



## Charleston Peninsula Coastal Flood Risk Management Study Frequently Asked Questions

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## OVERVIEW

### 1. What is the Charleston Peninsula Study?

The Charleston Peninsula Coastal Flood Risk Management study investigates solutions to address coastal storm risk to people, property and infrastructure on the peninsula.

### 2. What is the purpose of the study?

The Charleston Peninsula Coastal Flood Risk Management Study is currently in the initial (feasibility) phase of the Army Corps' project delivery process. The ultimate purpose of this 3x3x3 feasibility study is to determine whether or not there is a federal interest in a storm surge solution on the peninsula, and if so, outline a project recommendation. In the last several years, the City has initiated several flood mitigation actions, including its Flooding and Sea Level Rise Strategy, a vulnerability assessment, rehabilitation of Low Battery Wall, Dutch Dialogues and major drainage projects. This study primarily addresses the risks of coastal storm surges, while working in tandem with other flood mitigation efforts. It is one piece of the City's overall comprehensive flooding strategy.

### 3. Why is this study important for the Charleston peninsula?

Coastal storms on the Charleston peninsula place people at risk, including the potential for loss of life and declines in public health. The Charleston peninsula experiences coastal storm surges that adversely affect the economic sustainability of Charleston, including impacts to businesses, organizations and industry; critical facilities and infrastructure; and residents. Coastal storm events also limit access to critical facilities, emergency services and evacuation routes. Historic and cultural resources are at risk of damage due to storm surge flooding.

### 4. What is the Army Corps' 3x3x3 policy for feasibility studies?

To reduce the impact on taxpayers and hold agencies accountable, Congress directed the Corps to expedite feasibility studies in 2014 as a law. To do this, the Corps follows the 3x3x3 policy for feasibility studies like this one: no more than \$3M cost, completion within 3 years, and 3 concurrent levels of review. Exceeding the cost or completion limits requires an exemption. Public input is integral to our process. In addition to the initial extended public review and the second review early next year, the public will be invited to review and weigh-in during the design phase, if Congress/City of Charleston elect to move forward to that phase with the Army Corps' recommendation.

### 5. What features does the tentatively-selected plan recommend?

Currently estimated at \$1.75 billion, the National Economic Development (NED) Plan includes a perimeter storm surge wall (also built to withstand earthquakes), an offshore wave attenuation structure and nonstructural measures, such as home raising. If the project is authorized and funds are appropriated by Congress as a result of the study, the City of Charleston would be responsible for — based on current estimates — approximately \$600 million.

### 6. Where can I find the draft report and appendices?

The draft report is available at [www.sac.usace.army.mil/charlestonpeninsulastudy](http://www.sac.usace.army.mil/charlestonpeninsulastudy). Hard copies of the draft report are also available for those with limited internet access at Charleston District office at 69A Hagood Avenue, Charleston, SC Monday-Friday from 7 a.m.-4:30 p.m. until June 19.

### 7. How are the City of Charleston and other stakeholders involved?

The City of Charleston, Army Corps of Engineers and many stakeholders worked together to develop seven alternatives to alleviate coastal storm flooding on the peninsula. Only two of the

alternatives met the objectives to reduce loss of life, increase safety and minimize economic damages in a coastal storm event. Alternative 3, the National Economic Development (NED) Plan, best meets the study objective of effectively reducing the risk of damages on the peninsula from coastal storm events and provides the best return for the federal investment.

**8. What is considered a coastal storm event?**

Coastal storm events are hurricanes, tropical storms or tropical depressions that approach and pass through the Charleston vicinity or move on shore at or near the Charleston vicinity. The low elevations and tidal connections to the Ashley and Cooper Rivers and Charleston Harbor place a significant percentage of the city at risk of flooding from these coastal storm events, even if the storms do not make landfall.

**9. Is the study going to solve the city's flooding problems?**

The Army Corps of Engineers' coastal storm study is a piece of an overall comprehensive flooding strategy for the City of Charleston, and our team of engineers and technical experts are determined to do everything we can to help in this effort. In the last few years, the City has rolled out several flood mitigation actions, including its *Flooding and Sea Level Rise Strategy*, a vulnerability assessment, rehabilitation of Low Battery Wall, *Dutch Dialogues* and major drainage projects. In addition to reduced damages and risks from coastal storms, the federal project would also provide the City with opportunities to incorporate features that protect against other flood-related issues.

**10. What level of sea level rise does the Corps use for modelling?**

The Army Corps is required by the USACE Climate Change Center to use the USACE Intermediate sea level rise trend, which projects a 1.13-foot increase in SLR through 2050, for developing the tentatively selected plan. We then apply this plan to the USACE Low and USACE High SLR conditions in subsequent coastal modeling, set to occur this fall.

**11. Does this study follow the Dutch Dialogues recommendations?**

The Dutch Dialogues Charleston Report provides a large-scale framework for addressing several sources of flooding across the region and contains multiple recommendations. The Corps proposal is one aspect of this framework and would, if implemented, require coordination with all other flood reduction efforts. To learn more about how the Corps proposal works with the Dutch recommendation, view the [USACE-Dutch Integration](#).

**12. Does the study mean the proposed plan will be constructed?**

Army Corps feasibility studies does not guarantee construction. In the draft feasibility report, the Army Corps of Engineers has identified three generalized measures to reduce coastal storm surge risks on the peninsula: a storm surge wall, an offshore wave attenuator and nonstructural measures. The Army Corps' project delivery process has several steps before a storm surge wall could be constructed, including finalization of the current draft report (Spring 2021) after ongoing refinements, incorporation of comments, and any necessary modifications to the plan; the City of Charleston must agree with the recommendation and be willing to accept the local cooperation requirements of a non-federal sponsor; the Army Corps Chief of Engineers must approve the final feasibility report and submit a Chief's Report to Congress with a favorable recommendation of the project; Congress must make the decision whether to authorize the project; and, finally, Congress would need to appropriate and the City would have to provide the necessary funds to commence the design phase and later the construction phase of a cost-shared project.

## **COSTS**

**13. How has the study been funded?**

Following a series of hurricanes and severe storms, the Army Corps of Engineers received \$3 million of federal Emergency Supplemental Funding to study the impact and potential solutions of coastal storm events on the Charleston Peninsula. The study does not involve a cost-share requirement from the City until the next phase of preliminary engineering designs is approved and funded by Congress, which would be in 2022-2023 at the earliest.

**14. What is the estimated cost of the project?**

The cost for the study's conceptual features is currently estimated at \$1.75 billion. This estimate has a 53% contingency. The Corps develops a rough cost estimate during the initial planning stages to help inform preliminary feasibility decisions. The final cost estimate, which is completed as one of the last steps in the study, undergoes a very detailed, heavily scrutinized certification process by the USACE Center of Expertise. If the project is authorized and funds are appropriated by Congress as a result of the study, the City of Charleston would be responsible for — based on current estimates — approximately \$600 million.

**15. Is the cost estimate of the project accurate?**

The current cost estimate has a 53% cost contingency. The Corps develops a rough cost estimate during the initial planning stages to help inform preliminary feasibility decisions. The final cost estimate, which is completed as one of the last steps in the study, undergoes a very detailed, heavily scrutinized certification process by the USACE Center of Expertise.

**16. Are the City of Charleston's cost requirements required upfront?**

This initial (feasibility) phase of the study is 100 percent federally funded. Future phases, including the design phase and construction phase, require a 35 percent cost-share from the City. This means, the City must fund 35 percent of the total cost of that phase. The cost-share amount is not required upfront and is broken up based on annual requirements over each fiscal year. If Congress authorizes the next phase of the study and provides appropriation, the Army Corps estimates a total design phase cost of roughly 7 percent of the total project. This is a standard calculation and will likely change.

**STORM SURGE WALL**

**17. Did the Corps run cost/benefit analyses of different heights of the proposed sea wall?**

Yes. The study found that the 12-foot NAVD88 elevation yields the highest net benefits. Storm surge wall elevations are modeled against coastal storm scenarios selected and mandated by the federal government.

**18. If the study moves to the design phase, will design details of the storm surge wall be provided?**

The study is currently in the initial (feasibility) phase of the Army Corps' project delivery process. The ultimate purpose of this 3x3x3 feasibility study is to determine whether or not there is a federal interest in a storm surge solution on the peninsula, and if so, outline a project recommendation.

If the project moves to the design phase (the next phase in the project delivery process), the Corps will work with the City of Charleston and local stakeholders to closely look at design details, including height, placement and material selection, and prepare renderings. The Corps will request design funds to begin closely examining the look and feel of the storm surge wall around the Charleston Peninsula, as well as refining other aspects of the plan. The design phase is a collaborative effort. Within Federal parameters, the Corps will work with the City of

Charleston and local stakeholders (such as Historic Charleston, Preservation Society and many others) on determining design features. The City may propose some additional features to aesthetics and the alignment that would be entirely funded by the City.

Regardless of the final design features of a perimeter storm surge wall, the perceived elevation of the wall will vary depending on the location's topography (i.e., the above-ground wall height will vary according to whether an area is lower-lying or higher ground).

**19. Would the storm surge wall affect views of the water?**

Once the final elevation of the storm surge wall is determined, the view will depend on where you are on the Peninsula. Storm surge wall elevations are dictated by topographic requirements. Areas with the lowest topography elevation, for example, are more susceptible to severe coastal storm surge damages and, from a standing perspective, would have higher storm surge wall elevation. Areas with a higher topography elevation would require less storm surge wall elevation and maintain water views. Preserving the area's historic and cultural character is an important part of the Corps objective. We will continue to work with the city, local stakeholders and agencies, and the community on ways to avoid, mitigate or minimize impacts. Betterments (i.e. aesthetics) and recreation features can also be added to avoid, mitigate or minimize impacts.

**20. Where would the storm surge wall be located on the peninsula?**

The storm surge wall is modeled at elevation 12ft NAVD 88 (high battery wall is currently 9ft NAVD 88 for reference) and, if constructed, would tie into high ground around I-26 on the Ashley River side and along Morrison Drive on the Cooper River side. However, the storm surge wall is projected to vary at different visual heights based on existing topography. Please refer to the map in the final report for a broad conceptual alignment. Please note this conceptual alignment will likely change with additional public input and analysis.

**21. How did plan designers determine where the wall would end on I-26?**

The storm surge wall must tie into high ground or elevation 12-ft NAVD 88. Based on topography, the natural tie-in location is the I-26 location depicted in the alternative 3 map. Anything with an elevation greater than 12-ft NAVD 88 would require expensive modifications to I-26 and the Ashley River bridges.

**22. Is the storm surge wall alignment final?**

The tentative alignment of the storm surge wall is conceptual only. Based on public and agency comments, the Army Corps will continue to evaluate the alignment of the storm surge wall, including those areas outside of the alignment which are proposed for non-structural and other measures. More information on non-structural areas will be presented at the 2nd public review in early 2021.

**23. How does the plan protect areas outside of the proposed storm surge wall, including the Bridgeview Village apartments and Rosemont community?**

It is important to remember that these communities, including the Bridgeview Village apartments and the Rosemont community, are at a higher elevation already — between 8 and 11-ft NAVD88 — compared to the lower peninsula. Due to higher elevation, the plan recommends more minimal measures, such as ring dikes and temporary barriers, to mitigate storm surge risks in these areas. In general, developed areas and structures outside the conceptual wall alignment rest on higher elevation so there was not the need for storm surge wall in these areas. The Army Corps of Engineers study was inclusive of all of the lower-income residents of the Neck Area and other sites. The natural topography of these area has made it more cost effective to use nonstructural measures.

**24. Why are certain structures or areas tentatively outside the storm surge wall?**

At this stage of the Army Corps' project delivery process, the storm surge wall's alignment is a conceptual layout only. The actual location of the perimeter surge wall is not finalized until the design phase, a later project delivery phase that requires additional authorization and appropriation. The 12-foot NAVD88 surge wall is ultimately designed to mitigate storm surge damages to meet FEMA standards. In general, areas and structures outside the tentative storm surge wall are on higher elevation or were designed within FEMA's standards. For these areas and structures, the study recommends nonstructural and other measures to reduce the risks of storm surge.

The Army Corps of Engineers study is inclusive of all of the lower-income residents of the Neck Area and other sites. The Bridgeview Village apartments and Rosemont Community, for instance, are on naturally higher elevation (8 and 11-foot NAVD88), and for these areas, the study recommends other risk mitigation features, such as rink dikes and temporary barriers. The natural topography of these area has made it more cost effective to use nonstructural measures.

Some structures, such as the SC Aquarium and African American Museum, have base elevations higher than the proposed surge wall elevation and were designed and built to meet FEMA standards. A surge wall with a lower elevation than the structures' base elevation will do nothing to reduce the risk of damages during a storm event. Additionally, in order to enclose the SC Aquarium inside the 12-foot NAVD88 surge wall, the Corps would have to construct the surge wall in the harbor, significantly reducing the area's viewshed and obstructing channel navigability. Procedures and conditions for closing storm surge gates are not yet outlined. The City of Charleston would manage these gates and would be responsible for communicating changes in their operation.

**25. Can the storm surge wall be raised, if coastal storm events and sea level rise are more severe than predicted?**

Yes, the storm surge wall could be added to or made higher in the future. In the structural appendix, we state the T-Wall and Combo Wall have battered piles which are currently to be driven into the soil (Cooper Marl stratum) providing more lateral resistance. This will allow for easier retrofitting of the barrier to provide an increased level of protection without requiring structural or foundation upgrades.

**26. Will the perimeter storm surge wall create a bathtub effect in the Charleston Peninsula?**

No. Pedestrian, vehicle, rail, storm and access gates along the perimeter storm surge wall would remain open until a storm surge event. These gates would be closed at low tide during storm events to ensure water storage is available in marsh areas, alleviating any flooding caused by storm runoff. Pump stations along the perimeter storm surge wall would mitigate flooding in areas with no marsh storage. The Army Corps of Engineers has done a detailed water surface modeling analysis to ensure there would be no bathtub impacts.

**27. Is the Corps planning to do an analysis of potential seepage under the wall?**

The Corps will do an extensive geotechnical/structural analysis in design (PED) phase.

**28. Would Hurricane Hugo's storm tides in the Charleston harbor have overtopped a 12-foot NAVD88 storm surge wall?**

Hurricane Hugo was a Category 4 hurricane when it made landfall just north of Charleston in 1989. In the Charleston harbor, peak storm tides reached 9.4-foot NAVD88, or 10-12 feet above

mean sea level. Those tidal heights would not have overtopped a 12-foot NAVD88 storm surge wall.

## ENVIRONMENTAL

### **29. Does the Army Corps have plans to re-visit its environmental assessment?**

To date, there have been no official requests for an Environmental Impact Statement (EIS) from state or federal agencies. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is conducted to determine whether significant adverse effects will result from a federal action, the extent to which those impacts can be mitigated, and whether an EIS is warranted. The Corps has incorporated feedback from other agencies in its ongoing optimization of the tentatively selected plan to further avoid and minimize impacts to the environment, and which provides for appropriate compensatory mitigation for remaining impacts. As part of its NEPA compliance, the Corps continues to review updated project impacts and public input in periodic reassessment of its conclusion that a mitigated Finding of No Significant Impact (FONSI) is the appropriate NEPA document.

### **30. Were any “soft” or “green” solutions to flooding considered?**

Natural and nature-based features (NNBF), or green solutions, can be effective for other sources of flooding (tidal, SLR), but alone are not sufficient for storm surge flooding. You can save, restore or enhance the wetlands, and they are very helpful for absorbing wave action and storing water when it gets here, but they will not stop the storm surge. Wetlands do not reduce the height of the surge (the water on top of the tide level). The same is true for living shorelines. While not suitable for coastal storm surge risk reduction, the study recommends a number of green infrastructure practices that the City of Charleston could implement to help with localized flooding.

## FEEDBACK

### **31. How can the public provide feedback?**

The public is encouraged to [provide feedback](#) on the report on our [website](#) or by sending written comments to our district office (Environmental & Planning Office, 69A Hagood Ave, Charleston, SC 29412) through June 19, 2020. Comments on the contents of the current draft feasibility report and environmental assessment should be provided in this initial comment period. All feedback will be addressed in the final report.

### **32. What happens to my submitted comment?**

All comments will be evaluated and taken into consideration as the Corps continues to refine the current plan and proceeds to the final report. Comments will be addressed in the final feasibility report.

### **33. Why is there a second public review period?**

Over the next 12 months, we will continue to refine the plan with input from the public, additional modeling and analysis. Refinements are expected to include optimization decisions regarding storm surge wall alignment and elevation, changes in environmental considerations, and further development of nonstructural measures. Prior to release of the final report, we will hold a second public comment period in early 2021 limited to allowing the public to address these refinements. All feedback will be addressed in the final report.

### **34. Will the public have any more opportunities to comment on the study?**

At the outset, we expanded the initial public review period from 30 to 60 days. Due to the ongoing refinements to the tentative plan, including storm surge wall alignment, salt marsh impacts, and

other important aspects of the plan, the Army Corps will offer a second comment period in early 2021. Second or additional public review periods are not required for feasibility studies and are generally not common practice. However, we know how important this study is to Charleston and want to provide the community an opportunity to provide input on updated aspects of the plan.

## **NEXT STEPS**

### **35. What is optimization?**

Optimization is the next step in the study process and involves further refinement of the tentatively selected plan, also known as the National Economic Development (NED) Plan. The City of Charleston and Army Corps of Engineers — with input from stakeholders and the public — will assess different storm surge wall elevations and alignment throughout the study area. The Army Corps of Engineers will also do additional coastal and economic modeling to analyze various sea level rise scenarios during coastal storm events. The optimization stage begins April 2020 and ends early 2021.

### **36. What is the next phase of the study?**

After the feasibility study is complete, the City of Charleston and U.S. Army Corps of Engineers will enter the Pre-Construction, Engineering and Design (PED) Phase, or Design Phase, of the National Economic Development (NED) Plan. This phase does not begin until Congress provides funding. At this time, we are unable to describe how the physical aspects of the NED plan will look in front of businesses and residences.

### **37. How much of the next phase, the PED Phase, would the City be responsible for?**

The City is not responsible for any costs associated with the phase we are currently in, the feasibility phase, which ends in October 2021, with the submittal of a recommended plan to Congress. If Congress approves and funds the next phase, Pre-Construction Engineering and Design (PED), also known as the Design Phase, the city would be responsible for 35% of the design phase cost. Right now, the study estimates design costs at 7% of the total project cost, or \$76 million, which is a standard calculation the Corps uses until a more refined cost can be developed. This estimate will more than likely change. The City's cost-share for the PED phase is not required up-front and occurs in phases. If Congress approves and funds the phase after PED, the Construction Phase, that is also cost-shared at 35% for the City.

## **OTHER**

### **38. Will there be adverse impacts to communities surrounding the peninsula?**

Additional modeling and analysis over the next 12 months will include the investigation of adverse impacts to surrounding communities. If the analysis determines that adverse impacts to adjacent communities are likely, the Army Corps of Engineers will assess the need for and appropriate mitigation to address those impacts. Formal recommendations by the Army Corps of Engineers cannot move forward without weighing the potential for adverse impacts to adjacent communities.

### **39. Does the study recommend any eminent domain or buyouts?**

At this preliminary phase, the study discusses but hasn't identified the need for eminent domain or buyouts as part of the tentatively selected plan. Army Corps of Engineers' sponsors must have the ability to use eminent domain if required. Negotiation is required to acquire real estate. Fair market value as established by a real estate appraisal is the basis for the initial offers to the owner. If negotiation fails, eminent domain is an option that can be utilized. Waivers can be granted on a very limited basis to allow the Army Corps to initiate the eminent domain process in place of the sponsor. This does not replace the reasonable efforts to negotiate a purchase before

initiating an eminent domain action. Again, while the non-federal sponsor must generally possess the capability to exercise eminent domain, use of this process assumes that particular relocations or buyouts are identified as necessary for the project.

**40. Has (or will) the Corps model the potential damage of vibrations from construction to nearby buildings?**

Yes, the Corps will have monitoring plans in place for vibrations. Since this impact is contingent upon various factors, including exact storm surge wall alignment and finalized design material, monitor plans and vibrations are determined in the design (PED) and construction phases of the study.

**41. Has the Corps investigated the availability of materials for this project, including the amount of granite available for the wave attenuation device?**

No. The Charleston Peninsula Coastal Flood Risk Management Study is currently in the feasibility phase. Supplier research is not a feasibility task, because the Corps does not finalize materials until the design (PED) phase.