Part 3

SYSTEMIC FAILURES OF FLOOD CONTROL INFRASTRUCTURE
New Orleans neighborhoods were filled with as much as 12 feet of water, for up to 6 weeks.
Figure 3 - 10 M SPOT Satellite Image: 2 Sept 2005
With Water depth overlays

- 17th Street canal break
- Orleans canal
- London Ave Canal Breaks
- IHNC Failures

Water Depth | Color
---|---
15 | 1
14 | 2
13 | 3
12 | 4
11 | 5
10 | 6
9 | 7
8 | 8
7 | 9
6 | 10
5 | 11
4 | 12
3 | 13
2 | 14
1 | 15

Flood elevation: +3ft NAVD 88
Flood gate over rail crossing on Florida Ave Lift Bridge was not repaired and inserted across tracks, even though paid for over a year previous after being damaged.
The flood wall along the Orleans Drainage Canal was never completed, but stopped 100 yards from Pump Station because of an interagency dispute about who should pay for a new wall on the old pump station, which was built in 1903.
ING 4727 was built in 1990 as a dry cargo cover-top barge with a steel hull. It was 200 feet long, 35 feet wide, and 12 ft high, with a cargo volume of 84,659 ft³ (1877 tons). It was being leased to Lafarge North America, and was tied up along the MRGO channel.
Damage to concrete flood wall where ING 4727 Barge collided with it, along the south side of the IHNC adjacent to the Lower Ninth Ward
Industrial Canal at the Ninth Ward

Erosion
Strength Loss
17th Street Drainage Canal breach

- The 17th Street canal had walls 14 ft above MGL.
- The highest flow it had ever experienced was between 6 and 7 ft.
- It began failing when water got to 8.5 ft.
Army helicopters and contractors worked for weeks to fill the enormous gaps in the levee system, BEFORE pumping could begin.
Overlay of 1872 map by Valery Sulakowski on the 1937 WPA map, showing the 1872 shoreline and sloughs (in blue) along Lake Pontchartrain. The position of the 2005 breach along the east side of the 17th Street Canal is indicated by the red arrow.
Geologic profile for the 17th St Canal flood wall prepared by Corps’ New Orleans District office in 1990. Three of four holes in vicinity of the 2005 failure had zero sample recovery. These contacts were projected and sheet pile tips designed accordingly.
Alternative interpretation of the Eustis 1982 borings for the 17th Street Canal East Levee, near the 2005 break. In this case the swamp deposits would extend beneath the sheetpiling tips over a zone 300 feet long, where the break occurred.
17th Street Outfall Canal
East Bank Floodwall Construction
ca 1993 Floodwall Protection/Capping Project (High Level Plan)
Hammond Hwy to Veterans Blvd Sta. 8+50 to 80+00 (+) -- Typical

Existing floodwall elevations running ~12.1 ft (LMSL 1983-2001) — from 2005 post-Katrina field surveys

14.0 ft NGVD Design Elevation

Contract plan “NGVD” (unspecified epoch) - assumed ≈ MSL (LMSL) in 1993

USACE Monument 14 used as reference for floodwall construction

Elevations are referenced to an estimated LMSL (1983-2001 epoch) at Lake Pontchartrain

Preliminary 5 Mar 06 — subject to correction

Delta ≈ 1.9 feet

1.96 ft difference likely due to:
- Uncertain BM 14 elevation ... believed by MVN to be suspect/disturbed
- Uncertain BM 14 datum (1951 or ?)
- Settlement (probably < 0.3 ft)
London Avenue (North) breach

Similar failure mechanism as 17th St Canal
The South Breach of the London Avenue Canal was caused by excess seepage pressures developed in the sand underlying the canal, which had been dredged.