Multi-beam Bathymetry
Along the San Jacinto Battleground Shoreline

by

Robert Gearhart
Hydrographer and Marine Archaeologist
Surveying And Mapping, LLC

and

Scott Hiller
Geophysicist
Surveying And Mapping, LLC
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By Robert Gearhart, Hydrographer and Marine Archaeologist, Surveying And Mapping, L.L.C., Austin
and Scott Hiller, Geophysicist, Surveying And Mapping, L.L.C., Houston

The Texas Parks and Wildlife Department (TPWD) proposes to rehabilitate a sheet pile bulkhead that stabilizes and protects the shoreline of the San Jacinto Battleground State Historic Site along Buffalo Bayou. The decisive battle of the Texas Revolution was fought here on April 21, 1836. Today, the Houston Ship Channel, one of our nation’s busiest navigation projects, follows the route of Buffalo Bayou past the battleground. The TPWD has responsibility to preserve and interpret the San Jacinto Battleground for future generations. Together with the San Jacinto Museum of History Association, they have developed a master plan to assure the future of this site. One important aspect of the master plan is long-term stabilization of the Buffalo Bayou shoreline, as key elements of the historic site are located nearby. Approximate locations of the Texan Army Camps and the spot where Santa Anna surrendered to Sam Houston (based on a TPWD interpretive map of the battleground) are overlaid on the aerial view of the survey results (on page 7).

This project was funded by the Texas General Land Office (GLO) through the Coastal Impact Assistance Program (CIAP). The GLO approved a $2.6 million disbursement of CIAP funds to the TPWD for the assessment, design, and repair/replacement of as much of the bulkhead as possible. The goals of the project are to stabilize the toe of the existing slope for another 50 years and to reduce maintenance issues along the bulkhead for TPWD park staff. TPWD awarded a contract for professional engineering services for the preliminary engineering assessment, design and construction observation services to Atkins North America, Inc. The hydrographic survey was subcontracted to SAM, LLC through an Atkins contract with CivilCorp, LLC.

SAM completed a bathymetric survey of the bulkhead in January 2014 using a 400-kHz multi-beam echo sounder. The survey encompassed 10.7 acres, extending 1800 feet along the shoreline and 260 feet into Buffalo Bayou. The sounder was mounted on a rigid pole over the side of a 25-foot SAM hydrographic survey boat. The multi-beam was tilted outward at a 15-degree angle from horizontal, providing bathymetric coverage of the vertical bulkhead to within 1.5 feet of the water surface. Sounding positions were compensated for the orientation of the multi-beam receiver in all axes of movement using an inertial motion unit. The resulting point cloud contains over 48 million elevations providing a detailed representation of the submerged terrain. The data density averages 300 soundings per square foot along the vertical bulkhead surface and 90-100 soundings per square foot overall.

Results of the multi-beam survey assisted Atkins project engineers in plan-
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ning dive inspection work and in designing bulkhead repairs. Areas of potential interest were identified from the high-density bathymetry, allowing divers to conduct a targeted structural assessment.

The survey identified intact remains of an older submerged bulkhead fronting each end of the current structure. Atkins determined that the submerged structure is a remnant of the original bulkhead installed during the 1930’s when the monument was built. Knowledge of the earlier structure’s presence prior to dive inspection ensured that divers’ efforts were planned appropriately.

Contact: rgearhart@sam.biz or shiller@sam.biz
Website: www.sam.biz

Multi-beam image of bulkhead and vessel scour

Multi-beam sonar mounted on pole

Bathymetric contours adjacent battle

Sherman’s Camp
Burleson’s Camp
Santa Anna surrenders to Sam Houston
Millard’s Camp
Lamar’s Camp

Battleship Texas