Charleston District

CHARLESTON PENINSULA, SOUTH CAROLINA,

A COASTAL STORM RISK MANAGEMENT STUDY

Charleston, South Carolina

RESPONSE TO PUBLIC COMMENTS APPENDIX - I

February 2022

This appendix outlines the public involvement process, describes the public comment process, and provides responses to public comment received during the public comment period of the draft Feasibility Report and Environmental Impact Statement (FR/EIS) for the Charleston Peninsula Coastal Storm Risk Management Study.

1.1 Introduction

The NEPA process for this Study initially led to the release of a draft Feasibility Report and Environmental Assessment (FR/EA) in April of 2020. After further agency deliberation and review of public comments on the draft FR/EA, it was determined that the interests of NEPA would be better served by the preparation of an FR/EIS. In order to do so, an exemption had to be secured to the requirement identified in Section 1001(a) of the Water Resources Reform and Development Act of 2014 that feasibility reports are, to the extent practicable, to be completed in three years at a maximum Federal cost of $3 million. An exemption was obtained from the Assistant Secretary of the Army for Civil Works on March 2, 2021 which enabled the study to move to an EIS.

The Notice of Intent (NOI) for this study was published in the Federal Register on March 23, 2021 (86 Federal Register [FR] 15470). On the same date, FAQs on the study website were updated to reflect and notify the public regarding the decision to move to an FR/EIS. The scoping comment period ended April 22, 2021. A virtual (due to COVID-19 considerations) public scoping meeting was held on March 30, 2021. In addition, press release and social media announced the scoping comment period and virtual meeting.

Following the public scoping meeting and prior to release of the draft FR/EIS, information efforts continued with the public. These efforts included responses to media inquiries regarding aspects of the study and updating of study FAQs to reflect questions raised by and answers provided to media sources. On July 23, 2021, a meeting was held at the Rosemont Community Center to discuss the study, with a focus on proposed non-structural action for the Rosemont community and any potential impacts.

On September 10, 2021, the U.S. Army Corps of Engineers (USACE), Charleston District released the draft FR/EIS for the Charleston Peninsula Coastal Storm Risk Management Study for public review and comment. A Notice of Availability (NOA) of the draft FR/EIS was

published in the *Federal Register* on September 10, 2021 (86 FR 50713), noting the 45-day public comment period dates. Members of the public also received notice of the availability of the draft FR/EIS through a news release published and USACE social media accounts following the publication of the NOA in the *Federal Register*.

The release of the draft FR/EIS initiated a 45-day public comment period that ended on October 25, 2021. This public comment period was announced on the USACE website (https://www.sac.usace.army.mil/Missions/Civil-Works/Supplemental-Funding/Charleston-Peninsula-Study/) and announced through press releases and USACE's social media accounts. In addition, information regarding the virtual (due to COVID-19 considerations) public meeting and ways to comment on the draft FR/EIS were posted to the USACE's website and social media accounts, and through press releases. The draft FR/EIS was made available through several outlets, including USACE website, the City of Charleston, and on the U.S. Environmental Protection Agency EIS database website. During the comment period, USACE held one virtual public meeting on October 5, 2021. This meeting provided the public an opportunity to ask questions, make comments, and encourage public involvement and community feedback on the draft FR/EIS. Between 40 and 50 people joined the virtual public meeting, and no verbal or comments were received during this meeting. However, during the question-and-answer portion of the public meeting, approximately 13 questions were asked and answered, mainly focusing on funding. In addition to the October 5th virtual public meeting, USACE participated in the following outreach efforts both virtual and in person during the public comment period:

September 10, 2021 – 3x3 City Advisory Committee (open to public, virtual)

September 14, 2021 – Charleston City Council (open to public, virtual)

September 21, 2021 – Historic Charleston (open to public, virtual)

September 28, 2021 – Rosemont Community Meeting (cancelled at request of Rosemont)

September 30, 2021 – South Carolina Port Authority Meeting (in-person)

October 14, 2021 – Citadel Meeting (virtual)

October 19, 2021 – Charleston Chamber of Commerce (in-person)

October 21, 2021 – Charleston City Council Workshop (open to public, in-person)

October 22, 2021 – Gadsonburough Community Meeting (open to public, in-person)

October 23, 2021 - Rosemont Community Meeting (in-person)

The public was encouraged to submit comments using the draft FR/EIS online comment form. The public was also able to submit comments by mail to the Charleston District office, by calling and leaving a message at a dedicated study phone number, or by email to a dedicated study email address. All of the submittals received were entered into a spreadsheet in order to organize and analyze the content of each submittal.

During the comment period, approximately 102 submittals were received on the draft FR/EIS and associated appendices. Of the total number of submittals, approximately 65% were from the public, and 35% were from local, state, and federal agencies, and other stakeholders (such as NGOs). Once all submittals were entered into the spreadsheet, each was read, and substantive comments within each submittal were identified. Approximately 400 total comments were submitted, and of those, approximately 209 substantive comments were identified for agency response.

Organization of this Appendix

This appendix is organized as follows.

Section 1.2 Comment Process and Analysis — This section describes the process for managing, and sorting all public comments, and identifying substantive comments. In addition, this section provides information on the numbers and types of comments received, which are organized by topic/code and by submitter.

Section 1.3 Master Responses to Themes — This section presents general comment themes for each code and provides a master response for each general comment theme. Similar substantive comments are addressed collectively by summarizing them as a 'general comment theme' for some of the codes.

Section 1.4 Summarized Substantive Comments and Responses — This section displays in a table all the substantive comments and USACE's responses. Each individual substantive comment has received a response consisting of a reference to any applicable master response and/or individual response (some substantive comments from the same submitter and on the same topic were combined for purposes of response).

1.2 Comment Process and Analysis

Comment analysis is a process used to compile and correlate similar public comments into a format to facilitate consideration and response by decision makers and the study team. Comment analysis assists the team in organizing, clarifying, and addressing technical information pursuant to National Environmental Policy Act (NEPA) regulations. It also aids in identifying the topics and issues to be evaluated and considered throughout the planning process.

Submittals received during the public comment period was analyzed in a series of stages. First, USACE read each piece submittal to identify discrete points expressed by the author, each of which is considered to be a "comment." All comments were reviewed as "in-scope" or "out-of-scope," as well as "substantive" and "non-substantive." In-scope comments were those that addressed findings of the draft FR/EIS while out-of-scope comments included those comments addressing issues unrelated to the draft FR/EIS and/or Charleston Peninsula Coastal Storm Risk Management study. Substantive comments are those comments that:

- question, with reasonable basis, the accuracy of the information in the draft FR/EIS
- question, with reasonable basis, the accuracy of the environmental analysis
- develop and evaluate reasonable alternatives other than those presented in the draft FR/EIS
- advocate changes to the proposal or alternatives
- suggest factual corrections

Non-substantive comments are those comments that:

- are in favor of or against the proposed action or alternatives without a supporting rationale which meets the criteria for a substantive comment;
- only agree or disagree with policy or resource decisions without justification or supporting data that meet the criteria for a substantive comment; or,
- are vague, open-ended questions.

Consistent with CEQ guidance, comments expressing no more than that the submitter is in favor of or against the proposed action or alternatives, or comments that only agree or disagree with the study, are not considered substantive.

Next, each substantive comment was assigned a code in order to associate that comment with a particular resource topic, or element of the plan (such as cultural resources or wetlands). Staff derived code categories from an analysis of the range of topics covered and the contents of the submittal. The coding structure enabled comment organization by topic area.

Similar substantive comments were grouped together to reflect a unique "comment theme." The comment theme summarizes the main points or common topics expressed across one or more substantive comments as presented in Section 1.3. Comment themes are also intended to help guide the reader to comments on specific topics of interest. They do not replace the actual comments received from individuals. The comment themes represent approximately 58% of all substantive comments. In Section 1.3, master responses have been prepared for each of the comment themes. These master responses are also referred to in Table 1 Substantive Comments and Responses to address comments as applicable. The following is the list of comment themes in Section 1.3 and the percentage of comments per theme:

- Non-Storm Surge Flooding (4%)
- Climate Change and Sea Level Rise (9%)
- Interior Drainage (4%)
- Natural and Nature-Based Features (14%)
- Environmental Justice (10%)
- Induced Flood Risk to Surrounding Communities (5%)
- Wall Alignment (5%)
- Operation and Maintenance Procedures (3%)
- Public Outreach (1%)
- Visual / Aesthetics (3%)
- Historic and Cultural Resources (>1%)

Spreadsheets were used for management of the comments. The spreadsheet stores the text of all submittals and allows each comment to be coded by topic and issue. Some outputs from the spreadsheet include tallies of the total number of submissions and comments received, and sorting and reporting of comments by a particular topic or issue.

It is recognized that comments from entities or people who chose to respond do not necessarily represent the sentiments of the entire public. Further, this was not a vote-counting process, and

the emphasis was on the content of the comment rather than the number of times a comment was received.

1.3 Master Responses to Themes

Non-Storm Surge Flooding

General Theme 1

Concern that the scope of the study is too narrow in focus because it only addresses flooding from coastal storm surge does not address risk reduction from all flood risks affecting the Charleston Peninsula, such as rainfall and tidal flooding, especially in light of future sea level rise.

Master Response 1

USACE may only conduct feasibility studies based upon legal authority provided by Congress. The legal authority(ies) applicable to a study set the parameters for the scope of that study. In this case, Congressional authorization for the study limits the scope to addressing risk management of coastal storm surge. Authority for the Charleston Peninsula Coastal Storm Risk Management Study stems primarily from Section 110 of the Rivers and Harbors Act of 1962, P.L. 87- 874, and Senate Committee Resolution 395.

Section 110 authorized studies "of the coastal areas of the United States … in the interest of beach erosion control, hurricane protection and related purposes." Section 110 reads, in pertinent part:

> The Secretary of the Army is hereby authorized and directed to cause surveys to be made at the following named localities and subject to all applicable provisions of section 110 of the River and Harbor Act of 1950:
>
> Surveys of the coastal areas of the United States and its possessions, including the shores of the Great Lakes, ***in the interest of beach erosion control, hurricane protection and related purposes***: Provided, That surveys of particular areas shall be authorized by appropriate resolutions of either the Committee on Public Works of the United States Senate or the Committee on Public Works of the House of Representatives. [emph. added]

On April 22, 1988, the Senate Environment and Public Works (EPW) Committee Resolution 395 provided the necessary resolution of the Senate pursuant to Section 110, stating as follows:

> Resolved by the Committee on Environment and Public Works of the United States Senate, that the Secretary of the Army in accordance with the provisions of Section 110 of the River and Harbor Act of 1962, is hereby authorized to study, in cooperation with the State of South Carolina, its political subdivisions and agencies and instrumentalities thereof, the entire Coast of South Carolina ***in the interests of beach erosion control, hurricane protection and related purposes***. Included in this study will be the development of a comprehensive body of knowledge, information, and data on coastal area changes and processes for such entire coast. [emph. added]

Both Section 110 and Resolution 395 limit the overall scope to "beach erosion control, hurricane protection and related purposes."

The Water Resources Development Act of 1986 (WRDA 86) further defined the scope of Section 110. "Prior to WRDA '86, projects were formulated for hurricane protection, beach erosion control, and recreation. The enactment of WRDA '86 established hurricane and storm damage reduction (HSDR) and recreation as the basis for Federal participation, and the only two purposes for which Federal shore protection projects could be formulated." Final Report: An Analysis of the U.S. Army Corps of Engineers Shore Protection Program, IWR REPORT 96-PS-1 (USACE, June 1996).

The Corps' approach to the scope of Section 110 and Senate Committee Resolution 395 has been consistent over time. Other uses of this authority have likewise been limited to hurricane and storm damage reduction. For example, the Coastal Storm Damage Reduction General Investigations Study for Edisto Beach, Colleton County, South Carolina, was pursued under the same authority, and the NED Plan to reduce hurricane and storm damages was authorized by Congress in Section 1401(3)(1) of the Water Resources Development Act of 2016, P.L. 114-322. Another example is the General Investigation Study for Hurricane and Storm Damage Reduction at Pawley's Island, South Carolina. That feasibility study was likewise pursued under the authority of Section 110 and Senate Committee Resolution 395, and then authorized by Congress in Section 1001(39) of the Water Resources Development Act of 2007, P.L. 110-114.

Subsequent Congressional action has confirmed this interpretation of the applicable scope of Congressional authority. In the Water Resources Development Act of 2020 (Division AA of P.L. 116-260), Section 201(a)(31), Congress authorized a separate feasibility study for a "Project for tidal- and inland-related flood risk management, Charleston, South Carolina." At the time Congress did so, the Peninsula Study was well underway, having commenced in the fall of 2018

pursuant to the Bipartisan Budget Act of 2018, P.L. 115-123, Division B, Subdivision 1, Title IV. Were either tidal-related or inland-related flooding (or both) unrelated to coastal storms properly construed to be within the preexisting authorization stemming from Section 110, then the subsequent Congressional action to enact Section 201(a)(31) of WRDA 2020 would have been unnecessary and superfluous.

Congressional authority for this study may also be found in Public Law 84-71 of June 15, 1955. Public Law 84-71 provides that the Secretary of the Army is

> authorized and directed to cause an examination and survey to be made of the eastern and southern seaboard of the United States ***with respect to hurricanes***, with particular reference to areas where severe damages have occurred. [emph. added]

Section 2 of P.L. 84-71 further directed the Chief of Engineers to investigate

> Possible means of preventing loss of human lives and damages to property, with due consideration of the economics of proposed breakwaters, seawalls, dikes, dams, and other structures, warning services, or other measures which might be required.

The scope of this authority is centered on coastal storm risk management, emphasizing preventive measures to reduce risk to life and property.

Congressional appropriations to fund this study also reflect the justification for its scope. The Bipartisan Budget Act of 2018, P.L. 115-123 (BBA 2018) states that

> investigation funds are for high-priority studies of projects in States … with more than one flood-related major disaster declared pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.) in calendar years 2014, 2015, 2016, or 2017.

Federal disaster declarations were issued for Charleston County for Hurricane Joaquin in 2015, Hurricane Matthew in 2016, and Hurricane Irma in 2017. All three of the major disaster declarations which link this study to BBA 2018 investigation funding were for coastal storm-driven disasters, rather than tide- or rainfall-driven events unrelated to coastal storms.

USACE policy also recognizes limitations on the agency's authority to participate in certain types of flood risk reduction. Stormwater management is appropriately the responsibility of the local government (see, e.g., ER 1165-2-21). In addition, some types of nonstructural measures do not meet USACE criteria for agency participation and cost-share during implementation (see

PB 2016-01, Clarification of Existing Policy for USACE Participation in Nonstructural Flood Risk Management and Coastal Storm Damage Reduction Measures, 22 December 2015).

While the study authority does not include the investigation of measures to address flood risk due to tides or rainfall, the analysis of coastal storm surge does take into account tidal fluctuations and sea level rise, rainfall-induced flooding is included in inundation analyses, and mitigation for any adverse impacts to stormwater runoff will be investigated and recommended, as appropriate, during preconstruction engineering and design (PED). In addition, the proposed project could be integrated into the City of Charleston's comprehensive flood risk management strategy, as a principal component of that overall strategy. The City is planning to procure a City-wide Comprehensive Water Plan in 2022 which will set project prioritization standards for the management of stormwater drainage, tidal and other flood risks.

Climate Change and Sea Level Rise

General Theme 2

Concern that this study is not adaptable to climate change and does not offer protection against the effects of sea level rise. How were climate change and sea level rise incorporated into the study?

Master Response 2

Sea level rise, climate-induced or otherwise, was incorporated into the study. The elevation of the storm surge wall was determined based upon analyses that accounted for the effects of sea level rise on potential water surface elevations due to storm surge. The rate of sea level change (RSLC) used for the study was the USACE intermediate RSLC. This rate was selected because it balances the risk of formulating a project to either the high or low RSLC scenarios, and best reflects observed sea level rise, including with regard to the Charleston coastal area (see Sub-Appendix B4 Coastal, Chs. 3 and 4).

The No Action Alternative was assessed based upon intermediate RSLC. Without a project to address storm surge inundation, an intermediate rate of sea level rise would mean that in the year 2082, 50% of police stations, 42% of health care facilities, and 29% of fire stations on the Charleston Peninsula would be flooded to elevation 9 feet NAVD88 during a 4% annual exceedance probability (AEP) storm event. The identification of the preferred Alternative 2 also

used the intermediate RSLC; however, the performance of the Alternative 2 was evaluated under low and high RSLC, as well, to determine its overall performance. Under either a low or a high RSLC scenario, Alternative 2 would still provide substantial risk reduction, and a BCRs of 10.0 and 16.3, respectively (see, e.g., Appendix C Economics, C.1.4, C.1.7.4.2, and Tables 20 and 21).

All of the storm surge wall will be pile-founded due to the poor quality of the foundation materials above the Cooper Marl – the land-based T-wall would be anchored with piles driven into the Cooper Marl (see Sub-Appendix B2 Geotechnical, § 9). With this foundation, the storm surge wall would be designed and constructed so that the wall could be elevated to higher than 12ft NAVD88 if it is determined in the future that a higher elevation is necessary due to sea level rise (see Appendix B Engineering, 5.16 Resiliency and Adaptability). Because there is limited ability to adapt nonstructural measures once they are implemented, the optimal design elevation would be determined during the pre-construction, engineering, and design (PED) phase. This design could exceed the design elevation of the storm surge wall, taking into account future sea level rise scenarios and continued community engagement, among other things.

Performance of the Recommended Plan under the low, intermediate, and high sea level rise scenario is discussed in Section 8.2 and in Appendix B Engineering.

Interior Drainage

General Theme 3

Concern that this study does not sufficiently address the effect of the proposed project on interior drainage in the Charleston Peninsula. Concern about pump station reliability during flood events and how the location of pump stations was determined.

Master Response 3

A detailed description of the interior drainage analysis performed for the study is contained in Appendix B Engineering, 5.10, and is further detailed in Sub-Appendix B3 Hydraulics and Hydrology (Interior Drainage Analysis). What follows is a summary of the interior drainage analysis in response to the general concerns identified. The locations of storm gates referenced in the summary, below, are depicted in Appendix B Engineering, Figures 5.6.10 and 5.10.7, and

Sub-Appendix 3 H&H, Figure 3.6.1; pump station locations discussed are depicted in Appendix B Engineering, Figure 5.10.8, and Sub-Appendix B3 H&H, Figure 3.6.2.

The interior drainage analysis for the study has been refined to economically justify mitigation measures for interior flooding anticipated by the storm surge wall. The refined analysis accounts for the current locations of storm gates and pump stations (see above), and was used to determine the size of the pumps that would be required to mitigate interior flooding. The Recommend Plan includes a series of storm gates to allow the normal passage of water except in the event of forecasted storm surge, and five temporary and five permanent small-to-medium hydraulic pump stations to address and alleviate the potential bathtub effect. Further analysis during the PED phase would be done to confirm the final size and location of all pumps and gates.

Engineering team members developed hydraulic models for the existing and future without-project conditions. The existing conditions and future without-project conditions include features such as the Battery Seawall, City of Charleston pump stations (existing and future), and existing culverts which allow for daily tidal fluctuations (I.e., the Newmarket Creek culvert underneath Morrison Boulevard). The models also contain a high-resolution topography (terrain) dataset of the peninsula. Various rainfall frequency events and tide elevations are simulated with the model to visualize the natural drainage paths of rainfall runoff to drain to the bounding rivers and harbor. This visualization is essential for understanding the specific nature of overland drainage and flooding on the peninsula and conceptually assists in selecting locations for pump stations and storm gates. In addition to the model visualization tools, detailed hydraulic data is generated and stored within the modeling for use by engineers and economists. Such hydraulic data includes water surface elevations, water depths, water velocities, and volumetric flow rates (cubic feet per second, cfs).

The future with-project model is developed to visualize the impacts the storm surge wall would have on the rainfall runoff which would otherwise naturally drain to the bounding rivers and harbor. The model includes the future without-project conditions and the future with-project proposed features. The future with-project model includes the storm surge wall with storm gates placed mostly at low-lying tidal creek areas. The storm gates are to remain open to allow for daily tidal fluctuations and to be closed prior to a predicted storm surge event. Once the storm gates are closed, pump stations become a major component of alleviating any coincidental effect

on interior rainfall runoff. The pumps may also assist in removing flooding due to waves splashing over the wall. There are also instances in which storm surge may significantly overtop the wall and pump stations would not be able to handle seawater flowing directly into the system during the significant overtopping. However, as storm surge recedes the storm gates can open, and interior flooding can be evacuated by natural outflow and pumping. Further overtopping assessment is to be completed during PED phase while some assessment for pump performance during waves splashing over the wall has been completed and is included in Appendix B Engineering, Sub-Appendix 3 H&H (Interior Drainage), § 2.1 Wave Overwash.

All model simulations were completed to assess which areas around the peninsula would experience induced interior ponding due to the storm surge wall. As mentioned, the hydraulic model generates data (visually and analytically) for assessment. Various iterations are completed for various project alternatives to select pump station locations and pump station capacities. This iterative process includes the transfer of hydraulic model outputs as economic model inputs to economically quantify the nature of flooding for damages associated to future without-project conditions to be compared to future with-project conditions for various with-project alternatives.

In summary, the pump stations are placed using hydraulic and economic, qualitative/quantitative modeling measures. The pumps are to primarily operate when storm gates are closed due to storm surge with concurrent rainfall for which pumps then become the major component of interior flood relief. The City of Charleston currently has stormwater management features such as the Concord Street pump station which can help to quickly pump rainfall out of the interior areas that it services and this is especially critical when tides are elevated blocking the gravity driven outfall pipes. The city's rainfall flooding challenges are not within the scope of this study; however, these conditions must be recognized and any induced impacts due to the wall must be assessed. During PED phase, further modeling is also to be completed on a site-by-site basis to assist in the appropriate sizing of each pump station as the capacities of the stations vary depending upon the size of the service area.

At this time, at each permanent pump station, rather than having one large pump, three smaller pumps would be installed, if one fails then there is 2/3 pumping capacity. The proposed pump stations are to utilize the city's stormwater pipe systems, where necessary, for bringing water to the pump stations. The permanent pump stations are to contain permanent housing and the

temporary pumps are to only be deployed with appropriate notice prior to the arrival of storms that warrant gate closure. The deployment of temporary pumps is a strategy also mentioned in the City's Flooding and Sea Level Rise Strategy (2019). The pump station housing structures are to consider that first or operation flood elevations should be at least or above ground level to provide convenient access to equipment, to minimize the need for protection against groundwater, and to simplify the ventilation of the operation areas.

Natural and Nature-Based Features

General Theme 4

Concerns that natural solutions should be utilized more comprehensively in the proposed plan, be integrated into and replace segments of the storm surge wall, or that an exclusively natural and nature-based feature (NNBF) alternative be developed to address the flooding concerns in the Peninsula.

Master Response 4

According to the International Guidelines on NNBF for Flood Risk Management developed by USACE, NOAA, the World Bank, and others:,

> The term *natural and nature-based features* (NNBF) refers to the use of landscape features to provide FRM [flood risk management] benefits. NNBF projects may also produce other economic, environmental, and social benefits known as NNBF co-benefits. These landscape features may be natural (produced purely by natural processes) or nature based (produced by a combination of natural processes and human engineering) and include such features as beaches, dunes, wetlands, reefs, and islands. Landscape features can be used alone, in combination with each other, and in combination with conventional engineering measures such as levees, floodwalls, and other structures. The type, number, size, and combinations of measures (NNBF or conventional structures) used in an FRM system depend on the context of the problem and on the geographic setting, the goals of the project, and a host of other factors. Bridges, et al, 2021

FRM is defined as actions taken to reduce future damages to people and property from flooding and erosion, including the processes that contribute to these risks (Bridges, et al, 2021). NNBF are a type of nature-based solution. There are many terms related to NNBF, such as natural flood management, engineering with nature, green infrastructure, and soft defenses, and they share some common elements, but they are not necessarily synonymous with NNBF (Bridges et al, 2021). For example, while traditional levees may have some "green" elements to them or be

considered a "softer" solution than other flood risk structures, they are structural measures and are not classified as NNBF. There are also techniques for adding "greener" materials or living components to flood risk structures, such as the concept of a "living breakwater." However, these are not NNBF; these are still structural FRM measures that, through their design, could provide environmental co-benefits. Design elements of structural measures are typically determined in the Preconstruction Engineering and Design (PED) phase of USACE project development, rather than the Feasibility phase. Indeed, the Charleston Peninsula 3x3x3 Civil Design Opportunities (Fall 2021) produced by the City of Charleston's Civil Design Center expressly contemplates that these opportunities will be pursued in the PED phase of project development.

NNBF cannot be universally applied. Since there are different sources of flooding, NNBF will have differing levels of efficacy in reducing risks from various types of flooding. According to Bridges et al. (2021), "Before selecting NNBF, it is important to fully understand the sources, pathways, and receptors of flooding because this will help in selecting the right measures to address the flood risk problem at their source." Bridges et al. (2021) distinguishes between fluvial NNBF and coastal NNBF, although they may use some similar features. Fluvial NNBF are used to manage flood risks in rivers and floodplains from precipitation events, including in urbanized areas of watersheds. These NNBF primarily focus on capturing, storing, and altering the conveyance of rainfall floodwaters. In coastal systems, NNBF are a type of nature-based solution that involve landscape features that include beaches, dunes, wetlands, reefs, or islands to reduce flooding risks from coastal storms.

For the Charleston Peninsula Coastal Storm Risk Management Study, the use of coastal NNBF, or those landscape features mentioned above, were considered for risk reduction to coastal storms. Since NNBF involve natural systems, USACE listened to local experts who know the local conditions and ecosystems to understand what NNBF are appropriate. During the initial scoping phase of the study, local experts from state and federal agencies, academia, non-governmental organizations, and other stakeholders provided valuable insight on flooding issues on the Charleston Peninsula and on a range of structural, nonstructural, and NNBF solutions for flooding risks. This effort was also informed by the Dutch Dialogues. Of the NNBF solutions identified, those that were aligned with flood risk management related to precipitation, such as green roofs, cisterns, bioswales, recharge aquifers and recessed parks, were screened because,

among other things, they were not considered to be effective at reducing flood risks caused by coastal storm surge (as explained in Bridges et al., 2021) and therefore would not meet the objectives of this study.

The environmental conditions in a given location such as tide regime, salinity, temperature, and a host of other factors will also determine what NNBF are suitable for that location. As such, some of the coastal NNBF such as beaches, dunes, barrier islands and most forest types were not further considered because they would not be feasible due to spatial constraints and the fact that these features do not naturally exist in the study area. While it may be possible to engineer such features from scratch, the land use and environmental conditions on and around the Peninsula would need to be highly altered and engineered to evolve such features into highly functioning and sustainable ecosystems that provide the desired storm risk reduction effect where they do not already exist. Often there are limiting environmental conditions that prohibit a particular feature or living system from naturally occurring, or one might expect it would already be present. So, while these NNBF are possible and could contribute to storm risk management, at a screening level they were considered to have a high likelihood, or risk, of not being suitable solutions for this study in this location in the Charleston Harbor estuary.

As the International Guidelines acknowledge, "local conditions and constraints may dictate that conventional, structural engineering (e.g., floodwalls) will be the predominant approach." In this case, coastal NNBF that attenuate waves and/or slow and store coastal flooding such as living shorelines, raising marsh surfaces, and historic creek restoration were carried forward for consideration. Section 3.1.3 in the FR/EIS documents how these coastal NNBF were considered when formulating alternative solutions for coastal storm risk reduction. Since NNBF also provide many other benefits, Section 7.2.4 of the report describes how the co-benefits of the NNBF contributed to this study with respect to Environmental Quality, and Appendix F – Environmental describes the role of living shorelines in minimizing adverse environmental effects of the proposed plan. More information on how the proposed NNBF will be engineered is found in Appendix B – Engineering.

Reference:

Bridges, T.S., J.K. King, J.D. Simm, M.W. Beck, G. Collins, Q. Lodder, and R.K. Mohan, eds. 2021. International Guidelines on Natural and Nature-Based Features for Flood Risk Management. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Environmental Justice

General Theme 5

Concern that some communities such as Rosemont and Bridgeview are not protected by the storm surge wall and will still experience flooding impacts on neighborhood roads and on the foundations of their homes. Concern that the decision to employ nonstructural measures is driven by the economic valuation of affected structures which assigns greater value to structures in wealthier neighborhoods or those with a wider range of community assets than in lower-income residential areas.

Master Response 5

The objectives of the Recommended Plan (RP) for the Charleston Peninsula are to reduce coastal storm surge risks to human life and emergency access, reduce economic damages, and increase resilience. These objectives include all residents and businesses within the study area. The combined features of the RP, including the storm surge wall, nonstructural measures and living shorelines, would improve the resilience of the entire Charleston Peninsula and provide protection to a cross-section of socio-economic communities, without disproportionately burdening minority, low income or disadvantaged communities. Refer to environmental justice analysis in Section 6.20. To augment protection in areas where construction of the storm surge wall is impracticable, the study recommends nonstructural measures, such as flood-proofing and home-raising to achieve the same level of risk reduction with respect to reduced structural flooding as the storm surge wall. Those neighborhoods include Bridgeview Village and Rosemont.

The rationale for proposing nonstructural measures rather than a structural storm surge wall for the Rosemont and Bridgeview Village communities is primarily based upon topography and other constraints (see discussion of implementability in Section 3.3), not economic value. There are a number of low-income or minority community neighborhoods on the peninsula that would be *inside* the plan's primary structural measure, the perimeter storm surge wall. Among these are

the public housing communities of Cooper River Court, Meeting Street Manor, Gadsden Green, and Robert Mills Manor. In addition, census tracts which are more than 50% minority or low income are encompassed within the storm surge wall. In addition, while the purpose of nonstructural measures is to address the risk of coastal storm surge flooding, these measures may also provide incidental risk reduction for other sources of flooding, as well.

In the case of Rosemont, construction of the wall in tidal areas would result in large and permanent wetland impacts. This is an environmental impact that USACE has sought to minimize to the extent practicable throughout the study area. Upland construction of the wall to avoid wetlands would require involuntary buyouts and removal of homes in order to accommodate the footprint of the wall — something USACE has also sought to avoid throughout the study area to minimize adverse impacts to neighborhoods' community cohesiveness. Elsewhere on the peninsula where an upland barrier is otherwise appropriate, the wall will be constructed on city-owned lands so as to avoid involuntary removal of citizens from their homes. This option is not available in Rosemont. Topographically, the natural tie-in for the storm surge wall is located on the eastward side of I-26 which would essentially encapsulate this community inside the wall. Given the lack of subsurface drainage throughout Rosemount, the wall would create a significant bathtub effect that would need to be mitigated by large pump stations at the end of most streets, which would in turn require significant additional real estate acquisition. The Rosemont community already has a significant noise barrier wall on the side of the community facing the interstate – additional walls would contribute to a cumulative aesthetic impact on the community. For these reasons, USACE currently believes and has discussed with representatives of the Rosemont Community in stakeholder engagements that nonstructural solutions, such as elevating homes or dry floodproofing, are a better approach to reducing storm surge risk faced by the residents of Rosemont.

Regarding Bridgeview Village, ground elevation and the surrounding wetland and historic cemetery are the overriding factors for the selection of nonstructural measures for this community. The ground elevation in this area is already at an elevation of 9 ft NAVD88 or above, so the wall would only be around three feet above the surface to reach the 12 ft NAVD88 project elevation. In the Bridgeview Village area, construction would have to be on both uplands and wetlands, which would require buyouts and involuntary removal of citizens from their homes and impacts to surrounding wetlands. The neighborhood of Bridgeview Village on the

northeast edge of the peninsula has been identified as a nonstructural area because the wall would either impact the Charleston Cemetery Historic District and marsh wetlands or would require acquisition of a significant proportion of the structures in the community. Similarly, smaller wall systems encircling these neighborhoods would require significant impacts to protected cultural and natural resources and/or acquisition of a significant proportion of the community.

Where nonstructural measures such as home elevation or floodproofing are applied, they would reduce the risk to residential structures posed by flooding. With regard to flood impacts on neighborhood roads, the elevation of roads was generally screened from consideration as a project measure based on constructability and cost efficiency. Access to emergency services and facilities may be temporarily limited during storm events, however this remaining risk can be mitigated through non-federal solutions such as evacuation planning or the provision of high-water vehicles. Existing stormwater drainage issues impacting the flooding of neighborhood roads would benefit from non-federal solutions.

Finally, the Rosemont and Bridgeview Village communities (all structures) are part of the Recommended Plan to address coastal storm surge on the peninsula. All non-structural costs are part of the overall cost estimate and will be cost-shared 65% (Federal) and 35% (City of Charleston). The City of Charleston intends to provide temporary relocation assistance to those homeowners in the Rosemont Neighborhood that elect to participate in structurally elevating their homes. Final details of the process and timeline will be identified in the PED phase.

Induced Flood Risk to Surrounding Communities

General Theme 6

Concern that if the proposed plan is constructed it would result in increased flooding of or wave impacts to the surrounding communities such as James Island, Mt. Pleasant, and North Charleston.

Master Response 6

As described in Section 7.3.1 of the FR/EIS and Chapter 6 of Sub-Appendix B4 Coastal, USACE conducted a thorough review into whether the storm surge wall would deflect waves or increase flood water levels in surrounding areas. Some simulations showed up to a 1 to 2 inch increase in

water levels in some areas with the storm surge wall in place. However, this change is considered minimal for the following reasons: these increases were only seen in small areas of the surrounding coastline; these increases were only apparent during simulations for larger storms that overtopped the wall (12+ ft of storm surge) such that the areas in question would already be experiencing substantial inundation; and, the increase in water levels identified for some areas is within the margin of error of the model, itself. Structural damages as a result of the marginal differences in water surface elevations would be unlikely. With regard to the potential for wave impacts on surrounding coastal areas as a result of constructing the storm surge wall, due to various factors which would result in the scattering or dissipating of wave energy, the analysis indicates that the reflection and refraction of waves encountering the wall will have no effect on surrounding areas.

Wall Alignment

General Theme 7

Concerns regarding why some areas are inside the wall while other are outside, how the wall alignment was determined, and whether the alignment is final.

Master Response 7

The alignment of the wall has been optimized to minimize costs and impacts to the study area while achieving a desired level of flood protection to a height of 12 ft NAVD88. There are numerous construction, environmental, real estate, spatial, topographic, and other constraints that drove the positioning of the current wall alignment. Areas outside the wall protection typically already have a level of flood protection, i.e. apartment complexes with parking decks on the first level and living areas above. Other areas outside of the wall protection were selected for non-structural measures commensurate with the level of protection of the wall due to topographic and other constraints (see, e.g., Master Response 5, above). Changes to the alignment may occur during the PED phase. Drivers of the potential changes include, but are not limited to, new developments in technology or construction methodologies, results of additional engineering analyses, unforeseen cultural and historic resources, the presence of buried utilities not discovered during feasibility, and real estate acquisition challenges. Also, during the PED phase, changes will occur for the purpose of aesthetic and cultural mitigation that could not be

identified during the feasibility phase because they inherently relate to more detailed level of design.

Operation and Maintenance Procedures

General Theme 8

Concerns about how the study features would be operated and maintained, as well as about the cost of maintenance.

Master Response 8

The Manual to guide the City's operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) of the proposed project will undergo development in the PED phase, and is a required item of local cooperation requirement for project authorization and construction. While details of the Manual remain to be developed, storm gates and pump stations will be operated consistent with the project purpose. Operation of storm gates will be in response to an authoritative forecast of coastal storm surge flooding on the Charleston Peninsula. Typically, gates would remain open, and gate closure procedures would be initiated based on storm surge predictions. When storm surge inundation is expected, storm gates would be closed at low tide, to keep the rising tide levels from taking storage needed for associated rainfall. For the vehicular and pedestrian, closings, timing of the closure would be dependent on evacuation needs and the anticipated arrival of rising water levels that close transportation arteries. Tidal and precipitation flooding unrelated to coastal storm events will not be a basis for operation of the storm gates, but where one or both of these flooding sources coincides with coastal storm surge, storm gates may be operated to address the overall flood event. Pump stations may be operated to ameliorate the wall's effect on interior rainfall flooding. Further modeling and analysis of storm surge gate and pump operations and procedures will be conducted as part of PED. The City of Charleston will ultimately become responsible for OMRR&R of the system, which will be included in the City's overall operations and maintenance budget. The current projection of average annual maintenance cost is $3,000,000 per year (this amount is annualized, and the actual amount would be expected to fluctuate depending upon OMRR&R needs).

Public Outreach

General Theme 9

Concerns about current and future public outreach efforts, and whether public and stakeholder outreach efforts would be continued into the next phase including opportunities for staying engaging in the process.

Master Response 9

As summarized in Section 1.7 - Public and Agency Coordination and described in Chapter 5 - Coordination and Public Involvement Process, USACE has had a robust public outreach effort in coordination with the City's outreach effort which involved multiple engagements with public, stakeholders, and local, state, and federal agencies. These meetings/engagements were to solicit input, provide study updates and information, and gather information/data. As this study moves into the PED phase, USACE is committed to continuing public outreach efforts, potentially in the form of informational meetings and updates of the study on the study's website. USACE along with the City will continue working with stakeholders such as South Carolina Port Authority, U.S. Coast Guard, citizen groups, and public utilities. This list is not exhaustive. Consistent with Appendix A of 33 CFR Part 230, USACE will determine the need for and nature of additional NEPA documentation and related public involvement, if appropriate. In addition, the Section 106 Programmatic Agreement (Appendix D) and Memorandum of Understanding for Aesthetics (Appendix A), both include outreach efforts which will take place during the PED phase.

Visual / Aesthetics

General Theme 10

Concern about visual effects to the City of Charleston and how the proposed action may change the aesthetics of the area.

Master Response 10

Section 6.13.2 of the final FR/EIS acknowledges that the Recommended Plan could have significant aesthetic impacts to the Charleston Peninsula, and describes potential types of mitigation actions to address these impacts. These potential impacts and mitigation actions are also described in further detail in Appendix A – Visual/Aesthetic Resources Assessment. During PED, further impact analysis of visual and aesthetics resources would be conducted, and mitigation actions would be further refined based on the updated analysis. USACE is committed

to considering the mitigation of impacts to aesthetic resources in its design of the storm surge wall and other project features during the PED phase. The feasibility study provides for an estimated $53 million in aesthetic mitigation. In the PED phase, USACE will continue to work with the City and stakeholders regarding aesthetics, and will execute with the City a Memorandum of Understanding to guide the treatment of aesthetics (see Section 5.0 of Appendix A).

Historic and Cultural Resources

General Theme 11Concerns whether USACE is appropriately undertaking the planning and actions necessary to comply with Sections 106 and 110(f) of the NHPA, regarding minimization of harm to NHLs, regarding the Corps' commitment as part of the proposed action to address any flooding induced as a result of the wall, and the degree to which the undertaking will result in physical harm and other lasting effects on historic and cultural resources resulting in mitigation.

Master Response 11

The Programmatic Agreement (PA) is a key part of the Corps' National Historic Preservation Act (NHPA) compliance going forward for both Sections 106 and 110(f) of the NHPA. The input of the Advisory Council for Historic Preservation (ACHP), South Carolina State Historic Preservation Office (SHPO), and the City was invited and incorporated into the PA, including with regard to provisions implementing the requirements for both sections of the NHPA. Additional fine-tuning of the PA was done in response to comments received on the draft FR/EIS. The PA, by its terms, expressly prioritizes the avoidance and minimization of adverse effects both to known and previously unidentified NHLs.

Minimization of adverse effects to historic properties was one of the key constraints during the formulation of alternatives, and construction of the Project will have a significant positive benefit for the Charleston Historic District NHL. USACE acknowledges that construction of the storm surge wall will adversely affect the Charleston Historic District by introducing visual elements and altering physical features within the Charleston Historic District that diminishes the integrity of the setting and feeling; however, the risk of significant and lasting physical damage to the NHL structures themselves from coastal storm surge inundation events is viewed as the greater harm.

With regard to construction effects, there are no known potential acquisitions, demolitions, or modifications of historic structures, or disturbances of terrestrial and submerged archeological sites as part of the undertaking. Physical damage to historic properties is not expected from construction activities. Charleston is a city with numerous active construction projects. The PA has been developed with an abundance of caution to include the potential of adverse effects of construction and vibration.

The PA outlines the process by which USACE will consult with the appropriate parties to assess the effects of the undertaking on historic properties, avoid and minimize impacts to historic properties, and if necessary, mitigate impacts to historic properties. Where adverse effects to a historic property cannot be avoided or minimized as described, Concurring Parties (such as Catawba Indian Nation, Historic Charleston Foundation, and the Preservation Society of Charleston) have the right to participate in the development of the Historic Properties Treatment Plan to mitigate these effects.

USACE has integrated minimization of adverse effects into its planning process and continues to evaluate opportunities to minimize adverse effects as part of project optimization. An example is provided by the recent realignment of the storm surge wall away from Washington Street and East Bay Street and unto the State Ports Authority's Columbus and Union Pier Terminals. This realignment better met the needs of terminal operations but also resulted in reduced visual (and other) impacts by distancing the wall from historic structures and placing it on an active port terminal site.

Finally, in addition to the PA, USACE and the City will be entering into a Memorandum of Understanding (MOU) regarding the assessment of aesthetic resources. The terms of the draft MOU were presented in the draft FR/EIS. While the MOU is not intended to govern the treatment of historic properties/cultural resources, it is a parallel process which will provide additional consideration of and ability to address and mitigate for adverse visual effects which relate to the Peninsula as a whole. See Master Response 10, above.

Regarding the potential for induced flooding as a result of the storm surge wall, see Master Response 3 addressing the effect on interior drainage and Master Response 6 addressing the effect on adjacent communities, both above.

1.4 Substantive Comments and Responses

Table 1. Substantive Comments and Responses

Submittal #	Comment #	Name	Organization	Comment text	Response
1	1	Christopher DeScherer	SELC, CCL	We are pleased that the Corps has since decided to prepare an EIS given the significance of this proposal to the City of Charleston and its residents, and we look forward to reviewing and commenting on the draft EIS upon its release to the public.	Thank you for your comment.

Submittal #	Comment #	Name	Organization	Comment text	Response
1	2	Christopher DeScherer	SELC, CCL	In the meantime, and in partnership with the Coastal Conservation League, we have commissioned the attached report, Beyond the Wall, from Sherwood Design Engineers, an engineering company with experience designing resilient solutions to address flooding problems for communities around the country. This report provides a range of nature-based alternatives that address storm surge, as well as other sources of flooding, and also deliver additional benefits, such as recreational amenities. These alternatives are more in keeping with the character of the city than the proposed seawall, which would sever residents' connection to the water.	This submittal, including the attached report, was provided to USACE on 7 September 2021, 3 days prior to the release of the draft FR/EIS for public comment on 10 September 2021, and over 4 months after the close of the public scoping period from 23 March – 22 April 2021. In addition, because it predated the draft FR/EIS, the submittal makes repeated references to content in the draft FR/EA, which was released for public comment for 60 days on 20 April 2020. Section 5.1 of the draft FR/EIS notified prospective commentors to address content in the draft FR/EIS rather than the previous FR/EA. USACE elected to consider content in this submission, taking into account these limitations. Responses to particular comments follow.
1	3	Christopher DeScherer	SELC	First, the alternatives in Beyond the Wall are not final engineering plans. These are proposed alternative solutions to storm surge that meet the purpose and need of the proposed project and that the Corps should carry forward and evaluate as part of the NEPA process. In addition, it is our hope that these recommendations will help to spur an ongoing dialogue among residents and city leaders for how this project could better accomplish the Corps' and the city's goals in a way that equitably provides flood protection and recreational amenities throughout the peninsula. Second, as we have said previously, we agree that there may be specific locations on the Charleston peninsula where a traditional concrete seawall is the best option to address storm surge. However, there are clearly opportunities to take different approaches along other sections of the peninsula's shoreline by incorporating	The report, *Beyond the Wall, An Exploration of Alternative Strategies to the Corps Seawall Proposal for Charleston, South Carolina* by Sherwood Design Engineers dated September 2021 (Sherwood Report), proposes what it calls "alternative solutions" for three specific areas: the Battery, Lockwood Corridor, and Rosemont. Each of these "alternative solutions" will be addressed as individual comments, below.

Submittal #	Comment #	Name	Organization	Comment text	Response
				natural, layered strategies to address flooding. The recommendations from our report are in keeping with the Corps' assertion in the EA that "[r]esiliency increases when there are multiple layers incorporated in any risk management project," including "structural, nonstructural, and natural and nature-based" measures. EA at 51. In addition, it should be noted that we have not attempted to redesign the entire seawall project. Instead, we have selected three specific locations on the Charleston peninsula where the Corps should embrace a different approach. To that end, the Beyond the Wall report provides more tailored designs for the Battery, the Lockwood Corridor, and Rosemont. The approaches taken for these three areas can be applied to similar locations within the Corps' study area.	
1	4	Christopher DeScherer	SELC, CCL	The Battery Recommendations: • Add a living breakwater (pages 23-30). • Install glass panel floodwalls or removable flood panels on the existing Battery wall (page 27).	As described in Section 3.4 Screening of Conceptual Alternatives, the proposed wave attenuation structure (breakwater) which was initially carried forward as a measure and as part of Alternative 3 as presented in the April 2020 draft FR/EA has since been eliminated from further consideration. Updated engineering and economic analyses showed that the proposed breakwater was not effective at reducing storm surge inundation, and did not generate benefits to justify its cost. It received a low efficiency score because it is a high-cost measure (the draft FR/EA Appendix C Economics estimated the cost for a 4000' breakwater at > $300M) that would not produce inundation reduction benefits in addition to the storm surge wall. Accordingly, since Alternative 3 without the breakwater was the same as Alternative 2, the Tentatively Selected Plan shifted from Alternative 3 in the draft FR/EA to Alternative 2 in the draft FR/EIS. The "living breakwater" is subject to the same considerations as the original wave attenuation structure – it is not effective at reducing storm surge inundation, which is a primary objective and purpose of the study. Rather, as the Sherwood Report acknowledges, a living breakwater would only reduce wave action and shoreline erosion and reduce long-term maintenance of the Battery sea wall (pages 24-25). They still rely on the presence of a sea wall to reduce the risk of storm surge inundation (e.g., page 28), and depictions of the "living breakwater" suggest a very substantial footprint (pages 28, 30). "Living breakwaters" are still, in essence, breakwaters and therefore structural measures with some "green" design elements that may have environmental co-benefits, but they are not considered NNBFs as defined by Bridges et al. 2021. In addition, some of the environmental

Submittal #	Comment #	Name	Organization	Comment text	Response
					objections to the original breakwater such as obstruction of views could likewise be imposed by living breakwaters. NNBFs in the form of approximately 9,300 feet of oyster reef-based living shoreline sills are included in the Recommended Plan (for the primary purpose of erosional mitigation, the scope of the feature is the same as in the draft FR/EIS). These living shorelines will reduce marsh scour at the proposed storm surge wall and erosion of the shoreline edge, in addition to providing other environmental co-benefits. Regarding removable flood panels or deployable barriers, these were considered early in the study for incorporation into the storm surge wall. In terms of extensive use for large sections of the storm surge wall, these were judged to be ineffective as they would present labor-intensive installation and maintenance requirements, present potential sealing issues at each joint between panels, and require storage facilities. As such, they are risk and cost multipliers. However at very limited portions along the alignment, permanent or removable glass panels or other deployable barriers could be considered for cultural resources and/or visual and aesthetics mitigation. These potential mitigation features will be determined in the Preconstruction, Engineering, and Design (PED) phase with consideration of public input as described in Appendix A – Visual/Aesthetic Resources Assessment and Appendix D – NHPA Compliance, including Programmatic Agreement.
1	5	Christopher DeScherer	SELC, CCL	Lockwood Corridor Recommendations (multi-phased approach): • Phase 1: construct horizontal levee (earthen levee plus enhanced or created salt marsh), add a series of small breakwaters (pages 39-40). • Phase 2A: the horizontal levee would be extended inland to encapsulate Lockwood Drive, either by tunnel or cantilever (page 41). • Phase 2B: remove eliminate Lockwood Drive altogether in favor of park and pedestrian access (page 41).	The primary recommendation of Phase 1, levees as a structural measure were considered in Section 3.1.2. While they were retained for further consideration, they are only feasible where space allows because of their larger footprint. This would be difficult in many areas of the heavily developed peninsula and could require otherwise unnecessary condemnation of multiple properties, possibly including historic structures. It is noted that in the Phase 1 proposed by the Sherwood Report, the lanes for that portion of Lockwood adjacent to the levees would need to be reduced from 4 to 2 to accommodate levee size. The cover letter for the Sherwood Report notes that there may be specific locations on the Charleston peninsula where a traditional concrete seawall is the best option to address storm surge, and there may be other locations where alternative approaches may be preferable. Levees are retained for consideration in PED at limited portions of the proposed alignment where sufficient space is available and potentially as a mitigation measure. It is further noted that levees are still structural measures which may have some "green" elements added with environmental co-benefits, but they would not be considered NNBF. Enhancement or creation of wetlands as a management measure was screened out due to limited effectiveness at addressing storm surge (Section 3.1.3). - Natural and Nature-Based Features (NNBF) Considered. While elevating (or providing for the elevation of) salt marsh could provide some short-term coastal storm risk management benefits towards surge advancement reduction, the

Submittal #	Comment #	Name	Organization	Comment text	Response
					benefits of a relatively narrow perimeter marsh would be marginal, and it would not be sustainable long-term for the peninsula's limited wetlands to contribute materially to coastal storm surge risk reduction. Phase 2A would extend the horizontal levee inland, expanding the already significant footprint issues noted for Phase 1. In order to encapsulate Lockwood Drive without also elevating the roadway (a measure which was screened out in Section 3.1.2 due to constructability and cost-efficiency concerns), the Phase 2A rendering indicates a lowering of the roadway with reduced lanes below mean high water (see page 42) which would likely present comparable constructability and cost-efficiency concerns. Finally, the Phase 2B elimination of Lockwood Drive altogether would remove what has been described as a critical transportation corridor for the City. For example, the City's 7 February 2022 letter to USACE outlining items to be pursued in PED (available at https://charleston-sc.gov/AgendaCenter/ViewFile/Agenda/_02152022-7229) states that "Lockwood is an essential transportation corridor and key evacuation route for the Charleston Peninsula, providing access to Charleston's downtown, historic, and business districts …." The City's 3x3x3 Civic Design Opportunities report of October 2021 states that "Lockwood Drive itself also needs to be improved, converted to a more complete street with safe crossings as landscaped medians (as shown in the 1999 Downtown Plan)." The City's 1999 Downtown Plan, Ch. 6, does indeed propose what it describes as "calming" measures for Lockwood Drive, "provided that it can retain its role as a major arterial" transportation corridor. The final phase proposed in the Sherwood Report would eliminate entirely a portion of what the City has identified as a critical transportation artery.

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1	6	Christopher DeScherer	SELC, CCL	Rosemont Recommendations: • A horizontal levee and integrated earth berm or deployable barrier (page 55-62). • Develop, fund and implement a community resilience plan with community input (pages 51-52). • Construct blue/green infrastructure, a water management approach that incorporates both natural areas and engineered systems, such as permeable pavement, roadside swales, and rain gardens (pages 53-54).	A big part of the Recommended Plan's rationale for proposing nonstructural measures for Rosemont has to do with the impact of constructing a wall at this location. Upland construction of the wall would require involuntary buyouts and removal of homes in order to accommodate the footprint of the wall – that is something USACE has sought to avoid throughout the study area. As noted in the response to the preceding comment #5, levees require a substantially larger footprint than a wall, which would in turn lead to an expanded requirement for involuntary buyouts or removal of homes. Further, given the need for a perimeter barrier to largely encapsulate the neighborhood (be it a wall or levee) coupled with the lack of subsurface drainage throughout Rosemont, a significant bathtub effect would be created which require mitigation by large pump stations at the end of most streets, which would in turn require significant real estate acquisition or condemnation. Regarding deployable barriers, please see the response to comment #4, above. Developing, funding, and implementing a community resilience plan like the one proposed for Rosemont would fit within the category of Nonphysical, Nonstructural Measures Considered in Section 3.1.4. These types of measures are within the responsibility of the local government and generally not within USACE criteria for agency participation and cost-share during implementation. Accordingly, this category of measure was screened from further consideration as part of a Federal plan due to policy noncompliance, but retained for further consideration by the City of Charleston. The category of "blue/green" infrastructure fits within a measure considered in the draft FR/EIS and there described as Low-Impact Development/Green Infrastructure." While this could reduce the volume and speed of stormwater runoff and thereby reduce associated property and economic damage, it would not reasonably reduce coastal storm surge inundation. Like some other nonstructural measures, this measure is within the responsibility of the local government and generally not within USACE criteria for agency participation and cost-share during implementation. In addition, stormwater management is an area specifically identified as the responsibility of the local government (see, e.g., ER 1165-2-21). This measure was screened from further consideration as part of a Federal plan based on effectiveness and policy noncompliance, but was retained for further consideration by the City of Charleston.
1	7	Christopher DeScherer	SELC	Third, one fundamental problem with the Corps' current recommendation is that it does not address the city's most pervasive flooding problems. While storm surge is an obvious and major concern that we must prepare for, it is unknown when the peninsula will experience the next 100-year storm surge event. Although we cannot predict when the next 100-year storm event	Thank you for your comment. The study does take into account sea level rise, tides, and rainfall in conjunction with storm surge events. Please refer to Master Response 1 - Non-Storm Surge Flooding, and Master Response 2 – Climate Change and Sea Level Rise.

Submittal #	Comment #	Name	Organization	Comment text	Response
				will occur, Charleston is already experiencing the negative effects of numerous ongoing, flood threats that interact with and reinforce storm surge, including chronic tidal flooding and intensifying rain events combined with a low-lying, aging stormwater drainage system.	
1	8	Christopher DeScherer	SELC	The Corps' monolithic, expensive approach, requiring a match of local dollars, would take resources away from other, present day needs.	As the non-federal sponsor the City is required to provide 35%, and the federal government 65%, of the project's cost. After real estate easement credits, the estimated cost to the City is $250 million, paid over the 10-12 year design, engineering and construction phases. The City will develop a finance plan for PED phase and a finance strategy for construction phase from a variety of vetted sources, including portions of hospitality and accommodation fund surpluses, millage, funding from the state, etc. The funding plan and strategy will not and cannot take funding from City stormwater and drainage fees, which largely covers other City water management projects. Without the project, City would have an unreduced risk of multi-billion dollar storm surge damages, emergency access would not be protected, and loss of life potential on the peninsula will not mitigated. The resilience provided by the Recommended Plan would produce benefits far outweighing the costs. The storm surge wall is expected to be integrated into a City-wide flood risk mitigation approach.
1	9	Christopher DeScherer	SELC	Fourth, instead of building a single-purpose, uniform wall, the Corps should carefully evaluate solutions that are customized to the unique needs of different areas of the peninsula. The Charleston peninsula includes distinct neighborhoods and districts with varying levels of exposure to flooding and coastal storm events. The current plan treats the entire peninsula as one cohesive unit, rather than acknowledging the different challenges and adaptation needs throughout the city. By breaking down the study area into smaller blocks along the perimeter of the peninsula, the Corps should develop plans for the distinct needs of each neighborhood and shoreline area.	USACE recognizes that the peninsula includes distinct neighborhoods and districts. However, the peninsula is a coastal landform bordered by ocean waters on 3 sides and requires a comprehensive and cohesive solution for effective coastal storm surge risk reduction. Breaking the proposed perimeter into many smaller neighborhood-by-neighborhood sections would present additional technical challenges as the approach for each section would have to align with, match the elevation of, and seal against another portion of the perimeter, creating additional potential failure points. However, to the extent that the commenter is suggesting that the storm surge wall should be evaluated in smaller blocks in order to address distinct neighborhood feel or aesthetics or effects on historic properties, these effects as well as appropriate mitigation would be further analyzed in PED. Please refer to Appendix A - Visual /Aesthetic Resources Assessment and Appendix D – NHPA Compliance, including Programmatic Agreement.
1	10	Christopher DeScherer	SELC	Fifth, we understand that the Corps believes it is wedded to a narrow interpretation of its economic analysis and the calculation of National Economic Development benefits, and, as a result, it has not accounted for the benefits of greener solutions and has prematurely and wrongly eliminated these	Thank you for your comment. This comment refers to "alternatives in the EA," and therefore is not a comment on the draft FR/EIS (as noted above, the submittal predates the release of the draft FR/EIS). Please refer generally to Master Response 4 - Natural and Nature-Based Features. See also FR/EIS Section 3.1.3 Natural and Nature-Based Features (NNBF) Considered and Section 3.1.5 Measures Proposed in Response to the Draft FR/EIS. In addition, many measures that were proposed during public comment period were technically not conventional NNBF but modified structural measures with nature-based features incorporated into the design. According to ER 1105-2-100, Appendix E, page E-9, Section I, E-3. c. (2), a separable element is any part of a project which can be implemented as a separate action (at a later date or as a separate project). Separable elements

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				types of alternatives in the EA. This is contrary to Congress's express directive to the Corps "to consider the use of both traditional and natural infrastructure alternatives, alone or in conjunction with each other, if those alternatives are practicable." Section 1149 of Pub.L. 115-270, 33 U.S.C. § 2282 note (Oct. 23, 2018) (emphasis added). In fact, as we have said previously, the Corps has accepted a more flexible and inclusive approach for projects such as the Living Breakwaters project in New York.2 See Beyond the Wall at 23. Moreover, the Corps has led on the design and implementation of nature-based projects in other areas of the country.3 To date, the Corps' proposal here considers non-structural and nature-based measures only in isolation rather than as integrated components of a broader solution. The Corps must now rigorously study nature-based alternatives, such as the ones set forward in Beyond the Wall, in the EIS process, calculating not only their direct flood reduction benefits but also the many other resilience, ecological, and community benefits these systems can provide. As stated in our previous letter, "[t]he 'existence of a viable but unexamined alternative renders an environmental impact statement inadequate.'" Resources Ltd. v. Robinson, 35 35 F.3d 1300, 1307 (9th Cir. 1994).	usually must be incrementally justified. In other words, measures may only be combined if they are interdependent and must function together to achieve coastal storm risk reduction benefits. Measures that are separable, or not technically interdependent, must be individually justified to be included in the National Economic Development plan. For example, the addition of salt marsh behind a breakwater would not be considered interdependent or inseparable since the salt marsh is not required for the breakwater to function and the salt marsh would not likely be economically justified for storm risk reduction purposes on its own. The living shoreline sills are not interdependent with the wall (for storm risk reduction) so could not be justified in locations where the wall was not in the marsh. Where the wall is in the marsh or subject to direct wave action, the living shoreline sills are a practicable minimization measure.
1	11	Christopher DeScherer	SELC	Sixth, not only does the Corps' economic analysis fail to account for the benefits and services of nature-based solutions, but the cost-benefit analysis employed by the Corps to justify its preferred alternative is skewed in favor of affluent communities. As a general matter, the way the Corps values the impacts on affected structures assigns greater value to structures in wealthier neighborhoods than in lower-income areas.	This comment does not reflect the actual rationale for proposing nonstructural measures rather than a storm surge wall for the Rosemont and Bridgeview Village communities which is primarily driven by topography and other constraints, not economic value. It also fails to reflect the inclusion of other lower-income communities within the storm surge wall. Please refer to Master Response 5 - Environmental Justice.

Submittal #	Comment #	Name	Organization	Comment text	Response
				Additionally, areas with a wide range of community assets, such as hospitals or tourist attractions, receive a higher valuation in the impact analysis than areas lacking non-residential structures that contribute to economic activity.	
1	12	Christopher DeScherer	SELC	In its economic analysis for this project, the Corps does not provide sufficient information to determine why neighborhoods like Rosemont and Bridgeview Village were excluded from the proposed perimeter protection.	This comment predates release of the draft FR/EIS. Please refer to Section 3.5.2 of the final FR/EIS and Master Response 5 - Environmental Justice.
1	13	Christopher DeScherer	SELC	Further, the Corps must disclose its separate valuations of the Modeled Areas, including the Wagener Terrace and Newmarket Unprotected Modeled Areas, under all scenarios to provide transparency about the storm surge damages estimated for the areas not afforded protection by the proposed wall.	References in this response are to Appendix C Economics. The study area is divided into model areas (MAs) to facilitate the evaluation of flood damages (i.e., for the purpose of modeling flood damages). MAs were determined by taking into account topological features and generally reflect local drainage divides. The structure inventory developed for the study area was then broken down into these MAs (see Figure 10). The valuation for each MA is shown in Table 2. Whether a structure is in an Upland or Unprotected portion of an MA (see Figure 9) does not determine the valuation of the structure in the MA because the structure and content values were determined for the study area apart from delineating the MA. The valuation of an MA (whether Upland or Unprotected) would not vary with differing scenarios (the question seeks "valuations … under all scenarios"). Moreover, the designation of Upland and Unprotected portions of an MA is a function of the model showing flood damages based on whether there is a protective structure element, or PSE (Upland) or not (Unprotected) present in the MA. To present separated asset values by MA types (i.e., Upland or Unprotected) is not applicable and could be misleading because that is not the purpose for using these designations in the modeling process.
1	14	Christopher DeScherer	SELC	As it stands now, the Corps' proposal in the EA for neighborhoods, such as Rosemont, are lacking. The inequitable treatment of these Charleston neighborhoods must be resolved through greater transparency, but also through meaningful community engagement centered on community-driven solutions. See Beyond the Wall at 52. Although the Corps has recommended raising houses in Rosemont, this would not be enough to provide protection from storm surge and flooding, as residents with elevated houses in the neighborhood still struggle with the effects of flooding on neighborhood roads and on the foundations of their homes. In the attached report, Sherwood recommends community resilience planning for Rosemont and sets	This comment refers to "the Corps' proposal in the EA" and therefore is not a comment on the draft FR/EIS (as noted above, the submittal predates the release of the draft FR/EIS). Please refer generally to Section 3.5.2 of the final FR/EIS and Master Response 5 - Environmental Justice.

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				forth a suite of options residents could evaluate to determine how to best address storm surge and other sources of flooding in their neighborhood. Beyond the Wall at 53. The Corps cannot allow a flawed economic analysis to unfairly leave this neighborhood and others like it exposed to the increasing threat of storm surge and flooding.	
2	1	Michal Baird		I have read the Army Corps of Engineers' conclusion that a seawall protecting Charleston will have minimal impact on the surrounding communities. Also, of note, there was no mention of the wave deflection and its effects. This conclusion is starkly different from other studies I have reviewed, as well, anecdotal reports form towns and communities along the Mississippi River outside of the levees.	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
2	2	Michal Baird		There was a very detailed study of on seawall at San Jose on the San Francisco Bay. Reviewers of this study were surprised to discover that this one seawall impacted areas up and down and across the bay as far as 50 miles away. This increase in flood and wave action was significant. The economic damage was calculated to be millions of dollars after just one spring high tide. Please review this study.	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities. In addition, the referenced study is a sea level rise protection study, which is different and not directly comparable to the Charleston study. The referenced study also notes that the interactions and "feedbacks" are highly dependent on the specific geography and layout of the study area, which is also not applicable to the Charleston study, as the Peninsula is entirely different from a shoreline/coast line perspective. The majority of the Charleston storm surge wall is located on dry land, and therefore only affects surrounding areas during coastal storm events. The effect on surrounding areas for both increased flooding and wave energy reflection were modeled and shown to have negligible effect on surrounding areas. These differences are likely due to the fact that the San Francisco Bay is much more separated from the ocean compared to Charleston; this creates what is referred to as a "bathtub effect".
3	1	Margaret Peery		I am concerned that the wall only addresses surge. And I'm worried that climate changes are intensifying so quickly that the wall will be overtopped before it is finished.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.
3	2	Margaret Peery		I want the wall to incorporate some green solutions. I understand that the Army Corp is not willing for that to happen.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.

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4	1	H. Douglas Robertson		Mr. Wilson's statement (on podcast) that the condo buildings located between Union Pier and Columbus St. Terminal are at "no risk of damage" is untrue. The electrical, gas, water and sewage utilities and elevator mechanicals are all located on the ground/garage level of these buildings and would be damaged by flood waters. Mr. Wilson is seriously mistaken to presume that because living quarters are above the proposed wall height, that these buildings are at "no risk of damage." Just as the State Ports Authority is demanding protection for their terminals at the two SPA properties, so too must all these hundreds of residential properties be provided protection from storm surge. Ruination of a building's utilities at ground level is a very serious and expensive loss, and we ask that ACE address this undeniable reality and realign the proposed wall to prevent this damage to structures housing many hundreds of citizens.	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment. Additionally, location of utilities and possible utility relocation will be addressed during the PED phase.
5	1	Donna Hill		I see on the map The Bristol Condominiums are on the outside of the planned wall, can you explain why that is and what the plans are for our residents to be able to access our entrance and exit from our building? Is there someone that can meet virtually with our residents for questions and answers?	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
6	1	Rita Fishel Stroud		Do not even consider the sea wall idea, work on correcting the drainage problems instead. Heavy rain causes many more problems, storm surge is rare. We vote no to the whole sea wall idea.	Thank you for your comment. Please refer to Master Response 1 - Non-Storm Surge Flooding.

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7	1	Frank C. Leister		Has any consideration been given to barriers that could be activated to come off the bottom to block the surge and then retract back to the bottom after the surge?	Movable pop up or other deployable barriers were considered early in the study for the whole storm surge wall alignment; however at very limited portions along the alignment, deployable barriers could be considered. These types of devices are significantly more expensive than a static wall system both in construction and maintenance, which would increase the overall cost of the project greatly. Additionally, the wall would have to be broken into many smaller sections along its' length to allow for movement up and down. This will present a maintenance challenge as each section will have to seal against another portion of the wall, creating numerous failure points for leakage. Such systems were considered for the entire wall alignment, and then not pursued due to the cost, risk of failure, maintenance and operability issues identified above.
8	1	Charles Andrus		The present proposed wall design does not help or protect several condo complexes on both sides of the Maritime Center and the new African American Museum, including at least 135 units in Dockside Condominium, or even the area of the Aquarium. These need to be included in the revised protection plan.	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
9	1	Travis White		I live at 2 Laurens Street, Charleston SC and see that my condo building and several others are outside the protective wall while others in the area are inside. While I realize we are fairly new construction (2008) and meet the current FEMA flood standards, several buildings included in the protection of the wall are also newer and elevated. - Why are we excluded ?	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
9	2	Travis White		What effect can the excluded buildings expect who are in close proximity to the wall ie, water piling up etc.... ?	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
9	3	Travis White		Will buildings outside the wall have access to emergency services once the wall closes due to an approaching storm ?	Thank you for your comment. Please refer to Master Response 8 - Operation and Maintenance Procedures.
10	1	Omar Muhammad	LAMC	The FR, EIS, and the associated technical documents for this project present hundreds of pages of materials community members must sift through. Much of it is technical, spanning a wide variety of scientific fields. Given the many pages and the dense scientific information, we're requesting an additional 30 days to provide comments. Thus, the final comments will be due on	USACE considered this request to extend the public comment period. This NEPA process included a number of cooperating agencies, Federal, state, and local agencies, and stakeholders whose close involvement throughout the process with providing feedback. Given the broad range of comments received to date and the extensive Federal and non-Federal participation in the overall process as well as the level of public engagement in the area, USACE determined that an extension was not warranted and that the 45-day public comment period was adequate consistent with NEPA regulations.

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				November 25, 2021. The importance of this project to the community means we need more time for review.	
11	1	Whit S. Smith, III	Charleston Branch Pilots' Association	We are experiencing sea level rise first-hand, and have invested in multiple projects to protect our infrastructure and maintain our capability accordingly. Earlier this year, we completed a $600,000 project to elevate our parking area above what have become normal high tide levels. We fully support the initiative to protect the Charleston Peninsula from storms and sea level rise, and we look forward to participating in this study and the ensuing project. We, therefore, respectfully request to be considered for appointment to any steering or advisory committees and sub-committees that may aid in this effort to which our perspective might be relevant.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise. Please contact the City with regard to involvement on any local committees.
11	2	Whit S. Smith, III	Charleston Branch Pilots' Association	As the project matures to the design phase, we respectfully ask you to consider that pilotage is an essential service within the maritime transportation network the Port of Charleston serves. Pilots are often the last of the port's services rendered before a hurricane-imposed shut down, and the first to resume duties to get the port moving again when the storm subsides. Our role is normally to be the first underway, usually with the Coast Guard onboard, to conduct damage assessments of the port's infrastructure as soon as storm conditions drop below tropical parameters. Our fuel stores on site and our other critical provisions help us maintain our readiness. Therefore, we respectfully request that this project preserves access to our facility right up to the hours before a surge is imminent and immediately after	Thank you for your comment. Please refer to Master Response 8 - Operation and Maintenance Procedures. During the development of the Operation, Maintenance, Repair, Replacement, and Rehabilitation Plan in the PED phase, USACE will continue to coordinate with the Charleston Branch Pilots' Association regarding the operations of gates potentially impacting their facilities.

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				any surge subsides. We anticipate that the structures involved in this project will likely be inland of our facility, whether on Concord or East Bay Streets, but if it becomes necessary to dissect our property, we request to be heavily involved in the design and construction, as key stakeholder. Whatever the design, if we are dependent on a gate to access our facility, or have access over the structure, we request that such access be designed to allow for operations up to a few hours before the expected surge, and within just a few hours after the surge subsides.	
12	1	James Brooks		How will this study (wall) impact Mount Pleasant and James Island. The water bottles up in these areas and with sea level rise.	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
13	1	Jeffrey McWhorter	Palmetto Railways	Prior to the Corps' publication of the DFR-EIS, and consistent with its statutory authority, Palmetto Railways reviewed and commented on the Corps' previous notice of its intent to prepare and EIS, on its DFR-EA, and on Alternative 3 (then-advanced as the TSP). In short, Palmetto Railways expressed its opinion that the proposed alignment and location of the storm surge wall recommended as a component of Alternatives 2 and 3, and carried forward in the current TSP, has the potential to cause significant adverse impacts to Palmetto Railways' unfettered safe and efficient operation of its rail facilities on the peninsula. III. An alignment that does not cause a disproportionate adverse impact on existing the rail corridor infrastructure on the peninsula must e considered and should be adopted. In short, a project that results in less than unfettered access to and use of the rail facilities for which Palmetto Railways serves as switching provider and short-line operator is considered unacceptable to	Please refer to Master Response 7 - Wall Alignment. In addition, Section 6.17.2 - Alternative 2 acknowledges that closure of gates at rail crossings during a storm surge event would restrict rail access, but this would be temporary effect. This section further discusses existing emergency operation coordination with State and local agencies including the railroads would continue and include any gate operation procedures. During the development of the Operation, Maintenance, Repair, Replacement, and Rehabilitation Plan in the PED phase, USACE will continue to coordinate with Palmetto Railway and other railways regarding the operations of rail gates potentially impacting their facilities.

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				Palmetto Railways. According to the DFR-EIS, proposed Alternative 2 (the TSP), although still described as conceptual and subject to further refinement, includes a structural storm surge wall that is designed to be strategically aligned to allow for "continued operation of all ports, marinas, and the Coast Guard Station." Continued operation of the rail facilities located on the peninsula is omitted. In fact, the DFR-EIS concedes that access to these rail facilities will be limited: "The storm surge wall would include multiple ... railroad ... gates. Typically, the gates would remain open, and gate closure procedures would be initiated based on storm surge predictions from the National Weather Service. When major flooding is expected, storm gates would be closed at low tide, to keep the rising tide levels from taking storage needed for associated rainfall. For ... railroad gate closings, timing of the closure would be dependent on evacuation needs and the anticipated arrival of rising water levels that close transportation arteries. Specific gate operation procedures would be developed during the [Preconstruction, Engineering and Design] phase." DFR-EIS, Executive Summary at p.5. Notwithstanding this acknowledgment, the DFR-EIS contains no analysis of these impacts and potential disruptions to operations.	

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13	2	Jeffrey McWhorter	Palmetto Railways	Contributing to the uncertainty is that the precise location of the storm surge wall has not yet been formally defined, preventing Palmetto Railways from evaluating the specific impacts to its operations. According to Appendix B of the DRF-EIS, there are two contemplated crossings over existing railroad tracks and, thus, two railroad gates would be required. Similar to the approximately-proposed location of the surge wall, the precise location of these proposed gates is not readily identifiable in the DFR-EIS. Based on information contained in the DFR-EIS, as well as information relayed to Palmetto Railways during a recent meeting with Corps staff, it is our understanding that the potential location of the sea wall would be at the landside of the “high dock” edge of the Columbus Street Terminal, with a contemplated railroad crossing on the west side of the existing at-grade rail crossing on Johnson Street. Likewise, a crossing if the rail facilities of Union Pier Terminal would be required. Until the exact proposed location of the wall and the proposed railroad gates are formally proposed by the Corps, Palmetto Railways is unable to definitively evaluate the potential disruption(s) to its operations. Palmetto Railways acknowledges the previous comments of the South Carolina Ports Authority regarding its preference that any such a wall should only be built on the landside of the “high dock” on both terminals, which is the terminal decking adjacent to the waterfront where ships are worked, the Ports Authority’s warehouses, and Palmetto Railways’ rail facilities. However, in regard to the assumed proposed railroad gate over the tracks to the west of the existing at-grade rail crossing on Johnson Street, Palmetto Railways	Please refer to Master Response 7 - Wall Alignment. During the development of the Operation, Maintenance, Repair, Replacement, and Rehabilitation Plan in the PED phase, USACE will continue to coordinate with Palmetto Railway and other railways regarding the operations of rail gates potentially impacting their facilities.

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				maintains its opposition to any crossing of its mainline track, as the trackage in question is used in heavy switching operations such as this assumed proposed location. Nevertheless, and regardless of any ultimate location of the gate(s), if required, should the proposed final location of the surge wall cross existing rail trackage, requiring one or more rail gates, or run parallel to the tracks within the established rail right-of-way, it has the potential to significantly impact and impair the safe and efficient operation of Palmetto Railways' rail facilities. This is particularly true given the 70-foot easement (35-feet on center in either direction during construction, and a perpetual easement of 50-feet—25- feet on center in either direction) for the wall that is discussed in the DFR-EIS. Similar to the Ports Authority, Palmetto Railways has no intention of selling any portion of, or granting an easement over, its rail facilities. See 40 C.F.R. § 230.10(a)(2) (defining 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.").	

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13	3	Jeffrey McWhorter	Palmetto Railways	At bottom, unfettered access and use of these rail facilities is crucial to Palmetto Railways' ability to fulfill its statutory mission and purpose. On a micro level, any disruption to Palmetto Railways' operational abilities, even if temporary, would disrupt and impair the cargo operations of the Ports Authority on the Columbus Street Terminal and Union Pier Terminal. On a macro level, any disruption to Palmetto Railways' operational abilities on and around the peninsula has the potential to cause cascading and cumulative adverse effects on the State's rail transportation and shipping network which, combined with the State's maritime facilities and commerce, serves as the economic engine of the State. But see 46 Fed. Reg. 18026 (March 23, 1981) (providing that under NEPA, reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant). It is therefore Palmetto Railways' preference that any alternative carried forward for consideration by the Corps include a "no impact" condition on these rail facilities. At a minimum, however, it is imperative that, in order to mitigate against potential disruptions to operations, Palmetto Railways and the Ports Authority should be provided operational control over any gates that traverse rail facilities and provide access to Ports Authority terminals.	During the development of the Operation, Maintenance, Repair, Replacement, and Rehabilitation Plan in the PED phase, USACE will continue to coordinate with Palmetto Railway and other railways regarding the operations of rail gates potentially impacting their facilities.

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14	1	Kevin Mills	South Carolina Aquarium	In June of 2020, the SCA submitted comments to the USACE on the Draft Integrated Feasibility Report and Environmental Assessment (DIFR/EA) dated April 2020. In our commentary, we noted the substantial value of SCA assets at severe risk for inundation at elevations greater than approximately 8 feet MLLW (4.86 feet NAVD88) and estimated the cost to elevate affected assets in the $30-$50M range. The USACE is aware of the tremendous increase in the cost of construction in the form of raw materials, equipment, and labor since April 2020. Our estimate is likely 2 to 3 times higher now. Our core building systems and life support systems including water filtration, boilers, chillers, electricity service, etc. are all located below the elevation of our first-floor visitor experience, and at severe risk of flooding. We have focused on fortifying these areas, and we still have a considerable amount of engineering, design, and implementation needed to put in place workable solutions for managing flooding – even if we could depend on the protection of a storm wall. The cost to fortify what we have is very high, and it would be completely cost prohibitive (and space prohibitive) to relocate these core building systems.	Please refer to Master Response 7 - Wall Alignment. The intent of the economic analysis is to assess feasibility; therefore, the level of detail regarding damageable assets and alternative evaluation do not necessarily involve a detailed structure by structure analysis).

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14	2	Kevin Mills	South Carolina Aquarium	In our June 2020 commentary, we proposed the USACE consider integrating the wall alignment into the Cooper River side of the SCA building foundation. The SCA investigated the bathymetry of the near shore of the Cooper River next to the SCA building and found that the depths may be able to accommodate a wall alignment here, well inside the navigation channels in the Cooper River as shown in Figure 2-1 of the (DFR/EIS). Further, on December 3rd, 2020, our Chairman of the Board, Mr. Jonathan Zucker, engaged in a positive meeting with Mayor Tecklenburg to express our concerns and request consideration of a "sea-ward" wall alignment that would protect all the City assets on the East Peninsula. At the Mayor's direction, the City's Chief Resilience officer at the time, Mr. Mark Wilbert, engaged in a conversation with SCA Board Members and indicated he would take up a discussion of this topic with the USACE. At a minimum, the SCA requested that the USACE describe why they believe such an alignment is not viable. We received no formal response to this request and see that the wall alignment in the (DFR/EIS) in the vicinity of the SCA has not changed. This is extremely disappointing and frustrating, especially given the USACE's statement on p. 12 that all comments submitted on the April 2020 (DIFR/EA) will not be further considered.	Please refer to Master Response 7 - Wall Alignment. For this location, the proximity to the Federal navigation channel factors into the wall alignment. The buffer needed for construction and maintenance of a combo wall seaward of the aquarium would present risk to the vessels utilizing the Columbus Street Terminal. A wall seaward of the aquarium would block boat access, including the Charleston Maritime Center and National Park Service ferry to Fort Sumner. Additionally, such a wall would create new permanent impacts to the subtidal habitat.

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14	3	Kevin Mills	South Carolina Aquarium	Our second concern with the alignment as shown in the (DFR/EIS) is the number of mature trees that the USACOE proposes to sacrifice. This includes the mature trees along Calhoun Street between East Bay and Concord Streets, the mature canopy between Washington Street and Gadsdenboro Park (from Calhoun Street south to Laurens Street), and, most egregiously, the majestic trees that make Waterfront Park a jewel of the City's park system. To put forth that the cutting of these trees can be mitigated by planting new trees is simply inaccurate. It will take multiple generations for new trees to deliver the value and benefit we now enjoy from these greater than 300-year-old specimens. Trees, especially mature trees, are a living form of infrastructure, providing services that include stormwater management, air filtering, carbon sequestration, and, perhaps most importantly, they cool the environment around them. Surely the USACE is aware of the City's concern and proactive activity related to the effects of urban heat islands. In 2020, the City released an All-Hazards Vulnerability and Risk Assessment report, which identified populations and assets throughout the city that are vulnerable to various physical threats. Among the threats identified in the report was extreme heat. In response, the City is proactively gathering data1 that will help it manage this continuing threat that is exacerbated by global warming. Trees are the single best antidote to the effects of urban heat islands, performing three vital functions: 1. Their shade prevents solar radiation from hitting paved surfaces like concrete and asphalt, which absorb energy and rerelease it into the air as heat. 2. Their leaves cool the immediate area by using heat to evaporate the water trees pull from the soil during	During the detailed design phase, USACE and the City will look to minimize tree loss and impacts to visual resources. Trees that need to be removed would be relocated or replaced to preserve this natural resource to the greatest degree practicable.

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				their growth processes. Evaporative cooling occurs because water will absorb a relatively large amount of heat in order to evaporate. 3. They protect the human body from the harm of direct exposure to the sun's rays.	
14	4	Kevin Mills	South Carolina Aquarium	Thirdly, there are concerns the USACOE states explicitly in the (DFR/EIS) that apply directly, and inordinately, to the SCA. In Section 2.1, p. 15, the USACE cites the risk of relative sea level rise. The SCA, being outside the proposed wall and built on fill, is particularly susceptible to this phenomenon. In Section 2.2.1, p. 16, the USACOE cites the risk to workers who are exposed to flooded areas. The SCA's dedicated staff will be susceptible to these risks, both during the actual storm ride-out and after each event that has exceeded minimum flood elevations, when they proceed to clean up the substantial and hazardous flood related debris necessary to bring the SCA back on-line for the community.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.

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14	5	Kevin Mills	South Carolina Aquarium	Lastly, the SCA emphasizes and urges the City and USACE to recognize the economic value of SCA to the City and the region. In 2017, the Metro Chamber of Commerce's Center for Business Research estimated the annual impact of direct and indirect spending from Aquarium visitors to approach $283 million, sustaining more than 3300 jobs in the community. A temporary or permanent shutdown from catastrophic storm surge would be devastating to the local economy. We know from the experience of the Audubon Aquarium in New Orleans following Hurricane Katrina that years of slowdown can compromise the ability of the Aquarium to operate, and our recent experience during the pandemic provides real data related to business interruption. Assuming the SCA is forced to close for 8 months following a catastrophic storm event, and 5 years of regional recovery follows, we anticipate the following costs in today's dollars: South Carolina Aquarium Direct Impact: • Cost of Operations during shutdown: $7M • Capital Repairs and Replacements: $20M • Lost Revenues during Post-reopening period: $10M TOTAL: $37M Economic Impact to City and State: • Loss of City and State revenues during shutdown: $215M • Loss of City and State revenues during Post-reopening: $350M TOTAL: $565M GRAND TOTAL: $602M	The economic value of SCA is acknowledge and this statement can also be said about most businesses located in the study area. However, it is important to note that the intent of the economic analysis as stated in the Economic Appendix is contribution to National Economic Development (NED). Contributions to NED, expressed in monetary units, are the direct net benefits that accrue in the planning area and the rest of the Nation. Benefits from plans for reducing flood hazards accrue primarily through the reduction in actual or potential damages to affected land uses are NED. The loss of income by commercial, industrial, and other business firms is difficult to measure because of the complexity involved in determining whether the loss is recovered by the firm at another location or at a later time.

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15	1	Susan Lyons	Groundswell Charleston	Looking ahead, if the City Council votes to proceed into PED, we have several thoughts and concerns. They follow: In general, we believe that the Dutch Dialogues, the Sherwood report, among others, and Allen Davis's work at the Charleston Civic Design Center encompassing several professional suggestions, deserve as much consideration as possible within congressionally-imposed constraints. While these nature-oriented alternatives have not yet been engineered or costed out, they seem to many of our citizens to represent a direction for peninsula surge protection that is vastly preferable to a nearly continuous concrete wall. In that connection, we understand that the newly released South Atlantic Coastal Study (SACS) and new International Guidelines on Nature and Nature-Based Features for Flood Risk Management could enable the Charleston project to elevate nature-based solutions to at least an equal footing with traditional (gray) infrastructure on the peninsula. As has been noted over the life of the feasibility study, Charleston favors engineering with nature (EWN), also called Nature and Nature-Based Features (NNBF) and Nature-Based Systems (NNBS).	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features. In addition, many measures that were proposed during public comment period were technically not conventional NNBF but modified structural measures with nature-based features incorporated into the design. According to ER 1105-2-100, Appendix E, page E-9, Section I, E-3. c. (2), a separable element is any part of a project which can be implemented as a separate action (at a later date or as a separate project). Separable elements usually must be incrementally justified. In other words, measures may only be combined if they are interdependent and must function together to achieve coastal storm risk reduction benefits. Measures that are separable, or not technically interdependent, must be individually justified to be included in the National Economic Development plan. For example, the addition of salt marsh behind a breakwater would not be considered interdependent or inseparable since the salt marsh is not required for the breakwater to function and the salt marsh would not likely be economically justified for storm risk reduction purposes on its own. The living shoreline sills are not interdependent with the wall (for storm risk reduction) so could not be justified in locations where the wall was not in the marsh. Where the wall is in the marsh or subject to direct wave action, the living shoreline sills are a practicable minimization measure.
15	2	Susan Lyons	Groundswell Charleston	We remain concerned about the historic communities of Rosemont and Bridgeview and others, where flooding has been chronic and is expected to worsen, particularly in a surge event. The 3 X 3 Citizens Advisory Committee has recommended to City Council that a resilience study be conducted to determine opportunities for protection in Rosemont beyond house-raising and flood-proofing in the Corps plan. Perhaps the Corps could cooperate in this effort.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
15	3	Susan Lyons	Groundswell Charleston	We are especially concerned about the potential effect of a solid, non-enhanced wall on our view sheds. To Charleston's	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics.

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				citizens, businesses, and visitors, visual and actual access to the waters around our community are priceless; they need to be preserved.	
15	4	Susan Lyons	Groundswell Charleston	Similarly, there are areas where proposed placement of gates and/or pumps and other construction appear to threaten our trees. Trees are not only a treasured element in our landscape, their canopies are increasingly important in disbursing rainfall, and their contribution is critical to our environment amid climate change.	Please refer to Response to Comment #14-3.
15	5	Susan Lyons	Groundswell Charleston	Given the longterm nature of this project, we are concerned that should a significant surge come to Charleston before peninsula encirclement is complete, we could experience the kind of damage that would occur if the project had not begun. What will happen under those circumstances? The city as non-federal partner will need to address this possibility in its comprehensive Water Management Plan, but the Corps might have thoughts to share with the public about this.	The proposed construction phasing prioritizes areas that are at the greatest risk first such as medical area. In addition, the construction phasing is intended to provide as complete a tie into higher ground as possible along the way to provide as much protection as possible during the construction period. However, the peninsula would not be fully protected until construction is complete. There is no feasible way to offer protection to areas not yet behind the floodwall, however the risk would not be any higher than if the floodwall were not to be constructed. The City's existing emergency procedures would implemented while the study is being constructed.
15	6	Susan Lyons	Groundswell Charleston	Also given the longterm nature of this project, we understand that there are different estimates of sea level rise. This should be reconciled.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.
15	7	Susan Lyons	Groundswell Charleston	It has been noted frequently that the decision to move to ahead with this project will have to be made before much of the specific alignment and design is known in most of the sensitive neighborhoods and edges of the peninsula. If the city council does vote to move into PED, it will be even more critical to keep the public informed about these specific determinations. With that in mind, we would like the Army Corps to establish a schedule of frequent updates that can be communicated through the 3 X 3 Advisory Committee's Communications	Thank you for your comment. Please refer to Master Response 9 -Public Outreach.

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				Working Group to the citizens of Charleston.	
16	1	Cashion Drolet	Historic Charleston Foundation	Alignment: Both SC State Port Authority properties, the Columbus Street Terminal and Union Pier, should be protected by the perimeter project. Both properties are valuable economic assets to our city and state. Project alignment for these properties should be located as close to the landward side of the Cooper River as feasible to ensure no disruption of maritime operations and the future viability of Union Pier to be redeveloped as private property. Further, this realignment of the project should be addressed prior to development of the Final Report. · A more thorough review of the Ansonborough/Concord Street alignment should be pursued. The SC Aquarium, International African American Museum, and other residential and commercial properties in this area should be reevaluated for inclusion within the project. A robust review of the Lockwood Boulevard alignment should be conducted during PED. This is a more sensitive area of the city where the views of the Ashley River from the peninsula should be better prioritized. The Final Report should reflect the range of possibilities for alignment and typologies for any given segment of the project for consideration during PED in order for the public to better understand that alignment proposed in the study is not final and will not be made final until PED. HCF suggests using the “hatched area” or alignment zones approach as possible alignment when the Final Report is	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment. Of interest, generally, may be portions of the detailed responses below to Submittal #20, Comments 1 – 3.

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				published, as suggested in the Perimeter Protection Analysis Discovery Report prepared by Waggoner & Ball et al.	
16	2	Cashion Drolet	Historic Charleston Foundation	· Charleston is a special place, and the success of this project is not possible without appropriate aesthetic mitigation to ensure that the project integrates into Charleston's historic urban fabric. · While HCF is appreciative of the $50 million the Army Corps included in the September 10th optimized draft, we feel that it is premature to commit to this number, as it is likely inadequate.	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics. Aesthetic mitigation may be in addition to or complement that identified for historic or cultural resources pursuant to the Programmatic Agreement.
16	3	Cashion Drolet	Historic Charleston Foundation	HCF encourages the Army Corps to work in earnest with the City of Charleston Civic Design Division and the Section 106 Programmatic Agreement signatories during PED to determine an appropriate strategy for aesthetic mitigation. Before any discussion of mitigation occurs, we want to emphasize the need for the Army Corps to focus on avoidance and minimization of impacts to historical and cultural resources first.	As noted in the Whereas Clause thirteen within the Programmatic Agreement, "the Corps recognizes that significant historic districts and properties in and around the peninsula of Charleston are an integral part of the community's life and character; and preservation of this irreplaceable heritage is in the public interest. The knowledge and identification of the Charleston Peninsula's historic resources, together with the goal of preserving the integrity of these resources, will improve the planning and execution of the Project. The Corps commits to considering the avoidance and minimization of adverse effects to historic properties in its design of the storm surge wall and other Project features." Additionally, USACE commits in Stipulation III.B.3.b of the Programmatic Agreement that "avoidance of adverse effects to historic properties is the preferred treatment approach. The Corps will consider redesign of elements of the Project phase or feature in order to avoid and/or minimize historic properties and Project effects that may be adverse."

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16	4	Cashion Drolet	Historic Charleston Foundation	The utilization of more nature-based solutions in support of marsh and ecosystem resilience and ancillary erosion control remains a priority for HCF. All segments of the project should be considered for nature-based solutions. However, special attention should be paid to Rosemont, Wagener Terrace, the City Marina, and Brittlebank Park. Additionally, the High and Low Batteries should be evaluated for augmentation through naturebased solutions.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
16	5	Cashion Drolet	Historic Charleston Foundation	Consider reordering project phase 2 (High and Low Batteries) and phase 3 (the Eastside), per the recommendations made in the Perimeter Protection Analysis Discovery Report prepared by Waggoner & Ball et al. The existing protections of the batteries should be leveraged in order to provide protection for the underserved and highly vulnerable Eastside.	The proposed construction phasing prioritizes areas that are at the greatest risk first such as medical area. In addition, the construction phasing is intended to provide as complete a tie into higher ground as possible along the way to provide as much protection as possible during the construction period. However, the peninsula would not be fully protected until construction is complete. There is no feasible way to offer protection to areas not yet behind the floodwall, however the risk would not be any higher than if the floodwall were not to be constructed. The City's existing emergency procedures would be implemented while the study is being constructed.
16	6	Cashion Drolet	Historic Charleston Foundation	The risks associated with movable wall sections, gates, and mobile pump stations should be evaluated during PED in order to properly reflect the cost for the city of operation and maintenance of these project features.	An Operation, Maintenance, Repair, Replacement and Rehabilitation Plan is currently being developed and would continue to be refined during the PED phase. Also, Section 8.4 – Plan Economics and Cost Sharing of the Final FR/EIS indicates that there is an estimated average annual maintenance cost of $3 million to maintain the project as a whole, including the wall, gates and pumps. This cost is an annual average over the life of the project that takes into consideration increasing maintenance costs as the project ages.
16	7	Cashion Drolet	Historic Charleston Foundation	The Corps should better review the proposed pump capacity and locations in order to create synergy with internal drainage. This should be prioritized as part of the PED year 1 interior hydrology analysis.	Thank you for your comment. Please refer to Master Response 3 - Interior Drainage.
16	8	Cashion Drolet	Historic Charleston Foundation	While we are relieved to see the Corps has increased its sea level rise projections in the optimized plan from 1.3 feet to 1.6 feet, the City of Charleston projects a 2-3 feet increase in sea level rise over the next 50 years in its Flooding and Sea Level Rise Strategy of 2019. The Corps should revisit the sea level rise assumptions made for the project to ensure the most accurate approach	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.

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				for Charleston. Further, the project should be able to be retrofitted to account for additional sea level rise.	
16	9	Cashion Drolet	Historic Charleston Foundation	Are the 12 feet NAVD88 elevation and 2% annual recurrence event proposed accurate? FEMA CRS standards for other cities require higher levels of protection.	The 12 feet NAVD88 elevation is correct; however, the storm surge wall would provide storm risk reduction for a 0.7% annual exceedance probability event in 2032 and 1% annual exceedance probability event in 2082.
16	10	Cashion Drolet	Historic Charleston Foundation	The Rosemont Community is an historic African American community on the peninsula that has borne the brunt of environmental injustice through industrial pollution and interstate infrastructure projects. While HCF would like to see the Rosemont Community included within the perimeter of the project, we understand the Army Corps' recommendation of "nonstructural" measures instead of extending the proposed seawall up to Rosemont. However, the Corps should continue to evaluate Rosemont for additional resilience enhancements beyond the nonstructural solutions proposed. HCF commends the Corps project team to model and consider the effectiveness of the recommendations made for the Rosemont Community in the Beyond the Wall Report prepared by Sherwood Design Engineers.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
17	1	James Newsome	SC Port Authority	In brief, a project that results in significant adverse impacts on the objectives set forth above, including less than unfettered access to and use of the SCPA's facilities or diminutions in value to property contemplated for redevelopment, is considered unacceptable to the SCPA. According to the DFREIS, proposed Alternative 2 (the Tentatively Selected Plan, or TSP) includes a structural storm surge wall that is designed to be strategically aligned to allow for "continued operation of all ports, marinas, and the Coast Guard	Further design efforts will take into consideration the continued operation of all ports, marinas, and the Coast Guard Station including the rail facilities that service these operations. Where the storm surge wall must intersect a rail line, gates would be designed to take into account any and all clearances required for proper operation of rail services. Like all other proposed gates in the recommended plan, rail gates would only be closed in adherence to the Operation, Maintenance, Repair, Replacement and Rehabilitation Plan. During the Preconstruction Engineering and Design phase, USACE will continue coordinate with the SCPA and Palmetto Railways on the design and operation of storm surge wall and gates on the SPCA property. It is noted that the alignment of the storm surge wall along the South Carolina Ports Authority (SCPA) property has changed since the September 2021 draft FR/EIS in response to concerns presented by the SC Port Authority. Following the release of the draft FR/EIS, the SCPA engaged with the study team to optimize a segment of the storm surge wall that previously paralleled portions of East Bay and Washington Streets, moving it instead to the eastern edge of the property, closer to the shoreline. Among other things, this move provides storm surge risk reduction for any cargo stored at the port terminal.

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				Station." Adherence to this design constraint is an absolute from the SCPA's perspective. However, a critical component of the SCPA's operations at Columbus Street and Union Pier Terminals involve the rail facilities located on the peninsula that service these terminals. Continued operation of these rail facilities is omitted from the Corps' above-stated design constraints, but should be included, and the Chief's Report and Final EIS should contain an analysis regarding these impacts and their potential to disrupt maritime operations.	
17	2	James Newsome	SC Port Authority	In terms of the location and alignment of the wall, formal acceptance by the SCPA is not possible until the precise location and alignment is defined. However, as commented in previous letters, as well as discussed in recent in-person meetings, an alignment that tracks landside of the "high docks" on both Columbus Street and Union Pier Terminal would be the SCPA's preference and the only alignment that would minimize unacceptable disruptions to operations.	During the Preconstruction Engineering and Design phase, USACE will continue to coordinate with the SCPA and Palmetto Railways on the design and operation of storm surge wall and gates on the SPCA property.
17	3	James Newsome	SC Port Authority	The SCPA continues to reiterate the following significant conditions and concerns that the Corps should consider in evaluating the precise alignment of the wall: • Operational control of non-permanent features of the wall, i.e., the rail gates and wharf access gates, on the SCPA's property is foundational, both for operational and security reasons. The DFR-EIS states that specific gate operation procedures would be developed during the Preconstruction, Engineering and Design phase, and it is imperative that the SCPA be involved in those discussions and the development and implementation of those procedures. This will ensure that the SCPA can coordinate effectively the actions of the wharf gates and with Palmetto Railways regarding the	Thank you for your comment. Please refer to Master Response 8 - Operation and Maintenance Procedures. Further design efforts will take into consideration the continued operation of all ports, marinas, and the Coast Guard Station including the rail facilities that service these operations. Where the storm surge wall must intersect a rail line, gates would be designed to take into account any and all clearances required for proper operation of rail services. Like all other proposed gates in the recommended plan, rail gates would only be closed in adherence to the Operation, Maintenance, Repair, Replacement and Rehabilitation Plan. During the Preconstruction Engineering and Design phase, USACE will continue to coordinate with the SCPA and Palmetto Railways on the design and operation of storm surge wall and gates on the SPCA property.

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				rail ingress / egress on those rail facilities that are the core part of cargo operations throughout Columbus Street that cannot be disrupted. The SCPA understands that Palmetto Railways has also expressed a similar position on this point.	
17	4	James Newsome	SC Port Authority	• The existing utilities, including storm water, electrical, communications water and the Dominion Energy electrical transmission facilities that serve the peninsula of Charleston, must be addressed so as to not adversely affect operations.	The Appendix B - Engineering, paragraph 5.5.8 contains information, including drawings about how utility crossings will be handled to make sure the water tight integrity of the wall is maintained while allowing normal utility function. During PED, utilities would continue to be considered and addressed.
17	5	James Newsome	SC Port Authority	• The needs of the cruise industry using a new cruise terminal must be accommodated, including parking.	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
17	6	James Newsome	SC Port Authority	• Easement access must be clarified and addressed. The DFR-EIS indicates that a 70-foot easement (a construction phase easement of 35-feet on center in either direction, and a perpetual easement of 50-feet, 25-feet on center in either direction) will be required for the wall. As stated previously, the SCPA has no intention of selling any portion of its terminal property as a part of the granting of an easement, if such easement is granted. The SCPA understands that Palmetto Railways has stated its position that it likewise will not sell any portion of its rail facilities as a part of any easement. At bottom, any such easement, if granted, cannot be disruptive to SCPA operations or terminal integrity. The SCPA understands and expects the precise location and alignment of the wall to be fully determined as a part of the final Feasibility Report and EIS and prior to the signing and submission of the Chief's	Most of the storm surge wall footprint will require standard estate easements for permanent and temporary construction. 1) Perpetual Flood Protection Levee Easement (PFPLE) buffer is 25 ft. from the center of the wall on each side, and 2) Temporary Work Area Easement (TWAE) buffer is plus 10 ft. on each side of the PFPLE. Total temporary and permanent buffer applied = 50' PRPLE + 20' TWAE = 70' total footprint. Temporary construction and permanent access gates are included in the easements on land for pedestrian, vehicle, railroad, and storm tidal gates in the marsh. At this feasibility stage, only 11 properties will require Fee acquisition, and none are located on the SCSPA property. Other potential estates are Road Easement and Utility and/or Pipeline Easement. As informed by the SCSPA, the 3 warehouse buildings located on the Union Pier will be demolished and will require PFPLE and TWAE for construction of the wall.

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				Report to Congress. The SCPA therefore reserves the right to provide final comments at that time.	
17	7	James Newsome	SC Port Authority	III. Conclusion In sum, the SCPA recognizes that this project encapsulates a number of different interests, issues and perspectives. It is with that understanding that the SCPA appreciates the opportunity to engage with the Corps and other stakeholders on this important issue and work toward a concept that is amenable to everyone. While any project that would impair the SCPA's statutory authority and mission would be unacceptable and would disrupt the significant benefit that the SCPA brings to the Lowcountry region and State, the SCPA is committed to finding a solution that does not result in significant adverse impacts on the forestated objectives of maintaining unfettered access to and use of the SCPA's facilities or diminutions in value to property contemplated for redevelopment. Any impacts to these objectives should be fully and thoughtfully considered by the Corps in its analysis of the impacts of the project in a Final EIS, and avoidance and minimization measures should be employed, where possible.	Thank you for your comment.

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18	1	Omar Muhammad	LAMC	Environmental justice is a crucial component of the NEPA process. The Environmental Protection Agency (EPA) defines environmental justice as the "fair application of all laws, rules, acts, policy, programs, budgets and decisions and the meaningful engagement of all people regardless of the ethnicity, class, socioeconomic status, citizenship, gender, race." Furthermore, LAMC expands on this definition to include everything that impacts people's quality of life as environmental justice. To the community, meaningful engagement means involving the community in every aspect of a project development. Communities are not an afterthought to this process but centered in the work. This process includes the design, implementation, and evaluation of a project or program. Marginalized communities across the country are demanding more meaningful input into processes impacting their quality of life. They reject processes when they are not engaged in beneficial ways (based on their inputs). Within its Environmental Justice Interagency Working Group (EJIWG), the federal government developed a set of best practices specific to NEPA but are helpful for other efforts to ensure meaningful engagement of marginalized and vulnerable populations called promising practices (https://www.epa.gov/environmentaljustice/ej-iwg-promising-practices-ej-methodologies-nepa-reviews). We highly recommend the project team incorporate the promising practices into their project's engagement strategies.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

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18	2	Omar Muhammad	LAMC	The selection of Alternative two, the combined use of structural (Sea Wall) and non-structural (Elevation) solutions, to reduce damages from storm surge inundation is not the best approach to deal with impacts of the climate reality that challenges us all. The best and most cost-effective approach is adaptation and mitigation strategies such as preventing destruction and building on essential habitats such as barrier islands, wetlands, beaches, and marshes; improvements to stormwater infrastructure; and integration of strategies encouraging the capture, storage, and slow release of water on-site allowing water to recharge the water table and filter before entering our essential habitats. Environmental justice communities such as Bridgeview and Rosemont contribute the least to and bear the disproportionate impacts of climate change, so residents' lives and properties in affluent areas are protected.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise, Master Response 4 - Natural and Nature-Based Features, and Master Response 5 - Environmental Justice.
18	3	Omar Muhammad	LAMC	The sea wall will not address the types of flooding, from increased rain events and tidal cycles, most Charlestonians contribute to and imagine when thinking about and discussing flooding. The EIS for this project says specifically, "North Romney road, leading into Bridgeview Village from Morrison Drive via Romney Road floods during heavy rain and storm events, which can leave residents stranded and restrict access for emergency vehicles. While not a problem within USACE's authority to correct, this access road is recommended to be realigned/elevated to reduce flooding and ensure access during flood events" and "Like in the Bridgeview area, roads in Rosemont are prone to flooding from heavy rains. USACE recommends that local city and county entities address this issue in	Thank you for your comment. Please refer to Master Response 1 - Non-Storm Surge Flooding. It is noted that the nonstructural measures proposed will, incidentally, provide risk reduction for structures due to sources of flooding other than coastal storm surge.

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				concert with the home elevation for a more complete solution to the flooding concerns in this neighborhood." The community has expressed concerns about flooding within their neighborhood. They are worried about the characterization their communities do not flood, which we will present evidence countering that assertion.	
18	4	Omar Muhammad	LAMC	Non-structural solutions (Elevation and Flood Proofing) are being advocated and proposed as mitigation for Bridgeview and Rosemont. These measures are unacceptable because they do not consider the additional risk of exposure to contaminated materials washed in by storms and deposited in neighborhoods. This risk subjects residents to unacceptable health risk exposures to contaminated soil and residues, increasing risk to human health due to higher levels of sewage and hazardous materials.	Thank you for this comment. The purpose of this Coastal Storm Risk Management study is to reduce the risk of damages to structures from coastal storms and to life safety, which the proposed plan does. Minimizing the risk for adverse health effects associated with flooded structures is also an outcome of the proposed plan. However, reducing any degraded water quality conditions or marine debris that may accompany storm surge is not within the authority of this study. Contaminant concentrations in surge waters that would inundate the study area from the Atlantic Ocean and Charleston Harbor during a coastal storm event are not known, and such an assessment would be beyond the scope of this study. It is assumed that the turbulent wind, wave, and surge action would readily mix any concentrated areas of the water column. For surge waters after they inundate the study area, see response to Comment 18-6.
18	5	Omar Muhammad	LAMC	Natural-based solutions (living shoreline, green infrastructure, biofiltration, etc.) are also being considered. These approaches will not prevent, reduce or stop storm surge impacts but will improve water quality, aesthetics, ecosystem services, and quality of life for residents. However, we must acknowledge the impacts of legacy pollution on this area that will prevent recreational opportunities such as consumption of fish, oysters, shrimp, and crabs from the marshes along the boundaries of Rosemont in particular. It is imperative to recognize communities such as Rosemont and Bridgeview relationships with the essential habitats in and around their neighborhoods are subsistent cultures meaning what they catch they are	Thank you for your comment. Please refer to both Master Response 4 -Natural and Nature-Based Features and Master Response 5 -Environmental Justice.

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				consuming, which is why risk avoidance and mitigation are important to residents. We commend the applicants for reducing their impacts on essential habitats from 111 acres to 35 acres. The residents would like this same diligence of impact reduction for their risk exposure, health, and quality of life.	
18	6	Omar Muhammad	LAMC	Community Concerns Storm Surge Vulnerable The community has reviewed the recommendation for non-structural solutions, including elevation and floodproofing homes in Rosemont and Bridgeview. Residents have expressed concerns with this recommendation due to the ineffectiveness to prevent and/or reduce damages attributed to storm surge impacts such as floodwater carrying pollution (sewage, heavy metals, and other contaminants) into Bridgeview and Rosemont, where deposited contaminants on the soil in and around residential areas exposing vulnerable populations to substances which are harmful to their health. Below is a vulnerability index for the Rosemont community indicating high vulnerabilities (orange and red) for storm surge events. The residents of Rosemont are concerned about how the project's applicants will reduce their risk of exposure to contaminated floodwater. The community recognizes a structural solution will not work because of the increased flooding risks for the interior portion of the community. Hazardous Waste Facilities Proximity Rosemont's (outlined in red) proximity to existing contaminated sites is (Beazer East Inc. -- .34 miles away; Southern Lumber -- .34 miles away, and Solvay -- .45 miles	Regulating releases of and exposure to contaminants from hazardous facilities is the responsibility of the US Environmental Protection Agency (USEPA), not USACE. Facility owners are expected to incorporate risks from natural disasters and climate change into their own Site Management and/or Waste Management Plans. However, USACE realizes that coastal floodwaters could move waste debris or storage tanks. The three hazardous waste facilities identified by the reviewer as being in close proximity to Rosemont are not expected to pose significant health threats from storm surge to residents of Rosemont during a coastal storm event. While the three facilities have been identified as RCRA facilities by the USEPA, the Beazer East Inc. facility and the Southern Lumber & Millworks facility are each characterized as a "small quantity generator" of wastes related to wood preserving products. There are no reported releases in the Toxic Release Inventory. The Southern Lumbar facility is also located at a relatively high ground elevation of approximately 8-10ft. NAVD88 making is less susceptible to storm surge inundation. The Lanxess Corp/Solvay facility is described by the USEPA as producing phosphorous derivates, but it does not store or manage its waste on site. Generated waste is shipped to offsite facilities. Furthermore, the facility had no land, surface water or underground releases according to USEPA's Toxic Release Inventory, only air emissions, for which transmission would not be influenced by storm surge. A more accurate description of the current conditions of the Lanxess Corp./Solvay facility has been added to Section 4.16 of the report.

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				away). The pictures below illustrate the cumulative impacts experienced in the Rosemont community with existing environmental justice challenges. Because of NEPA's definition of indirect impacts (as conditions caused by the project determined later but reasonably foreseeable), we are proposing the following recommendation to reduce exposure risks to contaminated floodwaters. Research with bioremediation using microbial-based strategies for sediment reclamation, particularly for marine environments contaminated with polycyclic aromatic hydrocarbons (PAHs) and heavy metals. We want to understand why the project applicants did not consider bioremediation techniques, particularly for communities with legacy pollution concerns? One of the objectives of this project is to “reduce risk to human health, safety, and emergency access from coastal storm surge inundation on the Charleston Peninsula through the year 2082”. Without this assessment as a possible solution to reduce health risk exposure to contaminated floodwaters from a storm surge event, this objective for the project has failed the most vulnerable communities on the Charleston Peninsula. In addition, the community wants to know how this project will address cumulative environmental impacts?	

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18	7	Omar Muhammad	LAMC	A robust environmental justice analysis is needed for this project following the NEPA process, which requires documentation of significant environmental impacts, including the cumulative impacts of a myriad of environmental burdens taking into account environmental justice communities. This project's analysis falls woefully short of meeting this requirement. We request the project applicants conduct a robust environmental justice analysis, including cumulative impacts on the environment and the health risk to Bridgeview and Rosemont communities to help better inform what solutions to propose for mitigation in these communities. Without this analysis, the solutions selected will unintentionally cause additional harm in communities that are overburdened and experiencing disparities. The below EJSCREEN analysis for Rosemont also indicates multiple environmental concerns which the project fails to analyze as part of its NEPA process. LAMC recommends the project team review a process we participated in with EPA to develop a community-based vulnerability assessment that looks at disparities and other non-environmental vulnerabilities as consideration for a resulting resiliency action plan which resulted in the creation of the EJSTRONG8 initiative to help communities develop community-led resilience plans.	Thank you for your comment. Please refer to Master Response 5 - Environmental Justice. See also FR/EIS Section 6.22 Cumulative Effects (including Environmental Justice as a Key Resource Area.
18	8	Omar Muhammad	LAMC	Flooding and Stormwater Management The community has expressed concerns with flooding within their neighborhoods, and they are worried about the characterization their communities do not flood. We will present evidence countering that assertion. The below map shows the 6 feet of sea-level rise for Rosemont, indicating significant (high probability)	Thank you for your comment. Please refer to both Master Response 1 – Non-Storm Surge Flooding and Master Response 2 - Climate Change and Sea Level Rise.

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				inundation of water on the edges of Rosemont on all sides of the community, posing an increased risk for emergency vehicle access, particularly from the Northern side of Alston. This accessibility issue is a concern with the percentage of older adults in Rosemont. This concern also can potentially cut residents off from escaping an emergency or an evacuation order for a chemical release if the roads are impassable.	
18	9	Omar Muhammad	LAMC	Recommendation The community wants to see a coordinated effort from both the City of Charleston and Charleston County to improve the drainage inefficiencies in the Rosemont community, as acknowledged in the project documentation. The community feels strongly there needs to be an improvement to the stormwater system to include but not limited to additional storm drainage culverts, the uncovering of drains covered by a recent road resurfacing project, and the creation of a greenway with other green infrastructure strategies along the edges of Rosemont to manage stormwater runoff within the interior of the community. This greenway can add a buffer between the community and the marsh as well as the sound wall.	Thank you for your comment. Please refer to both Master Response 1 - Non-Storm Surge Flooding and Master Response 4 - Natural and Nature-Based Features.
18	10	Omar Muhammad	LAMC	We are asking the project applicants to examine which green infrastructure strategies can be incorporated with its recommended non-structural solutions to manage stormwater runoff. Current Community Research Projects	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.

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19	1	Robert Freeman	Safe Harbor City Marina	On June 18, 2020, we provided you with our comments on Alternative 3 of the Charleston Peninsula Study. Those comments included a detailed description of our facilities and activities and note that Safe Harbor operations account for the vast majority of private waterfront activity on the peninsula. The current draft update shows a very different proposed alignment with extremely adverse implications for our proprety and operations. It appears that the new alignment puts the entire City Marina complex to the watersdie and out of the protection of the wall. This would likely mean increased damage or the destruction of the complex in a major storm event. In operational terms, the proposed alignment would mean all entry into the City Marina complex would be through the wall. We do not understand the practical implications of this, but obviously large vehicles carrying fuel and delivering boats would pose potential problems. We do not have enough parking as it is and it would seem this aligment would reduce our waterside usable land either for the wall itself or constructing accesslanes to organize traffic flow caused by limited entry to the complex.	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
19	2	Robert Freeman	Safe Harbor City Marina	We appreciate the effort that has gone into this study. However, please consider this letter as our formal objection to the updated aligment for the reasons stated above. We would selcome the opportunity to discuss this with you further if you will send us a convenient time.	Thank you for your comment. Please refer to Master Response 9 - Public Outreach.

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19	3	Robert Freeman	Safe Harbor City Marina	Attached June 18, 2020 public comment letter on Draft FR/EA	USACE acknowledges the attached June 18, 2020 letter and as mentioned in the draft Feasibility Report/Environmental Impact Statement (FR/EIS), considered all substantive public comments received on the draft April 2020 FR/EA. Consideration of the FR/EA 2020 comments along with further engineering refinements resulted in USACE's decision to move from an EA to an EIS, as part of the scoping process for the FR/EIS (including with regard to potential alternatives and impacts of the proposed action), and in developing the content of the draft FR/EIS. As stated in the draft FR/EIS, any person desiring to provide public comment on this draft FR/EIS should submit their comment on the draft FR/EIS within the 45-day comment period, and not rely on or reference previous input or public comment on the draft April 2020 FR/EA. Only public comments submitted and received within the 45-day comment period on the draft FR/EIS will be considered in the agency's NEPA analysis and development of the final FR/EIS including the response to public comment appendix.
20	1	William J. Cook	Cultural Heritage Partners	PART 1. THE DEIS DOES NOT TAKE A "HARD LOOK" AT IMPACTS TO THE CHARLESTON HISTORIC DISTRICT NHL AND DOES NOT APPLY A HEIGHTENED STANDARD OF REVIEW IN EVALUATING THE PROPOSED PROJECT BECAUSE THE ARMY CORPS HAS NOT USED ALL POSSIBLE PLANNING TO MINIMIZE HARM. A. The Army Corps has not complied with NHPA Section 110(f) In reviewing this Project, the Army Corps is required under federal law to consider the impacts to resources in the Project Area. As an "action-forcing" statute, the National Environmental Policy Act (NEPA) is designed to ensure that the public and decision-makers are provided with the information they need to make a considered decision about the best path forward. The statute is also designed to ensure that the agency has carefully and fully contemplated the environmental effects of its proposed action,2 requiring federal agencies to take a "hard look" at the environmental consequences of a proposed action.3 In addition to considering impacts on the natural environment, NEPA requires federal agencies to consider impacts on	The basic comment is that "the Corps has not used all possible planning to minimize harm" and therefore is not in compliance with Section 110(f) and has not taken the requisite hard look under NEPA at impacts to the Charleston Historic District NHL. At the outset, it is noted that the phrase "all possible planning" (used repeatedly in the comment) is one which stems from Section 4(f) of the Department of Transportation Act, 23 U.S.C. § 138 (a). Congress enacted this standard for highway systems and transportation facilities under the jurisdiction of the Secretary of Transportation – it does not apply here. The applicable standard (which the comment also notes) is stated in Section 110(f) of the NHPA: "to the maximum extent possible undertake such planning and actions as may be necessary to minimize harm to the landmark." 54 U.S.C. § 306107. USACE believes an appropriate level of planning and actions was undertaken to minimize harm to the Charleston Historic District NHL. The commenter is not specific about what USACE should or should not have done in order to comply with the applicable standard. The comment does invoke the Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act ("Section 110 Guidelines"), and makes reference to the content of Standard 4, Guideline (j), including the "higher standard of care" and need to "consider all prudent and feasible alternatives to avoid an adverse effect on the NHL." In the Section 110 Guidelines, Standard 4, Comment (k), it is stated: "(k) Where such alternatives appear to require undue cost or to compromise the undertaking's goals and objectives, the agency must balance those goals and objectives with the intent of section 110(f). In doing so, the agency should consider: (1) the magnitude of the undertaking's harm to the historical, archaeological and cultural qualities of the NHL; (2) the public interest in the NHL and in the undertaking as proposed, and (3) the effect a mitigation action would have on meeting the goals and objectives of the undertaking. The alternatives analysis for the proposed project is the result of a hard look at the problem and the combination of measures necessary to provide a significant reduction in risk. The objective of the proposed project is to reduce risk to human health and safety, and of economic damages, from coastal storm surge inundation on the Charleston Peninsula through the year 2082. Not only was the minimization of adverse effects to historic districts and structures one of the key constraints on the formulation of alternatives, but the undertaking itself would have a significant positive benefit for the Charleston Historic District NHL. While some degree of adverse effects in the form of introducing visual elements and altering physical features within the Charleston Historic District that diminish the integrity of the setting and feeling is acknowledged, the risk of significant and lasting physical damage to the NHL structures themselves from coastal storm surge inundation events is viewed as the greater harm. The basic options for dealing with storm surge flooding are to divert, store, or convey the floodwaters elsewhere. Storage and conveyance are simply not viable options to reasonably reduce the risk of coastal storm surge flooding as applied to the fully developed Charleston Peninsula, and would themselves introduce some of the same adverse effects. Perimeter protection in the form of a storm surge wall is essential to protect the Charleston Peninsula from coastal storm surge flooding and is in the public interest. In

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				historic and cultural resources.4 The National Historic Preservation Act (NHPA) of 1966, as amended, requires that the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally-assisted undertaking consider the effect of that undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register prior to issuing any license or expending any federal funds on the undertaking.5 Section 106 of the NHPA requires the Army Corps to address impacts to historic properties. As part of the federal government's policy of protecting the nation's historic heritage and sense of orientation as an American people, Section 106 requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve throughout the country6.(2 40 C.F.R. § 1502.1; N.C. Wildlife Fed'n v. N.C. Dep't of Transp., 677 F.3d 596, 601 (4th Cir. 2012) (quoting Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989)). 3 Citizens Against Burlington v. Busey, 938 F.2d 190 (D.C. Cir. 1991), cert. denied, 502 U.S. 994 (1992). 4 40 C.F.R. §1508.27(b)(3); 40 C.F.R. § 1508.27(b)(8). 5 54 U.S.C. §§ 300101-307108. 6 Id., Section 1 of the NHPA, Pub. L. No. 89-665, as amended by Pub. L. No. 96-515.) If a federal or federally-assisted project has the potential to affect historic properties listed or determined eligible for listing in the National Register of Historic Places, a Section 106 review is required.7 During Section 106 review, once historic properties have been identified in coordination with the applicable State Historic Preservation Officer, the federal agency charged with	order to ensure that adverse effects are appropriately mitigated (including ongoing minimization during PED), the Corps has provided for the execution of a Programmatic Agreement (PA). Use of a PA in the fulfillment of Section 110(f) responsibilities is recognized by the Advisory Council on Historic Preservation (ACHP) (e.g., https://www.achp.gov/digital-library-section-106-landing/section-106-consultation-involving-national-historic-landmarks). In this case, the ACHP, South Carolina State Historic Preservation Officer (SHPO), and the National Park Service (NPS) have concurred that execution of the PA among USACE Charleston District, SHPO, the NPS, the ACHP, and the City of Charleston will fulfill USACE compliance with Section 106 and Section 110(f) of the National Historic Preservation Act for the proposed project. USACE has also consulted with The Preservation Society of Charleston, has invited it to sign the PA as a Concurring Party, and The Preservation Society of Charleston has elected to participate as a Concurring Party. The PA outlines the processes by which USACE, through it's planning and actions, will minimize harm to all NHLs within the APE to the maximum extent possible through storm surge wall design, gate placement, or design of a Project feature consistent with the SOI's Guidelines on Flood Adaptation for Rehabilitating Historic Buildings, the SOI's Standards for Rehabilitation, or other appropriate historic resource guidelines or standards. Minimization and avoidance of adverse effects to historic properties and NHLs provided by storm surge wall design can include but is not limited to: improvements to overall alignment, high-quality construction materials, contextualization of design and materials to specific location on the peninsula, ability to double as active park/recreational space, integrated public art or landscape features, and enhanced community experience. Stipulations II-III of the Programmatic Agreement further outline how USACE will consult with the appropriate parties regarding the identification and evaluation of historic properties, assess the effects of the undertaking on historic properties, avoid and minimize impacts to historic properties including NHLs, and if necessary, mitigate impacts to historic properties. Where adverse effects to an NHL cannot be avoided or minimized as described, Concurring Parties such as The Preservation Society have the right to participate in the development of the Historic Properties Treatment Plan. Accordingly, USACE has complied with the requisite "hard look" under NEPA and with the Section 110(f) standard of care. The commenter closes by asserting that the scope of the study should be broadened to also address tidal and heavy rainfall flooding. For USACE response to questions concerning the appropriate scope of the study, see Master Response 1 – Non-Storm Surge Flooding. However, to clarify a misunderstanding reflected in the comment, it is noted that tidal flooding which coincides with storm surge caused by hurricanes or other storms is addressed by the proposed project.

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				permitting the proposed project must find ways to avoid, minimize, or mitigate adverse effects to those properties in consultation with parties who have a demonstrated interest in the undertaking.8 The Army Corps has not reviewed impacts to the Charleston Historic District NHL using the appropriate standard of review as the DEIS requires. Section 110(f) provides: "Prior to the approval of any Federal undertaking which may directly and adversely affect any [NHL], the head of the responsible Federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council a reasonable opportunity to comment on the undertaking." Id. Section 110(f) "does not supersede Section 106, but complements it by setting a higher standard for agency planning in relationship to landmarks before the agency brings the matter to the Council[.]" House Report at 36-38, reprinted in 1980 U.S.C.C.A.N. at 6399-6401 (emphasis added). This higher standard was codified by the National Park Service (NPS) in the Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to Section 110 of the National Historic Preservation Act of 1966 ("Section 110 Guidelines"), which state that "Section 110(f) of the NHPA requires that Federal agencies exercise a higher standard of care when considering undertakings that may directly and adversely affect NHLs [National Historic Landmarks]." 63 Fed. Reg. at 20,503. Moreover, the Section 110(f) Guidelines further direct agencies to "consider all prudent and feasible alternatives to avoid an adverse effect on the NHL." Id. Because the proposed seawall will directly and adversely affect the	

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				Charleston Historic District NHL, the Army Corps must require all possible planning to avoid adverse effects. See National Parks Conservation Ass'n v. Semonite, 916 F.3d 1075 (D.C. Cir. 2019) (holding Section 110(f) is not limited to physical impacts and includes visual effects). Here, the DEIS does not give appropriate attention to the Charleston Historic District's NHL status because the Army Corps has not used all possible planning to minimize harm. As our previous comments explained, a seawall designed to partially address storm surge inundation during hurricanes and other severe storms should not be the sole focus of the Army Corps' Coastal Flood Risk Management Study, especially if one of the City's and local residents' overriding goals is to address tidal and heavy rainfall flooding that happens with increasing regularity, especially when this coincides with storm surge caused by hurricanes or other storms.9	

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20	2	William J. Cook	Cultural Heritage Partners	The Army Corps has not Properly Studied Alternatives to Avoid a “Bathtub” Effect During Major Rain Events The Army Corps’ preferred alternative—to build a seawall around the Charleston Peninsula—has not been proven to meet the Project’s purpose and need.10 This is because threats to human health and safety as well as economic damages would remain extremely likely in the event of a major storm event. Limitations in the Army Corps’ scope of work, as discussed below, make the DEIS inadequate for fully accounting for these threats. Moreover, we have significant concerns that the benefits may be too speculative to justify the tremendous costs. For example, Hurricane Hugo had a storm surge of over twenty feet in 1989,11 and all available data suggests that storm surge heights combined with land subsidence will continue to increase in the future. The DEIS relies on outdated data for determining an appropriate height for a seawall designed to address the Project’s stated purpose and need. We are also deeply concerned that the Army Corps has partially examined only one alternative designed to evaluate the “bathtub effect,” a major threat to life and property resulting from water trapped inside a prospective seawall. Charleston is already pressed with the challenges of maintaining excessive and increasingly frequent downpours that accompany storm events of all kinds and would be certain to accompany a hurricane event also causing storm surge. Any water trapped within the City from a wall would pose a significant risk of physical harm to historic properties within the NHL during major rain and flooding events when seawall gates are closed because water will have nowhere to go.12 The DEIS concludes that that the Project	The comment takes issue with the scope of USACE’s undertaking, whether the selected plan (or preferred alternative) will meet the identified purpose and need, the magnitude of residual risk, and the proposed project’s effect on interior rainfall flooding when storm gates are closed. Regarding the appropriate scope of USACE’s undertaking, please see Master Response 1 -Non-Storm Surge Flooding and Master Response 3 - Interior Drainage. Regarding whether the selected plan will meet the identified purpose and need, the comment argues that it will not “because threats to human health and safety as well as economic damages would remain extremely likely in the event of a major storm event.” A preferred alternative is the plan which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. USACE does not contend that the selected plan will eliminate all risk from coastal storm surge flooding, nor would it be preferable to attempt to construct such a plan when these factors are appropriately considered. Residual risk in the form of potential overtopping of the proposed barrier is acknowledged in the report. However, the analysis demonstrates significant reductions in damages to commercial and residential structures and their contents of approximately 62% (e.g., Final FR/EIS, Table 7-1. Damage Comparison between Future Without Project Conditions and Alternative 2) and in potential loss of life from an estimate 170.9 without the project to an estimated 69.9 (e.g., Final FR/EIS, Table 7 2. Life Loss Estimates) as a result of the storm surge wall. Regarding the concern that benefits are too speculative using Hurricane Hugo as an example, Hurricane Hugo actually supports the opposite conclusion that the benefits are anything but speculative. The proposed wall height would have stopped the storm surge inundation actually experienced on the Charleston Peninsula from Hurricane Hugo. While the wall would not hold back the peak storm surge experienced during Hugo, it should be noted that according to the National Weather Service (https://www.weather.gov/chs/HurricaneHugo-Sep1989), Hurricane Hugo produced the highest storm tide heights ever recorded along the U.S. East Coast. We disagree that project benefits are speculative because it would not prevent record-setting storm surge. Regarding the matter of whether closed storm gates could increase water levels significantly enough to potentially induce additional flood damages to nearby structures, including NHLs, USACE has not sidestepped the issue. Indeed, USACE has proposed 5 permanent and 5 temporary pump stations as part of the project features to address not only the accumulation of rainfall during gates closed conditions, but also to be used during gates open conditions if there are local depression areas that experience flooding due to the project (see Hydraulics and Hydrology SUB-APPENDIX B-4). These pumps are designed precisely to mitigate potential induced additional interior flooding as a result of the barrier wall. They will be designed to operate during storm surge conditions. The impact of the pumps on historic structures will be much less than that posed by unrestricted storm surge inundation. The wall and pumps will not materially contribute to offset any adverse impact of the wall on interior flooding will not contribute to cumulative effects on flooding at other locations. USACE’s study of the wall’s impact on flooding in communities adjacent to the Peninsula indicates negligible changes in water levels that result in no measurable economic damages. Similarly, the operation of pumps to remove floodwaters which would otherwise be removed from the Peninsula in the absence of a wall will contribute to cumulative effects on historic properties outside of the Charleston Historic District NHL. The exact placement and design of the pump stations are unknown at this time. The Programmatic Agreement among USACE Charleston District, SHPO, the NPS, the ACHP, and the City of Charleston regarding the Charleston Peninsula Coastal Flood

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				has “the potential to adversely affect rainfall flooding within the study area.13 Closed tide gates could increase water levels significantly enough to “potentially induce additional flood damages to nearby structures” in contrast to a scenario without a wall.14 But then the Army Corps sidesteps the issue: “While the Charleston Peninsula also experiences flooding from rainfall, USACE has not been authorized to specifically address that issue, although it is included in inundation analyses.”15 The DEIS then purports to remove any need for the Army Corps to address the flooding within the seawall’s perimeter by stating that “in urban and urbanizing areas, provision of a basic drainage system to collect and convey local runoff is a non-Federal responsibility.”16 However, the Army Corps does not have the luxury of shifting that burden because it is a foreseeable and consequent effect of the project. The Army Corps takes an inappropriately narrow view of its own jurisdiction. Furthermore, under the NHPA, the Army Corps has the duty to find ways to avoid, minimize, or mitigate harm. And, assuming for the sake of argument that a pumping system would work—if pumping floodwaters out of the Charleston Historic District is the only way to stop the even greater damage that would result to historic properties from flooding within the seawall when combined with storm surge—then it is the Army Corps’ duty under federal law to resolve that problem, not the City of Charleston’s. Moreover, installing water pumping stations within the NHL to pump out excess water—even assuming in the unlikely scenario that the pumps would work when submerged during a storm surge or flood event—would (1) create the potential for physical harm by constructing	Risk Management Project outlines the process by which USACE will avoid and minimize adverse effects caused by all project features including pump stations. If, through consultation with the appropriate agencies, the project feature is found to cause an adverse effect to a historic property, the Programmatic Agreement further outlines those steps USACE will undertake to mitigate those effects. Additional clarity has been added to whereas clause 5 and stipulation III.C.1 and 2 of the Programmatic Agreement to reiterate that pump stations are included in the construction APE and effects will be evaluated once the placement and design of these features are determined.

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				large new structures next to fragile historic 19th century houses and other buildings; and (2) cause additional and unconsidered visual harm within the NHL. Nevertheless, the DEIS does not consider these risks. Finally, the Army Corps has not considered adequately other cumulative effects that would inevitably follow from the proposed seawall, where water would either be deflected away or pumped out of the NHL potentially harming other historic properties outside the NHL, creating new harm that the DEIS has failed to consider. For these reasons, the Army Corps must revise the DEIS to address the omissions to meet the mandates that NEPA and the NHPA impose. Without doing so, it will be impossible for the Army Corps comply with NEPA's and Congress's mandate in Section 110(f) that the agency analyze all reasonably foreseeable cumulative effects and use all possible planning to minimize harm to the NHL.	

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20	3	William J. Cook	Cultural Heritage Partners	PART 2. THE DEIS AND PROGRAMMATIC AGREEMENT DESIGNED TO RESOLVE ADVERSE EFFECTS ARE DEFICIENT BECAUSE THEY DO NOT COMPLY WITH THE NHPA MANDATE THAT THE ARMY CORPS USE ALL POSSIBLE PLANNING TO MINIMIZE HARM. The Preservation Society agrees with the Army Corps' recognition in the proposed Programmatic Agreement that "significant historic districts and properties in and around the peninsula of Charleston are an integral part of the community' life and character; and preservation of this irreplaceable heritage is in the public interest."17 However, the Army Corps has not gone far enough in "considering the avoidance and minimization of adverse effects to historic properties in its design of the storm surge wall and other Project features."18 The Preservation Society supports the idea of Programmatic Agreements under appropriate circumstances to ensure compliance with the NHPA.19 When completing the Section 106 process prior to making a final decision on a particular undertaking is not practical, the regulations allow an agency to pursue a "project Programmatic Agreement" or "PA" as the Army Corps has done here. The most common situation where a project PA may be appropriate is when the agency cannot fully determine how a particular undertaking may affect historic properties or the location of historic properties and their significance and character prior to approving a project. Although a Programmatic Agreement makes sense for a complex project generally, the use of one here does not comply with the NHPA's requirement for	The comment argues that the draft FR/EIS and Programmatic Agreement are "deficient because they do not comply with the NHPA mandate that the Army Corps use all possible planning to minimize harm." As noted in response to CHS comment 1.A., the standard of "all possible planning" is one which applies to highway systems and transportation facilities under the jurisdiction of the Secretary of Transportation and does not apply here. The gist of this comment is that "the Army Corps is using the Programmatic Agreement to press consulting parties into approval or disapproval of a plan with insufficient detail and a high degree of uncertainty that the PED phase will neither eliminate nor ameliorate." However, the ACHP's Part 800 regulations expressly provide for the use of programmatic agreements "in certain complex project situations," including "[w]hen effects on historic properties cannot be fully determined prior to approval of an undertaking." 36 C.F.R. § 800.14(b)(1). The comment includes numerous blanket conclusions with which the Corps disagrees. For example, it states that "adverse visual effects from the seawall itself will be substantial and cannot be avoided or minimized in any meaningful way" during the PED phase. USACE has integrated minimization of adverse effects into its planning process, and continues to evaluate opportunities to minimize adverse effects as part of project optimization. An example is provided by the recent realignment of the storm surge wall away from Washington Street and East Bay Street and unto the State Ports Authority's Columbus and Union Pier Terminals, which better met the needs of terminal operations and resulted in reduced visual (and other) impacts by distancing the wall from historic structures. USACE's visualizations show that Project construction of the storm surge wall will adversely affect the NRHP listed and NHL designated Charleston Historic District by introducing visual elements and altering physical features within the Charleston Historic District that diminishes the integrity of the setting and feeling; however, these visualizations do not include project design or construction aspects that would indicate that additional adverse effects cannot be avoided or minimized in any meaningful way. Stipulation III.C outlines that way in which adverse effects from the undertaking may be avoided or minimized by storm surge wall design, gate placement, or design of a Project feature consistent with the SOI's Guidelines on Flood Adaptation for Rehabilitating Historic Buildings, the SOI's Standards for Rehabilitation, or other appropriate historic resource guidelines or standards. Minimization and avoidance of adverse effects to historic properties and NHLs provided by storm surge wall design or other Project feature design can include but is not limited to: improvements to overall alignment, high-quality construction materials, contextualization of design and materials to specific location on the peninsula, ability to double as active park/recreational space, integrated public art or landscape features, and enhanced community experience. There is no known potential acquisition, demolition, modification of historic structures and disturbance of terrestrial and submerged archeological sites as indicated in the comment. Physical damage to historic properties is not expected from construction activities. Charleston is a city with numerous active construction projects. The Programmatic Agreement has been developed with an abundance of caution to include the potential of adverse effects of construction and vibration as indicated in Stipulation III.C.2 The SHPO, NPS, and the ACHP have concurred that execution of the Programmatic Agreement among USACE Charleston District, SHPO, the NPS, the ACHP, and the City of Charleston regarding the Charleston Peninsula Coastal Storm Risk Management Project will fulfill USACE compliance with Section 106 and Section 110(f) of the National Historic Preservation Act. Numerous meetings and discussions were undertaken with all Consulting Parties to the Programmatic Agreement to determine appropriate mitigation for adverse effects to the Charleston Historic District. Stipulation III.D.1 of the Programmatic Agreement outlines the specific mitigation USACE will undertake for adverse effects caused only by the visual intrusion of construction of the storm surge wall on the Charleston Historic District. This mitigation will include an update to the NRHP

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				the Army Corps to resolve adverse effects. As discussed above, the Project does not meet its stated purpose and need, thus rendering NHPA review an incomplete exercise. Consulting parties still do not have a clear understanding of the overall totality of the Project's impacts. Although the Army Corps' approach is to push off additional review to the PED phase, the Programmatic Agreement requires consulting parties to make commitments now even though adverse effects, including cumulative effects, are not understood. Stated another way, the Army Corps is using the Programmatic Agreement to press consulting parties into approval or disapproval of a plan with insufficient detail and a high degree of uncertainty that the PED phase will neither eliminate nor ameliorate. Presenting an elaborate, yet undefined sequence of future consultations for individual project plans over a number of years, all of which are contingent on funding, does not meet the Army Corps' basic NHPA obligations. Moreover, with the exception of unknown archaeological resources, there is no question that the Project will harm historic properties, especially the integrity of the NHL within the Charleston Historic District. No one doubts that conclusion because adverse effects are well enough understood. As the Army Corps' visualizations show, adverse visual effects from the seawall itself will be substantial and cannot be avoided or minimized in any meaningful way. Moreover, the pumping stations suggested by the Army Corps that have not been simulated will cause additional visual harm to the NHL, another example that Section 110(f)'s heightened standard of review to use all possible planning to minimize harm has not been	Nomination Form and the NHL Nomination Form, production of a short report, geographic information system (GIS) files, and creation of educational materials regardless of minimization to impacts that may be identified during the Project PED phase. Adverse effects to the NRHP listed and NHL designated Charleston Historic District shall further be minimized by storm surge wall design, gate placement, or design of a Project feature in accordance with Stipulation III.C (Avoidance and Minimization of Adverse Effects) regardless of implementation of the mitigation outlined in Stipulation III.D.1. Further mitigation may be implemented throughout the PED phase of the project if adverse effects of any Project feature to a previously identified or unidentified historic properties in accordance with Stipulation III.B of the Programmatic Agreement. Historic property surveys and detailed engineering and design of project features are necessary to make these determinations. The Programmatic Agreement outlines the process by which USACE will consult with the appropriate parties to assess the effects of the undertaking on historic properties, avoid and minimize impacts to historic properties, and if necessary, mitigate impacts to historic properties.

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				met. In addition to the seawall's anticipated adverse effects on Charleston's viewshed and sight lines, the DEIS notes that additional—and potentially more troubling—adverse effects beyond visual effects are anticipated. They include potential acquisition, demolition, modification of historic structures and disturbance of terrestrial and submerged archeological sites.20 Physical damage to historic properties is expected from construction activities. Vibrations from pile driving during construction would have the potential to directly affect historic structures near the wall's footprint. 21 For example, vibrations will cause structural damage to nearby historic structures that are contributing elements of the NHL, or are individually designated as an NHL or listed in the National Register.22 In addition to vibrations from pile driving, heavy equipment could also cause "damaging vibrations" to properties located on East Battery, such as Roper House, which is individually listed as an NHL. Finally, heavy machinery and equipment are expected to cause temporary visual intrusions and lead to road closures, thus limiting access, ingress, and egress to historic properties not only to members of the public, but also individual property owners. 23 All of these impacts taken together make clear that adverse effects are sufficiently known so that their resolution should occur now and not be pushed into the future after completing the study. This is especially true where, as here, the Army Corps has apparently decided what appropriate mitigation will be, and that any other "betterment" beyond what the DEIS has proposed will be "funded 100% by the City."24 This is not how Congress intended	

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				Section 106 or NEPA review to work. Finally, after sidestepping responsibility for considering how the seawall will exacerbate flooding within the NHL and cause additional harm to historic properties and without any responsibility for developing a pumping system of five permanent and five temporary pump stations25—adverse effects the DEIS ignores—the Army Corps cannot argue legitimately that it has used all possible planning to minimize harm. Nor is it likely that the use of construction materials, wall design, or vibration "monitoring" could reasonably minimize harm.26 And the Army Corps' mitigation ideas—such as updating the NHL nomination form, producing a "short report," and preparing "educational materials" are of only marginal value in light of the effects of the Project .27 Therefore, the Preservation Society objects to the Programmatic Agreement as a way to resolve adverse effects unless the Army Corps revises the DEIS to address the concerns we raised in Part 1 above so that meaningful consultation can continue to occur.	
21	1	Cordelia (Cora) Connor		The Corps' analysis fails to provide an alternative plan to incorporate some natural solutions that are critical such as barrier islands, berms, bioswales, and other things such as noninvasive oyster reefs. This in turn will help the local fishing & tourism industry. Berms and natural systems are also easier to adapt to sea-level rise, as opposed to artificial concrete and steel barriers	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.

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21	2	Cordelia (Cora) Connor		It is unclear how many properties will be affected. The Army Corps' suggest it will pursue "non-structural" measures for Rosemont. Non-structural could mean buying and tearing them down because all homes will not meet the requirements for elevation or flood proofing. The Army Corps' should look at low impact design solutions strategies, as part of non-structural measures.	A structure by structure assessment of homes in the Rosemont community will be conducted during the Preconstruction Engineering and Design phase. Specific properties and nonstructural treatments would be identified at that time. Relocating structures out of high flood hazard areas has been screened from future consideration because there are limited comparable areas where homes may be relocated that are also out of the floodplain. Acquisition of properties for demolition has not been screened based on the study's evaluation criteria (constructability, cost efficiency, or effectiveness), however acquisition of homes in Rosemont would likely violate Environmental Justice executive orders and therefore would not be considered as a potential nonstructural treatment for Rosemont. The USACE encourages the City of Charleston to implement low impact design solutions, however USACE may not participate in any measure supporting basic stormwater drainage systems per Engineering Regulation 1105-2-100.
21	3	Cordelia (Cora) Connor		The storm surge wall proposal ignores the current flooding on the peninsula. It does not take into consideration the likely future sea level rise. The wall would not solve the problem of sea level rise nor work efficiently with storm surge, even directing the water to adjacent areas. It does not offer wind protection and other sources of flooding. We would like to see some language that would offer more sustainable and less invasive outcomes for the future. Storm surge walls that are decorated with plants or walkways, do not address our environmental challenges.	Thank you for your comment. Please refer to both Master Response 1 - Non-Storm Surge Flooding and Master Response 2 - Climate Change and Sea Level Rise.
21	4	Cordelia (Cora) Connor		The Rosemont community has been disproportionately impacted over the years. We have been excluded from previous decisions on infrastructure that has come through our small community. I have been a homeowner in this small neighborhood since the early 1980's, and I'm afraid that it might not be around in the future, not because of sea-level rise, but because of the negative impacts from the storm surge wall, including but not limited to businesses, transit, housing, and historic preservation.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
22	1	Benjamin Roper III		The Corps' analysis fails to provide an alternative plan to incorporate some natural solutions that are critical such as barrier islands, berms, bioswales, and other things such as noninvasive oyster reefs. This in	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.

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				turn will help the local fishing & tourism industry. Berms and natural systems are also easier to adapt to sea-level rise, as opposed to artificial concrete and steel barriers	
22	2	Benjamin Roper III		It is unclear how many properties will be affected. The Army Corps' suggest it will pursue "non-structural" measures for Rosemont. Non-structural could mean buying and tearing them down because all homes will not meet the requirements for elevation or flood proofing. The Army Corps' should look at low impact design solutions strategies, as part of non-structural measures.	A structure by structure assessment of homes in the Rosemont community will be conducted during the Preconstruction Engineering and Design phase. Specific properties and nonstructural treatments would be identified at that time. Relocating structures out of high flood hazard areas has been screened from future consideration because there are limited comparable areas where homes may be relocated that are also out of the floodplain. Acquisition of properties for demolition has not been screened based on the study's evaluation criteria (constructability, cost efficiency, or effectiveness), however acquisition of homes in Rosemont would likely violate Environmental Justice executive orders and therefore would not be considered as a potential nonstructural treatment for Rosemont. USACE encourages the City of Charleston to implement low impact design solutions, however USACE may not participate in any measure supporting basic stormwater drainage systems per Engineering Regulation 1105-2-100.
22	3	Benjamin Roper III		The storm surge wall proposal ignores the current flooding on the peninsula. It does not take into consideration the likely future sea level rise. The wall would not solve the problem of sea level rise nor work efficiently with storm surge, even directing the water to adjacent areas. It does not offer wind protection and other sources of flooding. We would like to see some language that would offer more sustainable and less invasive outcomes for the future. Storm surge walls that are decorated with plants or walkways, do not address our environmental challenges.	Thank you for your comment. Please refer to both Master Response 1 - Non-Storm Surge Flooding and Master Response 2 - Climate Change and Sea Level Rise.
22	4	Benjamin Roper III		The Rosemont community has been disproportionately impacted over the years. We have been excluded from previous decisions on infrastructure that has come through our small community. I have been a homeowner in this small neighborhood since the early 1980's, and I'm afraid that it might not be around in the future, not because of sea-level rise, but because of the negative impacts from the storm surge wall, including but not limited to businesses, transit, housing, and historic preservation.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

Submittal #	Comment #	Name	Organization	Comment text	Response
23	1	Torey Roper		The Corps' analysis fails to provide an alternative plan to incorporate some natural solutions that are critical such as barrier islands, berms, bioswales, and other things such as noninvasive oyster reefs. This in turn will help the local fishing & tourism industry. Berms and natural systems are also easier to adapt to sea-level rise, as opposed to artificial concrete and steel barriers	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
23	2	Torey Roper		It is unclear how many properties will be affected. The Army Corps' suggest it will pursue "non-structural" measures for Rosemont. Non-structural could mean buying and tearing them down because all homes will not meet the requirements for elevation or flood proofing. The Army Corps' should look at low impact design solutions strategies, as part of non-structural measures.	A structure by structure assessment of homes in the Rosemont community will be conducted during the Preconstruction Engineering and Design phase. Specific properties and nonstructural treatments would be identified at that time. Relocating structures out of high flood hazard areas has been screened from future consideration because there are limited comparable areas where homes may be relocated that are also out of the floodplain. Acquisition of properties for demolition has not been screened based on the study's evaluation criteria (constructability, cost efficiency, or effectiveness), however acquisition of homes in Rosemont would likely violate Environmental Justice executive orders and therefore would not be considered as a potential nonstructural treatment for Rosemont. USACE encourages the City of Charleston to implement low impact design solutions, however USACE may not participate in any measure supporting basic stormwater drainage systems per Engineering Regulation 1105-2-100.
23	3	Torey Roper		The storm surge wall proposal ignores the current flooding on the peninsula. It does not take into consideration the likely future sea level rise. The wall would not solve the problem of sea level rise nor work efficiently with storm surge, even directing the water to adjacent areas. It does not offer wind protection and other sources of flooding. We would like to see some language that would offer more sustainable and less invasive outcomes for the future. Storm surge walls that are decorated with plants or walkways, do not address our environmental challenges.	Thank you for your comment. Please refer to both Master Response 1 - Non-Storm Surge Flooding and Master Response 2 - Climate Change and Sea Level Rise.
23	4	Torey Roper		The Rosemont community has been disproportionately impacted over the years. We have been excluded from previous decisions on infrastructure that has come through our small community. I have been a homeowner in this small neighborhood since the early 1980's, and I'm afraid that it might not be around in the future, not	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

Submittal #	Comment #	Name	Organization	Comment text	Response
				because of sea-level rise, but because of the negative impacts from the storm surge wall, including but not limited to businesses, transit, housing, and historic preservation.	
24	1	Thomas Lavender, Jr	Carolina Yacht Club	Despite our previous comments and the continued development of details of the Study, CYC has received no additional information regarding the specific impacts the proposed storm surge wall would have on its historic yacht club property. The EIS clearly contemplates that the CYC property will be "intersected" by the storm surge wall (See Fig. 6-1, p. 152 EIS; Fig. 1.10-1, p. 18, EIS App. E) as conceptual drawings continue to depict the wall effectively bisecting the property and significantly impairing river access from CYC's structures. Even with the installation of walk and drive gates along the storm surge wall, the impact on CYC's parking and river access will be crippling to its ability to continue operating as a water-dependent activity. More importantly, the placement of the wall between CYC's indoor facilities and the river will eliminate the priceless views of the Charleston Harbor and East Battery the members and guests consider so essential to their continued enjoyment of the facility. As we have stated previously, the currently proposed placement of the storm surge wall represents an existential threat to CYC continued and successful operation, and for that reason we object to the present alignment. For this historic organization at least, the proposed plan appears to represent a cure that is worse than the disease. Potential future storm surge may damage CYC property at significant financial cost. The current proposed alignment of the storm surge wall will economically devastate	Pursuant to Section 106 of the National Historic Preservation Act, USACE must consider impacts on the undertaking to historic properties. Historic Properties are defined as those cultural resources (such as historic-aged structures) eligible for listing in the National Register of Historic Places (NRHP). It is unknown at this time if the Yacht Club property is eligible for listing in the NRHP. Therefore, pursuant to the stipulation outlined in the Programmatic Agreement, the property will be subject to an assessment of its eligibility during the precontruction, engineering, and design phase of the Project. If the structure is found to be eligible for inclusion in the NRHP, USACE will work with the CYC to avoid and minimize adverse effects of the Project to the building. If adverse effects cannot be avoided, USACE will mitigate for any adverse effects.

Submittal #	Comment #	Name	Organization	Comment text	Response
				CYC, potentially forcing it to shutter after more than one hundred years in this location. Historically, CYC has experienced little if any damage and only during king tide events.	
24	2	Thomas Lavender, Jr	Carolina Yacht Club	CYC also wishes to address aspects of the City of Charleston (City's) preliminary aesthetic concepts inasmuch as those have been included in the EIS within Appendix A. While CYC understands that these concepts have not been adopted by the Corps as part of the proposed plan, and has even engaged in discussions with the City regarding the various iterations of those aesthetic designs that are under consideration, CYC would be remiss if it did not express its concerns that Design Concept 1 (Battery Beach to Park) appears to represent a taking of all or most of CYC's available parking, and a conversion of a larger portion of its private property to a publicly accessible park than necessary for a storm surge wall. This would effectively eliminate the operation of CYC in its present form. CYC plans to continue its conversations with the City regarding these concerns, and provide formal comments to it regarding same. Copies of any such comments will be provided to the Corps going forward.	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics.

Submittal #	Comment #	Name	Organization	Comment text	Response
24	3	Thomas Lavender, Jr	Carolina Yacht Club	Attached April 22, 2021 NOI scoping letter on FR/EIS and June 18, 2020 public comment letter on Draft FR/EA	USACE acknowledges the attached April 22, 2021 NOI scoping letter and June 18, 2020 letter and as mentioned in the draft Feasibility Report/Environmental Impact Statement (FR/EIS), considered all substantive public comments received on the draft April 2020 FR/EA. Consideration of the FR/EA 2020 comments along with further engineering refinements resulted in USACE's decision to move from an EA to an EIS, as part of the scoping process for the FR/EIS (including with regard to potential alternatives and impacts of the proposed action), and in developing the content of the draft FR/EIS. As stated in the draft FR/EIS, any person desiring to provide public comment on this draft FR/EIS should submit their comment on the draft FR/EIS within the 45-day comment period, and not rely on or reference previous input or public comment on the draft April 2020 FR/EA. Only public comments submitted and received within the 45-day comment period on the draft FR/EIS will be considered in the agency's NEPA analysis and development of the final FR/EIS including the response to public comment appendix.
25	1	Elizabeth Fly	The Nature Conservancy	In 2019, the Conservancy conducted a largescale living shoreline analysis of the South Carolina coast to identify potential sites suitable for a living shoreline over a half-acre in size (Fig. 1). This analysis included both ecological and social data to capture impacts to the environment and nearby communities. The results of this analysis indicated a suite of locations on the Charleston peninsula suitable for a largescale living shoreline. We are pleased to see the sites proposed by the USACE on the Ashley River fall into our suitable locations, and we propose additional sites on the Cooper River side as well. Although some of these sites are marked "Low" priority based on our specific analysis, we consider them excellent sites for living shoreline placement for USACE's purposes on the peninsula – to provide an additional layer of protection against coastal storm impacts. Figure 1. Largescale living shoreline analysis by The Nature Conservancy showing priority sites on the Charleston peninsula. Factors in the analysis include existing marsh, critical infrastructure, cultural resources, and vulnerable populations.	Thank you for your comment and support for the locations currently proposed for oyster reef-based living shoreline sills. Each of the additional proposed sites in this submittal are addressed as individual comments, below. Many measures that were proposed during public comment period were technically not conventional NNBF but modified structural measures with nature-based features incorporated into the design. According to ER 1105-2-100, Appendix E, page E-9, Section I, E-3. c. (2), a separable element is any part of a project which can be implemented as a separate action (at a later date or as a separate project). Separable elements usually must be incrementally justified. In other words, measures may only be combined if they are interdependent and must function together to achieve coastal storm risk reduction benefits. Measures that are separable, or not technically interdependent, must be individually justified to be included in the National Economic Development plan. For example, the addition of salt marsh behind a breakwater would not be considered interdependent or inseparable since the salt marsh is not required for the breakwater to function and the salt marsh would not likely be economically justified for storm risk reduction purposes on its own. The living shoreline sills are not interdependent with the wall (for storm risk reduction) so could not be justified in locations where the wall was not in the marsh. Where the wall is in the marsh or subject to direct wave action, the living shoreline sills are a practicable minimization measure. Exact locations of the living shoreline sills will be determined in the PED phase and these sills are intended to minimize marsh erosion or scouring from the storm surge wall sited in the marsh on the Ashely River side. Since the storm surge wall along Cooper River side of the Peninsula would be on land, no marsh erosion or scouring would occur and therefore, no living shoreline sills in the Cooper River are anticipated.

Submittal #	Comment #	Name	Organization	Comment text	Response
25	2	Elizabeth Fly	The Nature Conservancy	Upper Peninsula The proposed living shoreline in the upper peninsula stretches from the Lowndes Point neighborhood to the northern edge of the Citadel. There is a gap in the proposed shoreline near the Citadel, where the wall has been tied into high ground. Recognizing the Citadel Boat Channel, we recommend extending this living shoreline further south and tying it in with the Brittlebank Park living shoreline (Fig. 2). Based on the Conservancy's analysis (Fig. 1), this entire area is suitable for a living shoreline, and a living shoreline in front of the high ground at the Citadel could provide an additional layer of storm surge protection through protecting and enhancing the existing marsh in this area.	The planned locations for the reef-based living shoreline sills in the upper peninsula area were based on their proximity to the planned storm surge wall in order to minimize impacts of the wall on marsh erosion, while also providing erosion reduction at the marsh edge from storms. In the area around the Citadel there is no storm surge wall planned because the Citadel is at a higher elevation. Additionally, it is assumed that the Citadel's dredge disposal area serves as barrier to wave action on the interior marsh behind the Joe Riley stadium. Therefore, living shorelines installation is not being considered for this area.
25	3	Elizabeth Fly	The Nature Conservancy	Brittlebank Park As suggested above, the proposed living shoreline at Brittlebank Park can be connected to the upper peninsula living shoreline. The reef can begin at the edge of Gadsden Creek and extend northward beyond the edge of Brittlebank Park (Fig. 2).	Thank you for your suggestions at this location. Reef-based living shoreline sills are tentatively planned along the shoreline at Brittlebank Park. During the PED phase, site suitability surveys for the living shoreline sills will be conducted to determine the exact locations.
25	4	Elizabeth Fly	The Nature Conservancy	Lockwood Drive A living shoreline along Lockwood Drive is critical to protecting and enhancing the remaining marsh in this area, which will provide additional storm surge protection and protect from shoreline erosion along T-wall and scouring along the combo-wall. The reef could extend from the U.S. Coast Guard station to the outfall of the Alberta Long Lake (Fig. 3).	Thank you for your suggestions at this location. Reef-based living shoreline sills are tentatively planned along the shoreline at Brittlebank Park. During the PED phase, site suitability surveys for the living shoreline sills will be conducted to determine the exact locations.

Submittal #	Comment #	Name	Organization	Comment text	Response
25	5	Elizabeth Fly	The Nature Conservancy	Cooper River side Shipyard Creek to Town Creek This shoreline encompasses significant industrial property in the upper neck of the Charleston peninsula, including Kinder Morgan and Agru America, and one of the largest remaining expanses of marsh within the Charleston peninsula study area (Fig. 4). With significant boat traffic along this stretch of the Cooper River, a living shoreline would protect the marsh adjacent to this industrial location and potentially provide storm surge protection in an area where no storm surge barrier is planned to be constructed.	Thank you for your suggestions at this location. However, as explained in the response to Comment 25-2 above, after additional evaluation, installation of reef-based living shorelines were not incrementally justified in this location under the authority of this study, and would not help minimize adverse impacts from the wall since the wall is located on land in this location.
25	6	Elizabeth Fly	The Nature Conservancy	Newmarket Creek/Laurel Island The highest priority site on the Cooper River side identified by the Conservancy's living shoreline analysis (Fig. 1) runs north and south from Newmarket Creek, under the Ravenel Bridge (Fig 5). The southern edge of the living shoreline could extend to the edge of the marina by the Ports Authority property and the northern edge could extend along a portion of Laurel Island. This living shoreline would help protect marsh and infrastructure, including railroad tracks, some multi-unit residential buildings, and SCPA property that is not behind the proposed storm surge barrier on Morrison Drive.	Thank you for your suggestions at this location. However, as explained in the response to Comment 25-2 above, after additional evaluation, installation of reef-based living shorelines were not incrementally justified in this location under the authority of this study, and would not help minimize adverse impacts from the wall since the wall is located on land in this location.
25	7	Elizabeth Fly	The Nature Conservancy	Waterfront Park The shoreline stretching between the Charleston Yacht Club to the northern edge of Waterfront Park (Fig. 6) is an ideal location for a large living shoreline that would enhance the marsh and provide protection of the shoreline and T-wall on shore, as well as be a highly visible NNBF for the public.	Thank you for your suggestions at this location. However, as explained in the response to Comment 25-2 above, after additional evaluation, installation of reef-based living shorelines were not incrementally justified in this location under the authority of this study, and would not help minimize adverse impacts from the wall since the wall is located on land in this location.

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26	1	Stephanie Wilson Gentile and Michael F. Gentile		We have the opportunity to do something really special in Charleston, that might become a future roadmap for other areas experiencing similar problems. However, a solid wall (in and of itself) is not the answer. We hope that the ACE takes into account other ideas as expressed in the Sherwood report, Allen Davis' presentation, the Dutch Dialogues presentation as well as others. While a "gray" barrier may be appropriate in certain areas of the Peninsula, we MUST consider more "green" barriers as well. While the ACE is charged with offering a proposal to protect the Peninsula from storm surge, the ACE and the City should take the opportunity to morph the solution into a multi-layered approach to enable Charleston to live with water.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
27	1	Caroline Barnes		The Corps' current recommendations do not address the city's most pervasive flooding problems, including chronic tidal flooding and intensifying rain events combined with a low-lying, aging storm water drainage system. The Corps' seawall approach is expensive and will take resources away from other, present day needs. Therefore, an area-specific approach should look at the context of that smaller section and assess whether nature-based solutions can be utilized that are multi-functional and address both storm surge and other flooding issues.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
27	2	Caroline Barnes		The Corps' current economic analysis fails to account for the benefits and services of nature-based solutions and is skewed in favor of affluent communities. There needs to be more transparency as to why neighborhoods like Rosemont and Bridgeview Village were excluded from the proposed perimeter protection. The Corps and the City of Charleston should begin now to work directly with communities like Rosemont and Bridgeview Village to	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

Submittal #	Comment #	Name	Organization	Comment text	Response
				develop community-led resilience plans to develop more equitable solutions for long-term flood mitigation in neighborhoods that have historically been left out of the conversation.	
28	1	Benjamin Roper Jr.		The Corps' analysis fails to provide an alternative plan to incorporate some natural solutions that are critical such as barrier islands, berms, bioswales, and other things such as noninvasive oyster reefs. This in turn will help the local fishing & tourism industry. Berms and natural systems are also easier to adapt to sea-level rise, as opposed to artificial concrete and steel barriers	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
28	2	Benjamin Roper Jr.		It is unclear how many properties will be affected. The Army Corps' suggest it will pursue "non-structural" measures for Rosemont. Non-structural could mean buying and tearing them down because all homes will not meet the requirements for elevation or flood proofing. The Army Corps' should look at low impact design solutions strategies, as part of non-structural measures.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
28	3	Benjamin Roper Jr.		The storm surge wall proposal ignores the current flooding on the peninsula. It does not take into consideration the likely future sea level rise. The wall would not solve the problem of sea level rise nor work efficiently with storm surge, even directing the water to adjacent areas. It does not offer wind protection and other sources of flooding. We would like to see some language that would offer more sustainable and less invasive outcomes for the future. Storm surge walls that are decorated with plants or walkways, do not address our environmental challenges.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.

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28	4	Benjamin Roper Jr.		The Rosemont community has been disproportionately impacted over the years. We have been excluded from previous decisions on infrastructure that has come through our small community. I have resided in this small neighborhood for 22 years, and I'm afraid that it might not be around in the future, not because of sea-level rise, but because of the negative impacts from the storm surge wall, including but not limited to businesses, transit, housing, and historic preservation.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
29	1	Bruce Glaeser		Will a completed storm surge barrier wall increase the probability of ground water flooding inside the barrier wall during a storm surge event? And if ground water flooding occurs then how will this be mitigated?	Thank you for your comment. Please refer to Master Response 3 - Interior Drainage.
30	1	Casey B. Williams		would the risk of flooding on Rosemont be greater without us being apart of the project? In my opinion if we're a part of the city we should certainly always be included in any proposed study that may impact our community. what are the advantages and disadvantages of the seawall around Rosemont? if the project goes further are we going to be compensated for the damage to our property. The wall for the noise barrier along interstate 26 cause great damage to our houses and property. some that was unseen. so we shouldn't have an adjuster to make the decision of what damage that already exist. some trees and brick fences been around Rosemont over 100 years and didn't collapse until after all the digging with the heavy equipment	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

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31	1	Charleston Branch Pilots	Port Services	We fully support the initiative to protect the Charleston Peninsula from storms and sea level rise, and we look forward to participating in this study and the ensuing project. We, therefore, respectfully request to be considered for appointment to any steering or advisory committees and sub-committees that may aid in this effort to which our perspective might be relevant. As the project matures to the design phase, we respectfully ask you to consider that pilotage is an essential service within the maritime transportation network the Port of Charleston serves. Pilots are often the last of the port's services rendered before a hurricane-imposed shut down, and the first to resume duties to get the port moving again when the storm subsides. Our role is normally to be the first underway, usually with the Coast Guard onboard, to conduct damage assessments of the port's infrastructure as soon as storm conditions drop below tropical parameters.	Thank you for your comment. Please refer to Master Response 9 - Public Outreach.
32	1	Cora Connor		The Corps' analysis fails to provide an alternative plan to incorporate some natural solutions that are critical such as barrier islands, berms, bioswales, and other things such as noninvasive oyster reefs. This in turn will help the local fishing & tourism industry. Berms and natural systems are also easier to adapt to sea-level rise, as opposed to artificial concrete and steel barriers	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
32	2	Cora Connor		It is unclear how many properties will be affected. The Army Corps' suggest it will pursue "non-structural" measures for Rosemont. Non-structural could mean buying and tearing them down because all homes will not meet the requirements for elevation or flood proofing. The Army Corps' should look at low impact design solutions strategies, as part of non-structural measures.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

Submittal #	Comment #	Name	Organization	Comment text	Response
32	3	Cora Connor		The storm surge wall proposal ignores the current flooding on the peninsula. It does not take into consideration the likely future sea level rise. The wall would not solve the problem of sea level rise nor work efficiently with storm surge, even directing the water to adjacent areas. It does not offer wind protection and other sources of flooding. We would like to see some language that would offer more sustainable and less invasive outcomes for the future. Storm surge walls that are decorated with plants or walkways, do not address our environmental challenges.	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.
32	4	Cora Connor		The Rosemont community has been disproportionately impacted over the years. We have been excluded from previous decisions on infrastructure that has come through our small community. I have resided in this small neighborhood for 22 years, and I'm afraid that it might not be around in the future, not because of sea-level rise, but because of the negative impacts from the storm surge wall, including but not limited to businesses, transit, housing, and historic preservation.	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.
33	1	Cynthia Bledsoe		Would this proposal not create a bowl effect similar to New Orelans? What is the waters are higher than the gates? Current estimate for sea levels by 2050 would render this approach ineffective.	Thank you for your comment. Please refer to Master Response 3 - Interior Drainage.
33	2	Cynthia Bledsoe		This might protect the peninsula, but what about a push effect for West Ashley and East of the Cooper? West Ashley already has significant flooding fissures and cannot bear an influx of flood waters.	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
34	1	Dale Morsefield		I am interested in learning more about the Modeling Study referenced in the webinar and on Pages 33 & 34 of the report that indicates in a 12 ft. storm surge the effect of the Peninsula seawall on adjacent harbor water levels would be a rise of only 1-2	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.

Submittal #	Comment #	Name	Organization	Comment text	Response
				inches. Are the details of this Modeling available for review? If so, how might they be accessed?	
34	2	Dale Morsefield		Are there any details available that would describe the appearance/aesthetics of the seawall from the water-side of the Harbor? If so, how might they be accessed? Thank you.	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics.
35	1	Dr James Yanney		1)A wall that has intermittent sections of strong steel gates that are open until a surge is expected and then they shut and are hard latched. These sections fold back on each other creating large viewing spaces and eliminates the need for elevated walls and walkways. Plantings and trees can beautify the overlapped sections when open and only show the bare steel fold out section for the short time to stop the surge. Concomitantly low lying roads can be elevated a couple of feet such as at the Lockwood bend. 2) Another design allowing for better visualization of the water and coastline would create a large steel wall with steel louvers that close when a surge is expected. These louvers overlap to create more strength and the force of the water creates even a greater seal . Again this can beautified with plantings. 3) Create a wall that is submerged in a concrete sleeve and is mechanically elevated into place before a surge.	Movable barriers or other deployable barriers were considered early in the study for the whole storm surge wall alignment; however at very limited portions along the alignment, deployable barriers could be considered. These types of devices are significantly more expensive than a static wall system both in construction and maintenance, which would increase the overall cost of the project greatly. Additionally, the wall would have to be broken into many smaller sections along its' length to allow for movement up and down. This will present a maintenance challenge as each section will have to seal against another portion of the wall, creating numerous failure points for leakage. Such systems were considered for the entire wall alignment, and then not pursued due to the cost, risk of failure, maintenance and operability issues identified above.

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36	1	Dr. Aaron Akin		The report mentions that pump stations will be required to mitigate interior flooding. How resilient and accessible are these stations? Also, how can you assure the public that these systems (one or all pump stations) will not fail resulting in detained water at a higher elevation? For example, floodwaters caused by a storm surge have the ability to recede while interior flooding held back by a wall will not.	Pump stations are designed to ensure sensitive equipment such as electronics are kept above flood levels. Pump capacities were calculated and utilize 3 pumps for what is known as two-thirds redundancy, where if one pump fails the station still functions at 2/3s capacity. Ultimately, operation and maintenance of the pump stations and the pumps themselves will become the responsibility of the City of Charleston, who will be responsible for any required maintenance to keep the pump stations operational. A operations, maintenance, repair, replacement, and rehabilitation manual will be finalized in the PED phase outlining procedures for maintaining the pumps, including ensuring they are operational before storm events occur. Additionally, the existing storm drainage system either already has, or will be equipped with one way check valves that prevent storm surge from passing under the wall, but will allow entrained water to flow out once the water level on the exterior of the wall drops below the level of the entrained water.
36	2	Dr. Aaron Akin		Does this study investigate the potential loss of tourism caused by making the bay view Charleston is known for inaccessible at the southern end of the peninsula? I would recommend including this in the cost-benefit analysis. Personally, I would be less inclined to visit the city or move to the southern end of the peninsula (south of Broad St) if the view was severely obstructed.	The potential loss of tourism is not taken into account in the economic analysis conducted for this study. The intent of the economic analysis as stated in the Economic Appendix is contribution to National Economic Development (NED). Contributions to NED, expressed in monetary units, are the direct net benefits that accrue in the planning area and the rest of the Nation. Benefits from plans for reducing flood hazards accrue primarily through the reduction in actual or potential damages to affected land uses are NED. The loss of tourism or the loss of income by commercial, industrial, and other business firms is difficult to measure because of the complexity involved in determining whether the loss is recovered by the firm at another location or at a later time (e.g. a transfer of activity). Visual and aesthetics analysis of the recommended plan is described in Section 6.13.2 – Visual and Aesthetics, and Appendix A. Additionally, please refer to Master Response 10 – Visual / Aesthetics.
37	1	Ellen Davis		The plan does not appear to give thorough guidance as to the properties that are being affected, and are situated outside the seawall. This automatically raises questions about what will happen to our property, in our case, The Bristol? If we can remain in it, will we be able to get through the gates during closed/flooding periods or will we need to evacuate? How will our property be protected? If we cannot remain in it, what will be done to fairly compensate us - we just paid over 1M for our condo 2 months ago? What is the timing that we will will be disrupted for construction and will we need to relocate during this period? If the answers are made in this document, I cannot decipher them, so hope that someone will do that for me. Thank you.	Thank you for your comment. Please refer to Master Response 8 - Operation and Maintenance Procedure. It is expected that the City of Charleston will update their emergency management plan in concurrence with the Operation, Maintenance, Repair, Replacement, and Rehabilitation Plan of the proposed storm surge wall and gate system, accounting for evacuations. This will include procedures for areas that become inaccessible after gate closure. Evacuation would be required in certain areas such as the Bristol. When the gates are closed, it will not be possible to pass through them. With or without the storm surge wall, mandatory evacuation orders are already issued by the Governor during large storm events. Public outreach efforts will occur informing the public of the construction schedule prior to the beginning of construction. At this time, it is not known if individual buildings would need to be empty while structural features are constructed.
38	1	Flannery Antinoro		Please consider implementing some natural features such as canals and allowing natural marsh to act to help in flood events. I fear	Thank you for your comment. Please refer to Master Response 1 - Non-Storm Surge Flooding, Master Response 3 – Interior Drainage, and Master Response 4 -Natural and Nature-Based Features.

Submittal #	Comment #	Name	Organization	Comment text	Response
				the construction of a wall could create a “bathtub” effect and does nothing to address normal nuisance and rain caused flooding which most citizens are affected by.	
38	2	Flannery Antinoro		What happens in the event that (God forbid) we are struck by a hurricane with major storm surge in the near future? This project will take years and years to complete. What will be given priority or completed first? How is this decided? What is being done to make sure minority groups/ areas will not be forgotten during consideration for phases of construction.	Storm surge risk is the highest flood risk to the businesses, homes, critical infrastructure, medical district, jobs and key peninsula communities, including low-income and historically disadvantage communities. A storm surge structure will benefit those communities as such communities lack the resources for post-surge recovery. The City is planning to procure a City-wide Comprehensive Water Plan in 2022 which will set project prioritization standards for drainage, tidal and other flood risks. Moreover, under a surge risk reduction effort with USACE, additional "flood fighting resources" from the federal government should be available. In addition, please refer to Master Response 8 - Operation and Maintenance Procedures.
38	3	Flannery Antinoro		Where will funds for this terribly expensive project be generated. I know some funds will be matched by the USAC but how does the City plan to acquire these funds?	As the non-federal sponsor the City is required to match 35%, and the federal government 65%, of the project's cost. After real estate easement credits, the estimated cost to the City is $250 million, paid over the 10-12 year design, engineering and construction phases. The City will develop a finance plan for PED phase and a finance strategy for construction phase, if the City decides to construct, from a variety of vetted sources, including portions of hospitality and accommodation fund surpluses, millage, funding from the state, etc. The funding plan and strategy will not and cannot take funding from City stormwater and drainage fees, which largely covers other City water management projects. Without the project, the multi-billion dollar storm surge damages would occur and loss of life potential on the peninsula will not mitigated. The storm surge structure is part of a larger, City-wide integrated flood risk mitigation approach; storm surge risk is and will remain the highest flood risk to the Peninsula for the foreseeable future.
39	1	James Higgins		Will the proposed wall make flooding worse for unprotected areas? Will the City of Charleston be liable for additional damage outside of the protected area?	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
39	2	James Higgins		Will the cost burden be assessed against the properties that benefit or will city residents, not on the peninsula, have to pay for a project that may make their flooding worse?	The City will develop a finance plan for PED phase and a finance strategy for construction phase that would include dedicated funds from a variety of sources, including respective surplus from both the tourism fund and accommodation fund, as well as funding requests from the state. A bulk of the tourism funds are derived from activity on the Peninsula in the historic and hospitality districts that this project would protect. This project would not be able to pull funding from City stormwater and drainage fees, which largely covers other City water management projects. As the study moves into the construction phase, the cost would be shared through the same accounts, as well as funding requests to the state and County. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.

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40	1	Jeffrey D. Lamberson, VP Facilities and Engineering, The Citadel	The Citadel	1. Realizing that the PED (Preconstruction Engineering & Design) is yet to be completed, we want to be sure that the existing storm water outfalls in the areas of the Warehouses, Shop and Facilities & Construction offices and the outfalls from Dunneman Avenue will be accounted for in the design of the wall in that area. 2. Need to determine how vehicular access will be maintained at the Grier Avenue and Wilson Avenue intersection with the wall tie in very close to northwest corner of Seignious Hall. 3. Need to confirm that vehicular access to the Old Landfill (Citadel Island Development on pg. 93 of Appendix A) will be maintained. This island is planned for future development and is the Citadel's only access to the Confined Disposal Facility (CDF) for dredge disposal beyond. 4. Would like USACE to consider possible alternative alignment to the wall location at Register Road on the Citadel Campus; keeping all of the residential units along Register Road inside of the wall. This could be accomplished with an on shore low height wall extension or by adjusting the landing location of the wall on the main campus. 5. The Citadel is very interested in mutually beneficial, living shoreline development in the Ashley River, that protects the survivability of the natural environment and preserves navigation of The Citadel boat channel.	1. All stormwater outfalls not already equipped with check valves will receive new check valves as part of the project. 2. Vehicular access will be maintained at all road crossings by utilizing gates such as swing, slide or removable stop logs as required for specific wall alignment and existing obstructions. A detailed plan for each road crossing will be developed in PED phase. 3. Finalization of gate will be determined during the PED phase. 4. Wall alignment has been optimized to minimize construction in water and marsh areas, taking advantage of high ground and avoid real estate acquisitions of property to make way for the floodwall. 5. Living shorelines are included in the recommended plan described in Section 8 and Appendix B. Also see response to Comment 25-2..

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41	1	Jesse Malan	ADC Engineering	How are secondary effects of the presence of the wall being evaluated/addressed? For example, does the wall change the way wind will interact with the peninsula and it's structures and inhabitants? Will it throw wind-borne debris up at a higher elevation? Into people's eyes/faces? on buildings or cars? etc. What other secondary effects of the presence of the wall will cause unintended consequences and who is studying these? Is it possible the wall will redirect waves/water motion in such a way that will generate faster erosion of nearby low land areas? In the event of seismic activity on the peninsula, is the effect of lateral land spread due to liquefaction accounted for in the design of the wall? Could future river/harbor dredging activities and/or future waterfront structure expansions affect the wall design and performance? IE, does the wall prevent the future shaping of and the needs of the city and region?	Cumulative effects of the proposed plan are evaluated in the FR/EIS. With regards to secondary effects of wind from the storm surge wall, storm generated wind related effects are unknown at this time; however, there are existing multi-story buildings, and other structures along the proposed wall alignment that already would affect movement of wind. Effects on wave action are evaluated in the FR/EIS. The majority of the wall would be located on dry land which may only be in contact with water/wave forces for relatively brief time periods during coastal storm events. Where it would be located in the marsh and come into direct contact with wind-generated waves, minimization measures have been proposed to offset unintended effects. The effect of the wall on the surrounding areas for both increased flooding and wave energy have been modeled and the results show the effect on surrounding areas is negligible, see Master Response 6 – Induced Flood Risk to Surrounding Areas. Seismic activity was accounted for in the wall design, see Appendix B – Engineering, Geotechnical Sub appendix. The wall would be pile supported with the piles being driven down into cooper marl formation, medium dense silty sand to firm silty clay which provides sufficient bearing capacity to support all structures. Even if surrounding soil is subject to liquefaction, the cooper marl supported piles, and therefore the wall, would not be affected. No cumulative effect with dredging activities was determined. For future land development, please refer to Master Response 7 – Wall Alignment.
42	1	Joelle Barbara		Want to understand more about how this wall and more specifically the permanent and moveable pumps will work. Will these only be utilized when hurricanes come to Charleston? Or will these pumps be used on a more regular basis in order to help mitigate the flooding that gets caused to the area during major rain events? Would like to see a plan that shows the impact areas the pumps would be able to service and help. Would like to see a permanent pump system on the eastside. Flooding on east bay and drake/ Amherst is extremely dangerous. This plan in my mind needs to be dual benefit to not only to save us from the	Thank you for your comment. Please refer to Master Response 3 - Interior Drainage.

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				oceans rising tides but also to ensure we don't exacerbate the already large problem of daily flooding on the peninsula. This part of the plan should be highlighted and explained more thoroughly	
43	1	LT John Houk	USCG	Recommend continued collaboration with the U.S. Coast Guard to plan for potential clashes with existing infrastructure as well as impacts to real property, security, and maritime operations.	Thank you for your comment. Please refer to Master Response 9 - Public Outreach.
44	1	Lynn White	Charlestowne Neighborhood Association	The acceptability of proceeding to the PED should be conditioned upon a Design Agreement with the City that incorporates clearly defined decision points at which engineering expenditures can be modified, deferred, or cancelled. As tax payers, we are concerned about the City entering into an agreement without effective controls or exit points that commits us to unsustainable financial obligations.	The City will enter into a 'Model Agreement for Design' with USACE before the City moves into PED. The City's Design Center created a 'Design Opportunities for PED' report that will inform the City's goals in PED. PED and its various studies will be funded on an annual basis. If the City needs to pause the study in any given year, it may do so by requesting a study pause or by not providing its 35% cost-share in any year. This will have negative financial and project schedule impacts. The non-federal sponsor also retains the right to terminate the study. USACE needs and wants to have a supportive and willing non-federal sponsor.
45	1	Mark Cline	Charleston Water System	Charleston Water System owns water and sanitary sewer infrastructure that parallels the Battery Wall which may be in conflict with improvements that may ultimately be recommended from the study. CWS is interested in assisting by providing input to the study regarding the locations and nature its infrastructure, as well as contributing to conflict mitigation strategies. Please contact us for detailed information. clinemf@charletoncpw.com	Thank you for your comment. Please refer to Master Response 9 - Public Outreach.

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46	1	Mary Ann Ward		I attended the October 22, 2021 meeting at the Charleston Maritime Center. I want to encourage the USACE and the city of Charleston to reconsider including our area inside the Seawall. If that cannot be done then the City and the Feds should consider buying all of us out so we can move to an area that doesn't require us to evacuate from storm surges. Our building with its storm shutters has protected us from so many hurricanes and will continue to. But leaving us outside the protected area makes us vulnerable in the event we are closed off but need emergency services here. To have to evacuate every time the seawall gates may be closed puts an enourmous burden on us even though our building becomes a fortress when all the storm shutters are closed. By not including us our property values may plummet and insurance costs may rise precipitously making it impossible to stay here. Thank you for listening	Thank you for your comment. Please refer to Master Response 8 - Operation and Maintenance Procedure.
47	1	Matt Bennett		Please address climate change in general as opposed to attempting to solve this short term problem that's really representative of a much larger problem!	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise.
48	1	Noah Winecoff		My wife and I are homeowners in downtown Charleston. We're concerned about the height and aesthetics of the wall, especially for Joe Riley Waterfront Park, White Point Gardens and the Battery. Some of the proposed wall height renderings show that the wall will block out significant waterfront view from streets such as Concord, Elliot and from the park itself. If we lose the clear views to the water from those streets and others, we lose some of the magic that makes these areas feel open.	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics.

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				We heard Joe Riley say (at his park dedication ceremony) something to the effect of, where the land meets water is something special for everyone to enjoy.	
48	2	Noah Winecoff		Lastly, we live in the worst rated flood zone in downtown Charleston and one storm that came through brought significant water up our street quickly. However the water came from the storm drains on our street, not by overflowing on the land due to a high (9.5") tide. I say this to show, that even though we have a chance of being hit with flooding in our area from a major storm, we'd rather the aesthetic of the area NOT be hurt by a large flood surge wall, which in our opinion would look unsightly and not suite the area well. Thank you for your time and consideration.	Please refer to Master Response 10 – Visual / Aesthetics.

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49	1	Rhonda D. Wright, MD		I am disturbed to see that the Optimised Plan resulting from the Charleston Peninsula Coastal Flood Risk Management Study remains focussed on a 12-foot-high seawall surrounding most of the peninsula. I believe that the Plan remains Suboptimal, for the following reasons: 1. It retains the entire seawall. Despite the EIS, this large and expensive structure will inevitably do much environmental and aesthetic damage while protecting only against flooding from storm surge, while Charleston's flooding problems go far beyond that. The expense of the wall will draw funds away from projects that will have much more impact upon the flooding that we currently face in every heavy rain. Furthermore, I don't see any mention of coordinating the Corps' storm-surge protection with existing or future city infrastructure designed to combat coastal and rain flooding.	Storm Surge risk is the highest flood risk to the businesses, homes, critical infrastructure, medical district, jobs and key peninsula communities, including low income and disadvantaged communities. To protect the peninsula from storm surge, the City has partnered with USACE on a Coastal Storm Risk Management study for the Charleston Peninsula. Such studies focus almost solely on coastal storm surge risk. It is acknowledged that the public and local entities would prefer that there would be a federal authority to pursue an integrated approach to flood risk management across the drainage/stormwater, tidal, riverine, groundwater and compound flood hazards (pluvial, fluvial, coastal); however at this time, that authority does not exist for USACE. Thus, the City is continuing to pursue storm surge risk reduction alongside its ongoing tidal and stormwater (drainage) programs and projects, all of these approaches address flood risk comprehensively. The City's Drainage Fund and Stormwater Fees cannot be used to cover the costs of the USACE storm surge project; that Fund and those fees are segregated in the budget and can be used only for designated drainage projects.
49	2	Rhonda D. Wright, MD		2. There is still insufficient attention to natural or nature-based, layered strategies for flood mitigation. The Corps should divide the study area into sections in order to identify areas on the peninsula where natural or nature-based, layered strategies to address flooding can be incorporated, and which areas will still need a wall.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.
49	3	Rhonda D. Wright, MD		3. The Corps' current economic analysis is skewed in favor of affluent communities. There needs to be more transparency as to why neighborhoods like Rosemont and Bridgeview Village were excluded from the proposed perimeter protection. Both the Corps' and the City of Charleston should begin now to work directly with communities like Rosemont and Bridgeview Village to develop community-led resilience plans to develop more equitable solutions for long-term flood mitigation in	Thank you for your comment. Please refer to Master Response 5 -Environmental Justice.

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				neighborhoods that have historically been left out of the conversation.	
50	1	Rich Jenkins		Does the design of the wall structure allow for the addition of “extension” panels when unusual high tides occur?	The wall structure will be designed so that up to 3 feet of additional height can be added at a later date. However, to go any higher than the current proposed height will require significantly longer wall lengths to tie into high ground, including potentially encircling the entire peninsula, and extensive modifications to features such as bridge crossings. Removable panels would not be feasible from a construction or maintenance standpoint and would be ineffective without the other major modifications such as bridge alterations.
51	1	Rick Mahon, Strategic Planner	Ralph H. Johnson VA Health Care System, Charleston, SC	If approved, RHJ VAHCS requests to be kept informed during the PED phase for discussion of proposed Gates along Lockwood Blvd and their impact on (Emergency vehicle) traffic in to and out of the Medical District	Thank you for your comment. Please refer to Master Response 9 -Public Outreach.
52	1	Robert Hagood		A wall around the city is a fine engineering feat, but is not necessary and too costly. If we are going to spend the Govt's money please do it in the form of low-interest loans to allow citizens raise homes that are built on low-lying areas (specifically historic marshes / trash landfills). We should design our plan to allow the water to flow in and out. We are tidal and the impact will be brief. Thank you, Robert C. Hagood	A nonstructural alternative was considered in the initial array of alternatives. The alternative was screened from further consideration because it would not address storm surge inundation that limits access to critical facilities, emergency services, and evacuation routes. In other words, nonstructural measures would increase some, but not all, aspects of resilience. Further, nonstructural measures, like buyouts, would violate the constraint of minimizing adverse effects to historic districts and buildings.
53	1	Robin Andrews		Why is it necessary to have gates where wall is just a few feet high? Why not ramp up the road to the top of the wall and down the other side? Why not have the wall along the Cooper River front at Waterfront Park and along Concord Street. What is the cost benefit of the additional cost of the wall divided by the value of the extra land included?	Potential options to upland gates would be considered as mitigation for effects to visual/aesthetics and/or historic resources, as appropriate during PED phase. The recommended plan assumes gate structures are required as a conservative approach to account for worst case costs. In addition, please refer to Master Response 7 – Wall Alignment.

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54	1	Ryan Davis		Would like a more defined understanding of the proposed pumps to eliminate the “bathtub effect”. Though future proofing our city from a catastrophic storm (what needs to be our #1 priority) we also need to ensure that consistent Charleston flooding during rainstorms is not exacerbated by this plan. As an east side resident we see consistent flooding on East Bay and Drake street creating hazards for our residents and their property. This is usually caused by the storm systems inability during high tide to effectively remove water from the city at a Rate consistent with the amount of rainfall. Would like to understand how the pumps will be able to mitigate or eliminate this or would like to see the pump plans upgraded to deal with this issue. An additional bathtub effect could have significant implications on property in the above listed areas. Especially at the intersection of Drake St. and Amherst st. This area in particular needs flood mitigation.	Thank you for your comment. Please refer to Master Response 3 - Interior Drainage.
55	1	Stephen Murray		This is a residential community know as Dockside. Could you please explain why we are not included within the proposed sea wall? Thank you	Thank you for your comment. Please refer to Master Response 7 - Wall Alignment.
56	1	Thomas Scanlon		We moved here for the unobstructed views of Charleston Harbor. In Appendix A Figure 3-10 you can see that this wall will totally block all views of the harbor not only for us, but all of Concord Street. It will have a most deleterious impact on the values of all our homes. Our neighbors are against the height of this wall. There is currently a grass berm that extends from the end of Waterfront Park. Why not increase the height of the existing berm? A one size fits all approach isn’t going to work. I’m not opposed to the concept. We need to prevent or minimize	Thank you for your comment. Please refer to Master Response 10 - Visual / Aesthetics. To maintain the same level of risk reduction along the wall, the berm would need to be increased to a similar height of the proposed storm surge wall and would obstruct views at that location. In addition, berms/levees require a larger footprint than a wall which may still be considered in the PED phase, if there is enough space to accommodate the larger footprint, as discussed in Chapter 3 – Conceptual Measures and Alternatives. If the berm is not raised to the same elevation as the proposed wall, there would be a gap in protection that would negate the entire effectiveness of the wall.

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				storm surge, but there needs to be a more flexible approach.	
57	1	Wilcox Held Jr		As a property owner in West Ashley, I have concerns that a barrier wall around the peninsula will displace storm water into areas of West Ashley that currently do not flood. Under this proposal, areas that are prone to flood in West Ashley would see higher water levels causing more damage. Your plans need to address these concerns.	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.
58	1	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Introduction and Summary of Concerns. In general, we have identified a number of significant flaws and concerns with respect to the Corps' DEIS, which threaten to undermine the study and squander the opportunities presented by this public review process. failing to explain and disclose relevant and important information about this project to the public, the Corps has effectively deprived the public of the chance to engage on this proposal in a meaningful way at a time when the opportunity for community engagement has already been made far more challenging by the COVID-19 pandemic. The problems with the DEIS, which are described more fully in the body of this document, include, but are not limited to, the following:	We believe that the FR/EIS meets the requirements of 42 USC 4332(1)(C) for "a detailed statement by the responsible official on -- (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." The FR/EIS reflects the agency's hard look at these considerations and a robust public involvement process in spite of the COVID-19 pandemic. The FR/EIS further meets the requirements of the 1978 CEQ NEPA Regulations which have been applied as a matter of agency discretion. Each of the identified "flaws and concerns" will be particularly addressed, below. Summary bullets and supporting detailed content in the submittal will be combined for purposes of response.

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58	2	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● While we are glad that the Corps conducted a full Environmental Impact Statement versus the earlier and more limited Environmental Assessment it planned to rely on, the DEIS fails to disclose for public scrutiny facts, data, and methodologies that are needed to evaluate this proposed project and its consequences. Under NEPA, the opportunity to comment requires that the Corps present for public scrutiny the rationale and pivotal data underlying its proposed action before the close of the comment and hearing period. For example, the Corps has touted the fact that the benefit-to-cost ratio for this project has skyrocketed from 2.3 in the draft Environmental Assessment in 2020 to 10.2 in the DEIS, but it has not explained why estimated economic benefits more than tripled and costs declined between the EA and the DEIS, an omission that raises serious questions about the reliability of the economic analysis and modeling that was undertaken in support of the analysis. In order to comply with NEPA, fundamental information is needed from the Corps about the assumptions, input values, and mathematical formulas used in the economic analysis and for other key analyses performed throughout the DEIS in order to allow for public understanding and scrutiny. I. The DEIS Fails To Present For Public Scrutiny The Rationale And Pivotal Data Underlying The Proposed Storm Surge Wall In Violation of NEPA. Under NEPA, lead agencies must disclose for public scrutiny those facts, data, and methodologies that are relevant to evaluating proposed projects and their consequences. E.g., Atchison, T&S F. Ry.	USACE has disclosed the facts, data, and methodologies needed to evaluate the proposed project and consequences. The draft FR/EIS did explain How the Plan Has Changed in ES.3. This included the elimination of the breakwater, the refined alignment of the storm surge wall away from salt marsh and onto land, and the elimination of a miter gate at The Citadel, resulting in a significant reduction in project cost and mitigation. The draft FR/EIS in ES.3 did not include specific cost figures for the elimination of the breakwater, though the draft FR/EA Appendix C Economics estimated the cost of the breakwater at > $300M. This was also explained in an FAQ titled, "What has changed since the draft FR/EA was released in April 2020?," available at https://www.sac.usace.army.mil/Missions/Civil-Works/Charleston-Peninsula-Study/. In the final FR/EIS, ES.3 How the Plan Has Changed, the changes in BCR are further explained. It is noted that the BCR is not a measurement of environmental impact, but is used to determine whether or not a project is justified based upon National Economic Development Benefits (see ER 1105-2-100, App. E, Section IV) and in support of budget requests (see ER 1105-2-100, App. D, D-4). The impacts of sea level rise on the design of the selected alternative was addressed in the draft and continues to be addressed in the final FR/EIS. For example, Appendix B Engineering, Sub-Appendix B4 Coastal, notes in 3.4 that that sea level rise does not alter the wall height of the Recommended Plan because the physical constraints of city infrastructure, bridges, topography and ongoing Low Battery wall reconstruction limit the maximum elevation to 12 feet NAVD88. The performance of the storm surge wall in terms of annual exceedance probability under low, intermediate, and high rates of sea level rise is discussed in the FR/EIS, Ch. 8. The estimated O&M costs was estimated based on assumptions of the proposed structural measure in place. These costs represent the current value of materials, equipment, services, and facilities needed to operate the project and make repairs, rehabilitate, and make replacements necessary to maintain project measures in sound operating condition during the period of analysis. They include salaries of operating personnel; the cost of repairs, replacements, or additions; and an appropriate charge for inspection, engineering, supervision, custodial services, and general overhead. These costs are estimated based upon actual current costs incurred for carrying out these activities for similar projects and project measures. Regarding explanation as to the increase in the estimated present value of damages from the draft FR/EA to the draft FR/EIS, the draft FR/EIS (including the Economics Appendix), was issued as a stand-alone NEPA document, rather than simply a revision or update of the draft FR/EA; accordingly, the information in the Economics Appendix was presented as a new analysis without explanation of what had been previously done in the draft FR/EA. However, the changes do reflect new and better information since the draft FR/EA. In short, the technical review of the draft FR/EA led the Project Delivery Team to re-evaluate the engineering inputs into the economics model. Typically, as storm frequency decreases, the water level goes up. This is to reflect

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				Co. v. Alexander, 480 F. Supp. 980, 992 (D.D.C. 1979), rev'd on other grounds, Izaak Walton League of Am. v. Marsk, 655 F.2d 346 (D.C. Cir. 1981); U.S. Lines, Inc. v. Fed Maritime Comm'n, 584 F.2d 519, 533–35 (D.C. Cir. 1978). "[T]he opportunity to comment . . . necessarily require[s] that the [agency] present for public scrutiny the rationale and pivotal data underlying its proposed action before the close of the comment and hearing period." Nat'l Wildlife Federation v. Marsh, 568 F. Supp. 985, 994 (D.D.C. 1983). The Corps has not complied with these obligations here. Despite proposing a massive storm surge wall with more than a billion-dollar price tag and commensurate impacts, the Corps has failed to disclose critical information from the public regarding a number of important analyses upon which the DEIS relies, including the economic analysis and impacts of sea level rise on the design of the selected alternative. The Corps' economic analysis illustrates this problem. The Corps has touted the fact that the benefit-to-cost ratio for this project has skyrocketed from 2.3 in the draft Environmental Assessment in 2020 to 10.2 in the DEIS, but it is unclear why the benefits have more than tripled and costs have declined between the EA and the DEIS, raising serious questions about the reliability of the economic estimates. First, and as explained in greater detail below in Section III, the Corps fails to provide sufficient explanation and justification for its cost estimates in the DEIS. The DEIS projects that O&M costs for Alternative 2 will average $3,000,000 per year, yet the Corps does not disclose the inputs it used to reach that number. DEIS at C-63. Nor does the DEIS explain what assumptions the Corps made in calculating	the fact that more frequent events are less severe, and less frequent events are more severe. Therefore, the storm statistics on the Peninsula were refined resulting in an improved economic analysis which increased the potential damages/benefits being presented in the draft FR/EIS. The comment asserts "an implausibly high estimate of damages, suggesting average damages to every single structure of almost $64,000 per year, with remaining damages even with the storm surge wall averaging $24,000 per year. DEIS at C-46." The "almost $64,000 per year" figure was obtained by dividing the Total Average Annual Damages in Appendix C Economics, Table 4, of $773,400,000 by the total number of structures in the study area of 12,095. We disagree that the figure is implausibly high, for several reasons. First, the figure reflects damage to the contents as well as to the structures. Second, the adjustment of Table 4's Total Present Value Damages over the 50-year period of analysis of nearly $22 billion for growth in population and wealth is an appropriate methodology for assessing storm-related damages. See, for example, the NOAA Technical Memorandum NWS NHC-6, The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2010, Table 3b (adjustments include for increase in wealth and population). Third, there is a consistent upward trend in the dollar amount of damages due to tropical storms and hurricanes. As stated in the NOAA Technical Memorandum NWS NHC-6, at 6: "Continued coastal growth and inflation will almost certainly result in every future major landfalling hurricane (and even weaker hurricanes and tropical storms) replacing one of the current costliest hurricanes. For example, all three of the U.S. hurricane landfalls of 2008 made the top 30 list, despite none of them being major hurricanes at landfall." Using Hurricane Hugo as an example, the cost of the 1989 hurricane not adjusted for inflation is given as $7B (Table 3a); when adjusted for inflation to 2010 dollars, the cost jumped to $12.8B (Table 3b); and, when changes in personal wealth and population were taken into account (but only through 2005), the cost in 2010 dollars jumped to $16.1B (Table 3b). Finally, the same modeling assumption applies to both the future without and the future with project conditions. The Present Value and Average Annual damage estimates are reasonable and supportable.

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				O&M costs across the life of the project. Second, the August 2021 estimate of the present value of damages reduced from Alternative 2 of $13,585,000,000 (DEIS, App. C-60) is more than three times the Corps' previous estimate from March 2020 for essentially the same suite of protective measures. The revised economic analysis is replete with changes like this and no explanation as to why. Third, in calculating the economic benefits of the proposal, the DEIS includes an implausibly high estimate of damages, suggesting average damages to every single structure of almost $64,000 per year, with remaining damages even with the storm surge wall averaging $24,000 per year. DEIS at C-46. More information is needed from the Corps about the assumptions, input values, and mathematical formulas used in the economic analysis for the public to ascertain the accuracy of the estimated benefits and costs. Without this information, it is not possible for the public to assess the accuracy of the Corps' economic findings. In sum, the Corps has not disclosed sufficient information about key assumptions, input values, and mathematical formulas that are necessary to evaluate analyses that are central to the justification for the storm surge wall. This deprives the public of a meaningful opportunity to comment, in violation of NEPA.	

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58	3	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● In addition to not disclosing the critical facts, data, and methodologies underlying some of its key analyses and conclusions, the DEIS offers an incomplete plan that puts off important aspects of the proposal to the Preconstruction Engineering and Design ("PED") phase; relies on outdated data and methodologies for evaluating sea level rise and other key issues; and fails to fully evaluate how the storm surge wall will be constructed, operated, and maintained. Because the DEIS offers such an incomplete picture of the final project, the public has been deprived of a meaningful opportunity to participate in the NEPA process. While the Corps has stated that there will be opportunities for public involvement during the PED phase, such informal opportunities for input are insufficient to satisfy NEPA. A. The DEIS Leaves So Many Details To The PED Phase That A "Hard Look" At The Proposal Is Currently Impossible. While NEPA does not require any particular action, the Supreme Court has repeatedly instructed that NEPA does require agencies to take a "hard look" at the impacts of major federal actions. "The sweeping policy goals announced in § 101 of NEPA are thus realized through a set of 'action-forcing' procedures that require that agencies take a 'hard look' at environmental consequences,' and that provide for broad dissemination of relevant environmental information. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989) (internal citation omitted). Here, the DEIS prepared by the Corps is so incomplete as to render such a "hard look" at environmental consequences impossible.	The basic concern stated is that NEPA for the current Feasibility phase is necessarily incomplete because the USACE project development process may address important aspects of a proposed project in the next phase of Preconstruction Engineering and Design (PED) phase. We believe this concern to be misplaced. The draft FR/EIS provided a sufficient level of detail, as does the final FR/EIS, to the enable an agency hard look and provide meaningful public involvement. At the outset, it should be noted that the PED phase is not a guaranteed next step, but is dependent upon a favorable conclusion to the Feasibility phase determining that the project is justified, the availability of both Federal and local funding to meet the parties' respective cost shares for PED, and the negotiation and execution of a Design Agreement between USACE and the City as non-federal sponsor. The PED phase will not commence without an executed Design Agreement. This is not a situation where a Federal agency is attempting to piecemeal or subdivide a Federal project into separate actions in order to avoid the true scope and impact of the activities that should be examined under NEPA. Rather, the handling of certain items during PED is a product of and reflects the agency's project development process. USACE civil works project development follows a multi-phased process, including Feasibility, PED, Construction, and Operation and Maintenance. The Feasibility phase is intended to develop a level of detail adequate to support a Chief's Report and recommendation to Congress for an authorized project. In recent years, Congress has directed that USACE expedite the Feasibility phase of project development. For example, Section 1001 of WRRDA 2014 (P.L. 113-121) directed USACE to complete the Feasibility studies within 3 years for $3 million with 3 levels of concurrent review (3x3x3). While an exemption for an additional 10-months and over $700,000 to complete the study and transition to an EIS was obtained, the overall Congressional policy of expediting the Feasibility phase continued to apply. The comment concludes by contending that USACE cannot make a thoughtful, informed Feasibility decision, and that public involvement cannot be meaningful during the Feasibility phase, without the information which will be developed in PED. This argument does not take into account USACE's own promulgated NEPA regulations. The Procedures for Implementing NEPA in 33 CFR Part 230 include an Appendix A devoted to the Processing of Corps NEPA Documents. Regarding projects in the PED phase, paragraph 3 provides: "District commanders will review the existing NEPA document(s) to determine if there are new circumstances or significant impacts which warrant the preparation of a draft and final supplement to the EIS. If the proposed changes and new impacts are not significant an EA and FONSI may be used." Further provisions in paragraph 3 outline the public involvement provisions for NEPA during the PED phase. Additional opportunities for public involvement during the PED phase are provided for consulting parties on historic and cultural resources in the Programmatic Agreement Regarding the Charleston Peninsula Coastal Storm Risk Management Project, and for the public in the Memorandum of Understanding Regarding the Assessment of Aesthetic Resources.

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				The DEIS is scattered with references to "the PED phase" where the project will be changed, including a section of 21 items devoted to "PED Tasks." See DEIS at 268. This list of "PED Tasks" includes essential items such as the design, location, and mitigation of the storm surge wall, as well as hazardous waste, hydrology, and transportation analyses. See DEIS at 268-69. The DEIS also states that "[c]hanges to the alignment may occur… [and] changes will occur for the purpose of aesthetic and cultural mitigation." DEIS at 253. While we recognize that large projects such as this proposed storm surge wall are complex and time-consuming to plan, such essential information must be more carefully considered if the procedural requirements of NEPA are to be satisfied. As referenced above, NEPA's purpose is twofold: (1) ensure that agencies make thoughtful, informed decisions and (2) make information available to the public at a meaningful time. 40 C.F.R. § 1502.14; see Robertson, 490 U.S. at 339 ("NEPA guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process" and "provide[ ] a springboard for public comment"). The information gaps resulting from the extensive list of PED Tasks yet to be adequately addressed results in a DEIS that fails both prongs of NEPA. The Corps cannot make thoughtful, informed decisions without such vital information, and the time for the public to receive this vital information is now, before the deadline for submitting public comments has passed. The Corps cannot escape these requirements simply by pushing them off beyond the formal comment period, and beyond the	

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				opportunity for public engagement under NEPA.	
58	4	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	B. The DEIS Does Not Accurately Address Climate and Hydrologic Concerns. The DEIS fails to describe the significant risks that storm surge would still pose to the Peninsula, even if the storm surge wall is built, by excluding several key considerations from the DEIS analysis, including, but not limited to unrealistic sea level rise projections and inland flooding exacerbation. Additionally, while the DEIS acknowledges that the storm surge wall would increase flooding during a rain event in certain areas on the Peninsula, the data used creates an incomplete picture of risk. "To take the required 'hard look' at a proposed projects' effects, an agency may not rely on incorrect assumptions or data," including outdated data, in its environmental analysis. Native Ecosystems Council v. U.S. Forest Serv., 418 F.3d 953, 964 (9th Cir. 2005); see also Lands Council v. Powell, 395 F.3d 1019, 1031 (9th Cir. 2005) (finding the data relied upon by the agency "too outdated to carry the weight assigned to it"); 40 C.F.R. § 1500.1(b) ("Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA."). The agency must also provide "up-front disclosures of relevant shortcomings in the data or models." Lands Council, 395 F.3d at 1032. Here, the Corps has failed to disclose	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise, and Master Response 3 – Interior Drainage.

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				important information to the public and has also relied on outdated data. i. Rainfall Flooding Risk, Modeling, and Pump Failure The DEIS acknowledges that the storm surge wall has the "potential to adversely affect rainfall flooding within the study area." DEIS at 156. The Corps also notes that closed tide gates could increase water levels significantly enough to "potentially induce additional flood damages to nearby structures" compared to a scenario without the wall. Id. In an effort to mitigate the ponding created by the storm surge wall blocking overland flow, the Corps has proposed ten hydraulic pumps that would be designed to remove water from within the perimeter of the storm surge wall. Five of these pumps would be permanent, and the remaining five stations would be on trailers and deployed as needed. We have major concerns about how the proposed storm surge wall exacerbate flooding due to rainfall and the flaws in the Corps' modeling effort. First, we are troubled by the Corps' plan to rely so heavily on such a large number of mechanical devices to address flooding in the Peninsula caused by the storm surge wall. The DEIS must sufficiently disclose the risks associated with the reliance on pump stations and mechanical tide gates, and the Corps must provide a contingency plan for recovery and response in the event of a failure. Engineered water systems that are highly reliant on pumps and mechanical components to function are prone to failures in significant rain or flood events. In 2019, New Orleans' pumps malfunctioned after the city's systems were overwhelmed from responding to a single extreme rain event.	

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				Second, we are also concerned that although the Corps has acknowledged that the storm surge wall will increase flooding in certain locations, the Corps' plan does not include any pumps or other strategies to address this impact. See DEIS at 156 (stating "not all locations with increased water levels warranted mitigation by hydraulic pumps."). The lack of any proposed measures in the Corps plan to address increased flooding in certain locations on the Peninsula is a significant flaw that needs to be addressed.	
58	5	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Third, the DEIS inexplicably relies on an outdated design of the storm surge wall when conducting the hydrologic modeling used to determine the number of pumps needed to manage internal ponding. This flaw in the DEIS, which is buried in the DEIS and easy to overlook, is a major weakness in the Corps' analysis. Figure 10 of the DEIS Sub-Appendix B-3 shows the storm surge wall with seven storm gates along the Ashley River that are not included in the most recent iteration of the storm surge wall's design. DEIS Sub-Appendix B-3 at 14. As a result, the hydrologic modeling used by the Corps to determine how water within the Peninsula can drain out of the City after a flooding event assumes that there are more drainage outfalls built into the wall than actually are present in their most updated design. The DEIS admits the use of this outdated model (DEIS at 159), yet the Corps fails to use the current design of the storm surge wall to conduct this analysis. This is a significant defect in the DEIS that could result in far greater problems of internal drainage and ponding than the Corps discloses in the DEIS. The Corps has explained that its problematic assumptions were not corrected due to the amount of time it takes to run the hydraulic models,	Since your review of the report, USACE's engineering team has updated the interior drainage modeling (HEC-RAS) to reflect all updated project features as part of the Tentatively Selected Plan (TSP) i.e., the modeling was updated with the newest proposed alignment to reflect the re-alignment near the Port and the storm gates/pumps needed in this area. Other changes would include reducing the number of storm surge gates as mentioned in the Wagener Terrace/Ashley River areas. The gate locations were reduced to reflect the TSP with 5 storm gates at Halsey Creek. The H&H Interior Drainage report and Main Engineering Appendix B have been updated to reflects these changes. Engineering Appendix B – Chapter 5 – Section 5.10 contains the Interior Drainage Assessment. Sections 5.10.3 and 5.10.4 discuss the model development and results but do not display results in depth not to overwhelm the Engineering Appendix B with data which are provided in the Interior Drainage Sub Appendix 3. The stand-alone Interior Drainage sub-appendices (Appendix B SubAppendix 3 H&H Interior Drainage) contains the detailed drainage assessment which reflects the updated modeling. Chapters 3 and 4 of this SubAppendix primarily contain the hydraulic model development, results, and discussion. In Chapter 5 of the Interior Drainage Sub Appendix 3, the Economics assessment is provided. It is noted that while the hydraulic modeling was updated to reflect updated project alignment and features, the economics model for interior drainage has not yet been updated and is to be updated during PED. Because of this. Section 5 provides the sufficient detail for what has and has not been updated for incorporation into the economics modeling. See these sections for further clarification.

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				see DEIS at 159; however, this is not a legitimate excuse. The extent to which the proposed storm surge wall may worsen interior flooding in the Peninsula is a major issue that must be accurately disclosed and presented to the public pursuant to NEPA with more than a "simplistic approach" as has been applied here. DEIS Appendix B at 68. In order to comply with NEPA, the Corps must redo this analysis and publish the corrected information for public review and re-open the comment period.	
58	6	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Fourth, the DEIS assesses how the storm surge wall will affect ponding when the tide gates are shut and for a certain size of storm, but the Corps does not address whether the storm surge wall could create ponding during a rainfall event even when the tide gates are open. See DEIS Sub-Appendix B-3 at 11. Because the storm surge wall would constrain water to a smaller number of openings compared to current drainage patterns, there is a substantial risk of ponding even without the closure of the tide gates. The Corps must evaluate and describe this risk as well in order to accurately contribute to the public's understanding of the project impacts and to appropriately address these negative impacts.	USACE utilizes the HEC-RAS 2D model for assessing the interior drainage flooding. During PED Phase, USACE will continue coordinating the City of Charleston engineers to further understand the City's existing sub-surface storm pipe systems and future improvements to those systems and how USACE's modeling and designing how the Corps' proposed interior drainage features can perform alongside the City's stormwater management features. The up-to-date Interior Drainage Sub Appendix 3 report (Chapter 2.3 "City Stormwater Management Systems") discusses the city's storm water system, the known current and future improvements, and the city's "Flooding and Sea Level Rise Strategy". In regards to addressing interior ponding, USACE has performed modeling for storm gates open and storm gates closed conditions. This is reported in the Interior Drainage Sub Appendix 3, both the outdated report that was reviewed here and the up-to-date report which reflects updated project alignment and features. More engineering assessment is needed during PED phase to develop the OMRR&R manual on how to operate storm gates, and to assess the feasibility and if there is a need for the proposed pump stations to operate during "storm gates open" conditions. At this phase of the study, the proposed pumps are not operating during open conditions but do operate when storm gates are closed. Further assessment of operations of gates and pump station will be conducted during PED phase so that USACE can appropriately design each feature of the system after more in depth, site-specific assessments are completed. The assessment conducted to date are shown in detail in the Interior Drainage SubAppendix 3.
58	7	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	ii. Overtopping and False Sense of Security The DEIS fails to adequately evaluate the risk of storm surge overtopping the proposed wall and similarly does not sufficiently address the concern that the mere construction of the storm surge wall is likely to lead to a false sense of security on the Peninsula and encourage even more development, thus increasing the overall threat of overtopping and underscoring the importance of thoroughly studying these related issues in the DEIS. First, the Corps inadequately considered sea level rise and therefore its modeling	As described in Section 6.19.2 – Safety, since some risks of rainfall flooding, and wave and surge overtopping with a coastal storm event would remain after implementation of the project, it is assumed that the City and residents would still follow emergency management plans and mandatory evacuation orders with implementation of Alternative 2. The proposed storm surge wall with top elevation 12ft NAVD88 would prevent stillwater overtopping for a 0.7% annual exceedance probability (AEP) surge event in 2032 and a 1% AEP event in 2082, assuming an intermediate rate of sea level rise as stated in Section 8.2 – Performance of the Recommended Plan and SubAppendix 4 - Coastal. Please refer to Master Response 2 - Climate Change and Sea Level Rise.

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				understates the extent to which sea level rise will exacerbate the threat of storm surge in the future. Properly accounting for tides, sea level rise, and rainfall in addition to storm surge is important for purposes of evaluating this proposal because it would reveal a significantly greater likelihood of a certain sized storm overtopping the wall. As designed, the storm surge wall would be overtopped with a 2% annual chance, or 50-year, storm surge and 1.65 feet of sea level rise. DEIS Sub-Appendix B4-Coastal at 88. The Corps touts the benefits of the proposed 12-foot storm surge wall, but the reality is that this wall would provide only marginal benefits given the relatively narrow range of storms in which the storm surge wall would substantially improve the City's resilience.3 Based on the recent history of storms in Charleston and along the South Carolina coast, the risk of extreme storms and overtopping is very real—and increases as the sea level rises. The DEIS notes that the elevation of the proposed storm surge wall is approximately 8 feet lower than the elevation of the peak surge that Hurricane Hugo would have brought if the northern section of the storm, with the largest surge, had hit Charleston Harbor.4 DEIS at 23. Given the risk posed to the public in the event of an overtopping, the Corps must provide meaningful information on how the wall would perform in the event of an overtopping. That information must come during this NEPA process and before the agency finalizes its preferred alternative, not in the subsequent PED phase.	

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58	8	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Second, the DEIS notes that in the event of an overtopping or tide gate failure, the flood levels would likely be similar to the no action alternative; however, there are no details provided to support this statement. DEIS Appendix B at 68. Successive overtoppings can weaken a floodwall,5 and the Corps has not considered potential additional damage caused by water retained by the floodwall after an overtopping. The DEIS states that "[a]ny detailed assessment of the timing of an overtopping scenario versus the opening and draining via gates in the wall will be deferred to PED phase." DEIS Appendix B at 68. This is yet another important analysis that the Corps is deferring until after public participation in the NEPA process.	For feasibility level of design and analysis, it is a reasonable assumption that the flood levels in the Future With Project scenario would be similar to the flood levels of the same storm in the Future Without Project (No Action) scenario. Volume of water within the proposed wall under various overtopping scenarios have not been modeled, however further modeling will be conducted during the PED phase.
58	9	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Third, although the DEIS acknowledges the potential for increased property values as a result of the wall, it has failed to consider the possibility that the wall would induce additional development. One study on the effectiveness of seawalls against tropical cyclones in Japan found that seawalls may contribute to a false sense of security, encouraging additional development in vulnerable areas behind the seawall and reducing evacuation rates during storm events.6 An EA for a seawall prepared by the Fish and Wildlife Service for a Pacific atoll identified induced growth and increased population density as indirect effects.7 In recent coverage of the New Orleans floodwall, a Corps official warned against communities growing complacent behind the structure.8 The DEIS at issue here has not addressed the risk associated with induced growth, and it is crucial that this project not elevate the risks of flooding to the Peninsula by impeding progress on hazard mitigation or creating a false sense of security.	Under the Future Without Project condition, the City of Charleston has projected significant population growth and increased development on the Charleston Peninsula (see Section 2.7.1). It should be noted that the current development trends, within the existing 100 year floodplain, are expected to continue with or without any action by USACE. After substantial plan formulation efforts, no practicable alternative was found to address coastal storm flood risk to existing development. As concluded in Section 9.12 – Executive Order 11988, Floodplain Management, based on the screening and evaluation process, the Recommended Plan is the most responsive and only practicable alternative that will substantially meet all of the study objectives, as well as the EO 11988 objectives of reducing the hazard and risk associated with floods, and minimizing the impact of floods on human safety, health and welfare.

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58	10	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	iii. Deflected Flooding The 2020 EA failed to consider the proposed storm surge wall's impacts on neighboring communities like Mount Pleasant or James Island. The Corps correctly decided to take a closer look at this issue in the DEIS, but this analysis is still lacking substance. The DEIS concludes that the impact on these communities, even during massive storms, would be negligible despite enormous amounts of water deflecting off significant new infrastructure. The DEIS acknowledges that "[w]ave heights vary depending on direction and speed of the storm and the same storm will generate different wave heights on opposite sides of the peninsula." Sub-Appendix B4-Coastal at 55. However, it is unclear whether the Corps' modeling captures how different storm types would affect the wave deflection potential of the storm surge wall. Additionally, the Corps has only considered the potential for wave deflection with one estimation of sea level rise, DEIS Sub-Appendix B4-Coastal at 58, meaning that impacts from higher water levels are unknown. The wave refraction modeling is also limited in geographic scope, as the Corps only considers impacts to shorelines directly across from the proposed storm surge wall and not further up the various channels tying into Charleston Harbor.9 The Corps again fails to provide enough information about its modeling efforts to allow the public the opportunity to understand and evaluate the Corps' conclusion that communities outside of the proposed storm surge wall have nothing to fear from future wave deflection or artificially high water levels due to the storm surge wall. At a minimum, the Corps	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.

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				must disclose its key assumptions, input values, and mathematical formulas to better explain its modeling effort and underlying analyses. By failing to do so, the Corps is depriving the public of a meaningful opportunity to comment, in violation of NEPA.	
58	11	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	iv. Sea Level Rise and Climate Impacts The DEIS acknowledges the reality of "continued or accelerated rise in the sea level in the Charleston area" through the end of the century driven by climate change. DEIS at 137. The DEIS describes the different types of flood risk Charleston faces and notes how this risk will increase as sea levels create a higher launching point for tidal, rainfall, and storm surge flooding. DEIS at 15. However, the Corps erroneously limited the data used to evaluate how sea level rise will affect this project, falling short of their own internal procedures and requirements under NEPA and significantly underestimating the amount of sea level rise that Charleston is likely to experience during the life of this project. In these ways, the DEIS does not properly examine the project's vulnerability to sea level rise. The Corps published three relative sea level rise scenario curves—Low, Intermediate, and High—for major tide gauges along the U.S. coast in 2013 ("USACE 2013 curves"). The USACE 2013 curves were novel at their release because they were some of the first to assess localized sea level rise along the entire U.S. coast. However, these curves are based on projections originally created by the National Research Council in 1987.10 More up-to-date sea level rise scenarios are	Thank you for your comment. Please refer to Master Response 2 - Climate Change and Sea Level Rise, and Master Response 8 - Operation and Maintenance Procedures. Please see also FR/EIS Section 2.9.2 Managing Risk discussing rates of RSLR, including the most recent NOAA 2022 rates.

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				available. Two major federal reports have since superseded and improved upon the USACE 2013 work. One report was co-authored by the Corps in 2016,11 and more recently, in 2017 the National Oceanic and Atmospheric Administration ("NOAA") released new scenarios of sea level rise to inform the 4th National Climate Assessment.12 This effort incorporated and improved upon previous work from NOAA, the Corps, the U.S. Environmental Protection Agency, the U.S. Geological Survey, and academia. Corps Guidance ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs ("SLR Guidance"), directs the Corps to use the USACE 2013 curves to evaluate the "direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining [Corps] projects…."13 The SLR Guidance allows for the Corps to incorporate other sea level rise curves into their analysis, in addition to the USACE 2013 curves, in order to properly evaluate how projects may be affected by sea level rise.14 For purposes of the DEIS, the Corps elected to primarily utilize "one rate of sea level change," the USACE 2013 Intermediate curve which projects 1.65 feet of sea level rise by 2082. The DEIS briefly acknowledges the USACE 2013 High curve and the newer NOAA 2017 sea level rise projections of the 4th National Climate Assessment, referencing the tidal flooding projections therein; however, the DEIS does not meaningfully incorporate the updated sea level rise data in the consideration of direct or indirect impacts or in the engineering of the storm surge wall project. The DEIS only considers sea level rise higher than the	

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				USACE 2013 Intermediate curve to decide between the storm surge wall alternatives with and without the breakwater. DEIS Appendix B at 29. The DEIS dismisses the need to consider how higher rates of sea level rise will affect the project's operation, stating that the higher water level only increases the amount of times the height of the wall is exceeded.15 However, the number of times the wall is expected to be overtopped is a significant justification for the project in the Benefit Cost Analysis and an important factor for community impacts. DEIS Sub-Appendix B4-Coastal at 56. The sea level curve used in the DEIS estimates a lower amount of sea level rise compared to more updated sea level rise projections. For comparison, the 2013 USACE Intermediate curve is roughly equal to the NOAA 2017 Intermediate-Low scenario. In order to not exceed the NOAA 2017 Intermediate-Low scenario, major greenhouse gas emission reductions would be needed to keep the global average temperature from rising above 2°C compared to the preindustrial average.16 This would effectively require global greenhouse gas emissions to be neutralized before mid-century.17 Based on emissions trends and the absence of a comprehensive effort to address climate change, this scenario is becoming less achievable. As of 2017 the globe had already warmed to 1°C above the average pre-industrial global temperature, and current emission promises under the Paris Accord would amount to approximately 3°C total warming even if they were fulfilled.18 The Corps does not acknowledge these shortcomings of the data they have chosen to use nor do they provide justification for why they did not rely on more updated sea level rise scenarios, such as the NOAA	

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				2017 data. Per the SLR Guidance, “analysts shall consider what effect higher relative sea-level rise rates could have on design alternatives, economic and environmental evaluation, and risk. The analysis shall include…intermediate and high rates, which include future acceleration of sea-level rise.” As described above, the USACE 2013 Intermediate curve is likely an underestimation of the amount of sea level rise the Charleston coast will actually see over the next 50 years and does not account for accelerated sea level rise with continued high emissions. However, the USACE 2013 High curve follows close to the more realistic NOAA 2017 Intermediate-High scenario, which accounts for continued high emissions in the near future and increased contributions from land ice melt.19 The NOAA 2017 Intermediate-High scenario curve projects upwards of 2 feet of sea level rise along the Charleston coastline by 2050, compared to baseline sea levels in the year 2000.20 By 2080, approximately the time period considered by this DEIS, the Charleston area could expect over 4 feet of sea level rise according to the NOAA 2017 Intermediate-High curve. This scenario is consistent with observations of sea level rise along the Southeast coast, and it models a future with emission levels similar to today.21 Making matters worse, in a climate scenario where today’s emission levels remain constant, the number of extreme rain storms in the Southeast will increase by two to three times the historic average by the end of the 21st century.22 By relying on outdated, likely inaccurate sea level rise data, the Corps risks designing and	

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				implementing an expensive project that is unable to achieve its stated objectives from the outset. Underestimating the amount of sea level rise that will take place could have major consequences for this proposal. First, the Corps does not account for how the tide gates will operate when, due to sea level rise, high tide exceeds current ground levels. After sea level regularly reaches the base of the storm surge wall, the gates would be closed far more frequently than the Corps predicts or possibly have to remain permanently closed, and the Corps has not considered how the system would operate in these conditions. Even before sea levels rise above ground level, it can be expected that regular high tide flooding will require increasingly frequent gate closures. Increased closure of the tide gates would incur additional environmental and community impacts that should be thoroughly evaluated. With even relatively low amounts of sea level rise, the water line will rise above the base of the wall in some areas, especially along the low-lying western edge of the Peninsula. Attempting to seal out the sea by permanently closing the tide gates would create a risk similar to the predicament of New Orleans, as a significant portion of the City would be below the water line and at risk of flooding in the event of machinery malfunction. Should the storm surge wall create such a "bowl" effect, it would be very difficult to remove water from the City.23 If the Corps does not take appropriate sea level rise scenarios into consideration, it is possible that the functional and structural integrity of the proposed storm surge wall could be compromised. Higher sea level rise increases the risk of overtopping during storm events, a risk which the DEIS does not adequately evaluate. With an increased	

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				risk of overtopping, the capacity of the proposed pumping system will need to be designed to handle additional pumping needs. Higher sea level rise could also increase the costs of the project by necessitating replacing the storm surge wall after construction to withstand a more significant storm event and sea-level rise condition. Recognizing the effects of climate change that the area is already experiencing, the City of Charleston is taking steps to prepare for increased future flooding through a Flooding and Sea Level Rise Strategy.24 Charleston experienced 89 minor tidal flooding events in 2019, shattering the record set in 2015 of 58.25 In 2020, Charleston saw 68 minor tidal flooding events and the most major tidal flooding events—tides over 8 feet—ever recorded in a single year.26 Charleston is set to see tidal flooding events half the days of the year before the middle of the century.27 After consulting with experts at NOAA and assessing the most up-to-date findings on relative rates of sea level rise, the City chose to plan for 2 to 3 feet of local sea level rise by 2070.28 This projection falls along the Intermediate and Intermediate-High scenarios produced by NOAA and the federal Interagency Task Force as part of the 2018 4th National Climate Assessment.29 The fact that the City of Charleston has chosen this sea level rise projection for purposes of guiding future development further calls into question the Corps treatment of this issue in the DEIS and weighs heavily in favor of the Corps using a more realistic sea level rise scenario in planning this critical Infrastructure project. By limiting significant consideration of sea level rise to a low scenario, the Corps	

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				undermines its own efforts to evaluate the many direct and indirect effects of sea level rise on the proposal and to design solutions that will effectively protect against future coastal storms and flooding.	
58	12	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	v. Groundwater The DEIS has not sufficiently considered the flooding risk caused by higher groundwater levels, driven by rising seas, over the lifetime of this project. As sea levels rise, the already shallow groundwater table along the coast introduces a new source of flooding in the form of groundwater inundation. Although the DEIS briefly acknowledges the potential for this type of flooding, see DEIS at 70, it does not assess the impact of this type of flooding on the storm surge wall itself or on the communities within the storm surge wall perimeter. One regional assessment in the San Francisco Bay Area found that on average, when inundation models account for rising groundwater along with sea level rise, the amount of land area affected by flooding more than triples.30 Decreased infiltration and pooling groundwater could exacerbate inland flooding buildup caused by the storm surge wall, and this potential must be captured and assessed in the inland flooding analysis.	With regards to the flood risk from groundwater, please refer to Master Response 1 – Non-Storm Surge Flooding. As discussed in Sections 4.3 and 6.3, groundwater in the subsurface aquifer is already shallow within the Charleston Peninsula and fluctuates with the tides, seasons, and precipitation and would continue in the Future With and Future Without Project conditions. Additionally, as sea levels continue to rise into the future, saltwater will continue to infiltrate the shallow subsurface groundwater aquifer of the peninsula.

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58	13	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	C. The DEIS Does Not Adequately Analyze the Proposal's Effects on Water Quality. Throughout the DEIS, the Corps bases its analysis of water-related issues on how water quantity will be affected, but the Corps insufficiently evaluates the impacts of the proposal on water quality in the Charleston area. The DEIS states that "[p]otential adverse effects [of the storm surge wall] on local water quality could range from temporary to permanent, but would be localized. With best management practices (BMPs) to protect water quality and implementation of minimization measures, some effects would be minor, but temporary adverse effects on water quality could still occur." DEIS at 163-64. The subsequent sections devoted to construction, tidal restriction, and stormwater quality outline some of the water quality impacts resulting from the storm surge wall but do little to address these impacts. See DEIS at 164-68. Importantly, the State of South Carolina has set a Total Maximum Daily Load ("TMDL") for Dissolved Oxygen ("DO") in Charleston Harbor in order to regulate discharges into the system that could worsen low oxygen levels, which are hazardous and even deadly for aquatic organisms. DEIS at 75. The Corps acknowledges that, "the proposed storm surge wall and gates could compound impairment of dissolved oxygen [in aquatic systems] behind the wall." DEIS at 165. The DEIS proposes mitigation of Essential Fish Habitat and six storm gates that would allow for tidal flows in tidal waterways and culverts directly impacted by the path of the storm surge wall. However, the DEIS does not explore how the project as a whole would affect DO levels in Charleston Harbor or how DO levels would be affected	Effects of the proposed plan on water quality (and any other environmental condition) are evaluated by comparing the quality of water with the project in place in the future to the water quality without the project, or the No Action Plan. For the stormwater runoff being collected from overland flow (that is not collected by the municipal subsurface drainage system) by the proposed pump stations would be of the same quality as it would without the project and flow overland into surrounding waterbodies. For the discharged water from the pump stations, which would be a point source, water treatment systems will be incorporated in all permanent pump station as described in Section 6.4.2 – Water Quality, so that the quality of the water entering surrounding waterbodies will actually be improved compared to without the project. The planned permanent pumps stations would be similar to the pump stations already permitted and operated by the City of Charleston, which meet state water quality standards. With respect to the storm gates and water quality, it is helpful to remember that the future without project water quality conditions during which the gates would operate is during and following a storm surge event. Water quality conditions in estuaries are highly altered during this time with low salinity concentrations and high dissolved oxygen concentrations from extensive rainfall drainage coming down tidal rivers from the inland areas that are also in the storms path. Section 6.4.2 – Water Quality describes that in the future with project conditions when the storm gates are closed at low tide for a storm surge event, stormwater runoff would collect in the tidal creek/saltmarsh areas with storm gates (and in man made lakes such as Colonial Lake or Alberta Long Lake). During the time the storm gates are closed, assumed to be 48 hours though could be more or less time depending on any given storm, the quality of the stormwater runoff could continue to degrade from the already degraded existing condition stormwater runoff, without the normal influx and mixing of tidal water, however the held water would be receiving direct rainfall. USACE would minimize adverse effects by reducing the time the gates are closed to the greatest degree feasible. Any degraded water quality in the small volumes of water held behind the storm gates relative to the volume of water found in the tidal creeks and connecting tidal rivers (Ashley and Cooper Rivers), when released into the already degraded post-storm tidal waters, would contribute a nominal effect to the without project degraded water quality conditions. Such a study of the post storm water quality conditions in the Charleston area without the proposed project is beyond the scope of this study. Due to the temporary and minor effect to water quality, and use of minimization actions, USACE does not believe that water quality modeling is warranted.

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				when the storm gates are closed and tidal exchange is cut off. The Corps must conduct a study for specific impacts to DO similar to the Moffat and Nichol 2017 study for Norfolk, VA on salinity impacts from storm gate closures, referenced in the DEIS. See DEIS at 167. As mentioned in Section I.B.i above, the storm surge wall would rely on five temporary and five permanent pumps to control stormwater pooling as a result of the storm surge wall construction. The DEIS acknowledges that these pumps would function as point sources of stormwater discharge when operating. DEIS at 168. However, the Corps does not assess the impact of these point sources on water quality, stating that the pumps would move the water "where it would have drained without the wall" and summarily concluding that the storm surge wall would therefore incur "temporary, minor, and not significant" impacts to water quality from stormwater runoff. See id. This claim ignores the reality that the pumps will concentrate runoff into piped outfalls and also reduce the filtration of pollutants possible during sheet flow across pervious surfaces. Due to the significant concentration of pollutants detected in Charleston floodwaters,31 and the declines in plant and animal diversity and fitness in waterbodies exposed to urban runoff,32 the Corps must more rigorously evaluate how the concentration of polluted runoff from pumping outfalls would affect receiving waterbodies. We agree with the Corps that water quantity is an important consideration when considering flooding, but that does not mean that it should be the only consideration. Diminished water quality in the Charleston Harbor would be an unnecessary burden for	

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				residents of Charleston and the surrounding area, and the Corps should adequately consider the risks that its proposal presents to water quality in the area. Only by properly considering those risk can the Corps then properly mitigate any harms, as required in an EIS under NEPA.	
58	14	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	D. The DEIS Does Not Adequately Assess Natural and Nature-Based Features. In the original alternatives analysis, the Corps excluded all standalone natural and nature based feature (NNBF) alternatives and did not consider NNBFs in combination with more traditional grey infrastructure. When the City of Charleston engaged with the Dutch Dialogues process, NNBFs and multi-use infrastructure were the primary means of protecting Charleston from increased flooding. More recently, the City of Charleston Design Division released a report on Charleston 3x3x3 Civic Design Opportunities ("Civic Design Report").33 As explained in the Sherwood Report, we have also advocated for NNBFs as primary strategies in Charleston's toolkit against flooding and rising seas. While we are glad that the Corps has altered its plan to include NNBFs, we are disappointed with the superficial application of NNBFs here and urge the Corps to incorporate more proven NNBFs into the design of its proposal. The DEIS includes plans for living shorelines comprised largely of oyster reefs at three locations along the western edge of the proposed storm surge wall. See DEIS at 255. The Corps credits these living shorelines as helping to protect the storm surge wall from scour and other degradation, as well as providing wetland gain effects to help offset the losses	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features. Please also see the responses to Submittal #1, Comments 1-6 (Sherwood Report). Additionally, a feasibly-level engineering description of the planned oyster reef-based living shoreline sills has been added to Appendix B – Engineering.

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				imposed by the construction of the wall. While we support the use of NNBFs, it is unclear why the Corps has chosen these specific locations and whether the sedimentation rates and wave energy at these sites will be sufficient to maintain healthy oyster-reef living shorelines. The Corps does not explain the full costs and benefits it expects of these living shorelines, why these living shorelines were chosen over other NNBFs, and why the living shorelines are used so sparingly. More detail on this part of the proposal is needed in order to better understand the Corps' proposal for these features. Further, if these three sections of living shorelines clear the costbenefit analysis, then it would stand to reason that more living shorelines could also be included as additional components of this proposal. While we are encouraged to see the Corps begin to consider how greener options could be incorporated into this project, far more comprehensive NNBFs than the proposed living shorelines could be integrated into the Corps' proposal and could provide Charleston with a myriad of additional benefits. We urge the Corps to more seriously integrate NNBFs into their proposal rather than attempting to appease the public's request for greener alternatives with a relatively insignificant proposal for living shorelines. In fact, the Civic Design Report outlines how the Corps can amend the proposed design to better fit the fabric of the Peninsula and incorporate the types of designs outlined in the Dutch Dialogues report and embraced by city stakeholders. The Civic Deign report envisions how the Corps' storm surge barrier could be improved through targeted and proven NNBFs, including planted berms and	

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				levees, reconstructed intertidal areas, and living breakwaters.34 Other creative solutions such as adaptable panels that could be installed at the existing Battery seawall are referenced in the Civic Design Report and exemplify how the Corps and the City of Charleston can approach this project as more than just a concrete wall. See Civic Design Report at 77. Additionally, and as we have said previously, we agree that there may be specific locations on the Charleston Peninsula where a traditional concrete wall is the best option to address storm surge. However, there are clearly opportunities to take different approaches along other sections of the Peninsula's shoreline by incorporating natural, layered strategies to address flooding. By breaking down the study area into smaller blocks along the perimeter of the Peninsula, the Corps should develop nature-based and community-based plans for the distinct needs of each neighborhood and shoreline area. The Civic Design Report recommends breaking up the Peninsula into at least 16 edge-segments. See Civic Design Report at 37. A more tailored approach would be in keeping with the Corps' assertion in the DEIS that "[r]esiliency increases when there are multiple layers incorporated in any risk management project," including "structural, nonstructural, and natural and nature-based" measures. DEIS at 29. Rather than build a single-purpose, uniform wall, the Corps should carefully evaluate NNBFs and other solutions that are customized to the unique needs of different areas of the Peninsula.	

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58	15	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	E. The DEIS Does Not Adequately Describe Mitigation for Impacts on Tidal Marshes. Constructing the proposed storm surge wall would result in 35 acres of wetland loss along the shoreline of the Charleston Peninsula. Wetlands mitigation is yet another key element of the proposal that is left for the PED phase, outside the window for the public to comment formally or provide its input. Deferring to a future stage, outside of the opportunity for public comment, is a disservice to the public and a violation of NEPA. Given the high cost of tidal marsh credits, it is all the more imperative that the Corps disclose its mitigation proposal under the Clean Water Act during the public comment stage. While there is no specific wetlands mitigation plan proposed or outlined in the DEIS, the Corps identifies several mitigation banks with available and projected credits. DEIS SubAppendix F-10 at 13. However, several of the banks listed lie far outside the watershed of the proposed project, meaning that wetlands filled in the Charleston area could be mitigated with wetlands in a different part of the state. This disconnect is contrary to both the Section 404(b)(1) Guidelines as well as the Charleston District's own Guidelines for Preparing a Compensatory Mitigation Plan ("SOP"). The 2008 Mitigation Rule emphasizes the importance of locating mitigation within the watershed of the impacts in order to come closer to the goal of no net loss. See 33 C.F.R. 332.3(b)(1). The Corps' SOP reaffirms this watershed approach by stating "permit applicants should consider factors such as current trends in habitat loss or conversion; cumulative impacts of past development activities; and chronic environmental problems such as flooding or poor water	The level of detail and planning identified in the Draft Mitigation Plan that USACE has prepared is consistent with USACE policy ER 1105-2-100. It is typical for the mitigation plan to remain a draft and not be finalized until late in the PED phase when environmental commitments (such as land acquisition or credit purchase) would be actualized upon initiation of project construction when the environmental damage would actually occur. USACE and the City of Charleston's consideration for use of wetland mitigation banks and permittee-responsible mitigation in the Draft Mitigation Plan is consistent with the Wetland Mitigation Rule. Since release of the draft FR/EIS, the Draft Mitigation Plan has been updated to clarify that wetland mitigation banking is the preferred mitigation alternative for this study since no PRM opportunities could be identified that would meet the mitigation requirement (however, if that situation should change, the PRM option could be reevaluated during PED). This update was coordinated with the natural resource agencies. The known approved saltwater mitigation banks in South Carolina were disclosed in the Draft Mitigation Plan that was released for public review, as well as an estimate of the number of credits and cost if those banks were to be selected based on current-day information. A particular bank will not be selected until it's time to finalize the Mitigation Plan. USACE agrees that compensatory wetland mitigation that is in kind in the primary service areas is preferred, and would be prioritized at the time a commitment is made to purchase credits. However, wetland mitigation bank selection will be influenced by which banks are approved and permitted at that time and the availability and cost of credits.

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				quality, and should use readily available information to identify potential mitigation opportunities within the same 8-digit Hydrologic Unit Code as the proposed project." SOP at 9-10. The failure to mitigate for impacts to tidal wetlands within the Ashley and Cooper River watershed is particularly troubling given that portions of the watershed are already failing to meet applicable water quality standards.	
58	16	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	F. The DEIS Does Not Adequately Describe Minimization And Mitigation Measures For Charleston's Historic Sites. As noted in the DEIS, the study area contains a remarkable 373 cultural resources that have been listed on the South Carolina database within the study area. See DEIS at 103. The Charleston Old and Historic District, which the proposed storm surge wall would encircle, is designated an NHL and contains 30 structures that are individually designated NHLs. See id. NHLs receive the highest level of protection under federal law: Pursuant to Section 110(f) of the NHPA, agencies must "undertake such planning and actions as may be necessary to minimize harm" to them, and to "consider all prudent and feasible alternatives to avoid an adverse effect on the NHL." 54 U.S.C. § 306107. In addition to known historic and cultural resources, there are untold numbers of undiscovered or unrecorded historic and cultural resources in the project area, including potential submerged resources in the Charleston Harbor Naval Battlefield. See DEIS at 107. The Corps' proposal would forever impair these irreplaceable resources by destroying and modifying historic structures during construction, intruding on the visual setting, and disturbing terrestrial and submerged archaeological sites. See id. at 9.	Thank you for your comment. Please refer to Master Response 11 – Historic and Cultural Resources. The Programmatic Agreement outlines the process by which the USACE will assess effects and avoid, minimize, and/or mitigate adverse effects as designs and detailed engineering plans are developed, including for pumps and pump stations. Please also see the responses to Submittal #20, Comments 1 and 3.

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				The DEIS acknowledges that the proposed storm surge wall will likely impact cultural and historic resources, including potentially hundreds of NRHP-listed sites. The project may necessitate acquisition, demolition, and modification of historic structures; obstruct and alter viewsheds and sight lines to historic districts; and disturb terrestrial and submerged archaeological sites. Id. However, the Corps has proposed no minimization or avoidance measures for these impacts and intends to defer these critical decisions until after project approval.35 The Corps should not shut these individuals and groups out of such an impactful project by pushing its mitigation analysis to a post-NEPA date. The current need to evaluate the least damaging alternative is especially important in light of the proposal's potential impacts to NHLs. The study area includes dozens of NHLs, which receive the highest degree of protection under Section 110(f) of the NHPA. Whenever an action may "directly and adversely affect" an NHL, the Corps is required to "undertake such planning and actions as may be necessary to minimize harm" to it. 54 U.S.C. § 306107. "Direct" effects include not only on-premise destruction or alteration, but also visual impacts. Nat'l Parks Conservation Ass'n v. Semonite, 916 F.3d 1075, 1088–89 (D.C. Cir. 2019). The viewshed impacts of the proposed storm surge wall would directly and adversely affect the integrity of the NHL-designated Charleston Old and Historic District. Beyond the visual impacts of the storm surge wall itself, there would also be visual impacts from the proposed pumping stations to remove water that has been trapped within the wall. The DEIS does not consider these impacts, nor does it consider the potential for physical harms caused by the construction and operation of	

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				these pumps alongside fragile historic structures. Without adequate consideration of these effects, the DEIS cannot possibly be said to "consider all prudent and feasible alternatives" to avoid these effects, as is required by Section 110(f). The Corps must address these potential harms, and how best to limit them, before the selection of the proposed plan. If the Corps does not analyze these issues now, it risks committing resources to a project whose harms may ultimately prove too extensive or too costly to minimize or avoid.	
58	17	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	G. The DEIS Does Not Adequately Address The Impacts Of The Proposal On Essential Fish Habitat, And On Threated And Endangered Species. The study area for the proposal also contains unique and important aquatic resources, including recreational and commercial fisheries and habitat for five several listed threatened and endangered species. See DEIS at 8. The salt marshes and estuarine tidal creeks around Charleston, which NOAA has designated Essential Fish Habitat ("EFH"), are particularly important to supporting invertebrate and fish species in their juvenile stages. See id. at 91. More than 75 percent of the U.S. commercial catch and even more of the recreational catch complete at least part of their life cycles in estuaries.36 The proposed storm surge wall would destroy or impair portions of these ecologically critical areas. See Friends of Back Bay v. U.S. Army Corps of Eng'rs, 681 F.3d 581, 589 (4th Cir. 2012) (finding marsh communities are unique and ecologically critical as well as "globally rare"). The Environmental Appendix considers impacts to EFH, but as with the rest of the	A thorough Essential Fish Habitat Assessment has been prepared for this study. It has been added to Appendix F. Wetland mitigation proposed for the study specifically takes into account lost saltmarsh habitat function that is essential for commercially and recreationally important species (EFH). The habitat functional analysis was approved by NOAA and USACE, and was disclosed to the public in the Draft Mitigation Plan. An evaluation of potential effects of the proposed plan on Federally-listed threatened and endangered species was conducted in accordance with Section 7 of the Endangered Species Act and can be found in Appendix F. USACE made either a no effect, or a may affect but not likely to adversely affect, determination for the listed species that could be in the region of influence of the proposed plan. The US Fish & Wildlife has concurred with these determinations for the listed species under their jurisdiction. USACE is awaiting concurrence from the National Marine Fisheries Service for listed species under their jurisdiction. Based on input from these agencies and the SC Department of Natural Resources, additional measures will be taken by USACE and the City of Charleston to minimize effects on the threatened and endangered species, as well as ones on Essential Fish Habitat. These measures have been added to the Draft Mitigation Plan.

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				DEIS, the information provided is insufficient to satisfy the requirements of NEPA. The appendix includes the Fish and Wildlife Coordination Act Report that primarily focuses on "further discovery of information about the types of impacts to fish and wildlife resources from the proposed measures, as well as potential strategies for minimization and mitigation." DEIS at F-5. However, the sections on "Measures to Avoid Impacts" and "Measures to Minimize Impacts" are just another exercise in delaying the substance of the process beyond the formal view of the public. In "Measures to Avoid Impacts," the DEIS states that "[d]irect impacts to aquatic resources can be avoided by not building coastal defense structures in the estuarine environment," but that even upland construction can have impacts, hence the need for minimization measures. DEIS at F-24. In the next section on "Measures to Minimize Impacts," the DEIS offers little in the way of an actual plan to reduce the harm to these vital habitats, instead listing a series of considerations for a later date. DEIS at 24-25 ("consider ecological engineering tactics," "modify or lower certain stretches along the seawall," "use models to predict the shoreline response," "avoid placement [of hydraulic pumps] in the aquatic environment"). NEPA demands more than an outline of steps that the Corps may or may not take in the future to address impacts to these ecologically critical areas. It is impossible for the public to comment on a plan that does not yet exist, but the public has no formal opportunity to comment in the future. The Corps must prepare a substantive plan during the EIS stage, not a list of things to be considered at the PED stage, so the public can provide its input on	

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				whether the area's vital areas will receive adequate protection pursuant to the Corps' plan.	
58	18	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	H. The DEIS Does Not Adequately Analyze the Potentially Contaminated Site Near the Proposed Construction Area. The DEIS mentions the possibility of contact with hazardous materials during the construction of the proposed storm surge wall. See DEIS at 217. Specifically, the DEIS states: There is the potential for adverse effects from constructing the storm surge wall near the Calhoun Park Area CERCLA site. There is also the potential for unplanned encounters with contaminants during construction of the wall in unknown locations since the wall would be located in a few industrialized areas. To minimize these potential effects, a Phase 1 Site assessment would be conducted in the PED phase, which would help to identify if there are contaminated areas where construction is planned. Normally the cleanup and removal of any hazardous or contaminated material within a project area is the responsibility of the local sponsor. Id. The Corps again kicks the primary issue down the road to be dealt with at a later date, a date beyond when the City or the public can meaningfully weigh in on the proposal under NEPA. Delaying the analysis of this potentially hazardous site beyond the formal comment period and the formal approval for the	A Phase 1 Site Assessment is consistent with the type of design and detailed engineering activities carried out during the PED phase. PED provides the opportunity to avoid or minimize contact with hazardous materials by realignment of the storm surge wall or other such activities. USACE project agreements for construction do hold the non-federal sponsor responsible for CERCLA obligations as the party responsible for providing real estate necessary for the project. However, USACE and the City will have the opportunity during PED to address any identified hazardous materials issues before proceeding to construction and incurring cleanup obligations. Since the public release of the draft FR/EIS, new information has become available from the USEPA and added to Sections 4.16 and 6.16.2 - Hazardous Materials and Wastes regarding the Calhoun Park CERLCA site stating that "the Calhoun Park Area site now supports the South Carolina Aquarium and new International African American Museum, shops, a parking garage, several parks, an electrical substation, and mixed-use development" and "this site has undergone remediation and redevelopment and considered currently protective". As such, it is unlikely that contamination at this site will be encountered with future development, including construction of the proposed plan.

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				proposal is especially concerning in light of the final sentence of the excerpt above. The Corps expects the local sponsor, the City, to approve the proposal and sign up not only to cover 35% of the planned costs of the project, but 100% of the cleanup of this potential hazardous site that could be worsened as a direct result of the construction of the storm surge wall. Perhaps this would be less of an issue if CERCLA liabilities were typically inexpensive, but the reality is that CERCLA cleanups have the potential to be extremely expensive.37 Rather than perform a thorough analysis of the potentially contaminated site during the EIS phase and provide the City and the public with the necessary information to make an informed decision on the dangers of construction, the Corps wants to delay until the results of the analysis can no longer have an impact on the fate of the proposal. The City, and ultimately Charleston residents, will suffer the potentially exponential harms that accompany an expensive CERCLA cleanup, yet neither the City nor the residents can properly assess these risks because the Corps has declined to perform its site analysis before the relevant deadlines.	
58	19	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	I. All of These Flaws Combine to Deprive the Public of a Sufficient Opportunity to Participate in the Planning Process. Courts have held that "the opportunity to comment . . . necessarily require[s] that the [agency] present for public scrutiny the rationale and pivotal data underlying its proposed action before the close of the comment and hearing period." Nat'l Wildlife Federation v. Marsh, 568 F. Supp. 985, 994 (D.D.C. 1983); see also U.S. Lines v. Federal Maritime Commission, 584 F.2d 519, 540 (D.C. Cir. 1978) (discussing "the fundamental proposition that the right to	Thank you for your comment. Please see the responses to Submittal #58, Comments 1 through 18, above.

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				comment or the opportunity to be heard on questions relating to the public interest is of little or no significance when one is not apprised of the issues and positions to which argument is relevant. Only when the public is adequately informed can there be any exchange of views and any real dialogue as to the final decision"). Here, the Corps has consistently failed to provide a comprehensive plan for public comment, and consistently failed to provide the full details underlying the decisions that it has made. Without full knowledge or full disclosure, the public cannot adequately provide its input to the Corps as is required under NEPA. The failure of the Corps to provide enough detail on the proposal to afford the public a meaningful opportunity to comment formally on the DEIS is a fundamental problem. The Corps assures the public that there will be informal opportunities for the public to weigh in during and after the PED phase, but such opportunities are insufficient to satisfy the requirements of NEPA. To satisfy the "hard look" requirements of NEPA fully, it is imperative that the public be presented with a final plan, the same final plan intended for eventual implementation by the agency, and be allowed to offer formal opinions on that plan. Here, the public is limited to the chance to offer its opinion on a mere sketch of a plan, with no assurances that its voice will be heard, or listened to, whenever a final plan actually comes to fruition.	
58	20	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South	• The DEIS relies on an overly narrow scope of study, with the Corps repeatedly explaining that the authorization for the study is strictly limited to coastal storm surge inundation and that the DEIS cannot address any of the other flooding issues that are worsening on the Charleston Peninsula.	Thank you for your comment. The USACE position is not that "any flooding not caused by storm surge is beyond the purview of the federal government." The USACE position is that Congressional authority applicable to this study limits its scope to coastal storm surge risk reduction. Please refer to Master Response 1 – Non-Storm Surge Flooding.

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			Carolina Wildlife Federation, and Audubon South Carolina)	However, the sources the Corps cites in the DEIS for this limited authorization do not support such an overly narrow scope, nor do the Corps' own regulations require the Corps to take such a constrained approach. II. The DEIS' Artificially Narrow Focus on Storm Surge Inundation Skews the Outcome of the Study and Does Not Select the Least Damaging Practicable Alternative. The Corps "may not define the objectives of its action in terms so unreasonably narrow that only one alternative . . . would accomplish the goals of the agency's action." Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991). This would "circumvent the requirement [in NEPA] that relevant alternatives be considered." City of New York v. Dep't of Transp., 715 F.2d 732, 743 (2d Cir. 1983). Instead, the agency must take a hard look at factors related to the stated purpose and then "define goals for its action that fall somewhere within the range of reasonable choices." Citizens Against Burlington, 938 F.2d at 196. Here, the Corps' stated objectives are to reduce risk to human health and economic damage from coastal storm surge inundation on the Charleston Peninsula. See DEIS at 19. While storm surge poses a serious threat to the Peninsula, it is just one cause of the City's broader coastal storm and flooding problems. Due to the study's limited scope, extreme rainfall and associated stormwater runoff, tidal flooding, groundwater inundation, and compound events are excluded from consideration in the design and function of this project. By examining storm surge in isolation from these other sources of flooding that work together to threaten the Peninsula, the Corps risks the possibility of recommending solutions that are ineffective or even counterproductive.	

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				The Corps must expand its study to consider and develop more comprehensive solutions to coastal storms and flooding. A. The Corps Claims That the Study Authorization Covers Only Storm Surge Inundation, But Statutory Language And Congressional Intent Do Not Support This Interpretation. The Corps repeatedly insists that the authorization for this study is limited to the consideration of storm surge. However, the sources that the Corps cites for this authorization in its Study Authority section do not mandate such an overly narrow area of focus. First, the Corps cites Section 110 of the Rivers and Harbors Act of 1962, which authorizes the Secretary of the Army to conduct surveys of the coastal United States "in the interest of beach erosion control, hurricane protection and related purposes." Id. at 1-2. Next, the Corps cites a Senate Environment and Public Works Committee Resolution authorizing the study of the entire South Carolina coast in accordance with the Rivers and Harbors Act provisions. See id. at 2. Finally, the Corps cites to the Bipartisan Budget Act of 2018 that provided the actual funding and timeframe for this study. See id. The relevant excerpt from the Corps' citation of the Bipartisan Budget Act is: "FLOOD CONTROL AND COASTAL EMERGENCIES For an additional amount for 'Flood Control and Coastal Emergencies', as authorized by section 5 of the Act of August 18, 1941 (33 U.S.C. 701n), for necessary expenses to prepare for flood, hurricane and other natural disasters and support emergency operations, repairs, and other activities in response to such disasters." Id.	

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				A plain reading of these sources provides no justification for the claim that this study is limited solely to storm surge inundation. Nowhere do the words “storm surge” even appear in the congressional language. The heading of the section that provides the funding for the study not only explicitly lists, but begins with the broad category of “flood control.” Without a doubt, storm surge qualifies under Congress’ instructions to the Corps here, but the Corps erred in deciding that storm surge is the only consideration. As we have emphasized, Charleston suffers from a multitude of flooding sources, and there is no logical rationale for why all but one source has been omitted from consideration in this study. A more expansive interpretation of the Corps’ study authority is reinforced by other Corps studies along the Atlantic coast. For example, in Norfolk, the Corps’ study was designed to “address flooding damages due to coastal storm events”38; in Miami-Dade Back Bay, the Corps sought “to reduce coastal flood risk and increase resiliency”39; and in the South Shore of Staten Island, the Corps’ objective was to manage “the risk of damages from storm surge flooding” and “the residual flood damage from rainfall events.”40 A few pages later in the “Scope” section of the DEIS, the Corps does acknowledge that “the Charleston Peninsula also experiences flooding from tides and rainfall,” but falls back to the incorrect claim that “the authority and funding for this study does not include the investigation of measures to address these aspects of flood risk management.” Id. at 6. Instead, the Corps says it will investigate and recommend mitigation for adverse impacts to stormwater runoff in accordance with its own regulations. See id. A closer look at	

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				these Corps regulations makes the narrow focus on storm surge even more confusing. The title of the section to which the Corps refers is “Flood Damage Reduction,” and the very first sentence provides that “Section 1 of the Flood Control Act of 1936 declared flood control to be a proper Federal activity since improvements for flood control purposes are in the general interest of the public.” U.S. Army Corps of Engineers Planning Guidance Notebook, ER 1105-2-100, Section 3-3. The Corps has continually stated that any flooding not caused by storm surge is beyond the purview of the federal government, yet its own regulations, regulations which the Corps cites in the “Scope” section of the DEIS, seem to provide for exactly the opposite. The first subsection provides for “Structural Measures” such as the storm surge wall proposed here, but the very next section provides for “Nonstructural Measures” such as “changing the use made of the floodplains, or by accommodating existing uses to the flood hazard” with examples such as “flood proofing,” “flood warning and preparedness systems,” and “regulation of floodplain uses.” Id. at 3-3.a.(1)-(2). The Corps repeatedly mentions how certain sources of funding are a non-federal responsibility, however the only similar language in its own regulations concerns an entirely different matter. The regulations provide that “[i]n urban and urbanizing areas provision of a basic drainage system to collect and convey local runoff is a non-Federal responsibility.” Id. at 3-3.b.(6). We are not asking the Corps to provide Charleston with a basic drainage system. Instead, we request that the Corps at least	

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				consider other sources of flooding and how they can interact with storm surge flooding in undertaking this study in accordance with congressional instructions and its own regulations. While storm surge is an obvious and major concern that we must prepare for, it is unknown when the Peninsula will experience the next 100-year storm surge event.41 Although we cannot predict when the next 100-year storm event will occur, Charleston is already experiencing the negative effects of numerous ongoing, flood threats that interact with and reinforce storm surge, including chronic tidal flooding and intensifying rain events combined with a low-lying, aging stormwater drainage system. The near-term risk of inland flooding is already a significant threat to the Peninsula's economy and daily operations. The Corps' monolithic, expensive approach would take resources away from other, present day needs. In short, a concrete storm surge wall intended to solve only one flooding problem may not be the best place to start to address Charleston's flood exposure.42 At a minimum, if this process continues to move forward, it is imperative that we examine alternatives that are multi-functional and designed to tackle storm surge in addition to other flooding threats. The narrow scope of this study precludes the Corps from designing the project to effectively address coastal storms and multiple sources of flooding and from sufficiently taking into account compound events and future conditions. The Corps cannot effectively consider Charleston's flooding problems in isolation from one another. These problems are extensive and funds to address them are limited. The Corps claims that the measures in its proposed plan "are consistent with the	

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				City's goals of future development, and with recommendations from the Dutch Dialogs [sic]." DEIS at 150. However, as noted in the Final Report of the Dutch Dialogues, "single purpose infrastructure is a poor investment."43	
58	21	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	B. The DEIS Does Not Select the Least Damaging Practicable Alternative, Contrary to the Requirements of the Clean Water Act. The Corps must comply with the substantive and analytical requirements of Section 404 of the Clean Water Act, 33 U.S.C. § 1344, and the Section 404(b)(1) Guidelines ("Guidelines"), 40 C.F.R. Part 230. 33 C.F.R. § 336.1. The Guidelines expressly apply to the Corps' "civil works program," 40 C.F.R. § 230.2(a), and require that the Corps select the least environmentally damaging practicable alternative, id. § 230.10(a). The Guidelines provide significant protection to wetlands, and the degradation or destruction of wetlands "is considered to be among the most severe environmental impacts covered by these Guidelines." 40 C.F.R. § 230.1(d). The Corps must consider, among other things, whether its actions modify "the capacity of wetlands to retain and store floodwaters and to serve as a buffer zone shielding upland areas from wave actions, storm damage and erosion." 40 C.F.R. § 230.41(b). Given the significant public benefits wetlands provide, the Corps must avoid wetland impacts to the greatest extent possible44 and take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the United States. 40 C.F.R. § 230.91(c)(2). Tidal wetlands are a particularly important subset of wetlands. The Corps' Charleston District classifies tidal wetlands as primary priority areas where "adverse impacts . . . should be	Thank you for your comment. A Clean Water Act Section 404(b)(1) evaluation has been prepared for this study. It can be found in Appendix F. USACE made informed decisions to avoid impacts to wetlands from a previous iteration of the proposed plan that could have resulted in over 100 acres of impacted wetlands. The current proposed plan (Alternative 2) would result in less than 40 acres impacted. The CWA 404(b)(1) evaluation found in Appendix F demonstrates that there are no practicable alternatives that would have less adverse impact on the aquatic ecosystem. On this basis, the proposed plan (Alternative 2) is identified as the least environmentally damaging practicable alternative in light of the overall project purpose. Please also refer to Master Response 1 - Non-Storm Surge Flooding, Master Response 4 – Natural and Nature-Based Features, and see the responses to Submittal #1, Comments 1-6 (Sherwood Report).

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				avoided and minimized to the maximum extent practicable."45 Due to the importance of these habitats to our coastal ecosystem and communities, we urge the Corps to consider alternative storm surge wall alignments which reduce the impact to tidal wetlands while providing community protection. We understand that the Corps believes it is wedded to a narrow interpretation of its economic analysis and the calculation of National Economic Development benefits, and, as a result, it has not adequately accounted for the benefits of greener solutions and has prematurely and wrongly eliminated these types of alternatives early in the process. This is contrary to Congress's express directive to the Corps "to consider the use of both traditional and natural infrastructure alternatives, alone or in conjunction with each other, if those alternatives are practicable." Section 1149 of Pub.L. 115-270, 33 U.S.C. § 2282 note (Oct. 23, 2018) (emphasis added). In fact, as we have said previously, the Corps has accepted a more flexible and inclusive approach for projects such as the Living Breakwaters project in New York.46 Moreover, the Corps has led on the design and implementation of nature-based projects in other areas of the country.47 As stated in our previous letter, "[t]he 'existence of a viable but unexamined alternative renders an environmental impact statement inadequate.'" Resources Ltd. v. Robinson, 35 35 F.3d 1300, 1307 (9th Cir. 1994). The current DEIS does not disclose adequate information on a sufficiently wide range of alternatives, including a full range of nature-based solutions, to compare their respective impacts and to discern which course of action would be the least environmentally damaging. As described above, the Corps has yet to	

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				provide the public with a complete account of the direct and indirect impacts of even its preferred alternative. While the Corps initially considered a broad array of alternatives, it prematurely eliminated most without assessing their respective impacts and benefits and costs. This is especially true of non-structural and nature-based alternatives, which are most unlike the proposed storm surge wall and are most useful for comparison purposes. Non-structural and nature-based solutions would be far less environmentally damaging than an eight-and-a-half-mile long storm surge wall; in fact, they could deliver net benefits to the environment by restoring natural systems. See Appendix A: Natural and Nature-Based Infrastructure Benefits. Therefore, it is the Corps' duty under the Guidelines to analyze these alternatives in detail and to demonstrate that they are not practicable before screening them out. The DEIS' cursory dismissal of non-structural and nature-based solutions does not satisfy that requirement.	
58	22	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	• The DEIS erroneously focuses almost exclusively on traditional "grey infrastructure" solutions, e.g., human-engineered infrastructure such as concrete seawalls, bulkheads, and groins. The DEIS fails to sufficiently consider nature-based solutions or green infrastructure that could deliver multiple benefits, including buffering from storms and increased flood storage capacity. Instead of building a single-purpose, uniform wall, the Corps should carefully evaluate solutions that include multiple benefits and are tailored to the unique needs of different areas of the Peninsula. In evaluating potential solutions for the City, the Corps is required under federal law to select the least damaging practicable alternative a test which the	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features. Please also see the responses to Submittal #1, Comments 1 - 6 (Sherwood Report).

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				Corps has failed to meet in its DEIS. The Corps' analysis of alternatives prematurely excludes solutions like these without providing the necessary comparison of potential benefits, costs, and damages.	
58	23	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	III. The Corps' Economic Analysis Is Biased Toward Costly, Environmentally Damaging Grey Infrastructure When Alternative, Nature-Based Solutions Are Available. With an estimated benefit-to-cost ratio ("BCR") of 10.2, the EA identifies Alternative 2 as the plan that maximized net National Economic Development ("NED") benefits. Alternative 2 involves building a storm surge perimeter wall around much of the Charleston Peninsula, using nonstructural measures for residential structures that remain at risk of storm surge damage after the wall is constructed, and "living shorelines" placed in selected locations. However, the Corps' analysis of benefits and costs uses incorrect or, at a minimum, incomplete data about the costs and benefits of all project alternatives, especially the full range of nature-based solutions (not simply a handful of oyster reef-based shorelines) that the Corps did not sufficiently consider in the DEIS. The DEIS does not sufficiently explain cost and damages estimates and the assumptions and data supporting them, and the Corps failed to consider the full range of green infrastructure alternatives—either alone or in conjunction with grey infrastructure—before it could quantify their	In the final FR/EIS, Section 3.1.3 - Natural and Nature-Based Features (NNBF) Considered discusses what NNBFs were considered in this study's planning process. In addition, many measures that were proposed during public comment period were technically not conventional NNBF but modified structural measures with nature-based features incorporated into the design. According to ER 1105-2-100, Appendix E, page E-9, Section I, E-3. c. (2), a separable element is any part of a project which can be implemented as a separate action (at a later date or as a separate project). Separable elements usually must be incrementally justified. In other words, measures may only be combined if they are interdependent and must function together to achieve coastal storm risk reduction benefits. Measures that are separable, or not technically interdependent, must be individually justified to be included in the National Economic Development plan. For example, the addition of salt marsh behind a breakwater would not be considered interdependent or inseparable since the salt marsh is not required for the breakwater to function and the salt marsh would not likely be economically justified for storm risk reduction purposes on its own. The living shoreline sills are not interdependent with the wall (for storm risk reduction) so could not be justified in locations where the wall was not in the marsh. Where the wall is in the marsh or subject to direct wave action, the living shoreline sills are a practicable minimization measure.

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				costs and benefits. Further, the Corps has a long, well documented history of cost overruns, which deserves special scrutiny here since the estimated $1.245 billion price tag for an 8.6-mile long storm surge wall and additional nonstructural measures appears low. Because the Corps will select the alternative with the highest BCR, any shortcomings in its cost and benefit projections will have large ramifications for taxpayers, the City of Charleston, Peninsula residents, and the environment.	
58	24	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	A. The Costs And Benefits Of The Proposal Lack The Detailed Assumptions Needed To Assess Their Accuracy And Are Likely Inaccurate. Between investment costs and annual operation and maintenance ("O&M") costs, the Corps estimates the average annualized cost of Alternative 2 at $46,900,000, compared to average annualized benefits of $479,000,000. DEIS at 6. There is a high probability, though, that the Corps has underestimated the true cost of the proposed storm surge wall and vastly overstated its benefits. To begin, the Corps fails to provide sufficient explanation and justification for its cost estimates in the DEIS. For example, the DEIS projects that O&M costs for Alternative 2 will average $3,000,000 per year, yet the Corps does not disclose the inputs it used to reach that number.48 DEIS at C-63. In fact, the Corps has not even developed O&M procedures for the project yet, DEIS at 264, so it is perhaps unsurprising that the associated costs are likewise undeveloped. Further, the DEIS does not explain what assumptions the Corps made or why it made those assumptions in calculating O&M costs across the life of the project. For example, at	The estimated O&M costs were based on assumptions of the proposed structural measure in place. These costs represent the current value of materials, equipment, services, and facilities needed to operate the project and make repairs, rehabilitate, and make replacements necessary to maintain project measures in sound operating condition during the period of analysis. These costs are estimated on actual current costs incurred for carrying out these activities for similar projects and project measures. The discussion of other Corps' project costs and budgets are outside the scope of Charleston Peninsula Study and Economic Analysis. See also the response to Submittal #58, Comment 2, above.

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				what frequency does the Corps assume major repairs will be needed due to severe storms, overtopping events due to sea level rise, or the age of the structure? Finally, the Corps has not considered how its $98 billion backlog of civil works projects could delay funding and construction of the Charleston project, likely resulting in exponential cost increases.49 These deficiencies are especially concerning in light of the Corps' poor track record with cost projections. A 2013 U.S. Government Accountability Office ("GAO") report found that at least two-thirds of the 87 Corps flood control projects budgeted for construction between FY2004 and FY2012 experienced cost overruns.50 Overruns were caused by, among other things, design changes, underestimated costs, contract cost changes, and delays in federal funding.51 For example, when Congress first authorized the Rio de Flag flood control project in 2000, the Corps estimated the cost of the project at $24 million.52 According to the City of Flagstaff engineer, the City knew, even then, that the actual cost would be much greater than $24 million, and true to expectations, cost estimates have since ballooned to $121 million—a 404 percent increase—as the final design for the project nears completion.53 This story has played out time and time again with Corps projects—from the Olmsted Lock and Dam project, whose actual cost exceeded estimates by more than $2 billion54; to the Lower Mon project, whose estimated cost has increased 260 percent since authorization55; to the Turkey Creek Basin project, whose estimated cost has risen from $43 million to $108 million.56 As with its cost estimates, there is reason to suspect that the Corps' benefit estimates are inaccurate based on its error-prone history. The GAO has found that a number of major	

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				Corps studies "overstated benefits, and therefore did not provide a reasonable basis for decision-making" because they "were fraught with errors, mistakes, and miscalculations, and used invalid assumptions and outdated data."57 According to the GAO, these problems are pervasive at the Corps, and "the Corps' track record for providing reliable information that can be used by decision makers . . . is spotty, at best."58	
58	25	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	Changes in the Corps' estimates of economic benefits and costs between the initial EA release in March 2020 and the August 2021 Economics Analysis raise serious questions about the reliability of the economic estimates. The August 2021 estimate of the present value ("PV") of damages reduced from Alternative 2 of $13,585,000,000 (DEIS at C-60) is more than 3 times the Corps' previous estimate from March 2020 for essentially the same suite of protective measures. The Corps has provided no information about why the damages estimate would have increased so much in light of the almost identical valuation of the 12,095 structures considered ($9.168 billion in 2021 (DEIS at C-28) versus $8.489 billion in 2021) and the Corps' having removed 2 storms from their simulation that presumably led to overestimation of flood damages. Moreover, the Corps' estimate of the project's costs for Alternative 2, which has been expanded to include living shorelines in addition to the storm surge wall and nonstructural measures for residences left unprotected by the wall, has declined from an estimated $65.89 million in the 2020 EA to $46.9 million in the 2021 DEIS (DEIS at C-63). The economic analysis includes a very complex set of inputs from hydrologic models to asset-level data, such as first floor	The Economic Analysis, including BCR and net benefits, presented in the Economic Appendix were done in accordance with USACE Guidance such as ER 1105-2-100 and uncertainty analysis was done with regards to best practices. The changes seen in the Economic Analysis reflect new and better information since the draft FR/EA. In short, the technical review of the draft FR/EA led the PDT to re-evaluate the engineering inputs into the economics model. Typically, as the storm becomes less frequent, the water level goes up. This is to reflect the fact that more frequent events are less severe, and less frequent events are more severe. Therefore, the storm statistics on the Peninsula was refined and the current draft FR/EIS that improved our analysis which increased the potential damages/benefits. See also the response to Submittal #58, Comment 2, above.

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				elevations. There is some discussion of the errors and uncertainty in some of these steps, but the full range of uncertainty is not adequately addressed. The analysis fails to account for uncertainty in the project's actual costs between 2032 and 2082 and applies restrictive assumptions about the ranges of inputs used to calculate project benefits.59 DEIS at C-65. Of course, some uncertainty is unknown (i.e., the next big storm will not be exactly like the synthetic storms included in the modeling). The uncertainty grows as the error propagates through the lengthy analysis, yet the final numbers for the BCR have no error bars or discussion of uncertainty. The lack of any explanation or clear justification for why the results changed so much between the March 2020 and August 2021 analyses raises many questions about the accuracy of the results and whether the Corps estimates of benefits and costs can be trusted. The Corps' estimated BCR jumped from 2.3 in March 2020 to 10.2 in August 2021 with no explanation provided as to why. We typically do not see BCRs as high as the one produced in this DEIS. Further, the Corps' assertion that Alternative 2 has a "greater than 100% chance that its benefits will be exceed its costs [ibid]", DEIS at C-65, is clearly false, especially if a realistic range and distribution of costs were included in the benefit-cost modeling analysis. The Corps' high estimated benefits require additional documentation and explanation because they appear implausibly high. The Economic Analysis found that the value of the 12,095 structures on the Peninsula was $15.2 billion, or an average of $1.26 million per structure (depreciated replacement of structure plus contents in 2021 dollars; Table 2). They further assessed the present value of damages without the wall as	

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				$21.935 billion (discounted at 2.5% per year), or $773.4 million in average annual damages (Table 4). Their analysis of damages suggests undiscounted cumulative damages of about $38.67 billion ($773 million * 50 years), or 2.5 times the current value of all structures on the Peninsula and their contents. In other words, the Corps' analysis appears to suggest that damages are so high in the absence of the wall that if all structures were impacted, storm surges can be expected to require full replacement of the full inventory of structures and their contents at least 2.5 times over a 50-year period (i.e., every 20 years). Not only is this an implausibly high estimate of damages, suggesting average damages to every single structure of almost $64,000 per year, but the estimated impact of the wall only mitigates 62% of the damages. The Corps' estimated damages remaining after building the storm surge wall average $294.4 million per year, or more than $24,000 per structure per year. Although we are concerned that the Corps' expected damages from storm surge are severely inflated, if the estimates are in fact accurate, then we have more philosophical concerns about the value of building a wall that leaves the Peninsula vulnerable to storm surge damages in excess of $24,000 per structure per year, an amount that many residents may find to be unacceptably high. More information is needed from the Corps about the assumptions, input values, and mathematical formulas used in the economic analysis for the public to ascertain the accuracy of the estimated benefits and costs. Because the Corps selects, and Congress funds, projects based on their BCR, it is absolutely critical that the cost and benefit projections for each alternative are as accurate as possible. The Corps' estimates	

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				for the proposed storm surge wall are likely inaccurate and, at best, incomplete and require further consideration and clarification of the assumptions underlying the analyses before the agency can declare this proposal feasible. Ultimately, it is taxpayers and the City of Charleston who will be left to foot the bill if, as has happened so often in its history, the Corps' estimates are wrong and costs balloon during project design and construction. The agency must consider all alternatives and accurately value the costs and benefits of each alternative to ensure that this does not occur.	
58	26	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	B. Nature-Based Solutions Would Offer Multiple Benefits To The Community And The Environment, Likely At A Lower Cost Than The Corps' Proposal. Whereas the Corps at least attempted to estimate the costs and benefits of structural alternatives, it declined to conduct any economic analysis at all on non-structural and naturebased solutions. As shown in Sections 3.1.2 and 3.1.3, the Corps briefly considered alternatives such as creek restoration and storage solutions, but dismissed them summarily with little explanation. Additionally, the Corps' DEIS discussed, but did not consider the costs and benefits of a "nonstructural only" alternative that includes relocation or buyout, elevation, and floodproofing of selected structures, as well as a flood warning system, revised emergency response plan, and green infrastructure measures. The Corps determined that this alternative failed to meet some of their criteria, and they assigned it low scores for efficiency and "acceptability due to negative anticipated reactions from the public." DEIS at C-55. Multiple studies and projects across the country, including in coastal regions, have	Thank you for your comment. Chapter 2 of the FR/EIS has been updated to provide a more thorough description of the measures considered and reasoning for screening or retaining them, and formulation of the measures into the final array of alternatives. Project costs can be found in Section 8.4 – Plan Economics and Cost Sharing and a discussion of quantitative and qualitative benefits of the proposed plan can be found in Section 7.2 – Federal Objective and Comprehensive Benefits. In addition, many measures that were proposed during public comment period were technically not conventional NNBF but modified structural measures with nature-based features incorporated into the design. According to ER 1105-2-100, Appendix E, page E-9, Section I, E-3. c. (2), a separable element is any part of a project which can be implemented as a separate action (at a later date or as a separate project). Separable elements usually must be incrementally justified. In other words, measures may only be combined if they are interdependent and must function together to achieve coastal storm risk reduction benefits. Measures that are separable, or not technically interdependent, must be individually justified to be included in the National Economic Development plan. For example, the addition of salt marsh behind a breakwater would not be considered interdependent or inseparable since the salt marsh is not required for the breakwater to function and the salt marsh would not likely be economically justified for storm risk reduction purposes on its own. The living shoreline sills are not interdependent with the wall (for storm risk reduction) so could not be justified in locations where the wall was not in the marsh. Where the wall is in the marsh or subject to direct wave action, the living shoreline sills are a practicable minimization measure. Also, please refer to Master Response 4 - Natural and Nature-Based Features, and see the responses to Submittal #1, Comments 1 - 6 (Sherwood Report) for more context to the measures and alternatives that were considered for this study.

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				confirmed that natural infrastructure can exceed the flood reduction benefits of grey infrastructure and at much lower costs. See supra Section Appendix A. Further, as acknowledged in the DEIS, nature-based alternatives have the potential to address more sources of flooding on the Peninsula than just storm surge, including internal drainage issues and tidal flooding. DEIS at 39–40. Therefore, incorporating these solutions into the existing proposal could deliver even greater flood reduction benefits. Not only are non-structural and nature-based alternatives generally more cost-effective than grey infrastructure at controlling flood damages, they provide other valuable benefits to communities and the environment that grey infrastructure does not. On this point, the DEIS suffers from a major shortcoming: The only project benefits included in the Corps' calculations are reduced flood damages to structures and contents on the Peninsula, but that measure ignores the multiple benefits that natural solutions would deliver. DEIS at C-62–64. For example, natural infrastructure increases the effectiveness and resilience of structural measures by buffering against storms.60 It also eliminates the risks of catastrophic failure and overtopping of floodwalls, which are so serious that the Association of State Floodplain Managers has urged communities to use non-structural measures whenever possible and limit construction of levees to a "last resort."61 Finally, nature-based solutions enhance ecosystem services and improve aesthetics and access to nature, DEIS at 83-84, providing direct and indirect benefits such as water purification, wildlife habitat, multimodal transportation, and nature-based tourism.62 In sum, the DEIS unfairly favors grey	

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				infrastructure by declining to even evaluate the costs and benefits of non-structural and nature-based solutions. The Corps must now give these alternatives due consideration, calculating not only their direct flood reduction benefits but also the myriad other resilience, ecological, and community benefits discussed above.	
58	27	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● While there are several predominantly Black neighborhoods within the proposed project area, including Rosemont and Bridgeview Village, the DEIS does little more than pay lip service to the needs of these communities. With very little analysis or explanation, the Corps concludes that constructing the storm surge wall to protect these communities would be "impracticable." DEIS at 224. Instead of engaging the community to determine a range of alternative measures that could provide equitable levels of protection to Rosemont from flooding, the Corps simply recommends voluntary home elevations and flood proofing. To comply with its environmental justice responsibilities, the Corps must engage the residents of Rosemont and other environmental justice communities now to create a robust adaptation plan that reflects their desires while ensuring the same level of protection as this project will provide to other neighborhoods throughout the Peninsula. IV. The Project Will Result In Inequitable Treatment Of Environmental Justice Communities. The DEIS fails to properly consider the impacts to minority and historically disadvantaged communities on the	Thank you for your comment. Please refer to Master Response 5 - Environmental Justice.

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				Peninsula. By Presidential decree, “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States...” Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994). Advancing environmental justice is a central focus of President Biden’s Administration, with EPA Administrator Michael Regan noting that “[t]oo many communities whose residents are predominantly of color, indigenous, or low-income continue to suffer from disproportionately high pollution levels and the resulting health and environmental impacts. We must do better.”63 To do better, President Biden has instructed federal to “make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.” Exec. Order No 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021). Similarly, the Administration has committed to “secur[ing] environmental justice and spur[ring] economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care.” Id64. As the Fourth Circuit has made clear, “environmental justice is not merely a box to be checked,” and courts will vacate permits for a deficient analysis. Friends of	

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				Buckingham v. St. Air Pollution Control Bd., 947 F.3d 68, 91–92 (4th Cir. 2020) ("the [agency] failed to grapple with the likelihood that those living closest to the Compressor Station—an overwhelmingly minority population... will be affected more than those living in other parts of the same county").	
58	28	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	While there are several predominantly Black neighborhoods within the proposed project area, including Rosemont and Bridgeview Village neighborhoods, the DEIS does little more than pay lip service to the needs of these communities. DEIS at 136-37. Rosemont is a historically Black neighborhood that is surrounded by former industrial sites with a legacy of land and water pollution. Residents were majorly impacted by the decision in the 1960s to construct Interstate 26 through a large portion of the neighborhood, displacing scores of homes and limiting access to the area. Access is also frequently blocked by standing water due to nuisance flooding and rain events. Rosemont remains a tightknit community where many longtime residents have passed down their homes from generation to generation. Bridgeview Village is a publicly-funded, privately-owned low-income community. Bridgeview Village remains one of the few options for low-income housing on the Peninsula. Like Rosemont, Bridgeview Village is located near former industrial sites such as Laurel Island, a capped landfill that, until recently, housed Charleston County's recycling center. The community is accessible only by a few points of entry, which are often obstructed by standing water from nuisance flooding and rain	Thank you for your comment. Please refer to Master Response 5 - Environmental Justice. Please also see the response to Submittal #1, Comment 6, above.

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				events. The residential structures that comprise Bridgeview Village are slab-on-grade apartment buildings, which are susceptible to flooding and present unique adaptation challenges.65 The DEIS fails to adequately address the impacts of storm surge and flooding on Rosemont and Bridgeview Village, or to offer an adequate range of potential solutions for protecting these communities against storm surge. With very little analysis or explanation, the Corps concludes that constructing the storm surge wall to protect these communities would be "impracticable." DEIS at 224. Instead of engaging the community to determine a range of alternative measures that could provide equal levels of protection to Rosemont from flooding, the Corps simply recommends voluntary home elevations and floodproofing. Id. Raising houses, however, would not be enough to provide protection from storm surge and flooding, as residents with elevated houses in the neighborhood still struggle with the effects of flooding on neighborhood roads and on the foundations of their homes. Although the Corps does not say this in the DEIS, we question whether the cost-benefit analysis employed by the Corps to justify its preferred alternative is a methodology that is skewed in favor of affluent communities. As a general matter, the way the Corps values the impacts on affected structures assigns greater value to structures in wealthier neighborhoods than in lower-income areas because damages are assigned based on a structure's square footage and the Corps' assumptions from a "windshield survey" about a residential structure's "condition" (categorized as good, average or poor, DEIS at C-19) and "construction class" (categorized as average, custom, or luxury, DEIS at C-19). These assumptions inevitably tilt the	

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				valuation of potential damages more toward areas with large, luxury residential structures. In its economic analysis for this project, the Corps does not provide sufficient information to determine why neighborhoods like Rosemont and Bridgeview Village were excluded from the proposed perimeter protection. Further, the Corps must disclose its separate valuations of the Model Areas, including the Wagener Terrace and Newmarket Unprotected Model Areas, under all scenarios to provide transparency about the storm surge damages estimated for the areas not afforded protection by the proposed wall. See DEIS, Appendix C. The Corps must include this type of information and explain its analysis more fully so the public can understand how its economic study shaped its recommendations. No matter what the Corps' rationale is for recommending nonstructural measures for Rosemont and Bridgeview Village as opposed to perimeter protection, the inequitable treatment of these Charleston neighborhoods must be resolved through greater transparency and meaningful community engagement centered on community-driven solutions. See Sherwood Report at 52. The Corps cannot give short shrift to Rosemont, Bridgeview Village, and the other environmental justice communities identified in the DEIS or allow a flawed economic analysis to unfairly leave these neighborhoods exposed to the increasing threat of storm surge and flooding while more affluent neighborhoods are slated for flood protection by the storm surge wall. To comply with its environmental justice responsibilities, the Corps must engage the residents of Rosemont and these other communities now to create a robust adaptation plan that reflects their desires while ensuring the same level of protection	

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				as citizens on the rest of the Peninsula. In its report, Sherwood explains that Rosemont, like many other neighborhoods on the Peninsula that Corps seeks to protect with the storm surge wall, faces future flooding threats from tides, rainfall, storm surge, and poor inland drainage. The marsh edge of the community sits approximately at sea level, so any sea level rise and increase in storm severity will increase, perhaps catastrophically, the coastal flooding risk. Sherwood Report at 48. As Sherwood states in its report, the Corps' approach to Rosemont—recommending only general, non-structural strategies with no specific implementation plan—is unacceptable. Not only does the proposed storm surge wall omit Rosemont from its boundary, it may even have the harmful effect of deflecting wave activity into the marsh around Rosemont. Given the substantial future threats facing this community, the Corps and the City must meaningfully engage with residents to design and implement place-based and community-sensitive measures to avoid catastrophic loss, slow erosion of natural resources, and protect quality of life in Rosemont. A holistic, resilient solution starts with focused community dialogue that elevates the voices of Rosemont residents to target positive change. As part of this project, the Corps can—and should—incorporate and fund a resilience plan that serves Rosemont now and into the future, as well as lay the physical and financial foundation for a series of proposed structural resilience measures. In addition to funding a resilience plan, the Sherwood Report also includes a suite of options residents could evaluate to determine how to best address storm surge and other sources	

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				of flooding in their neighborhood. Sherwood Report at 53.	
58	29	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● Because the Corps eliminated a host of potential nature-based solutions too early in the process and did not offer a sufficient range of alternatives to address storm surge and flooding in environmental justice communities, like Rosemont, we commissioned a report by Sherwood Design Associates titled "Beyond the Wall: An Exploration of Alternative Strategies to the Corps Seawall Proposal for Charleston, South Carolina" (hereinafter referred to as the "Sherwood Report").1 The Sherwood Report details a series of nature-based alternatives to a storm surge wall, all of which would be capable of providing Charleston with more comprehensive, longer-lasting benefits than a onedimensional storm surge wall. In order to fulfill its obligations under NEPA, the Corps' must evaluate alternatives such as these for all communities in the project area and provide the necessary comparison of potential benefits, costs, and damages. The Corps has also failed to evaluate the greater benefits to the Peninsula and the environment from a wide range of multi-functional, nature-based solutions to flooding.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features. Please also see the responses to Submittal #1, Comments 1 - 6 (Sherwood Report).

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58	30	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● The DEIS does not adequately explain the direct, indirect, and cumulative effects of this proposal. In particular, the Corps has insufficiently considered the risks of catastrophic failure and overtopping of the storm surge wall; the risks associated with reliance on mechanical pumps to address flooding inside of the storm surge wall; the water quality impacts of discharging ponded water into surrounding waters and wetlands; and the risk that the storm surge wall will promote a false sense of security on the Peninsula, thereby inducing risky growth inside of the wall. Further, the analysis in the DEIS of how the storm surge wall will exacerbate inland flooding is incomplete and flawed. The DEIS also fails to describe in sufficient detail how the Corps proposes to mitigate the impacts of its proposal, including the plan to compensate the public for the extensive impacts to wetlands.	Thank you for your comment. This comment is a summation of previous comments – please see the preceding responses, above.
58	31	Christopher DeScherer	SELC (Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation, and Audubon South Carolina)	● The proposed storm surge wall would encircle one of the most significant and best preserved collections of historical sites anywhere in the country, including the Charleston Old and Historic District and hundreds of properties listed on the National Register of Historic Places ("NRHP"). Dozens of these properties, including the historic district itself, are designated as National Historic Landmarks ("NHLs") and thus receive the highest degree of protection under federal law. Pursuant to Section 110(f) of the National Historic Preservation Act ("NHPA"), the Corps must "undertake such planning and actions as may be necessary to minimize harm" to NHLs. 54 U.S.C. § 306107. The current proposal would result in the destruction, modification, or impairment of NHLs and other historical sites, and the Corps' fails to sufficiently describe its plans to avoid and	Thank you for your comment. Please see the Master Response 11 – Historic and Cultural Resources. Please also see the responses to Submittal #20, Comments 1 and 3.

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				minimize harm to these unparalleled resources.	
59	1	Scott W. Anthony	Harleston Village Association	Moreover, while the HVA is encouraged that it is the desire of the Army Corps of Engineers ("Corps") to address storm surge flooding, we are concerned that the seawall proposal could slow other efforts to mitigate flooding. In fact, Harleston Village and the Medical District are often paralyzed by non-storm surge, flood related incidents. As such, HVA requests that the Corps, the City of Charleston, and any other decision-maker, focus their respective efforts to ensure that a comprehensive plan is developed and implemented to protect our city. We ask that these respective parties act with a sense of urgency such that efforts to mitigate all forms of flooding are not delayed. Specifically we request that this proposal not interfere or otherwise delay the Calhoun West/Beaufain Drainage Improvement Project.	Storm surge risk is the highest flood risk to the businesses, homes, critical infrastructure, medical district, jobs and key peninsula communities, including low income and disadvantaged communities. To protect the peninsula from storm surge, the City has partnered with USACE on a Coastal Storm Risk Management study for the Charleston Peninsula. Such studies focus almost solely on coastal storm surge risk. It is acknowledged that the public and local entities would prefer that there would be a federal authority to pursue an integrated approach to flood risk management across the drainage/stormwater, tidal, riverine, groundwater and compound flood hazards (pluvial, fluvial, coastal); however at this time, that authority does not exist for USACE. Thus, the City is continuing to pursue storm surge risk reduction alongside its ongoing tidal and stormwater (drainage) programs and projects, all of these approaches address flood risk comprehensively. The City's Drainage Fund and Stormwater Fees cannot be used to cover the costs of the USACE storm surge project; that Fund and those fees are segregated in the budget and can be used only for designated drainage projects. The draft 2002 City budget has funding for various drainage projects and funding for the procurement of a Comprehensive Water Pan. This plan would take a holistic look at flood risk and risk reduction options across the City. It is likely that the storm surge structure would lower the service demands upon any future to-be-built Calhoun West/Beaufain Drainage project.
59	2	Scott W. Anthony	Harleston Village Association	Attached June 17, 2020 public comment letter on Draft FR/EA	USACE acknowledges the attached June 17, 2020 and as mentioned in the draft Feasibility Report/Environmental Impact Statement (FR/EIS), previously considered all substantive public comments received on the draft April 2020 FR/EA. Consideration of the FR/EA 2020 comments along with further engineering refinements contributed to USACE's decision to move from an EA to an EIS, as part of the scoping process for the FR/EIS (including with regard to potential alternatives and impacts of the proposed action), and in developing the content of the draft FR/EIS. As stated in the draft FR/EIS, any person desiring to provide public comment on this draft FR/EIS needed to submit their comment on the draft FR/EIS within the 45-day comment period, and not rely on or reference previous input or public comment on the draft April 2020 FR/EA, and only public comments submitted and received in response to the draft FR/EIS would be considered in the agency's NEPA analysis and development of the final FR/EIS including the response to public comment appendix.

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60	1	John Darby	The Beach Company	With respect to the most recent proposal and corresponding alignment of the storm surge wall, we are concerned that the potential side effects and unrelated consequences have not been fully considered and, as such, respectfully object. Putting aside the potential negative impact the storm surge wall could have on flooding that is not the result of a storm surge, we are greatly concerned as to the negative impact it would have on the natural aesthetic beauty that makes Charleston what it is today. While we appreciate the study team's recognition of Charleston's "aesthetic resources" and its commitment to "considering the mitigation of significant impacts to aesthetic resources in its design of the storm surge barrier", we are concerned that there simply is no meaningful way to mitigate the impact of erecting a 12-foot-tall barrier around the perimeter of the City - effectively blocking the very views that the City has to offer its residents and visitors.	Thank you for your comment. Please refer to Master Response 10 -Visual / Aesthetics.
61	1	R. Kieth Summey	City of North Charleston	This letter is intended to provide comment by the City of North Charleston on the referenced Feasibility Report / Environmental Impact Statement. Specifically, the City of North Charleston is concerned about any amount of water surface elevation increase in the City of North Charleston due to the construction of the proposed storm surge wall. Section 7.3.1 of the Draft FR/EIS indicates that the water surface elevations "ranged from an increase or decrease of less than one inch depending on location." We are unable to identify in the Draft FR/EIS any identified specific impacts to North Charleston, and there is no information in Figure 7-2 for North Charleston. Information in Engineering Appendix B, Coastal Sub-Appendix B-4, Chapter 6 - Wave Refraction on Surrounding Areas,	Thank you for your comment. Please refer to Master Response 6 - Induced Flood Risk to Surrounding Communities.

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				indicates that some simulations show up to a 1 to 2 inch increase in water levels for the FWP condition. Again, we are unable to identify any information in this section that is specific to North Charleston. The City of North Charleston requests specific identification of the potential impacts to properties within the City of North Charleston. It is the City of North Charleston's position that any increase in water surface elevation, or other adverse impact, on properties within the City of North Charleston due to the proposed seawall construction, or other proposed mitigation activities, is unacceptable.	
62	1	Alexandria Daniel	Gadsden	I'm the GM for Gadsden, and several of us were in attendance at the ACE meeting on Friday, 10/22. We appreciate your time hosting the meeting for us. While we understand that the purpose of the seawall is to protect the peninsula from storm surge, we realize that if proposed plans for location are approved, this will have a negative impact on Gadsden's property values and will result in an increase in insurance rates due to the negative risks of Gadsden being located outside of the seawall.	The properties waterward of the proposed storm surge wall would continue to experience the coast storm risks as they currently experience. Thus, it would be anticipated that insurance rates would not increase, beyond any expected yearly rate increases.
62	2	Alexandria Daniel	Gadsden	We also have concerns of the wall excluding our owners/residents from a safety perspective. We fear that as plans evolve creating the seawall ops manuals, the seawall may be used for storm surges unrelated to hurricane.	Thank you for your comment. Please refer to Master Response 8 -Operation and Maintenance Procedures.
63	1	Joe Helminski		On behalf of the residents of the Gadsden (5 Gadsdenboro Street), Anson House (2 Laurens Street) and their Anson Borough neighbors I am writing regarding the tentatively selected storm surge wall plan. The location planned to construct the wall	Please refer to Comment 62-1. Please refer to Master Response 8 -Operation and Maintenance Procedures.

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				around the peninsula to reduce damages from storm surge inundation does not currently include our area. We are concerned of the potential negative impacts of exclusion including personal safety, increased costs and decreased property values.	
64	1	Mark Fite	Environmental Protection Agency	As a cooperating agency on this project, the EPA participated in various interagency meetings and reviewed the preliminary DEIS on August 17, 2021. Our primary concerns during the preliminary review involved impacts to wetlands, mitigation and water quality. The EPA also acknowledged that issues such as climate change and environmental justice were appropriately addressed in the preliminary DEIS.	Thank you for your comment.
64	2	Mark Fite	Environmental Protection Agency	Based on our review of the DEIS, the EPA commends the USACE on the reduction in wetland impacts from approximately 111 acres in the April 2020 draft environmental assessment to approximately 35 acres in the DEIS by realigning the storm surge wall from saltmarsh wetlands to land and the installation of storm gates at Halsey Creek to allow for tidal exchange. The DEIS indicates that the remaining wetland impacts will be addressed through mitigation. In the enclosed detailed comments, we have remaining recommendations pertaining to wetland mitigation and water quality for the USACE to address in the Final EIS to further protect human health and the environment.	Thank you for your comment.
64	3	Mark Fite	Environmental Protection Agency	Enclosure: Wetlands: According to the Draft Mitigation Plan (Appendix F), the USACE is considering compensatory mitigation through mitigation banking or Permittee-Responsible Mitigation (PMP) to offset wetland impacts. Recommendation: The EPA recommends	The Mitigation Plan cannot be finalized until the PED phase when the engineering design is finalized. The draft Mitigation Plan has been updated since the public release of the draft FR/EIS to identify the preferred mitigation alternative as wetland mitigation banking, and has been shared with the Interagency Coordination Team (ICT) which includes EPA, see Appendix F – Environmental. USACE will continue to meet with and engage the ICT throughout the PED phase to keep them fully aware/informed of any modifications that would be made to the Mitigation Plan.

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				including a complete mitigation plan in the Final EIS that identifies the details of the compensatory mitigation strategy that will be used.	
64	4	Mark Fite	Environmental Protection Agency	Water Quality: Potential impacts to water quality in tidal creeks, particularly Halsey Creek, are of concern. According to Section 6.4 of the DEIS, site specific studies have not been conducted to evaluate the impacts of the walls/gates on water quality, specifically salinity and dissolved oxygen. The EPA notes the following statement: "Since dissolved oxygen levels are already impaired in the Ashley River (Sanger et al, 2020), which could be assumed to extend into small tributaries of the Ashley River like Halsey Creek, the proposed storm surge wall and gates could compound impairment of dissolved oxygen behind the wall." With no water quality data for any of the tidal creeks, baseline conditions are unknown and future water quality trends cannot be established. Recommendation: We recommend water quality monitoring for dissolved oxygen and salinity to establish baseline conditions in the tidal creeks (particularly Halsey Creek). Additionally, the EPA recommends an adaptive management plan be included in the Final EIS that outlines potential mitigation if water quality is negatively impacted post construction.	Effects of the proposed plan on water quality (and any other environmental condition) are evaluated by comparing the water quality of water with the project in place in the future to the water quality without the project, or the No Action Plan. For the stormwater runoff being collected from overland flow (that is not collected by the municipal subsurface drainage system) by the proposed pump stations would be of the same quality as it would without the project and flow overland into surrounding waterbodies. For the discharged water from the pump stations, which would be a point source, water treatment systems will be incorporated in all permanent pump station as described in Section 6.4.2 – Water Quality, so that the quality of the water entering surrounding waterbodies will actually be improved compared to without the project. The planned permanent pumps stations would be similar to the pump stations already permitted and operated by the City of Charleston, which meet state water quality standards. With respect to the storm gates and water quality, it is helpful to remember that the future without project water quality conditions during which the gates would operate is during and following a storm surge event. Water quality conditions in estuaries are highly altered during this time with low salinity concentrations and high dissolved oxygen concentrations from extensive rainfall drainage coming down tidal rivers from the inland areas that are also in the storms path. Section 6.4.2 – Water Quality describes that in the future with project conditions when the storm gates are closed at low tide for a storm surge event, stormwater runoff would collect in the tidal creek/saltmarsh areas with storm gates (and in man made lakes such as Colonial Lake or Alberta Long Lake). During the time the storm gates are closed, assumed to be 48 hours though could be more or less time depending on any given storm, the quality of the stormwater runoff could continue to degrade from the already degraded existing condition stormwater runoff, without the normal influx and mixing of tidal water, however the held water would be receiving direct rainfall. USACE would minimize adverse effects by reducing the time the gates are closed to the greatest degree feasible. Any degraded water quality in the small volumes of water held behind the storm gates relative to the volume of water found in the tidal creeks and connecting tidal rivers (Ashley and Cooper Rivers), when released into the already degraded post-storm tidal waters, would contribute a nominal effect to the without project degraded water quality conditions. Such a study of the post storm water quality conditions in the Charleston area without the proposed project is beyond the scope of this study. Due to the temporary and minor effect to water quality, and use of minimization actions, USACE does not believe that water quality modeling is warranted.

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64	5	Mark Fite	Environmental Protection Agency	Environmental Justice and Community Impacts: There are three communities on the Charleston Peninsula with environmental justice concerns within the vicinity of the project area that should benefit from the proposed project. The Public Housing communities of Cooper River Court and Meeting Street Manor, which are located within the perimeter of the sea wall, will benefit from that protection, while non-structural measures (floodproofing and/or elevating) will be implemented at Rosemont Neighborhood and Bridgeview Village. The EPA also notes that the USACE collaborated with the City of Charleton during the feasibility study on potential seawall aesthetic impacts and mitigation measures. Section 6.13 of the document discusses potential impacts and mitigation measures and a draft Memorandum of Understanding between the two agencies can be found in Appendix A.	Thank you for your comment.
65	1	Joyce Stanley	US Department of Interior	The Department has been a cooperating agency with the U.S. Army Corps of Engineers (USACE) in the development of the Environmental Impact Statement (EIS) for this study. Previous scoping comments from the Department raised concerns about potential viewshed impacts to and from nearby Fort Sumter and Fort Moultrie National Historical Park as well as historic properties within the surrounding National Historic Landmark district. Based on a review of the Draft EIS, the Department does not offer any specific comments as it appears that no National Park Service (NPS) lands or waters would be enclosed within the proposed Storm Surge Wall around the perimeter of the Charleston Peninsula. Therefore, there do not appear to be any direct impacts to NPS resources. However, there may be impacts to the views to and from historic properties that are being	Thank you for your comment.

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				addressed through a Programmatic Agreement (PA) that is currently being developed in accordance with the National Historic Preservation Act (NHPA). As a consulting party under NHPA, comments on the draft PA have been provided separately to USACE.	
65	2	Joyce Stanley	US Department of Interior	While we have worked with the Department of the Army and the City to reduce impacts, we find that further reduction of marsh habitat impacts could be accomplished by moving the proposed location of the wall closer to the existing shoreline. Long term adverse effects to the marsh habitat behind the proposed wall should be evaluated thoroughly. Although the planned surge gate will allow for some tidal flow it will not equal natural sheet flows experienced during diurnal tidal exchanges. As a result, over time the marsh habitat behind the wall is likely to degrade through loss of native vegetation. Construction of the surge wall is certainly a major undertaking and will require a significant monetary and personnel investment from the City to operate and maintain the gates and pumps planned along the wall as well as ensure the wall itself is maintained in good condition. The Department of the Army and the City must develop and finalize a detailed Operations and Maintenance Plan for the entire storm surge wall and commit to long term funding for its maintenance.	Thank you for your comment. In order to reduce impacts to saltmarsh wetlands where the wall cannot be sited on land, USACE has planned the storm surge wall as close to the shoreline as feasible. USACE expects the wall to be constructed roughly 35ft from the shoreline in order to accommodate the 25 ft needed for the angled pilings that would support the wall. During the PED phase, it may be possible to reduce the 35 ft distance to some degree, but the 25 ft construction footprint must be maintained. There is only one location in the proposed plan where storm gates would be installed in the wall. While Halsey Creek is already impacted by one tidal restriction and lies in a highly urbanized watershed, this expensive minimization measure allows for Halsey Creek to continue to function as a tidal creek system, which would be fully lost without the gates. A published and approved model was used to estimate the partial loss in habitat function which has been estimated to be approximately 60% of the total saltmarsh wetland function, and will be offset through compensatory wetland mitigation. This is described in the Draft Mitigation Plan. The storm gates would allow for 75 ft of opening in the short segment of wall (0.1 mi) here, which is 12 times larger than any culvert on other tidal creeks in the study area that continue to function. USACE believes that it has reasonably estimated the lost saltmarsh habitat function in the this urbanized tidal creek and appropriately planned to compensate for the loss, and post-construction monitoring is not necessary. For comment about operation and maintenance, please refer to Master Response 8 -Operation and Maintenance Procedures.

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65	3	Joyce Stanley	US Department of Interior	We remain committed to continued involvement throughout the review and development of the proposed project. We realize that the TSP design may change in scope as the project develops. Other preliminary concerns are listed below: • Noise during construction and its affect upon resident and transient wildlife. • Long term loss of salt marsh habitat through tidal flow degradation. • Trash collection behind wall resulting from upland storm drainage. • The potential risk of development expansion into marsh behind the surge wall. • Appropriate compensatory mitigation for resource losses must be conceived and approved.	Construction related noise effects to residents and wildlife have been evaluate and are described in Section 6.15.2. The City of Charleston currently has a noise ordinance that would be followed. Please refer to the response to Comment 65-2 for potential tidal flow degradation. Currently, the City of Charleston is responsible for removing trash and storm debris within the City's jurisdiction, including any trash that may collect now behind the Battery seawalls. If the new wall is constructed, this same municipal responsibility would continue. Removal of debris around the wall would also be required of the City to maintain the structural integrity of the wall. It is not anticipated that an expansion of development into the salt marsh would occur with the implementation of the proposed plan, although the loss of the wetlands would have already occurred and been compensated for. The City of Charleston must acquire property or obtain easements for the footprint of the project and the buffer, of which most of the small areas of impacted wetlands would fall into. Private development could not occur there. To maintain the structural integrity of the storm surge wall no development can occur within the buffer. The Mitigation Plan cannot be finalized until the PED phase when the engineering design is finalized. The draft Mitigation Plan has been updated since the public release of the draft FR/EIS to identify the preferred mitigation alternative as wetland mitigation banking, and has been shared with the Interagency Coordination Team (ICT) which includes DOI representation, see Appendix F – Environmental. USACE will continue to meet with and engage the ICT throughout the PED phase to keep them fully aware/informed of any modifications that would be made to the Mitigation Plan.
66	1	Stacie Crowe	SC Department of Natural Resources	Chapter 4 – Affected Environment 4.8 Aquatic Resources As stated in the Draft FR/EIS, "SCDNR monitors biological communities throughout the state's coastal habitats." A narrative summary of the SCDNR monitoring data from the Tidal Creek Project (TCP) and South Carolina Estuarine and Coastal Assessment Program (SCECAP) should be included in the body of the FR/EIS and should refer to the associated raw data which is anticipated to be presented in the Environmental Appendix.	USACE appreciates SCDNR for compiling and providing relevant data from the SCECAP and the TCP for monitoring sites in the ROI of this study, which included two sites in the Lower Cooper River, two sites in the Lower Ashley River, one in the Charleston Harbor nearshore to the High Battery Wall, a site in New Market Creek, a site in Vardell's Creek, and a site in Diesel Creek. The data have been added to Appendix F - Environmental, and the data are discussed in Section 4.4 Water Quality, Section 4.6 Wetlands, Section 4.8 Aquatic Resources, and Section 4.9 Benthic Resources. Since this is a public document, more technical presentation of the data has been left to the appendix. While the data is over 10 years old for most of SCDNR monitoring sites in the ROI, USACE has attempted to use best available information to characterize the affected environment of the study area.

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66	2	Stacie Crowe	SC Department of Natural Resources	4.9 Benthic Resources With respect to benthic resources, the Draft FR/EIS states, “In general, the biological condition of benthic communities and sediment quality tends to be lower in tidal creeks than in open waters across South Carolina’s estuaries.” This comment is somewhat misleading. According to the 2017-2018 SCECAP report1, when tidal creek and open water habitats investigated in the study were considered separately, a greater percentage of tidal creek habitat was in fair to poor condition. However, in general, 90% South Carolina’s coastal estuarine habitat (tidal creek and open water habitats combined) was considered to be in good condition. Lower biological condition values are often seen in tidal creek habitats, which likely reflect the fact that they are naturally more stressful environments than open water habitats. Tidal creeks also have a closer connection to the developed uplands, which can lead to higher levels of water quality and sediment quality measures such as fecal indicator bacteria and sediment chemical contamination. As noted above, SCDNR studies have investigated water quality and habitat quality near or within the study area and Region of Influence (ROI). An accurate summary of data from relevant studies, included as text in the FR/EIS, would create a more robust picture of baseline biological conditions for the proposed project. Please refer to appropriate data in the Environmental Appendix in the Final FR/EIS. 1 Sanger, D.M., S.P. Johnson, A.W. Tweel, D.E. Chestnut, B. Rabon, M.H. Fulton, and E. Wirth. 2020. The Condition of South Carolina’s Estuarine and Coastal Habitats During 2017-2018: Technical Report. Charleston, SC: South Carolina Marine Resources Division. Technical Report No. 111. 52 p.	The relevant site information has been incorporated into the report and the appendix as described in the response to comment #66-1.

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66	3	Stacie Crowe	SC Department of Natural Resources	6.4 Water Quality The Draft FR/EIS acknowledges that the storm surge wall associated with Alternative 2 could have an adverse effect on creek and marsh water quality behind where the storm surge gates would be placed, and particularly in Halsey Creek. SCDNR has expressed concern regarding the potential for significant impacts on tidal creek and marsh hydrodynamics, as well as the ecological functions associated with tidal flows, as a result of the installation and operation of multiple gates. Overall hydrologic impacts are predicted to be temporary and minor based on normal conditions. The SCDNR believes the operation and maintenance of mechanical gates in a dynamic, saltwater environment will be difficult and the risk of gate failure or mismanagement is high. The potential for such failures and the associated impacts to creek and marsh hydrology and hydraulics should be acknowledged in the Final FR/EIS.	An operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) manual for the proposed project will be developed and finalized in the PED phase, and is a required item of local cooperation requirement for project authorization and construction. The City of Charleston will be responsible for the OMRR&R of the project. As outlined in the OMRR&R manual, routine inspections and maintenance actions of the proposed project including the gates will help ensure the project features would be functioning properly, and as needed, repaired. In addition, please refer to Master Response 8 – Operation and Maintenance Procedures.

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66	4	Stacie Crowe	SC Department of Natural Resources	Compensatory Mitigation The Draft Mitigation Plan considers two basic mitigation alternatives, purchase of mitigation banking credits and Permittee-Responsible Mitigation (PRM). No PRM sites have been identified nor has a specific mitigation bank been identified. The SCDNR recommends the following be considered in the formulation of a final compensatory mitigation plan for this project: 1. Compensatory mitigation should be used only after all adverse impacts of a project have been avoided and minimized to the greatest extent possible and no other feasible, less damaging alternatives exist. A detailed mitigation plan should be developed to compensate for all unavoidable impacts, both temporary and permanent, to natural resources. 2. Mitigation plans should be designed to replace wetland and other aquatic resource losses with those that are functionally similar. Mitigation sites should be located within the same watershed or ecosystem as the proposed impacts. 3. The restoration and enhancement of previously disturbed and degraded aquatic habitat is preferred over the creation of new habitat from uplands or the conversion of one type of functioning wetland/habitat to another. Creation or habitat conversion options result in the elimination or displacement of existing wetland/aquatic functions and result in no additional ecological benefits. Mitigation plans involving restoration or enhancement should include a monitoring plan, specific performance standards, and contingency measures to be implemented in the event of mitigation failure. 4. All mitigation proposals involving shellfish restoration will require careful	The Mitigation Plan will be finalized in the PED phase as the design is finalized and will be compliant with 33 CFR Part 332. The draft Mitigation Plan has been updated since the public release of the draft FR/EIS and has been shared with the Interagency Coordination Team (ICT) which includes SCDNR, see Appendix F – Environmental. USACE will continue to meet with and engage the ICT throughout the PED phase to keep them fully aware/informed of any modifications that would be made to the Mitigation Plan. USACE has identified wetland mitigation banking as the preferred mitigation alternative in the updated Draft Mitigation Plan, since no feasible Permittee-Responsible Mitigation opportunities were identified that would meet the mitigation requirement. Any purchased mitigation bank credits would be for saltmarsh restoration, and approved banks in the primary service area would be prioritized. Shellfish restoration for compensatory mitigation is not currently being considered. The oyster reef-based living shoreline sills are for the purpose of erosion minimization impacts related to the proposed wall and coastal storms. USACE appreciates the technical expertise that SCDNR has provided on potential placement, design, and materials during the feasibility phase, as a Cooperating Agency for this study. Construction of the measures and features of the proposed plan, should it be authorized and funded, would be executed in accordance with acquisition laws and regulations for the Federal Government.

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				upfront planning and should be coordinated with the SCDNR. SCDNR is generally not a consultant or contractor for hire to conduct shellfish restoration projects to meet the mitigation needs of permit applicants, particularly private entities. The SCDNR would not be able to accept funds or enter into a contract with a private entity to conduct work for shellfish restoration projects that would require monitoring, performance, and long- term success obligations. However, the SCDNR can accept the donation of funds with no additional obligations to support existing programs such as South Carolina Oyster Recycling and Enhancement (SCORE), but this type of mitigation would have to be reviewed and approved by the resource and regulatory agencies. Understand that the acceptance of the donated funds would not provide SCDNR's automatic approval of any project that this was proposed as mitigation. 5. The SCDNR does not consider the direct preservation of tidal saltmarsh under little to no threat as viable mitigation. Unless a Kings Grant can be documented, lands located below the mean high-water mark are in state ownership. Regardless of ownership, for mitigation in the form of preservation to be appropriate and provide compensatory mitigation value, the resources to be protected must be under threat of destruction or adverse modification. This is very difficult to demonstrate in the open tidal environment, given the protection afforded by existing regulations. Mitigation credit for marsh protection can be indirectly generated by the establishment of upland buffers placed immediately adjacent to tidal wetland areas.	

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66	5	Stacie Crowe	SC Department of Natural Resources	While the SCDNR is not opposed to the planning and evaluation process used in developing the final array of alternatives and selecting the TSP, the SCDNR does not concur with the stated overall conclusion that, with minimization and mitigation measures, most of the environmental effects assessed are minor. The SCDNR considers the proposed project area to be worthy of the highest degree of environmental protection possible. The proposed project will involve significant impacts to important natural resources, requiring a thorough review under the NEPA/EIS process, with careful consideration given to avoiding and minimizing impacts to important natural resources.	Thank you for this comment. This integrated FR/EIS provides a thorough evaluation of the potential for adverse and beneficial effects on all aspects of the human environment from the alternatives. A Clean Water Act Section 404(b)(1) evaluation has also been prepared for this study. It can be found in Appendix F. USACE made informed decisions to avoid impacts to wetlands and aquatic resources from a previous iteration of the proposed plan that could have resulted in over 100 acres of impacted wetlands and other structural measures and features that have been eliminated (e.g., breakwater and midor gate). The current proposed plan (Alternative 2) would result in less than 40 acres impacted. The CWA 404(b)(1) evaluation found in Appendix F demonstrates that there are no practicable alternatives that would have less adverse impact on the aquatic ecosystem. On this basis, the proposed plan (Alternative 2) is identified as the least environmentally damaging practicable alternative in light of the overall project purpose. Within the selected alternative, USACE will continue to consider modifications to the measures and features that further minimize adverse effects on the environment during the PED phase. For permanent adverse effects on saltmarsh wetland habitat that cannot be minimized, those effects would be offset through compensatory wetland mitigation as described in the Draft Mitigation Plan.
66	6	Stacie Crowe	SC Department of Natural Resources	The SCDNR finds it important to consider alternatives with a greater emphasis on the use of non-structural and nature-based measures and strongly encourages the incorporation of these measures in the EIS process. Nature-based and layered resilience alternatives promote the establishment of tidal vegetation and other important natural resources, provide flood reduction benefits, and provide important ecological functions such as water purification and wildlife habitat.	Thank you for your comment. Please refer to Master Response 4 - Natural and Nature-Based Features.

Definition of Terms

Primary terms used in this document are defined below.

Submittal — A submittal is the entire document received from a commenter. It can be in the form of a letter, email, voicemail, verbal comment, or a comment submitted online.

Comment — A comment is a portion of the text within a submittal that addresses a single subject. It could include such information as an expression of support or opposition to the use of a potential management measure, additional data regarding the existing condition, or an opinion debating the adequacy of analysis.

Code — A code is a grouping based on a common subject. The codes were developed and are used to track major subjects throughout the planning process.

Concern Statement — A concern statement summarizes the issues identified in each code. For each code, concern statements were developed to better categorize the content of the comments received. Some codes required multiple concern statements because the comments within them represented different ideas. Other codes had only one concern statement because the comments within them presented similar ideas.