

Corps analysis shows canal's weaknesses

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Katrina made it clear that floodwalls on the 17th Street Canal were in no shape to defend against a major hurricane. Ostensibly built to tolerate storm surge almost 14 feet above sea level, one section of floodwall and levee adjacent to Lakeview failed against water estimated at no more than 10 feet.

Now, a geotechnical analysis of the canal, perhaps the most exhaustive ever performed, indicates that the Lakeview breach was hardly the canal's only weak spot. In fact, almost none of the floodwall sections between Lake Pontchartrain and Pump Station No. 6 can handle the design capacity of 13.9 feet of water, according to the study.

The yearlong study, conducted by the [Army Corps of Engineers](#) primarily to determine the canal's "safe water level" for the 2007 hurricane season, divided the 4.8 miles of walls and levee into 36 sections to analyze just how much storm surge each can withstand. It found that only two sections, those closest to Pump Station No. 6 and on the high ground of Metairie Ridge, can hold more than 13 feet of water. Many other sections of walls and levees can't be counted on to contain more than 7 feet of water.

The report casts more doubt on the abilities of the corps and its contractors over the years to design and construct reliable flood protection for the New Orleans area. But any sense of alarm at the study's findings should be tempered by the improvements made since Katrina, officials said.

The greatest of these are the huge floodgates that the corps has built at the canal's mouth, along with temporary pumps to move water over the gates if they must be closed against a storm surge into the canal.

"It is important to note that the canal is no longer part of the front-line hurricane and storm damage reduction system," the corps analysis says. "With construction of the (gates) ... the corps has removed the 17th Street Outfall Canal levees and floodwalls from the critical first line of defense from storm surges.

"The canal's only purpose now is to convey urban runoff from upstream pump stations to the lake; it will not be required to withstand storm surges."

The corps undertook the geotechnical analysis to determine just how much water the canal can safely hold. As a result, it decided in May that the safe water level for the current hurricane season must remain at 6 feet above sea level, to ensure that the weakest section won't be compromised.

Corps officials had hoped to be able to raise the level another foot or so, but they backed off after finding too many weak links.

The most troubling area is on the New Orleans side of the canal near the Veterans Memorial Boulevard bridge, which the analysis indicated couldn't safely tolerate more than 6.3 feet of surge.

The corps already has used the study to shore up those troubled sections of levee and floodwall near the bridge. And going forward, corps officials said, they hope to use the analysis as a blueprint to improve other weak links in the canal and eventually to raise the safe water level.

High-level corps officials recently told [Southeast Louisiana Flood Protection Authority-East](#) members that the agency has an outside consultant already working to determine exactly what needs to be done at the most vulnerable spots.

In the meantime, flood authority member Tom Jackson, a former president of the [American Society of Civil Engineers](#), said residents should be assured they are safe from future breaches and not get spooked by the dismal picture of just how deficient the canal was when Katrina blew in 23 months ago. He predicts that the 17th Street Canal ultimately will morph into a drainage channel with a single, permanent pump station located somewhere near the lake.

"But for now, the gates are in place. The public is no longer at risk from another breach," he said. "The corps has addressed the most vulnerable spot at Veterans, so Pump Station 6 can pump as it needs to when the gates are open."

Property owners on both sides of the canal remain worried about localized flooding if the gates are closed, the water level rises in the canal and upstream pumps must shut down. But Jackson discounts such fears.

If the gates must be closed, he predicts, residents will be pleasantly surprised to find that the temporary pumps installed by the corps will be able to move water far longer against a rising lake than the inland pump stations can.

After Katrina struck in 2005, the corps had to forgo new studies and start building, because Congress and the White House ordered floodgates by June 1, 2006, for the 17th Street Canal, the London Avenue Canal and the Orleans Avenue Canal.

There was no time to evaluate the stability of walls and levees along the three outfall canals. Elected officials and corps commanders knew only that they no longer trusted the structures.

Only now, through the data generated by the corps' new geotechnical analysis, is a picture of the entire 17th Street Canal beginning to emerge, and it isn't a pretty one.

Calling it the most extensive analysis of the canal performed to date, the corps used computers to help analyze thousands of bits of hydraulic and geotechnical data, including soil samples from dozens of borings.

The analysis divided the levees and floodwalls into 20 sections on the Metairie side and 16 sections on the New Orleans side. The divisions, which were based on geometry, soil properties and other criteria, enabled analysts to determine how each section, known as a reach, could be expected to perform at various water levels.

In addition, the examination assessed how each of the 36 reaches might react under three separate failure mechanisms:

- Seepage, in which water moves from the canal outward into the soil of the adjacent levee.
- Wall stability, which looks at the potential for wall movement in either direction.
- Global stability, or a combined failure of levee and floodwall.

The results indicate that protection on the Metairie side is generally more robust than its counterpart to the east. Still, the analysis shows that 12 reaches of the Metairie levee and floodwall -- more than half of them on that side -- cannot be expected to hold more than 8.7 feet of surge.

The most vulnerable spot on the Metairie side of the 200-foot-wide canal is a section near Rosebud Street, where wall stability would be an issue if subjected to more than 7.3 feet of surge and where even 7.5 feet could portend a global wall-levee failure.

On the New Orleans side, other particularly vulnerable spots include floodwalls on each side of the 453-foot-long Lakeview breach, since repaired. Here, the safe water level was calculated to be only 6.5 feet. Another dicey section is near 28th Street, which probably could hold no more than 7 feet of water.

In all those instances, the analysis indicates that a global failure of levee and floodwall could result if those levels were exceeded.

Similar analyses are in the works for the more robust Orleans Avenue Canal, which didn't fail during Katrina, and the London Avenue Canal, which breached in two places.

The health of floodwalls and levees along the particularly sandy London Avenue Canal is so tenuous that the safe water level there is only four feet -- an elevation restriction so low that the [Orleans Sewerage & Water Board](#) can't pump as required during particularly heavy rainstorms.

A complex test will be performed on the London Avenue Canal this month to better assess the status of those walls.

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