



SSPEED Center

Severe Storm Prediction, Education, & Evacuation from Disasters



GALVESTON BAY PARK PLAN

Houston-Galveston Protection System

March 2022

Overview

For more than 13 years, the Severe Storm Prediction, Education and Evacuation from Disasters (SSPEED) Center has been researching storms and their impact, as well as implementing mechanisms for accurate storm prediction, responses and mitigation efforts. The SSPEED Center has had full support from the Houston Endowment since 2009. In 2015, the SSPEED Center engaged in a long-term study to investigate and develop a potential regional surge protection system known as the Galveston Bay Park Plan (GBPP). The project is scheduled to receive \$1 million in support in 2022 from the Port of Houston, City of Houston, Harris County, and Joe Swinbank (representing private industry). The project is being designed in collaboration with the Coastal Spine and would commence construction under a series of permits issued by the U.S. Army Corps of Engineers. The GBPP would create a new string of islands that is intended to form a barrier to provide flood and surge protection in the region with improved operational safety for the Houston Ship Channel. The proposed project will offer our communities environmental enhancements, public recreation areas, and navigation enhancements both on the Houston Ship Channel and for recreational craft.



Figure 1. GBPP would provide protection from storm surge near Galveston Bay

Galveston Bay Park Plan

The GBPP runs parallel to the Houston Ship Channel from Baytown to Texas City (Figure 2). Proposed components of the plan include:

- + Widening the Houston Ship Channel from 700 feet to 900 feet;
- + Building a 25-foot surge protection barrier along the Houston Ship Channel to protect the western shoreline of Galveston Bay;
- + Collaborating with Coastal Spine Project that places an initial line of defense along Bolivar Peninsula through Galveston out to the west end of Galveston Island (Figure 3);
- + Constructing a world-class park system for recreational and community activities;
- + Supporting environmental development and restoration including beach infill, oyster reef protection, and water quality / salinity evaluation; and
- + Providing beneficial use for maintenance dredging in building up the Park recreational areas.

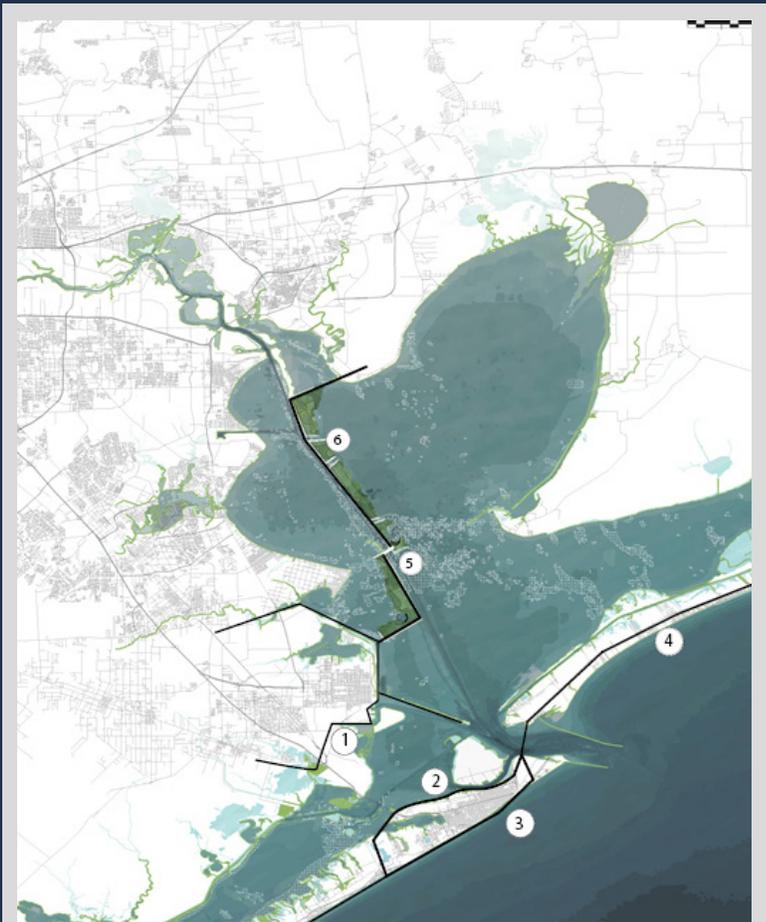
Our analysis shows that the barrier portion of the Galveston Bay Park Plan can be constructed for \$4 to \$6 billion, with an expected timing of completion between 2027 and 2030. The main protection feature along the Ship Channel should take approximately five years to complete. The remaining park assets will be constructed using channel maintenance dredge material as it becomes available through regular routine maintenance – putting a beneficial value to the material as opposed to simple disposal.



Figure 2. Aerial rendering of Galveston Bay Park

Engineering Analysis & Surge Protection

The structural components of the GBPP are designed to protect the Port of Houston and the west side of Galveston Bay from surge levels reaching 25 feet, a degree of protection that is intended to provide a critical level of protection to this important area of national importance. The SSPEED Center’s models show that this is a reasonable and responsible level of projection for future storms given climate change and expected surge increase estimates. Figure 3 highlights the key engineering components of the plan. Figures 4 and 5 illustrate the storm surge and flooding impacts with and without the GBPP. The storm surge estimates and impacts were run with FEMA Storm 36, a 132 mph storm making landfall at San Luis Pass.



MULTIPLE LINES OF DEFENSE

- ① Texas City Levee (Update)
- ② Backside Levee
- ③ Galveston Seawall (Existing)
- ④ Coastal Spine
- ⑤ Mid Bay Gate (~1,000 ft wide)
- ⑥ In-Bay Berms

Figure 3. Structural components of the GBPP

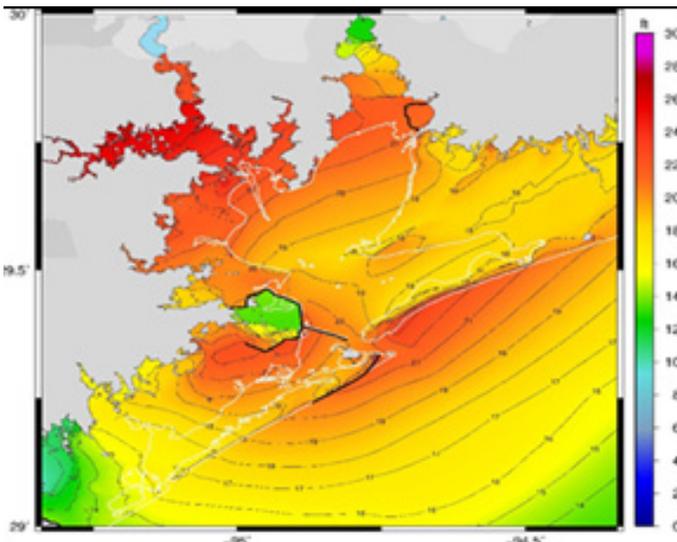


Figure 4. Storm surge impacts without GBPP (ft)

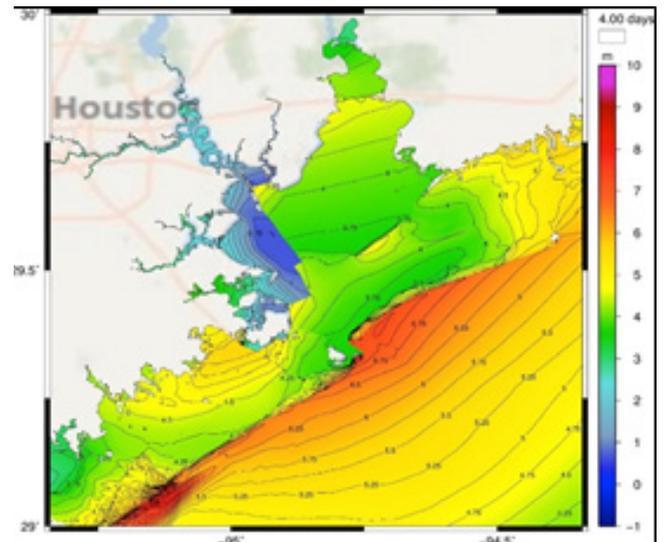


Figure 5. Storm surge protection provided by GBPP (m)

Environmental & Navigation Analysis

From an environmental standpoint, SSPEED Center analysis indicates that the proposed GBPP has a minimal impact on bay circulation and salinity. While the structural design and construction of the GBPP may impact oyster reefs, the plan includes a restoration of current oyster reefs and construction of new oyster habitats. To meet the growing traffic and increased size of the container ships serving the Port of Houston, Houston Ship Channel will be expanded and dredged. The excavated materials are to be used to create the barriers and ultimately the recreational areas along the barrier. The GBPP plan includes designs that will benefit environmental conditions in the Bay and provide for new valuable research on bay water quality and habitat.

Proposed Next Steps

The GBPP includes components that can be implemented quickly to provide both interim as well as comprehensive, long-term protection from storm surge in Galveston Bay. The plan is to receive \$1 million in funding to prepare the project for the initial environmental permitting. Additional surge modeling will be conducted with a range of storms (windspeed, landfall, precipitation) and impact will be analyzed with and without the GBPP. Furthermore, the GBPP is designed to protect and enhance our coastal communities. The SSPEED Center is focused on conducting socio-economic and other environmental impact analysis to ensure all benefits of the plan are equally recognized and shared by our coastal communities.



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