

SUCCESS STORY

▶▶▶ PROVIDING URBAN IMPACT ASSESSMENT AND MODELING FOR THE ARMY CORPS OF ENGINEERS

PROBLEM

The U.S. Army Corps of Engineers was mandated by Congress to identify which properties in the cities of Pierre and Ft. Pierre would be at high risk for flooding due to increasing the standard release rate from the Lake Oahe Dam to generate additional electricity. Applied Data Consultants, Inc. (ADC) was called in to conduct several states of data development and modeling to determine the potential urban impact on increasing the flow from the dam.

The study was to identify which properties in the cities of Pierre and Ft. Pierre would be at high risk for flooding due to these projected increases. Using this information, the overall cost to buy out residents was determined using the land and property values, the cost of impacted utilities, and relocation and demolition costs. The initial study had to be completed within 90 days and required considerable coordination with multiple departments within the U.S. Army Corps of Engineers and the cities of Pierre and Ft. Pierre.

SOLUTION

Neither Pierre nor Ft. Pierre had a GIS system, so existing CAD and MicroStation files were obtained from the cities, local utility companies, and county sources. The entities involved sent copies of pertinent relational databases. The parcel, electrical line, gas line, sanitary sewer, storm sewer, sewer outlet, manhole cover, survey marker, and street centerline layers were in different formats and different coordinate systems. The data was converted to a GIS format, reprojected and georeferenced to generate the base data set for the study. The relevant fields from the relational databases were joined to the spatial data. Numerous discrepancies within the database were investigated and corrected. Using one-half foot orthophotography, the houses and other structures were digitized and attributed for later use in 3-D modeling.

The second phase of the project was the modeling of the 100-year and 500-year flood boundaries based on the projected releases from the dam. Over 20 different scenarios were generated and evaluated.

The third phase was the development of CEDAR (Cost Estimate for Damage After Release). This interface allowed the user to select a flooding scenario and criteria as well as the land and utilities coverage for the area. Prices were assigned to each utility (i.e. price per foot of sewer or price per manhole).

RESULTS

Through the modeling performed by ADC, properties that would be impacted by the flood were identified and reports generated that indicated land value, relocation and demolition costs. This allowed the government to identify and buy out properties in the impacted area, and allowed additional electricity to be generated for this growing area.

