



## St. Tammany Parish Hydraulic and Hydrologic Modeling Study

In 1997, the U.S. Army Corps of Engineers, New Orleans District (the District) needed to develop a conceptual flood management plan for St. Tammany Parish in southeast Louisiana. Flood management in St. Tammany Parish was a unique challenge, with 100 square miles drained by a complex network of natural bayous and man-made canals. Moreover, the plan was to be presented to voters in November, just a few short months away. The District contracted WEST Consultants to analyze the District's flood management plan alternatives on a very tight schedule.

Hydrologic and hydraulic models were needed to evaluate existing conditions and compare flood management alternatives. For hydrologic modeling, HEC-1, the U.S. Army Corps of Engineers (Corps) hydrologic modeling package was used. Using the HEC-1 program, a 10-year runoff hydrographs for various locations in the study area were determined. The results of the hydrologic models provided the input for hydraulic modeling.

The hydraulic modeling of the St. Tammany Parish watershed was an intricate modeling task. The Corps' UNET (Unsteady Flow through a Full NETWORK of Open Channels) computer program was used to simulate the system, which included 23 waterway and canal segments, 95 culverts and bridges, a marsh area, and a variety of pumps and weirs. There were also many in-line and off-channel detention basins and storage areas and some of the canals underwent flow reversals.

Thirteen waterways and watersheds were analyzed for the existing-condition hydraulic model of St. Tammany Parish study: Bayou Paquet, Bayou Liberty, Bayou Bonfouca, Bayou Vincent, Western Diversion (W-14 Lateral) Canal, W-14 Canal, Reine (W-15 Lateral) Canal, French Branch (W-15 Canal), Poor Boy Canal, Gum Bayou, Doubloon Bayou, Schneider Canal, Salt Bayou, and portions of Fritchie Marsh. By agreement with the District, the existing-condition model included all features (detention basins, diversions, etc.) scheduled for completion by 1999. An alternative model was developed for Bayou Paquet and two alternative models for Bayou Liberty. For the other parts of the system, WEST created fourteen additional models, each adding project features incrementally. The project features lowered the maximum water surface elevation significantly for most of the studied areas.

Given an extremely complex system to model and an abbreviated time schedule, we were able to provide the New Orleans District with useful answers about their proposed flood management plan, allowing the District and the citizens of St. Tammany Parish to make informed decisions about their watershed.

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