



H-GAPS Plan 2017

Overview

The Severe Storm Prediction, Education and Evacuation from Disasters (SSPEED) Center was established in 2007 as a response to the need to better address severe storm prediction and its impact on the Gulf Coast area. Since receiving full support from the Houston Endowment in 2009, the SSPEED Center has engaged in a long-term study to investigate and develop a potential regional surge protection system, known as the Houston-Galveston Area Protection System (H-GAPS). As a result of this study, the H-GAPS Plan was developed as a series of structural and non-structural mitigation techniques to protect the coastal areas from storm surge. SSPEED promotes **Multiple Lines of Defense** in reducing storm surge impacts in the Gulf Coast region (Figure 1).

Plan Components

Coastal Spine System

The Coastal Spine System includes land features, such as elevated roadways designed to serve as an evacuation route and a levee, and water features, such as a navigational gate and an environmental gate across the main channel at Bolivar Roads. **This system is similar to the “Ike Dike” plan, but differs in the location and type of land features.**

In-Bay System

The In-Bay System consists of constructing in-bay levees along the HSC as well as a navigation gate across the main channel (Mid-Bay Gate). Additionally, the plan would raise a portion of the existing Texas City Levee and provide for a ring levee around the City of Galveston. This system was initially evaluated using ADCIRC modeling for major storm surge protection. These components significantly reduce storm surge flooding in the northern and western segments of Galveston Bay, including the HSC, Cedar Bayou, and Baytown.

Figure 2 (next page) shows baseline conditions for Storm 36, a large surge event greater than Hurricane Ike.

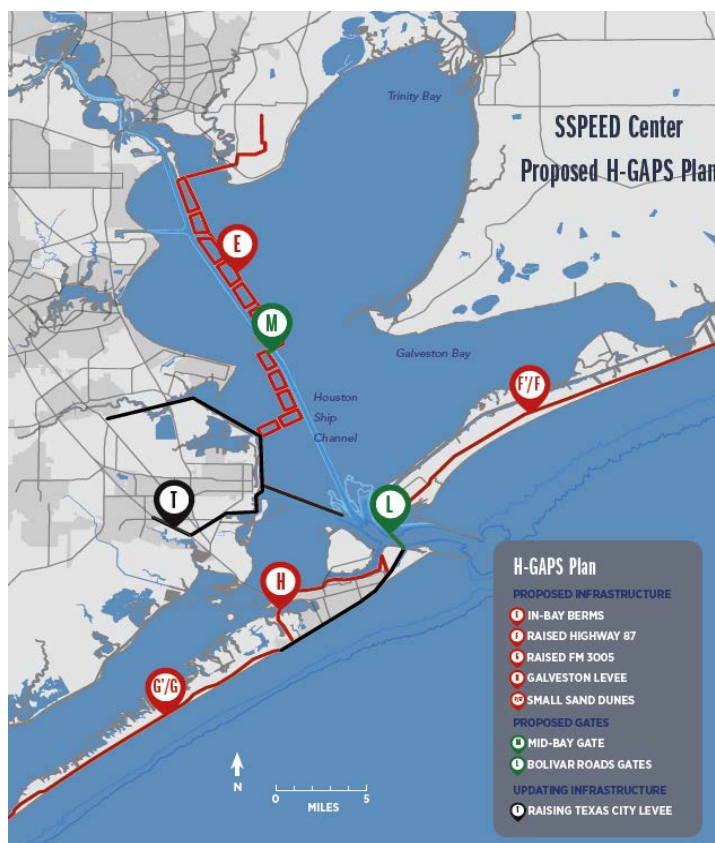


Figure 1: It is clear from our analysis that elements of both a coastal spine and in-bay structures are needed in the long term to protect against a very large hurricane event, especially when combined with sea level rise.

Multiple Lines of Defense

Areas of Focus

Houston Ship Channel

The United States' largest petrochemical complex and some of its most critical industrial facilities are located along the Houston Ship Channel (HSC); however, many of the facilities are not well protected against major flooding events. A large storm or hurricane could inundate the industrial area, affecting hundreds of storage tanks, which could cause severe damage to the Houston-Galveston region and the national economy. The SSPEED Center is proposing the construction of an in-bay gate and levee system to help protect the HSC. This major structural alternative has a high benefit-cost ratio compared to other mitigation proposals (See Figure 3).

The City of Galveston

Galveston is protected from storm surge flooding with the existing Seawall at the coastline; however, during Hurricane Ike, the backside of the city flooded from surge in the bay. Thus, part of the H-GAPS Plan is to construct a ring levee around the city and raise the Seawall to provide complete protection from surge flooding (See Figure 1).

The West Side

The west side of the bay is heavily developed and most vulnerable to surge flooding due to the hurricane-force winds that push water in the bay towards the western shoreline. As a result, under the H-GAPS Plan, the In-Bay System of the gate and berms provide enhanced surge flood protection for the communities on the west side of the bay, such as Morgan's Point, La Porte, Clear Lake, Seabrook, and Kemah (See Figure 3).

Houston-Galveston Area Protection System

The H-GAPS Plan consists of Multiple Lines of Defense (Fig. 1), a concept currently being employed in the Netherlands. It is hoped that this regional system will be implemented by some governmental entity, such as the U.S. Army Corps of Engineers (USACE), with funding from local, state, and/or federal sources. This project would have to comply with various applicable laws and regulations in order to get permitted for construction.

Next Steps

The H-GAPS Plan includes some components that can be implemented quickly to provide both interim as well as comprehensive, long-term protection from storm surge.

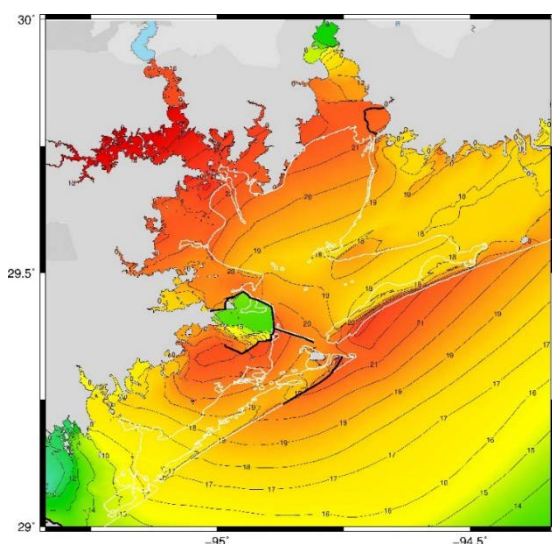


Figure 2:
Storm Surge
36 Baseline

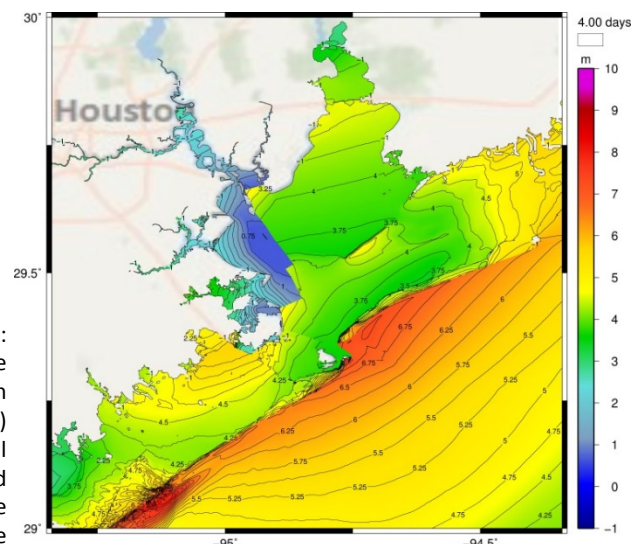


Figure 3:
Surge
reduction
(Storm 36)
with Coastal
Spine and
Mid-Bay Gate
in place