

## Water

### Water Resources

#### Client

Harris County Flood Control District  
& Texas Department of  
Transportation

#### Location

Houston, Texas, USA

## Beltway 8 Water Quality Treatment Wetland

### Project Highlights

- 53 hectares of created and restored wetlands
- Water quality project includes wetlands created to improve stormwater quality through natural treatment technologies and building a large marsh system for wetland habitat
- Water balance modeling for wetland design

### Project Description



The Green Bayou Wetland Mitigation Bank includes approximately 485 hectares of land owned by the Harris County Flood Control District (HCFCD) for creating and restoring wetlands. This “bank” provides wetland credits to offset unavoidable impacts to natural wetlands from construction projects throughout the urban Houston area.

The Beltway 8 Water Quality Project is located on a 73-hectare parcel of the mitigation bank and includes over 53 acres of wetlands created for the dual purpose of treating stormwater and creating habitat for wildlife. In addition to rainfall, source water to support these wetlands includes runoff from a portion of the multilane Beltway 8 that circles the northern edge of Houston.

CH2M HILL’s design included a storm sewer interceptor, a surge basin, a pump station, pretreatment stormwater ponds, treatment wetland cells, and a large habitat wetland component. An onsite wetland plant nursery was created to develop plant propagules for 40 wetland species established throughout the project site. Fifteen planting zones were created and species selected based on water quality treatment, wildlife habitat creation, and aesthetic objectives.

CH2M HILL provided alternative development and analysis, conceptual design, final design, and construction services, as well as a unique water balance modeling tool. This model used historical rainfall and limited site information to develop information critical for wetland design. The model predicts water stages in at least three interrelated pond and wetland areas over a 20-year period and transforms these predicted results into a stage-duration graph for each pond or wetland area. We then determined the amount of each type of wetland habitat supported by the variable stormwater inflows. CH2M HILL used standard models to predict the water quality benefits of polishing ponds and marshes that initially receive the highway runoff.

The Project also maximizes wetland habitat functions to maximize credit value for mitigation. CH2M HILL optimized wetland area and habitat value using the wetland evaluation technique approved for this mitigation bank, the primary goal of which is to enhance wildlife habitat values. Different areas incorporate open water and marsh vegetation, high plant species diversity through planting and natural regrowth, multiple water depths, and riparian greenways through the wetland area. Public use of the wetland area for



nature study also was provided by incorporating access points and overlooks.

The project was partially funded by the Texas Department of Transportation through the Intermodal Surface Transportation Efficiency Act (ISTEA). This grant requires that the funds be used for water quality improvement and aesthetic enhancement of the beltway corridor. HCFCD also contributed funding for the treatment wetland project, and participated in concept development, design review, permitting, and construction management.