



Texas Council of Engineering Companies
2006 Engineering Excellence Awards
Gold Medal Winner – Category G: Water Resources, Storm Water Management

Savannah Storm Water
Relocation Facility



Savannah

Located in Brazoria County, the new 1,250-acre master-planned community of Savannah experienced a major storm event that caused Savannah's main entrance to flood for more than 24 hours, blocking access for the small number of residents already living in the community. Acting quickly, Friendswood Development called on Brown & Gay Engineers to evaluate the situation and develop an effective, long-term solution. Engineers from Brown & Gay were out in the field the day of the storm, assessing the extent of the flooding and gathering data to determine the cause. In the following days, they documented high water marks, collected topographic data, and evaluated the internal storm sewer and street system, as well as the outfall system.

Brazoria County is a very flat, low-lying area prone to flooding. Even a small storm can cause a significant amount of ponding and inundate roadways very quickly—the August 16, 2002, event that caused Savannah's problem dropped more than 10 inches of rain in a matter of a few hours.

Brown & Gay determined that a gravity drainage solution would not accommodate the large volume of water produced by a similar or more severe storm in a short amount of time because of an inadequate downstream outfall system.

Although the local city and flood control entity considered the situation normal for the area, Friendswood Development Company and

Brown & Gay Engineers were determined to correct Savannah's drainage issues rather than force the residents to settle for status quo. The engineers' solution consisted of an internal pump station with four large capacity, submersible pumps capable of moving large volumes of water at relatively low heads. To avoid any reduction in detention storage volumes and downstream



impacts from such a pumping facility, the large existing detention pond was divided into an upstream and downstream pond. Water from the storm sewer is routed, by gravity, to the upstream pond. As the water level rises and extra capacity is needed in the upstream pond, the pumps relocate water to the downstream pond where it is

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contained and gradually released into a Brazoria County drainage channel through a restrictor structure to avoid any impact downstream. The pumps are normally used in irrigation systems due to their ability to move massive amounts of water quickly. These submerged, low-noise pumps begin to operate when level control sensors detect specific water levels. The pumps are operated and sequenced by a complex control panel that is backed up by an emergency generator. One by one the pumps power on, as needed, to control the level of rising water.

A typical, widely used storm water control solution utilizes pump systems in conjunction with levee systems, but Brazoria County did not have a levee system in place to serve its flat terrain and inadequate outfall channels. To solve Savannah's issues, Brown & Gay Engineers had to venture outside of the "norm." Using a pump-controlled, separated detention system created much-needed additional storm water storage. This new system serves more than 600 home sites and the lowest-lying area of Savannah.

Brown & Gay Engineers' innovative use of this particular pump and adaptation of a standard

levee system has proven extremely successful. Since the pumps became operational, Savannah has experienced numerous intense storm events, but has not experienced a single street flooding issue, while other areas surrounding the development continue to be confronted with drainage problems. In preparation for Hurricane Rita in September 2005, the pumps were used to lower the water surface elevation of the upstream pond to allow additional storage volume for the anticipated massive amount of rainfall.

Friendswood Development's ultimate concern was Savannah's residents. Low-noise pumps were carefully chosen to preserve the quiet, peaceful atmosphere of the community. The solution improved mobility in and out of the community, thereby alleviating a huge safety concern. The project gave residents a sense of security and confidence, knowing that their community is well-prepared for future storm events. In addition to impacting the safety and quality of life of Savannah residents, the flooding problem, if not solved quickly, could have been detrimental to the image of Friendswood Development Company and the continued success of the Savannah development.