Survey and Spatial Data Inputs for Flood Water Modeling of Hurricane Katrina's Affects on Greater New Orleans

Prepared for

Bruno and Bruno Law Firm
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By

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July 30th, 2007

I have been retained by counsel (Bruno & Bruno Law Firm) to review survey data, spatial data, aerial photography, LIDAR data, etc. related to the hurricane protection system in the Greater New Orleans area. The primary focus of this report is to provide key survey related inputs to the flood water modeling being performed by the Delft University of Technology team.

Coordinate System, Units and Datum

Horizontal coordinates for spatial data provided in this report refer to the Lousiana State Plane Coordinate System, South Zone, NAD 83. The unit of measurement is the U.S. Survey Foot.

Elevations are in feet and refer to the North American Vertical Datum of 1988 (NAVD88-2004.65).

1.0 LIDAR Data

I obtained LIDAR data of the entire area from the U.S. Army Corps of Engineers IPET Web site https://ipet.wes.army.mil/. The LIDAR data sets listed below were each downloaded from the IPET web site.

(A) 5 meter resolution Pre Katrina LIDAR of the entire area adjusted to NAVD88, 2004.65 datum.

(B) 1 foot resolution Pre Katrina LIDAR of the levees adjusted to NAVD88, 2004.65 datum.

(C) 3 foot resolution Pre Katrina LIDAR of metro New Orleans adjusted to NAVD88, 2004.65 datum

(D) 2 foot resolution Post Katrina LIDAR of the levees adjusted to NAVD88, 2004.65 datum

(E) 3 foot resolution Post Katrina LIDAR of the levees adjusted to NAVD88, 2004.65 datum.

These LIDAR data sets were geo-referenced into the Louisiana State Plane Coordinate System, NAD83, South Zone. The horizontal unit of measurement utilized was the U.S. Survey Foot.

The LIDAR data sets were provided to the Delft University of Technology team for their use in modeling the ground features in the flooded areas.

2.0 Aerial Photography

Aerial photography of the area was obtained from several sources. The primary aerial sets utilized in this report are listed below:

(A) Pre Katrina 2005 1 meter ground resolution DOQQ aerials downloaded from the www.atlas.lsu.edu web site.

(B) Post Katrina 1 foot ground resolution 8/31/05 and 9/2/05 GE Energy aerial photography which is available on the IPET web site.

3.0 Flood Protection System

Utilizing the Pre Katrina 1 foot resolution LIDAR and the 1 foot resolution GE Imagery, we prepared a map of the levee and floodwall structures around the greater New Orleans area. This mapping was prepared utilizing Esri ArcView software and was provided to the Delft University of Technology team in vector form. A raster image of the limits of this mapping is shown in Figure 3-1.

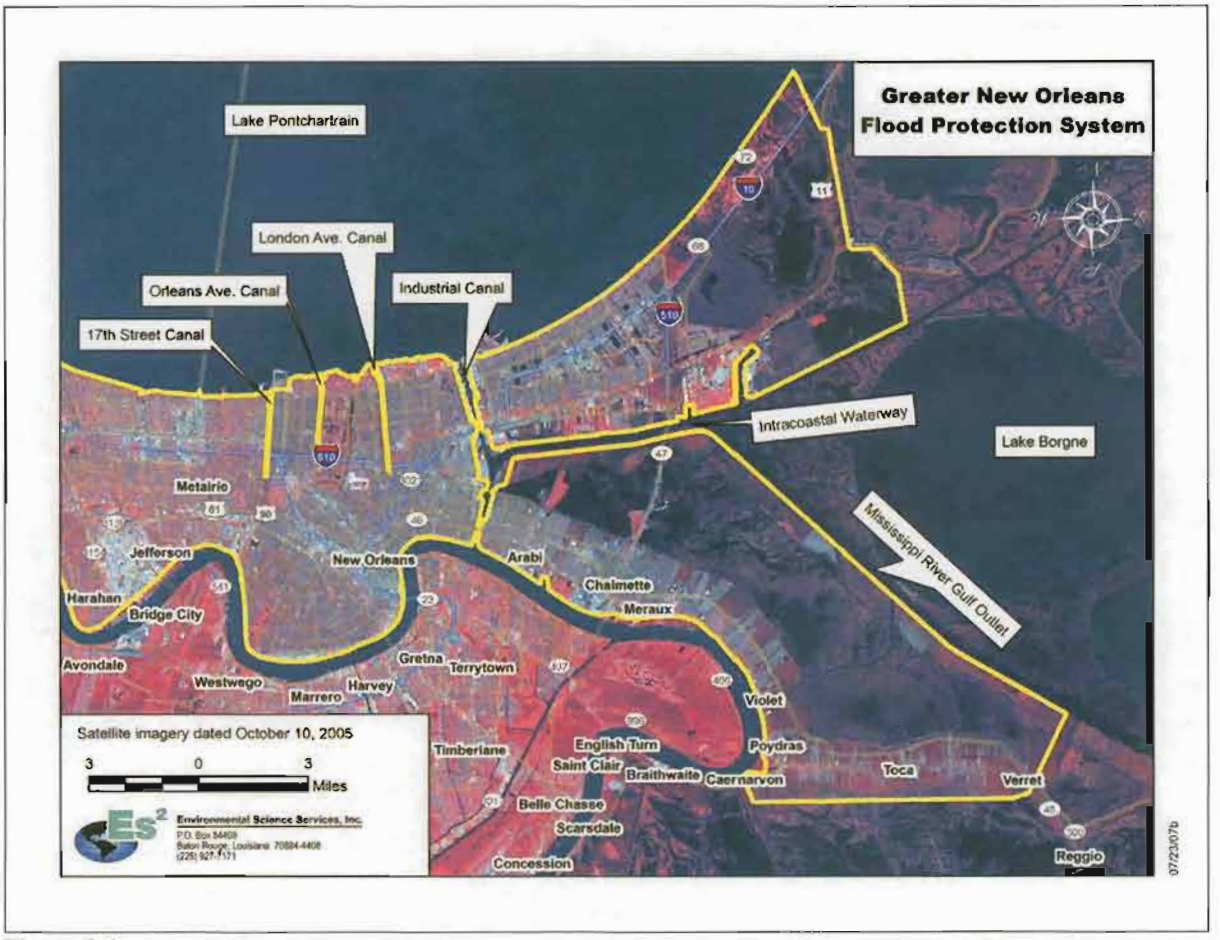


Figure 3-1

4.0 Breach Mapping

Using a combination of the Post Katrina LIDAR and the GE Imagery, we mapped the location and sill height elevation of all visible breaches in the flood protection system. It should be noted that the elevation of the sill could not be mapped in this manner on breaches which extended below the water level at the time of the LIDAR flight. For those breaches, we utilized eye witness accounts of the depths of the breaches, which were provided by Dr. Ivor Van Heerden. We also very recently received Corps of Engineers survey data at some of the underwater breach sites. Figure 4-1 shows the overall extent of our breach mapping. Figures 4-2, 4-3 and 4-4 show a few examples of mapped breaches.

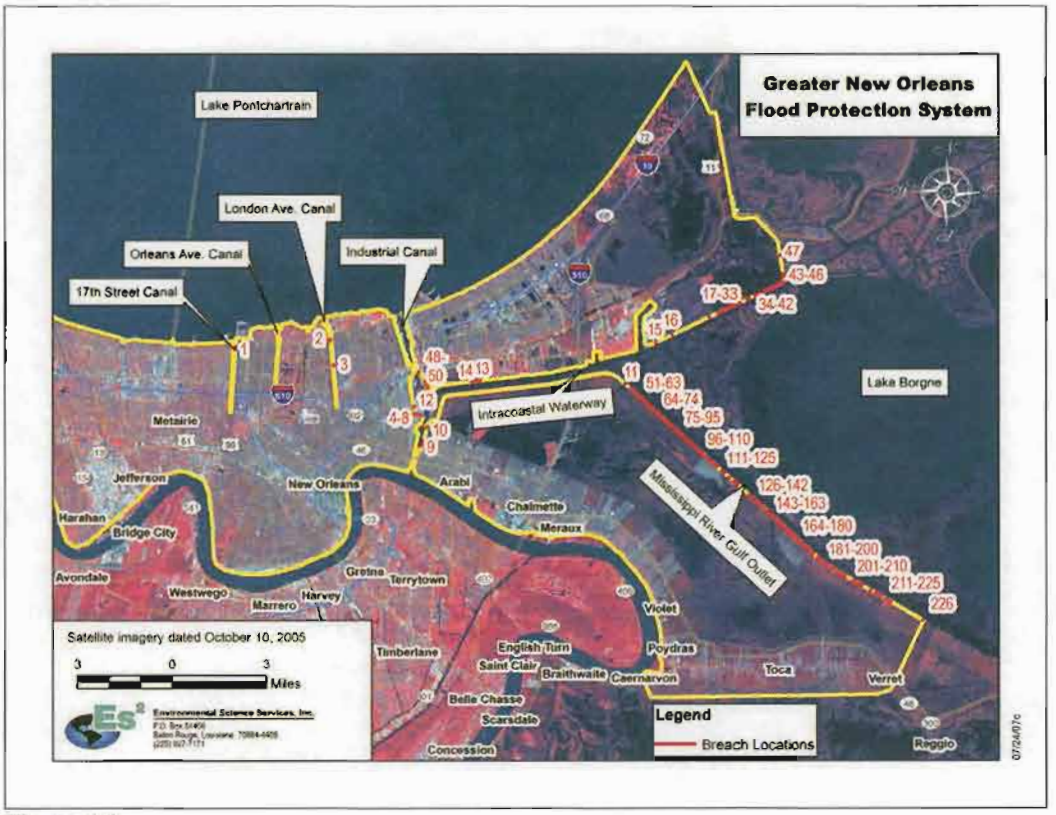


Figure 4-1



Figure 4-1

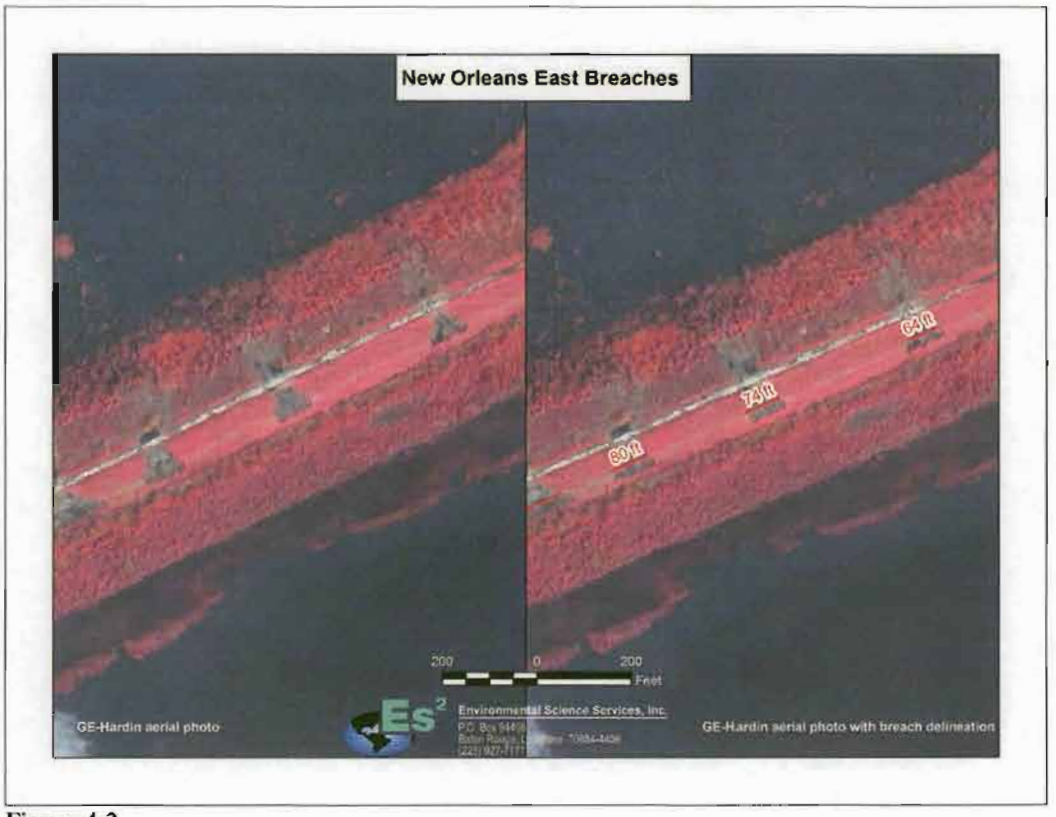


Figure 4-2



Figure 4-4

The results of our breach mapping were sent to the Delft University of Technology team in both Esri shape files and as Excel spreadsheets.

5.0 Pumping Station Data

Pumping Station data was obtained from both the IPET written reports and from a hard drive provided by the U.S. Army Corps of Engineers. In particular we utilized the data contained in the file \ipet_GIS.ZIP+\IPET.MDB. It contained pump name, capacity, location coordinates, "pump-from" data, "pump-to" data, as well as pump elevation data.

6.0 Other Images

In addition to the data sets listed above, I have also started reviewing numerous images contained on the recently provided Corps of Engineers database. Figure 6-1 below, was taken from a flythrough of hydrographic survey data in the 17th Street Canal. The file is entitled "17th_Mar2006_2min_250Ft.avi" located at "\IPET_PW_Post-Katrina\Survey\HYPACK\17th St Canal\AVI" on the Corps database drive provided. The vast majority of the canal is relatively shallow but the area where the breach occurred was dredged to a depth of approximately 18 feet. The relationship of dredging this deep in the immediate vicinity of shallow sheet piles is something that will be investigated further.

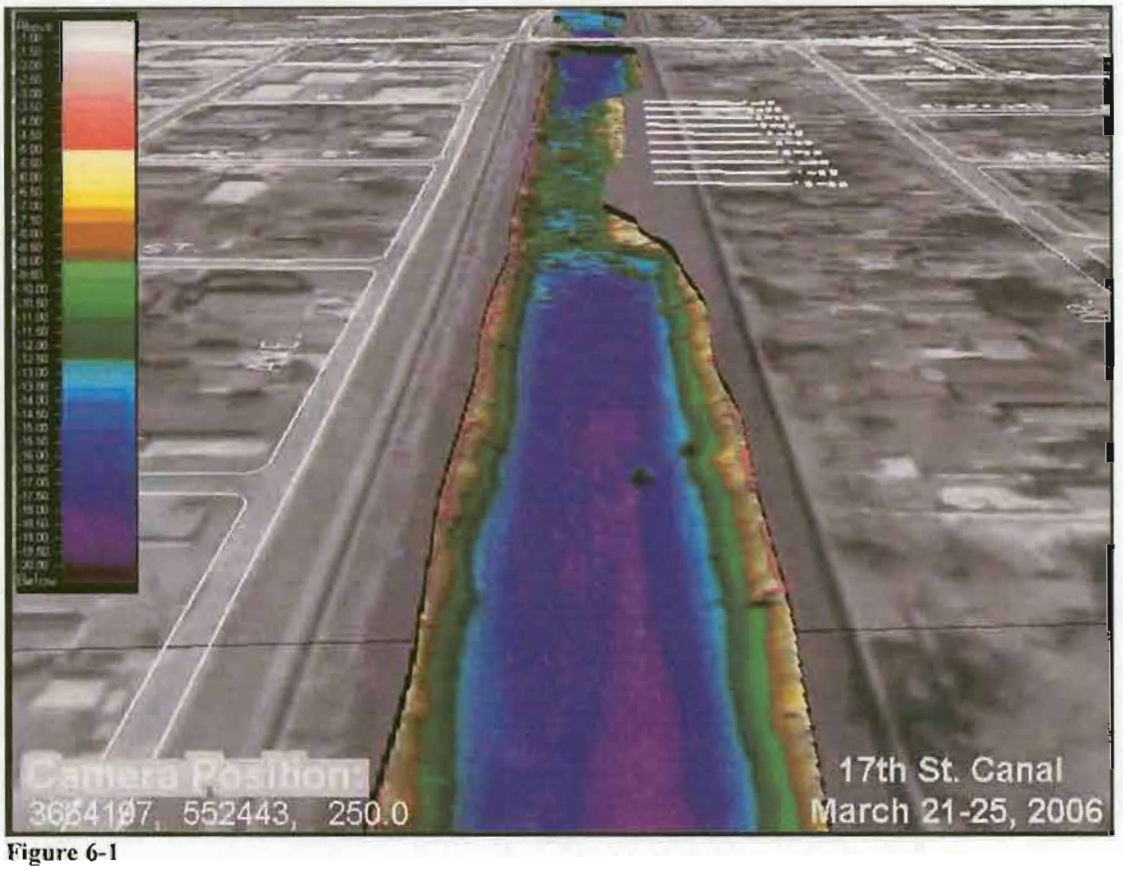


Figure 6-1

Figure 6-2 is a photograph taken of the 17th Street wall failure while water was still pouring into the neighborhood behind the wall.



Figure 6-2

Figure 6-3 shows the same area, a piece of the broken floodwall and the devastation left behind after the breach was blocked and the water was pumped out of the neighborhood.



Figure 6-3

Figure 6-4 shows the same area totally flooded, while the area on the other side of the canal, where no wall failure occurred, is completely dry and damage to homes and businesses is relatively minor.



Figure 6-4

Figure 6-5 is a photograph taken of the lower 9th ward area immediately adjacent to a large wall failure on the east side of the Inner Harbor Navigation Canal. Note that most of the structures which were located immediately east of the break are simply gone.



Figure 6-5

Figure 6-6 is a photograph of the Bayou Bienvienue structure at the Mississippi River Gulf Outlet (MRGO). It shows the water flowing around the flood control structure. Also note that the levee west of the structure is in good condition, while the levee east of the structure is heavily damaged.



Figure 6-6

Figure 6-7 shows a ground level view of a portion of the MRGO levee that is simply gone. Thousands of feet of this levee were very heavily damaged.



Figure 6-7

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Please note that we received almost 500 gigs of data from the U.S. Army Corps of Engineers this past week and have just started going through it. This report will be updated as pertinent data sets are made available and reviewed.