



Mitigation Project Gets an 'A' Plus

Full Mitigation Best Practice Story

Harris County, Texas

Harris County, TX – The prediction of rain was not welcomed at Klein High School prior to 2003. Due to the expansion of the campus and the rapid development of the surrounding areas, storm drains were heavily taxed. Heavy rain often flooded some of the school's buildings. After sandbagging for several years, Klein Independent School District (ISD) sought a better solution.



"We used to have these cute little Home Depot type plastic storage units right outside entry doors, and we had a good stock of sandbags," said Donald Blue, Director of Capital Projects for Klein ISD. "Every time we got a good rain, we'd put a little sandbag down around the doors. Students had to step over them, and of course we couldn't put handicap accessible ramps over the sandbags."

Klein ISD retained an engineering firm to perform a study and make recommendations. A stormwater drainage project was proposed.

The Drainage Project was initiated in April 2003 and completed in January 2006 at a cost of \$970,113. Klein ISD received a \$727,580 grant from the Federal Emergency Management Agency (FEMA) through its Hazard Mitigation Grant Program (HMGP).

HMGP pays 75 percent on approved projects that will prevent or reduce damage from storms and other natural hazards. These grants are made available for both public and private projects.

"Most of what we did is not visible. It's all underground," Blue said. "However, we have this real neat detention pond, which is also a practice field."

Phase I of the project consisted of three parts. First, the removal and relocation of existing facilities at the practice field and excavating a stormwater detention pond located on the practice field. The detention pond is two feet deep, and the excavated dirt was used to create a berm around the practice field.

The second part was the installation of Tide Flex Check Valves (backflow) to the school's existing storm sewer system to ensure that potential off campus stormwater cannot flow back through the system and flood the campus.

Last came the removal and replacement of approximately 400 square yards of asphalt pavement to install 400 linear feet of 12-inch gravity flow stormwater pipe from the gymnasium to an existing drainage ditch.

Phase II of the storm water drainage improvements was the installation of a 54-inch gravity pipe, buried 15 feet deep.

"From past experience, the sandbags were put out 10 to 20 times a year," Blue said. "If the sandbags were not in place each time there was a threat of rain, the district could easily have incurred \$1,000,000 per year in losses."

Continued Blue, "We kept the sandbags around for a year following the completion of the drainage project just in case something went wrong, but nothing did. The project was very successful. The system works well and everyone is happy."

Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region VI**

State: **Texas**

County: **Harris County**

City/Community: **Houston**

Key Activity/Project Information

Sector: **Public**

Hazard Type: **Flooding**

Activity/Project Type: **Flood Control**

Structure Type: **Masonry, Reinforced**

Activity/Project Start Date: **04/2003**

Activity/Project End Date: **01/2006**

Funding Source: **Hazard Mitigation Grant Program (HMGP)**

Application/Project Number: **DR 1379-084**

Activity/Project Economic Analysis

Cost: **\$970,113.00 (Actual)**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **No**

Value Tested By Disaster? **Unknown**

Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://www.kleinisd.net/>

Reference URL 2: <http://www.floodsmart.gov>

Main Points

- Heavy rain at Klein High School often flooded some of the school's buildings before 2003.
- Sandbagging was the method previously used, but they did not provide the best line of defense against floods because they could not build too high. Students still needed to get to class, and there was the problem of handicap ramps.
- In April 2003, Klein ISD initiated the Drainage Project with HMGP funding from FEMA.
- There were two phases that resulted in a detention pond, the installation of Tide Flex Check Valves, the removal and replacement of asphalt pavement, and the installation of a 54-inch gravity pipe.
- Nothing has gone wrong since the project - it has been very successful.



Detention Pond created in drainage project



Shirley Mayes, State Project Officer and Donald Blue, Director of Capital Projects for Klein ISD



Picture of drain leading to detention pond