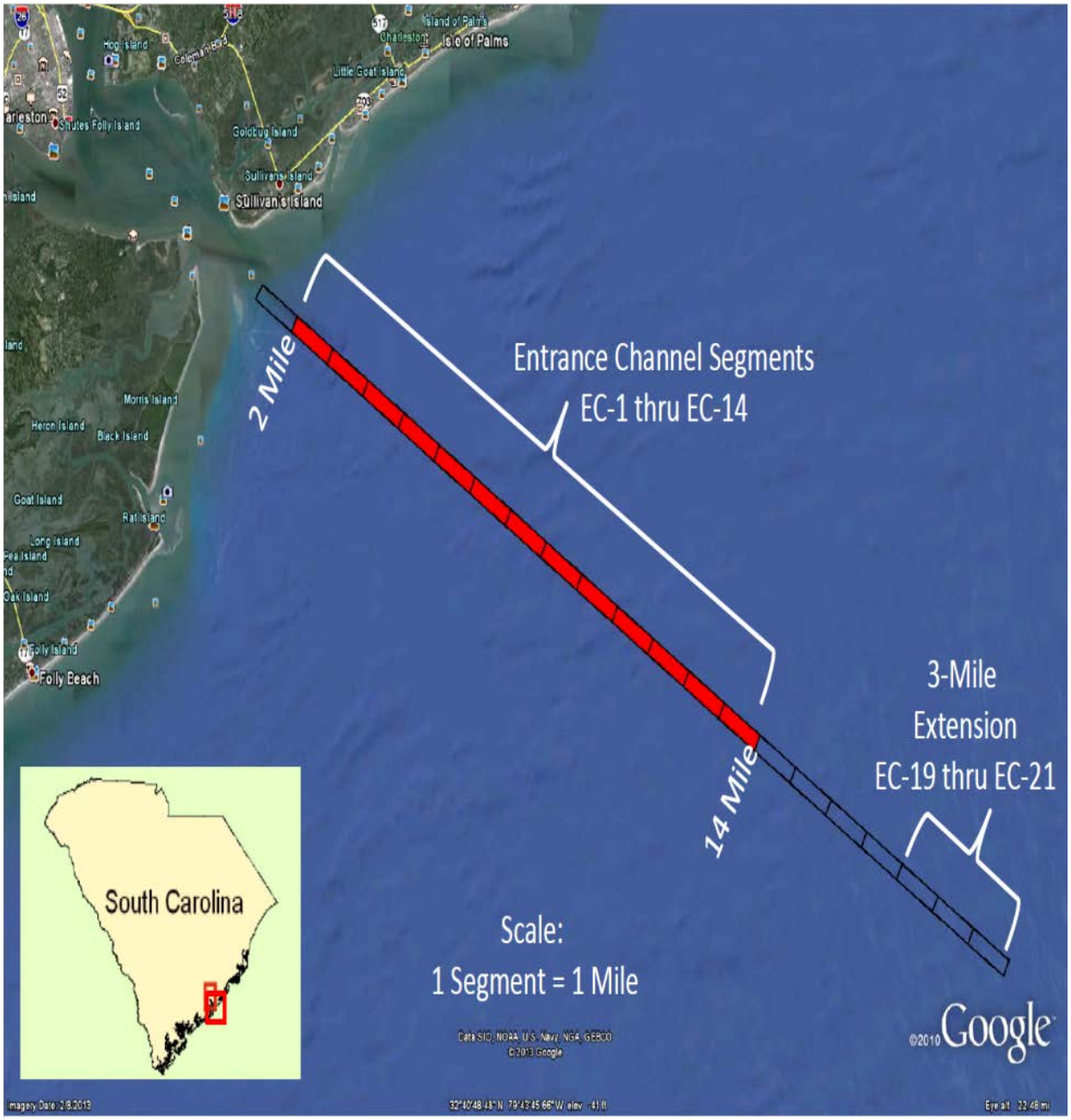

Figure 2. Charleston Nearshore Artificial Reef Location.

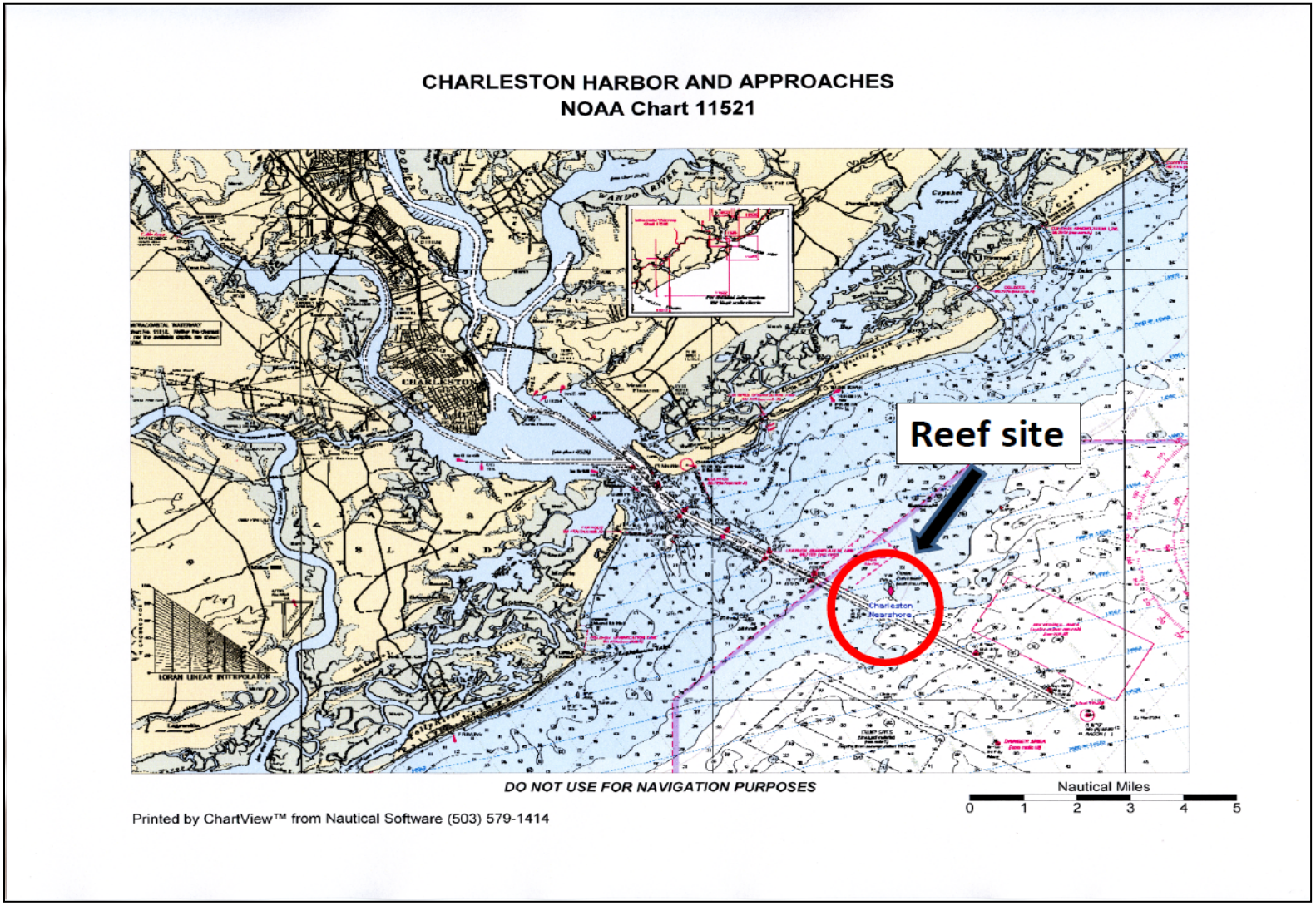

Table 2. Probability matrix for encountering rock based upon historical data. Taken from the Charleston Harbor Post -45 Deepening Feasibility Study, Geotechnical Appendix B.

Estimated Entrance Channel New Work Quantities (CY)				% MATERIAL IN DREDGE CUT TO -58 MLLW				Average Depth TOR (Geophysical)	Average Depth TOR (Washprobe)	Probabilty of Encountering Bedrock
	% (58') QTY	55'	58'	Avg % Uncon	Avg % SoftRock	Avg % CompRock	% Unknown			
Segment 4	8.4%	402,897	737,540	35%	52%	0%	14%	-52	-53.3	HIGH
Segment 5	8.3%	401,301	729,419	46%	34%	11%	9%	-46	-53.4	HIGH
Segment 6	7.4%	349,131	652,831	52%	38%	0%	10%	-48	-53.2	MODERATE
Segment 3	7.1%	306,321	625,978	59%	7%	0%	34%	-54	-52.8	LOW-MODERATE
Segment 7	6.5%	285,333	573,134	62%	33%	0%	5%	-50	-52.9	HIGH
Segment 1	6.5%	265,711	569,596	76%	0%	0%	24%	-54	-53.7	LOW
Segment 10	6.3%	272,282	550,547	30%	16%	47%	7%	-54	-53.3	HIGH
Segment 11	5.9%	250,045	517,333	17%	5%	73%	5%	-52	-53.4	HIGH
Segment 8	5.8%	252,198	507,662	54%	35%	6%	5%	-52	-52.1	HIGH
Segment 9	5.4%	227,373	476,307	38%	24%	34%	3%	-52	-52.8	HIGH
Segment 12	5.1%	198,198	450,290	18%	30%	52%	0%	-50	-51.6	HIGH
Segment 2	5.0%	159,265	435,529	58%	17%	5%	19%	-54	-53.9	MODERATE
Segment 13	4.9%	191,720	430,406	17%	33%	50%	0%	-48	-51.5	HIGH
Segment 16	4.2%	161,390	367,736	35%	31%	28%	6%	-58	-63.8	LOW
Segment 15	3.3%	121,885	289,292	0%	0%	0%	100%	-58	-60.5	LOW
Segment 14	3.3%	120,112	287,713	0%	0%	0%	100%	-52	-55.3	MODERATE
Segment 17	2.2%	70,524	188,858	0%	0%	0%	100%	-56	-65.5	LOW
Segment 19	1.7%	38,774	147,116	0%	0%	0%	100%	-60	-62.3	LOW
Segment 18	1.4%	28,801	118,868	0%	0%	0%	100%	-60	-64.0	LOW
Segment 20	1.2%	12,428	108,614	0%	0%	0%	100%	-65	-62.7	LOW
Segment 21	0.0%	21	2,470	0%	0%	0%	100%	-62	No Data	LOW
Total QTY (CY)	100.0%	4,115,709	8,767,238							

Table 3. Maximum dimensions of rock per segment based drilling data. Taken from the Charleston Harbor Post -45 Deepening Feasibility Study, Geotechnical Appendix B

Channel Segment	Area (sq. feet)	Max Thickness (feet)
EC-4	1,114,646	2.5
EC-5	4,145, 692	12.9
EC-6	2,188, 318	7.3
EC-7	3,028,295	6.6
EC-8	4,500, 286	10.0
EC-9	5,433,416	11.2
EC-10	5,560,563	6.6
EC-11	5,759,802	7.2
EC-12	5,756,055	8.4
EC-13	3,720,418	8.6

3.0 GENERAL DESCRIPTION OF DREDGED MATERIAL

3.1 Review of the Charleston Harbor Entrance Channel Sediment. Borings from 1988, 1989, 1990, 1998, and 1999 were available. More than 125 borings have been conducted; however, all were not reviewed for this analysis. Based on a review of these borings, the more inshore portions of the channel generally contain grey fine grained silty or muddy sands or silts and clays. Deeper beneath these sediments, mixtures of clay, fine sand, and calcareous limestone occurs at varying depths. At approximately Station 450+00, (between navigation buoy's 12 and 10) the surface material becomes more of a thin poorly graded fine to medium sand sandy thin veneer over the clay, sandy, shell calcareous mixture. The clay, sand, shell, calcareous mixture again occurs at varying depths and in some cases is resistant to collection by vibracore. Station 450+00 is approximately 32,500 feet (6.3 miles) offshore of the end of the Charleston jetties or 45,000 feet from the inshore end of the Fort Sumter Range (8.5 miles). This review implies that inshore of 450+00 the sediments are generally finer and more subject to harbor influences than those seaward – sandy sediments.

Additionally the dredging records 2003 to 2010 indicate that the major shoaling areas are inshore of station 300+00 (buoys 13 and 14). The ocean dredged material disposal site (ODMDS) is adjacent to the channel from about station 300+00 out. Seaward of about 450+00, the sediments are likely nearshore ocean sediments; likely similar to those of the adjacent ocean area. They are distant from known sources of pollution. Inshore of Station 450+00 beginning at station 400+00 samples were taken for Section 103 evaluation (pursuant to the Marine Protection Research and Sanctuaries Act).

Charleston Harbor sediment samples for chemical and biological evaluations were collected October 20 through November 19, 2012. Table 4 indicates the numbers of samples and subsamples collected. The results are discussed in U.S. Army Corps of Engineers (2013) Final Report, Charleston Harbor Navigation Improvement Project (Post 45) MPRSA Section 103 Sediment Testing and Analysis, Charleston, South Carolina, December 2013.

Table 4. Sediment and Water Samples Collected.

TOTAL NUMBER OF SAMPLES		No. Composite Samples	No. Sub-Samples
	Vibra core samples	21	105
	Grab samples	1	5
	Site Water samples	3	--

Ten entrance channel core samples (2 composite samples) were taken in the Charleston Entrance. Ten sub-samples (for two composite samples) were taken between station 400+00 and the inshore end of the Fort Sumter Range (40,000 feet channel length - 7.6 miles). These biological and chemical tests indicated that the inner ocean entrance channel material is acceptable for ocean disposal – that is it does not contain contaminants at levels that other than 'trace contaminants".

The testing discussed above included a review of events that have occurred since the last sampling or dredging event that might influence sediment chemistry or bioassay results A query of the U.S. Coast Guard Pollution Incident Reporting System was conducted. Since January 1, 2009, 360 incidents in the Charleston Harbor Federal Navigation Project vicinity were reported in the U.S. Coast Guard Incident Reporting System. These were mostly minor oil and fuel spills and similar insignificant events.

Subpart G of the Guidelines requires the use of available information to make a preliminary determination concerning the need for testing of the material proposed for dredging. This principle is commonly known as "reason to believe". The entrance channel material proposed for use for construction as the rock reef is composed primarily of sand, gravel, or broken rock material. This coarse material is unlikely to contain unacceptable levels of contaminants due to its physical characteristics. In addition, knowledge gained from recent Charleston Post 45 testing may be utilized to conclude that there is no reason to believe that contaminants are present. Additionally the proposed dredging site for the rock reef material is not proximal to other sources of contamination. This sediment information provides a "reasonable assurance that the proposed discharge material is not a carrier of contaminants" (230.60(b)).

3.2 Quantity of Sediments (Cubic Yards). The following new work dredging estimates (Table 1) indicate the following:

a. The Charleston Post 45 proposed project (52 foot/48 foot depths) for the Fort Sumter Channel: Approximately 60,000 cubic yards of rock will be dredged by hydraulic pipeline with rock cutter head and placed in barges. Tugs will tow and deposit the predominantly rocky material in the SCDNR Charleston Nearshore Reef (see Figure 2).

b. The Charleston Post 45 proposed project (52 foot/48 foot depths) for the Fort Sumter Channel: Approximately 180,000 cubic yards of rock will be dredged by mechanical clam shell with rock bucket and placed in barges. Tugs will tow these barges and deposit the predominantly rocky material in the SCDNR Charleston Nearshore Reef (see Figure 2).

3.3 Source of Material. All of the dredged material subject to this Section 404 (b)(1) analysis for the Charleston Harbor Post 45 proposed project (i.e., the -52/48 channel depth) would be excavated and placed in barges. The barges would then be towed and deposited within the SCDNR Charleston Nearshore Reef. The source of this rock material would emanate from the bottom sediments from the Fort Sumter reach in the Charleston Harbor Entrance Channel.

4.0. CHARLESTON DISTRICT'S COMPLIANCE WITH SECTION 404(b)(1) GUIDELINES

The evaluation requirements of Section 404 of the CWA are guidelines developed by the U.S. Environmental Protection Agency (USEPA) in conjunction with the USACE and codified in 40 CFR Part 230. Under Subpart B of the Guidelines, the USACE's evaluation of the Post 45 Project is required to address the following four tests in order to be in compliance with these Guidelines.

4.1 Finding of Practicable Alternatives (40 CFR 230.10 [a])

The first compliance test of the Guidelines states that:

Except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

The Guidelines define a *practicable alternative* as one that is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR 230.10 [a][2]). Section 4.1 forms the basis of the USACE, Charleston District's analysis of practicable alternatives for the Guidelines evaluation.

4.1.1 Offsite Locations and Configurations.

For the Dredged Area: Offsite locations were not considered because the project is specific to the area within the existing Charleston Harbor Entrance Channel (Fort Sumter reach), near the SCDNR Charleston Nearshore Reef (Figure 2).

For the Disposal Area: Offsite locations were considered for the disposal of the dredged material. Ocean disposal was considered with the dredged material to be placed within the Charleston Harbor ODMDS. However this alternative would take additional time and money, since the SCDNR Charleston Nearshore Reef is significantly closer than the ODMDS. The rock dredged from the entrance channel and placed in the adjacent SCDNR Nearshore Reef would also be a beneficial use of dredge material. Therefore, the SCDNR Nearshore Reef was selected as the only practicable alternative for disposal of about 240,000 cubic yards of rock from the Entrance Channel (Fort Sumter reach).

4.1.2 Onsite Configurations

For the Dredged Area: **Onsite Alternative 1:** The USACE, Charleston District considered using either a rock cutterhead hydraulic pipeline dredge or clamshell with rock bucket to deepen the Fort Sumter reach in the Entrance Channel. The excavated sediment would be placed in barges and disposed in the Upper Harbor Channels existing CDF's (Daniel Island, Clouter Creek, and Yellow house). Although these methods would allow for excavation of the Entrance Channel to sufficient depths, the distance from the Entrance Channel to the Upper Harbor Channels CDFs is over 30 miles one way and would add significant time to complete the project due to the limited quantity of material that the barge could accommodate. The cost and logistics associated with the barge being loaded and transported to the offsite disposal area was determined to be not practicable and resulted in considerable additional costs and traffic within the Charleston Harbor Channels. Since there were no real benefits to the environment associated with this alternative, it was not considered any further.

For the Disposal Area: **Onsite Alternative 1:** In lieu of placing the rock material from the Fort Sumter reach (in the Entrance Channel) to the Charleston Harbor ODMDS or the SCDNR Nearshore Reef, the District considered developing new alternate disposal sites within the Waters of the United States (i.e., within the 3 mile limit). The excavated material from the

deepened Fort Sumter reach in the Entrance Channel would be placed in barges and dumped in a new offshore disposal area near the Entrance Channel. However, no benthic, cultural, or substrate surveys have been undertaken within this new proposed offshore disposal area. Additionally, no State and/or Federal permits have been obtained for this proposal. The time required acquiring the necessary authorizations and the possible significant cost to mitigate the impacts to the waters and/or existing hard bottom areas would be excessive. Due to the additional time and significant costs to the Charleston Post 45 project, this alternative was not considered to be a practicable alternative.

4.1.3 No Action Alternatives

No Action Alternative:
The No-Action Alternative would result in the placement of the rock dredged from the Fort Sumter reach in the Entrance Channel and disposed within the Charleston Harbor ODMDS. The beneficial use of rock dredged from the Post 45 project would not be used to enhance fishery resources in the SCDNR Nearshore Reef. The No Action Alternative would have a negative effect on recreational fishing and not provide additional opportunities for sport fisherman and divers in South Carolina. Therefore, the No Action Alternative was not considered further.

4.1.4 Least Environmentally Damaging Practicable Alternative (LEDPA): The LEDPA is determined through an evaluation of the Guidelines of Section 404 of the Clean Water Act. In this case, the sole activity regulated under Section 404 for this proposed discharge is the dredged rock placed in the SCDNR Charleston Nearshore Reef. A more thorough evaluation of "reasonable" alternatives took into consideration the area to be dredged. After an evaluation of the alternatives for the dredge area, as well as alternatives considered for the disposal of the dredged material, the dredged rock being discharged into the SCDNR Charleston Nearshore Reef is considered to be the least environmentally damaging practicable alternative (LEDPA) under the Guidelines.

4.2 Additional Restrictions on Discharge (40 CFR 230.10[b])

The second compliance test under the Guidelines considers specific impacts that may warrant additional restrictions on discharge. Specifically, the Guidelines state that no discharge of dredged or fill material may be permitted if it will:

1. Cause or contribute to violations of any applicable State water quality standard.

2. Violate any applicable toxic effluent standard or prohibition under Section 307 of the CWA.

3. Jeopardize the continued existence of species listed as endangered or threatened under the ESA of 1973, or result in the potential for adverse impacts (destruction or adverse modification) of a habitat which is determined by the Secretary of the Interior or Commerce to be a critical habitat under the ESA of 1973. If an exemption has been granted by the Endangered Species Committee, the terms of the exemption shall apply, in lieu of this paragraph.

4. Violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

The proposed use of the SCDNR Charleston Nearshore Reef, and the larger deepening effort of which it is a part, does not violate applicable State water quality standards or Section 307 prohibitions or effluent standards (see Sections 3.0 and 5.0 in this analysis and Section 5.0 of the Final IFR/EIS for additional information supporting this determination). The proposed activity does not jeopardize the continued existence of federally listed threatened or endangered species or affect their critical habitat (see Section 5.0 in this analysis and the BATES in Appendix F of the Final IFR/EIS for additional information supporting this determination. Formal consultation has been initiated with NMFS and the resulting biological opinion is included as an appendix to the Final IFR/EIS. The proposed activity does not violate the requirements of a federally designated marine sanctuary (see the EFH assessment in Appendix H in the Final IFR/EIS for additional information supporting this determination). Accordingly, the Charleston Post 45 Project is in compliance with the requirements of section 230.10(b) of the Guidelines. 4.3 Finding of No Significant Degradation (40 CFR 230.10[c]).

4.3 Finding of No Significant Degradation (40 CFR 230.10[c])

The third compliance test under the Guidelines considers the potential for the proposed discharge to cause or contribute to the degradation of waters of the U.S. The Guidelines state that except as provided under Section 404(b)(2), the discharge of dredged or fill material that will cause or contribute to significant degradation of waters of the U.S. may not be authorized. The Guidelines further define the types of effects that may, either individually or collectively, contribute to the significant degradation of waters of the U.S. These include:

1. Significant adverse effects of discharge of pollutants on human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites;

2. Significant adverse effects of discharge of pollutants on life stages of aquatic wildlife and other wildlife dependent on aquatic ecosystems, to include the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and/or chemical processes;

3. Significant adverse effects of discharge of pollutants on aquatic ecosystem diversity, productivity, and stability including but not limited to the loss of fish and wildlife habitat, or the loss of the capacity of wetland to assimilate nutrients, purify water, or reduce wave energy; and

4. Significant adverse effects of discharge of pollutants on recreational, aesthetic, and/or economic values.

The proposed disposal of excavated rock material within the SCDNR Charleston Nearshore Reef will not cause or contribute to significant degradation of waters of the United States. This finding of no significant degradation is based on extensive sampling, testing and evaluation of the harbor sediments consistent with Subpart G of the Guidelines, an evaluation pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act (USACE 2014) which is found in Appendix J of the Final IFR/EIS, and additional findings and determinations pursuant to Subparts C through F of the Guidelines, with special emphasis on the persistence and permanence of the effects (see also Section 5.0 of the Final IFR/EIS for additional information supporting this determination). Accordingly, the proposed discharge is in compliance with the requirements of Section 230.10(c)

of the Guidelines.

4.4 Minimization of Potential Adverse Impacts (40 CFR 230.10[d])

The fourth compliance test under the Guidelines considers the extent to which steps have been taken to minimize potential adverse effects. The Guidelines state that, except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

All appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. See the discussion under "Actions to minimize adverse effects (Subpart H)," below, for details regarding specific minimization measures. Accordingly, the proposed discharge is in compliance with the requirements of section 230.10(d) of the Guidelines.

5.0 FURTHER EVALUATION OF THE 404(b)(1) GUIDELINES

For each of the below listed evaluation criteria, this section describes the potential impact, any minimization measures that would be used to reduce the level of impact, and the resultant impact level. This analysis addresses the impacts associated with placement of dredged or fill material into waters of the U.S., including special aquatic sites.

Potential effects on physical and chemical characteristics of the aquatic ecosystem (Subpart C)

Sec. 230.20 Substrate. The substrate of the aquatic ecosystem underlies open waters of the U.S. and constitutes the surface of wetlands. Based on a review of Entrance Channel borings, the more inshore portions of the channel generally contain grey fine grained silty or muddy sands or silts and clays. Deeper beneath these sediments, mixtures of lay, fine sand, and calcareous limestone occurs at varying depths. The sediment to be discharged into the SCDNR Charleston Nearshore Reef is composed mainly of calcareous limestone and will be contained within the proposed 25 acre placement area. Each barge load of dredged rock placed within the nearshore reef may contain minimal amounts of suspended sediment, which could cause minor amounts of turbidity within the water column. The insignificant amount of sediment discharged into the SCDNR Charleston Nearshore Reef would have no effect on the composite and/or bottom contours of the nearshore reef area. Therefore, the proposed discharge will have no significant adverse effects on the substrate.

Sec. 230.21 Suspended particulates/turbidity. Suspended particulates in the aquatic ecosystem consist of fine-grained mineral particles, usually smaller than medium sands, and organic particles. Suspended particulates may enter water bodies as a result of surface runoff, flooding, vegetative and planktonic breakdown, re-suspension of streambed sediments, and man's activities including dredging and filling. Particulates may remain suspended in the water column for variable periods of time as a result of such factors as water velocity, turbulent agitation of the water mass, particle shape, specific gravity, and diameter, and physical and chemical properties of particle surfaces. The extent and persistence of these adverse impacts caused by discharges

depend upon the relative increase in suspended particulates above the amount occurring naturally, the duration of the higher levels, the current patterns, water level, and fluctuations present when such discharges occur, the volume, rate, and duration of the discharge, particulate deposition, and the seasonal timing of the discharge. Suspended solids within the barge loads of rock material placed within the SCDNR Charleston Nearshore Reef could affect turbidity within the nearshore area. Predominantly dredged rock material will be placed within the nearshore reef and minor amounts of sediments would settle out within the water column. As a result, the majority of the sediment remains within the nearshore reef and would not impact the adjacent water column. The SCDNR Charleston Nearshore Reef is located about 2.5 nautical miles from the Charleston Harbor jetty. The 240,000 cubic yards of dredged rock that would be placed within the nearshore reef adjacent to the entrance channel would be insignificant compared to the volume of water currently within the nearshore area. Any suspended solids within the dredged rock would be diluted in the water column; therefore, the proposed discharge will have no significant adverse effects on suspended particulates/ turbidity.

Sec. 230.22 Water. Water is the part of the aquatic ecosystem in which organic and inorganic constituents are dissolved and suspended. It constitutes part of the liquid phase and is contained by the substrate. Water forms part of a dynamic aquatic life-supporting system. Water clarity, nutrients and chemical content, physical and biological content, dissolved gas levels, pH, and temperature contribute to its life-sustaining capabilities. Suspended solids within each barge load of dredged rock could affect turbidity in the nearshore area. A small amount of sediment within each barge of dredged rock would be placed within the SCDNR Charleston Nearshore Reef. The majority of sediment would settle out while the predominantly rock is discharged into the reef. As a result, a very small amount of sediment would be discharged each time a barge is unloaded at the reef site and would enter the water column. The SCDNR Charleston Nearshore Reef is 2.5 nautical miles from the Charleston Harbor jetty and the placement area has strong currents and tidal flushing. The amount of sediment from each barge load of dredged rock that would be discharged into the nearshore ocean would be insignificant compared to the volume of water currently within the waterbody. Any suspended solids within each barge load of rock would be diluted in the water column; therefore, the proposed discharge will have no significant adverse effects on water.

Sec. 230.23 Current patterns and water circulation. Current patterns and water circulation are the physical movements of water in the aquatic ecosystem. Currents and circulation respond to natural forces as modified by basin shape and cover, physical and chemical characteristics of water strata and masses, and energy dissipating factors. The nearshore ocean is traditionally navigable water with strong currents and tidal influence. The amount of sediment from each barge load of dredged rock that would be discharged into these waters would be insignificant compared to the volume of water currently within the nearshore ocean; therefore, the proposed discharge will have no significant adverse effects on current patterns and water circulation.

Sec. 230.24 Normal water fluctuations. Normal water fluctuations in a natural aquatic system consist of daily, seasonal, and annual tidal and flood fluctuations in water level. Biological and physical components of such a system are either attuned to or characterized by these periodic water fluctuations. The Atlantic Ocean is traditionally navigable water with strong currents and tidal fluctuations. The amount of sediment from each barge load of dredged rock that would be discharged into these waters would be insignificant compared to the volume of water currently within the waterbody; therefore, the proposed discharge will have no significant adverse effects

on normal water fluctuations.

Sec. 230.25 Salinity gradients. Salinity gradients form where salt water from the ocean meets and mixes with fresh water from land. Obstructions which divert or restrict flow of either fresh or salt water may change existing salinity gradients. The SCDNR Charleston Nearshore Reef proposed for use by the USACE, Charleston District is located within the tidally influenced Atlantic Ocean. Sediment within each barge load of dredged rock from the adjacent Entrance Channel would have similar salinity level as the water at the proposed reef site. Therefore, the proposed discharge will have no significant adverse effects on salinity gradients.

Potential effects on biological characteristics of the aquatic ecosystem (Subpart D)

Sec. 230.30 Threatened and endangered species. The Guidelines specifically state that "where consultation with the Secretary of the Interior occurs under section 7 of the Endangered Species Act, the conclusions of the Secretary concerning the impact(s) of the discharge on threatened and endangered species and their habitat shall be considered final."

A Biological Assessment of Threatened and Endangered Species (BATES) was prepared for the Charleston Harbor Post 45 Project (See Appendix F in the Final IFR/EIS). The BATES reached the following conclusions:

The Charleston Post 45 project may affect and is likely to adversely affect the loggerhead, green and Kemp's ridley sea turtles when hopper dredges are operating during the new work construction and O&M dredging in the Entrance Channel. The project may affect but is not likely to adversely affect the loggerhead, green and Kemp's ridley sea turtles when a cutterhead, mechanical dredged and any bed leveling is performed. All other activities will have no effect on these species. The project construction methods will have no effect on the leatherback sea turtle. Protective dredging measures will be incorporated consistent with the existing SARBO. In addition to these short term construction impacts, the project will have no effect on marine sea turtle food supplies, habitats, or life periods as a result of channel modifications. The loggerhead, leatherback, Kemp's ridley and green sea turtles will be analyzed under Section 7 consultation with the NMFS and a Biological Opinion may be developed in order to account for any takes that may occur.

No whales are likely to be adversely affected by the proposed project. Transportation to and from dredging sites and the disposal areas may affect but is not likely to adversely affect the North Atlantic right whale and the humpback whale. All other construction aspects and the changed channel dimensions will have no effect on these species food supply, life stage, nor habitats. North Atlantic right whales have been observed in the project area and dredging conditions outlined in the 2008 South Atlantic Regional Biological Opinion on Hopper Dredging will be followed in order to avoid impacts to North Atlantic right whales. Humpback whales are not likely to be in the project area but the same protective conditions will be followed in order to avoid potential impacts. A Biological Opinion may also be written on whales by NMFS.

The USFWS has standard manatee protection conditions involving water-borne construction projects including dredging. With implementation of these conditions the proposed project construction may affect but is not likely to adversely affect the West Indian manatee. The channel modifications will have no effect on food supplies, habitats, or life period. In addition the USFWS

and NMFS may also include special terms and conditions in a Biological Opinion for this project.

Both the shortnose and Atlantic sturgeon will have protective conservation measures in place as outlined in the SARBA. The NMFS may also include additional protective terms and conditions in a Biological Opinion that will be adhered to. With the implementation of the protection measures in place the proposed project construction methods (i.e., hopper, cutterhead and mechanical dredging) may affect, and is likely to adversely affect shortnose and Atlantic sturgeon. If trawling is used during construction or O&M both species are likely to be adversely affected. Channel modifications may affect but are not likely to adversely affect sturgeon species food supplies, habitats, or life periods.

Most aspects of the proposed project construction and O&M dredging will have no effect on the American wood stork, piping plover, or red knot. If beneficial use of dredged material occurs at Crab Bank, the project may affect but is not likely to adversely affect these species food supply, life stage, or habitats. Little or no nesting or foraging data for these species has been found at the project's upland confined disposal areas. These species are protected under the migratory bird treaty act as well as the endangered species act. Therefore, regardless of status changes in the case of any bird species, protective measures will be in place.

There will be no effect on seabeach amaranth as no records of the species occurrence in the project area have been found. If seabeach amaranth is in the project area it would be expected to be outside of the construction areas as it is a beach dwelling plant.

The BATES was submitted to both the USFWS and the NMFS for their review and approval. Formal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) was initiated with NMFS. USACE, Charleston District will abide by all Terms and Conditions mentioned in the Final Biological Opinion for the Charleston Harbor Post 45 Project, dated April 22, 2015. The placement of predominantly rock material dredged from the adjacent entrance channel and placed within the SCDNR Charleston Nearshore Reef is not expected to adversely impact any threatened and/or endangered species.

Sec. 230.31 Fish, crustaceans, mollusks, and other aquatic organisms in the food web. Aquatic organisms in the food web include, but are not limited to, finfish, crustaceans, mollusks, insects, annelids, planktonic organisms, and the plants and animals on which they feed and depend upon for their needs. All forms and life stages of an organism, throughout its geographic range, are included in this category. Suspended solids from the minor amounts of sediment within each barge load of dredged rock placed within the SCDNR Charleston Nearshore Reef could impact fish and wildlife. The majority of the suspended solids would settle out within the nearshore reef before entering the adjacent water column. These ocean waters are traditionally navigable waters with strong currents and tidal influence. The amount of sediment that would be discharged into these waters would be insignificant compared to the volume of water currently within the waterbody. Any suspended solids within the barge load of rock would be diluted in the water column. In addition, the receiving water (i.e. the Atlantic Ocean) would be similar to the dredged rock. As a result, the impacts of the return water on aquatic organisms are expected to be negligible; therefore, the proposed discharge will have no significant adverse effects on fish, crustaceans, mollusks or other aquatic organisms (see EFH Assessment in Appendix H in the Final IFR/EIS).

Sec. 230.32 Other wildlife. Wildlife associated with the SCDNR Charleston Nearshore Reef would only include transient birds and fishery resources which would not be impacted by the dredged rock placed within the SCDNR Charleston Nearshore Reef in the Atlantic Ocean. Therefore, it has been determined that the proposed discharge will have no significant adverse effects on wildlife.

Potential Effects on Special Aquatic Sites (Subpart E)

Sec. 230.40 Sanctuaries and refuges. Sanctuaries and refuges consist of areas designated under State and Federal laws or local ordinances to be managed principally for the preservation and use of fish and wildlife resources. There are no sanctuaries or refuges in or near the SCDNR Charleston Nearshore Reef. The closest refuge is the Cape Romain National Wildlife Refuge located approximately 27 miles from the nearshore reef site where the rock material will be discharged in the Atlantic Ocean. Therefore, the proposed discharge will have no significant adverse effects on sanctuaries and refuges.

Sec. 230.41 Wetlands. Wetlands consist of areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. No wetlands will be filled by the proposed placement of dredged rock within the SCDNR Charleston Nearshore Reef; therefore, the proposed discharge will have no significant adverse effects on wetlands.

Sec. 230.42 Mud flats. Mud flats are broad flat areas along the sea coast and in coastal rivers to the head of tidal influence and in inland lakes, ponds, and riverine systems. Coastal mud flats are exposed at extremely low tides and inundated at high tides with the water table at or near the surface of the substrate. There are no “broad flat areas” constituting mud flats within the deepening footprint in the Entrance Channel. In addition, there are no mudflats located in the SCDNR Charleston Nearshore Reef where the dredged rock material will be placed. The SCDNR Charleston Nearshore Reef is located 2.5 nautical miles from the Charleston Harbor jetty. The dredged rock will be placed in the Atlantic Ocean devoid of mud flats at the discharge point. Therefore, the proposed project will have no significant adverse effects on mudflats.

Sec. 230.43 Vegetated shallows. Vegetated shallows are permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as freshwater species in rivers and lakes. The SCDNR Charleston Nearshore Reef rock placement site is at minus 35 foot depth MLLW in the Atlantic Ocean. There are no vegetated shallows in or adjacent to the proposed reef site. The dredged rock placed with the nearshore reef is a tidal waterbody devoid of vegetated shallows; therefore, the proposed discharge will have no significant adverse effects on vegetated shallows.

Sec. 230.44 Coral reefs. Coral reefs consist of the skeletal deposit, usually of calcareous or silicaceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef. There are no coral reefs in or near the SCDNR Charleston Nearshore Reef; therefore, the proposed discharge will have no significant adverse effects on coral reefs.

Sec. 230.45 Riffle and pool complexes. There are no riffle and pool complexes within the SCDNR Nearshore Reef.

Potential effects on human use characteristics (Subpart F)

Sec. 230.50 Municipal and private water supplies. Municipal and private water supplies consist of surface water or ground water which is directed to the intake of a municipal or private water supply system. The SCDNR Nearshore Reef is located 2.5 nautical miles from the Charleston Harbor jetty in the Atlantic Ocean and will have no significant adverse effects on municipal and/or private fresh water supplies.

Sec. 230.51 Recreational and commercial fisheries. Recreational and commercial fisheries consist of harvestable fish, crustaceans, shellfish, and other aquatic organisms used by man. Dredged rock placed within the SCDNR Nearshore Reef would be beneficial for recreational fishing. The rock reef creation was coordinated with local shrimping interests and the project would have no adverse impact to shrimp trawling as long as material placement occurs within the boundaries on the NOAA charts. The minor amount of turbidity generated each time a barge of dredged rock is placed within the 25 acre reef would be minor and temporary; resuming normal conditions after placement activities are completed. Subpart G of the Guidelines requires the use of available information to make a preliminary determination concerning the need for testing of the material proposed for dredging. This principle is commonly known as "reason to believe". The entrance channel material proposed for use for construction as the rock reef is composed primarily of sand, gravel, or broken rock material. This coarse material is unlikely to contain unacceptable levels of contaminants due to its physical characteristics. In addition, knowledge gained from recent Charleston Post 45 testing may be utilized to conclude that there is no reason to believe that contaminants are present. Additionally the proposed dredging site for the rock reef material is not proximal to other sources of contamination. This sediment information provides a "reasonable assurance that the proposed discharge material is not a carrier of contaminants" (230.60(b)). In fact the placement of 240,000 cubic yards of rock within the SCDNR Nearshore Reef would enhance recreational fishing and sport diving.

Sec. 230.52 Water-related recreation. Water-related recreation encompasses activities undertaken for amusement and relaxation. Activities encompass two broad categories of use: consumptive, e.g., harvesting resources by hunting and fishing; and non-consumptive, e.g. canoeing and sight-seeing. The SCDNR Charleston Nearshore Reef is located within the Atlantic Ocean. The Atlantic Ocean is utilized heavily in this area for boating, waterborne commerce, and fishing. There are miles of coastline and marsh utilized for water-related activities in this area. The placement of dredged rock within the SCDNR Charleston Nearshore Reef will have no significant adverse effects on water-related recreation.

Sec. 230.53 Aesthetics. Aesthetics associated with the aquatic ecosystem consist of the perception of beauty by one or a combination of the senses of sight, hearing, touch, and smell. Aesthetics of aquatic ecosystems apply to the quality of life enjoyed by the general public and property owners. The only visible portion of the proposed project related to the placement of dredged rock within the SCDNR Charleston Nearshore Reef would be the mechanical dredge, barge and tugboat. The reef placement site is located 2.5 nautical miles from the Charleston Harbor jetty. The discharge may result in a minor sediment plume which could be visible at the surface; however, it will be temporary and return to normal at the completion of the project. Based on the above, the proposed discharge will have no significant adverse effects on aesthetics.

Sec. 230.54 Parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves. These preserves consist of areas designated under Federal and State laws or local ordinances to be managed for their aesthetic, educational, historical, recreational, or scientific value. The Charleston Post 45 project placement of dredged rock in a nearshore reef will not involve encroachment into or location adjacent to parks, national monuments, national seashores, wilderness areas, research sites, and similar preserves; therefore, impacts to these resources are expected to be negligible.

Evaluation and testing (Subpart G)

Sec. 230.60 and 230.61 General evaluation of dredged or fill material and Chemical, Biological and Physical evaluation and testing.

Section 3.0 General Description of Dredge Material in this 404(b)(1) evaluation fully describes the chemical, biological, and physical evaluation and testing of the harbor sediment for the Charleston Post 45 project.

Actions to minimize adverse effects (Subpart H)

Actions regarding the location of the discharge, the material to be discharged, controlling the material after discharge, the method of dispersion, those related to technology, plant and animal populations, spawning or migration seasons and other biologically critical time periods were considered. In evaluating this Section 404(b)(1) analysis, the direct fill in waters of the U.S. has been minimized to the maximum extent practicable.

The following special conditions will either be included in the Environmental Commitments section in the Final IFR/EIS and/or within the contract specifications to protect the integrity of the aquatic environment and protect fish and wildlife resources:

That the USACE, Charleston District will ensure that the dredging contractor is aware that it is the expectation of this office that environmentally responsible dredging take place at all times. It is also a requirement of the contract that the disposal site within the SCDNR Nearshore Reef have an on-site inspector (this inspector can be an employee of the Dredging Contractor or the "Engineer") monitoring the disposal site throughout the dredging activity to ensure that the dredged rock placement activities are properly maintained and all the requirements of the "Dredging and Disposal Plan" (with all revisions addressed above) are adhered to.

6.0 FACTUAL DETERMINATIONS (SUBPART B, SECTION 230.11)

Physical substrate (40 CFR 230.11(a)). As discussed previously, the dredged material from the entrance channel will be placed in the authorized SCDNR Charleston Nearshore Reef consists mainly of large coarse grain rocky sediments. Once placed in the SCDNR Charleston Nearshore Reef, the predominately rocky sediment will be used as a beneficial source for fishery habitat in the Atlantic Ocean. The purpose of this action is to create a rocky reef structure within the predominantly sandy substrate of the nearshore ocean. The depth of the placement area would be at minus 35 feet MLLW. Once completed the top of the proposed rock mound would be at 25

feet MLLW. The substrate of the Atlantic Ocean at the discharge location is consistent with the material being dredged from the adjacent entrance channel. Finer sediments suspended in the predominantly rocky material are expected to be minimal upon discharge and will disperse quickly into the water column; therefore, the proposed discharge within the designated SCDNR Charleston Nearshore Reef will have a minor impact on the physical substrate in the immediate vicinity of the discharge point or the surrounding substrate on the Atlantic Ocean.

Water circulation, fluctuation, and salinity (40 CFR 230.11(b)). The Atlantic Ocean in the vicinity of the SCDNR Nearshore Reef is traditionally navigable water with strong currents and tidal influence. The amount of rocky sediment that would be discharged into the ocean from the barges will be insignificant compared to the volume of water currently in the disposal area. The dredged material from the entrance channel and associated rocky sediment placement in the nearshore ocean are also located in a marine landscape and are of similar salinity to that at the discharge point along the ocean; therefore the discharge will have a negligible effect on the salinity regime of the ocean at this location. In addition, the insignificant amount of rocky sediment being released within the SCDNR Charleston Nearshore Reef will have a negligible effect on the water circulation and fluctuation in the receiving waterbody.

Suspended particulate/turbidity (40 CFR 230.11(c)). Suspended solids within the barge loads of predominantly rocky sediment placed in the SCDNR Charleston Nearshore Reef could affect turbidity within the Atlantic Ocean. However, once the predominantly rocky dredged material is placed within the SCDNR Nearshore Reef, the accompanying insignificant amount of finer sediments will be allowed to settle out within the ocean water column. As a result, the majority of the coarser rocky sediment will be retained within the SCDNR Charleston Nearshore Reef and will not significantly affect turbidity within the ocean water column. The amount of finer sediment within the barge loads of rock would be insignificant compared to the volume of water currently within the nearshore artificial reef site. Any suspended solids within the barge loads of predominantly rock sediment would be diluted in the water column and be immediately dispersed. Once the project construction is complete, turbidity levels at the discharge point (i.e., SCDNR Charleston Nearshore Reef) will return to normal levels. Therefore, the proposed discharge will have a minimal, short term effect on turbidity.

Contaminant availability (40 CFR 230.11(d)). As described above in the Evaluation and Sediment Testing Section 3.0 and in USACE (2013 and 2014), sediments in the areas proposed for dredging were tested. Sediment testing concluded pollutants were found to be within acceptable parameters. Based on the results of the sediment testing and subsequent report, it is not anticipated that there will be any adverse impacts to the aquatic ecosystem from contaminants, nor will there be any violations of state water quality standards resulting from the placement of rocky dredged sediment placed within the SCDNR Charleston Nearshore Reef.

Aquatic ecosystem effects (40 CFR 230.11(e)). The finer sediment from the barge loads of predominately rocky sediment being discharged into the Atlantic Ocean is insignificant compared to the water existing within the system. Sediment testing concluded (Section 103 Evaluation (USACE 2014), which is found in Appendix J in the Final IFR/EIS) pollutants were found to be within acceptable parameters, will not be harmful to the aquatic environment or organisms therein; therefore, impacts to the aquatic ecosystem and organisms are expected to be negligible.

Proposed disposal site (40 CFR 230.11(f))(1). A close evaluation of 40 CFR 230.11(f))(1) states that each disposal site shall be specified through the application of the Guidelines defined within this section. These guidelines relate specifically to disposal sites in open waters and the factors to consider when determining the acceptability of a proposed mixing zone. Predominately coarse grained rocky sediment will be placed within the previously authorized SCDNR Nearshore Reef. The SCDNR has obtained all required authorizations to allow the placement of material within this designated site. Currently, SCDNR has placed concrete rubble, Cooper River Bridge rubble, missile ballast cans, missile motor cradles, and seven barges in the Charleston Nearshore Reef. No significant amounts of fine grained material dredged from the Entrance Channel will be placed in open waters of the Atlantic Ocean. The proposed placement of rocky material excavated from the entrance channel will be a beneficial use of dredged material. Only insignificant amounts of turbidity would be generated from the placement of rocky material within the SCDNR Charleston Nearshore Reef. Therefore the turbidity generated from each barge load of rocky material placed within this previously authorized SCDNR Charleston Nearshore Reef is insignificant and would stop once all work has been completed. The proposed mixing zone adjacent to the SCDNR Charleston Nearshore Reef would be minor since all of the predominantly coarse grained sediment would be retained within the disposal area.

Cumulative effects (40 CFR 230.11(g)). A cumulative impact analysis has been prepared for the Charleston Harbor Post 45 Project and can be found in Appendix O in the final IFR//EIS. This analysis focused on the potential cumulative impacts of the overall proposed project to various resources in the Atlantic Ocean, estuary including wetlands, fisheries, groundwater, and Threatened and Endangered species, Air Quality, etc. The disposal of dredged material for purposes of augmenting the SCDNR Charleston Nearshore Reef is not expected to materially contribute to any adverse cumulative impacts.

Secondary effects (40 CFR 230.11(h)). The use of the authorized SCDNR Charleston Nearshore Reef is a mature and well-established dredged material management alternative. This facility is designed to minimize the direct and secondary impacts of discharging predominantly rocky dredged material. Even under the No Action alternative, the SCDNR Nearshore Reef will continue to occupy the same footprint and continue to receive suitable material for the development of an artificial reef site. Because testing indicates that harbor sediments are within acceptable levels for contaminants, there is no expected secondary impact due to leaching of material discharged into the SCDNR Nearshore Reef. Most of the secondary impacts associated with the dredged and fill material placement sites for the Charleston Harbor Post 45 Project are positive, since they are part of the project's mitigation plan. Based on the predominately rocky dredged sediment placed within the designated SCDNR Nearshore reef which will limit secondary effects, the proposed discharge into these facilities will have a negligible effect.

7.0 FINDINGS OF COMPLIANCE

This document constitutes USACE's determination that the proposed discharge in the SCDNR Charleston Nearshore Reef complies with the Guidelines and documents that the USACE has considered public comments during the Final IFR/EIS review period (See Appendix Q of the Final IFR/EIS). The Record of Decision (ROD) describes the final USACE decision on the Charleston Post 45 Project and its determination of whether the proposed project complies with the Guidelines. At this time and based on the foregoing analysis, the USACE's finding is that the proposed

discharge of dredged material in the SCDNR Charleston Nearshore Reef is in compliance with the requirements of the Guidelines.

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