
Lessons from 9/11 and Hurricane Katrina

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Engineer Research and Development Center

Military Engineering

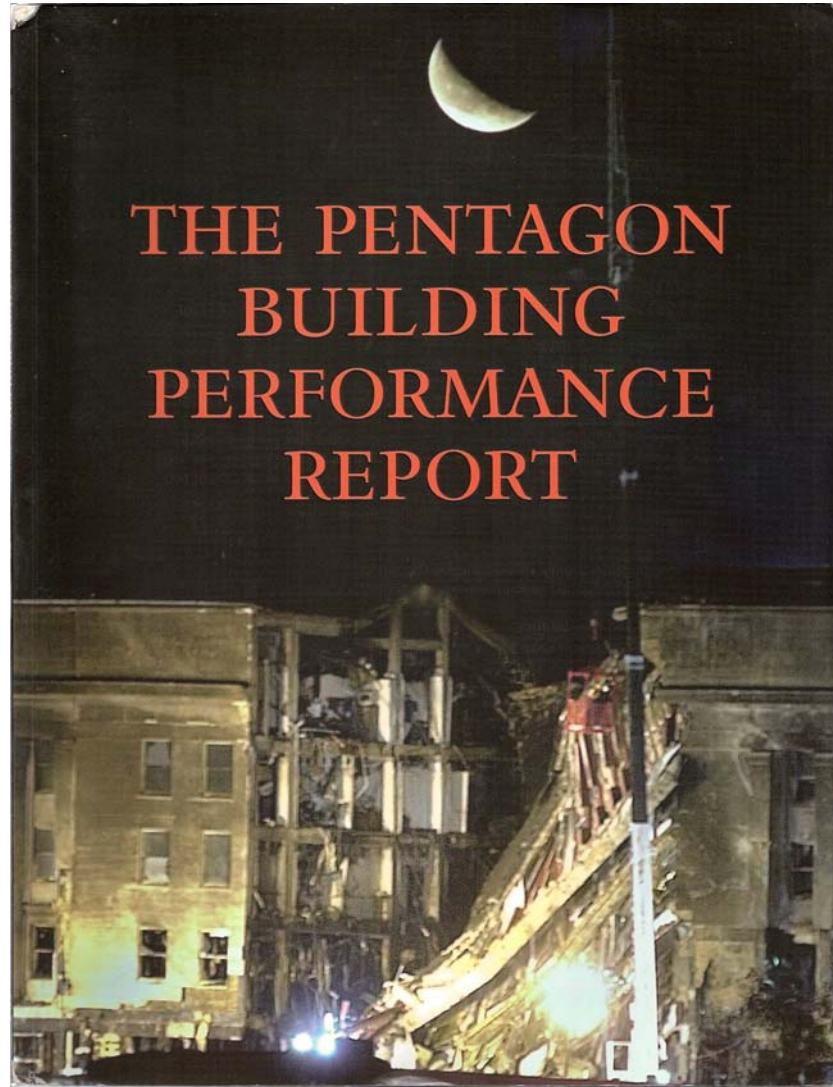


Civil Works



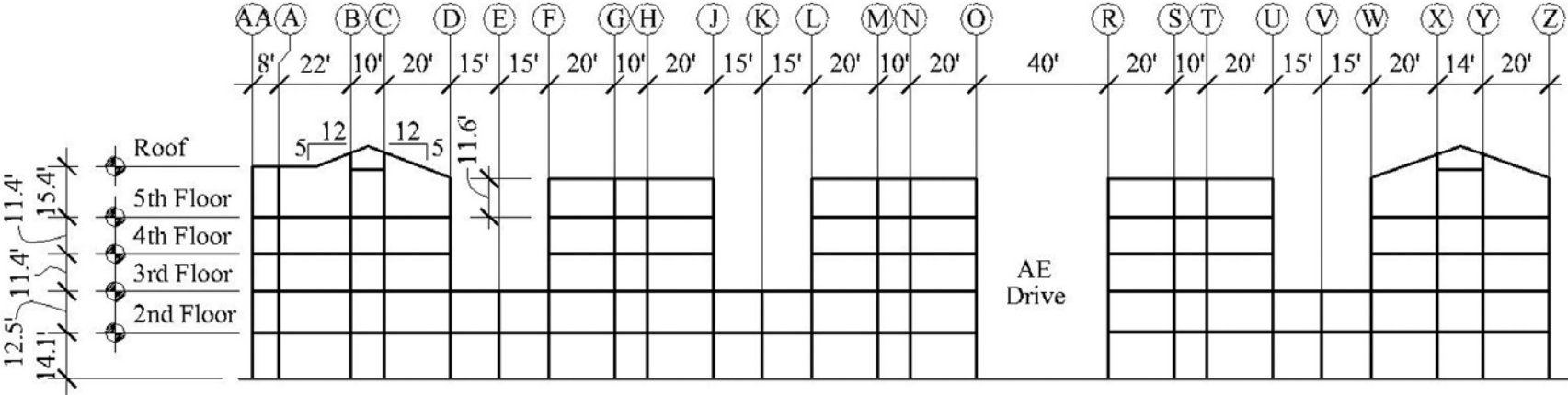
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ASCE Building Performance Study

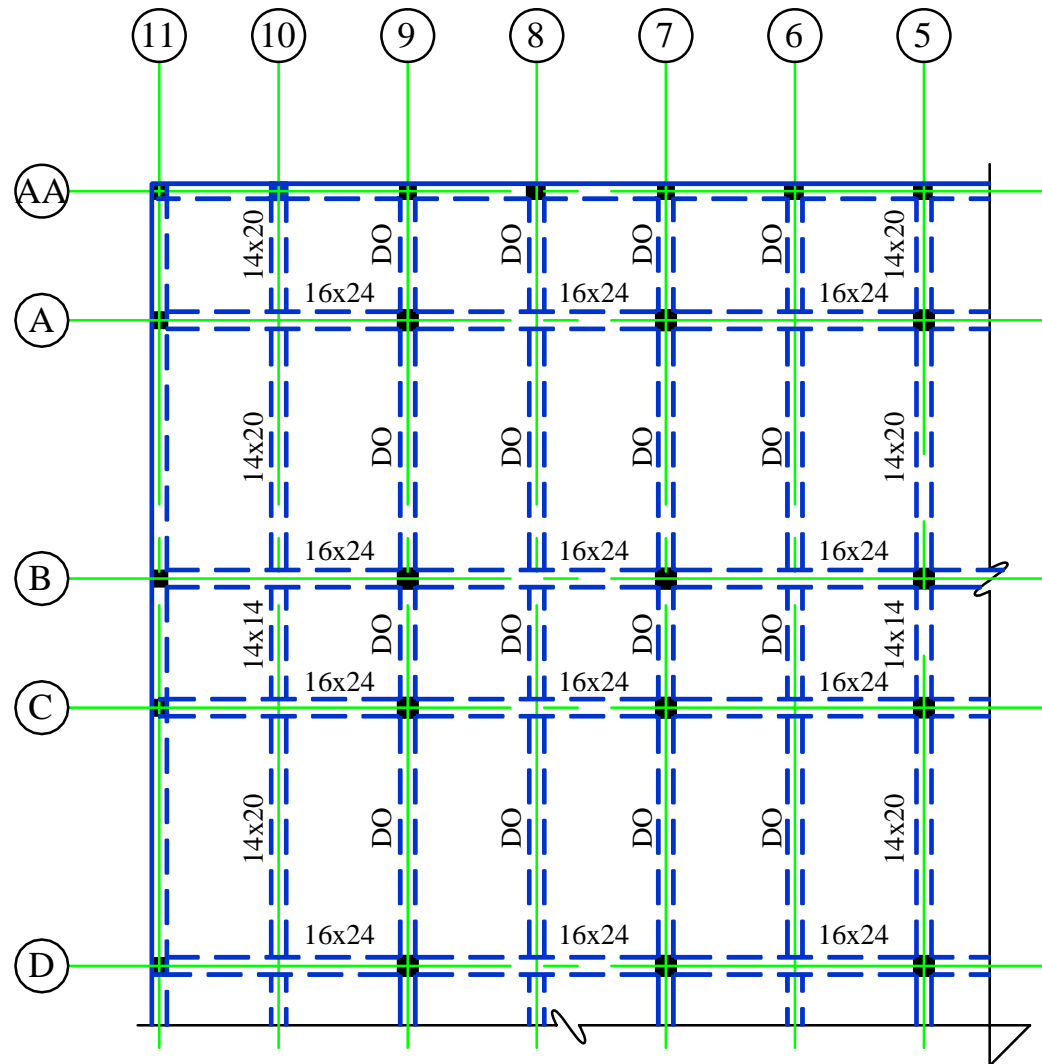


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Cross Section



Structural Framing

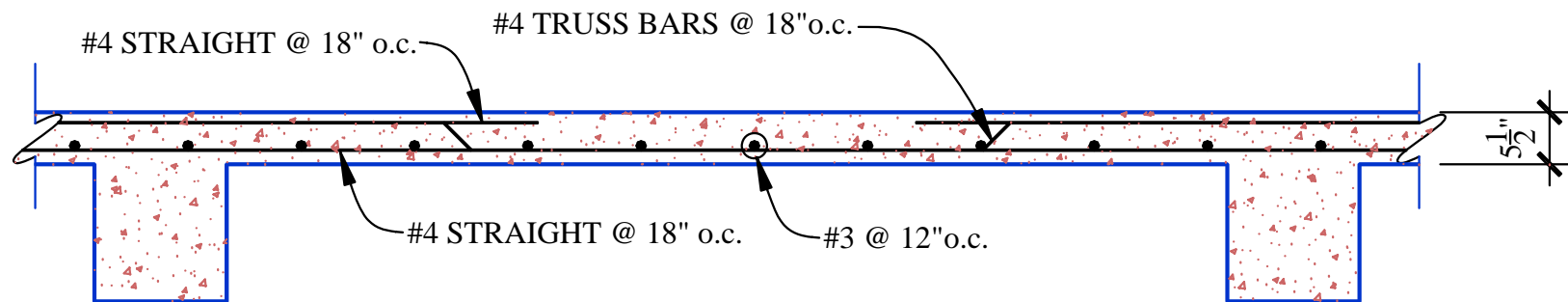


NOTE: FLOOR IS 5½" CONCRETE SLAB

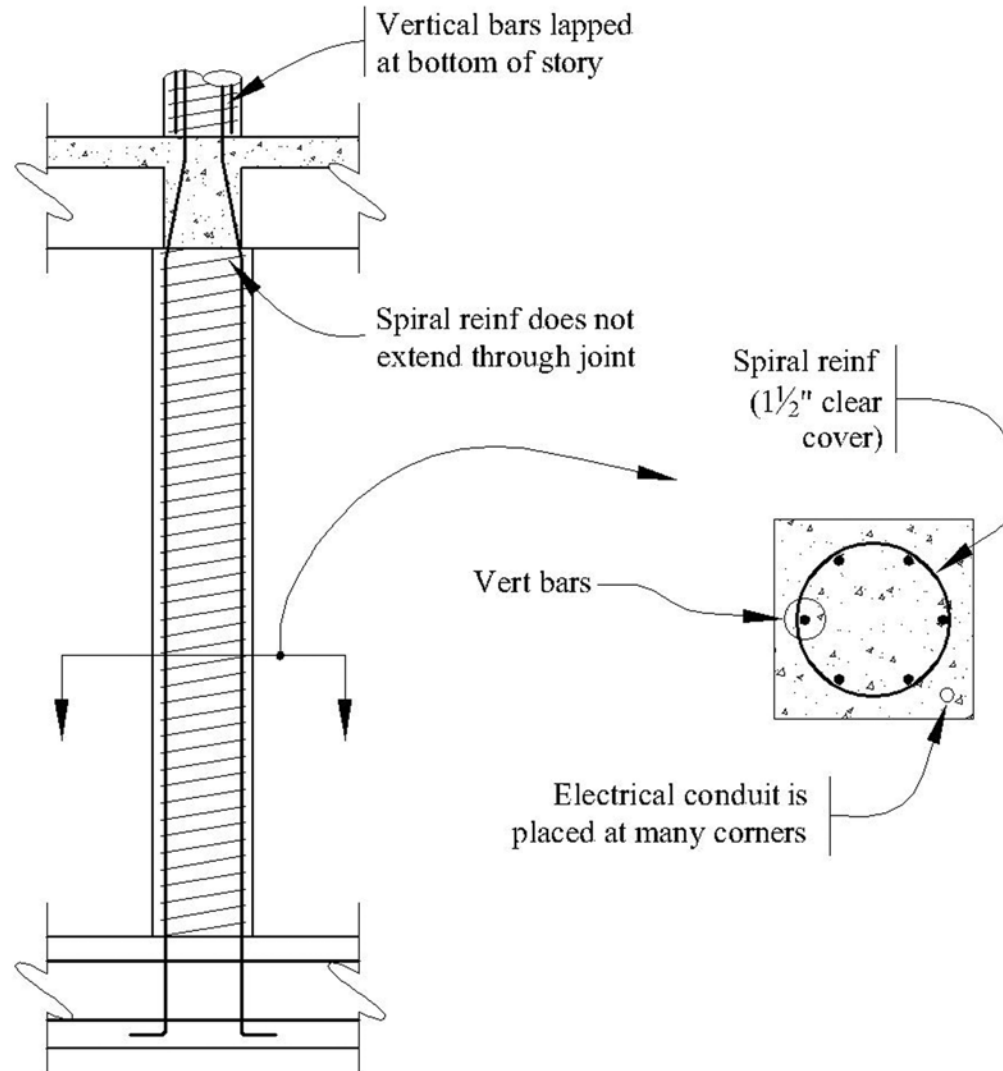


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Reinforcement of Floor Slabs



Spirally Reinforced Columns

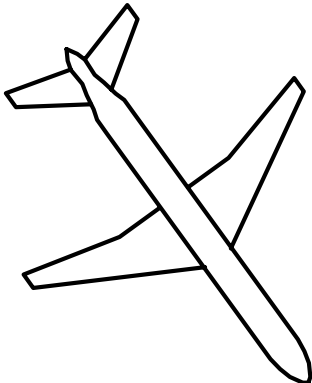


Aircraft Impact



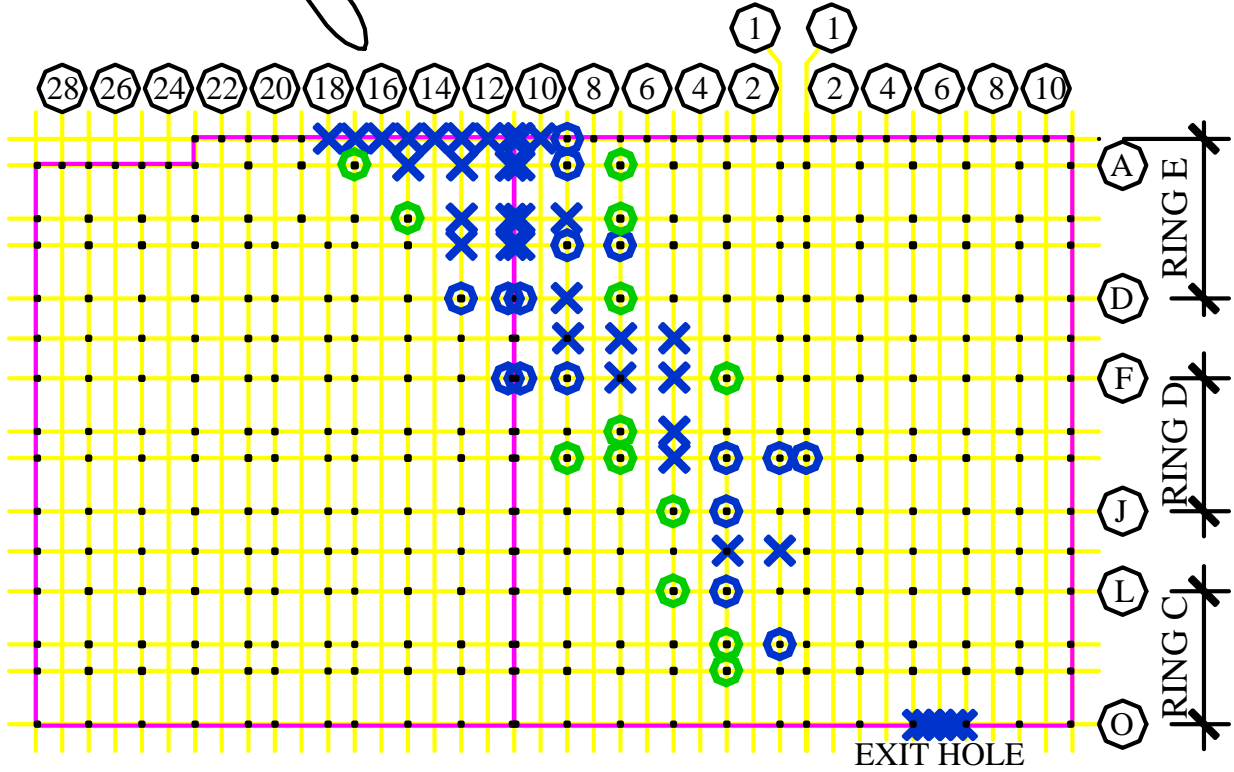
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Impact Damage to Columns

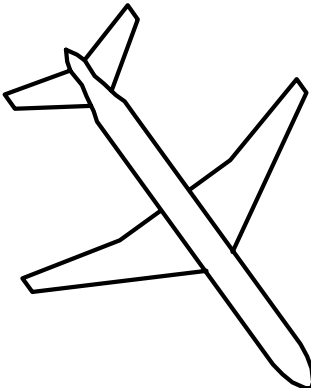


LEGEND

- ✕ MISSING COLUMN
- STRIPPED AND BOWED COLUMN
- SPALLED BUT STRAIGHT

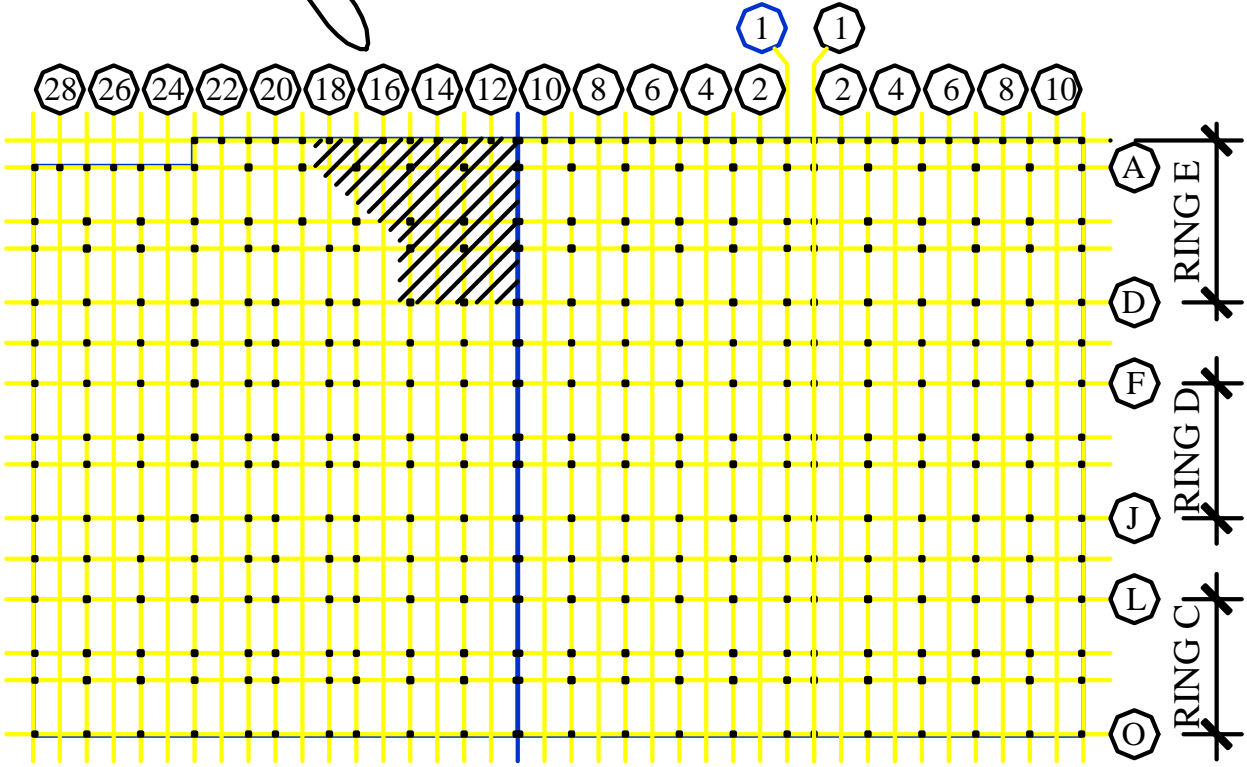


Limit of Collapse



LEGEND

////// COLLAPSED AREA





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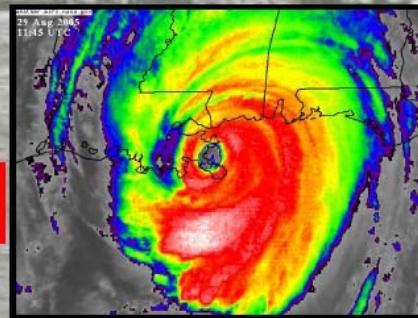
Performance Evaluation of the New
Orleans and Southeast Louisiana
Hurricane Protection System

Draft Final Report of the Interagency
Performance Evaluation Task Force

Volume I – Executive Summary and Overview

1 June 2006

FINAL DRAFT
(Subject to Revision)



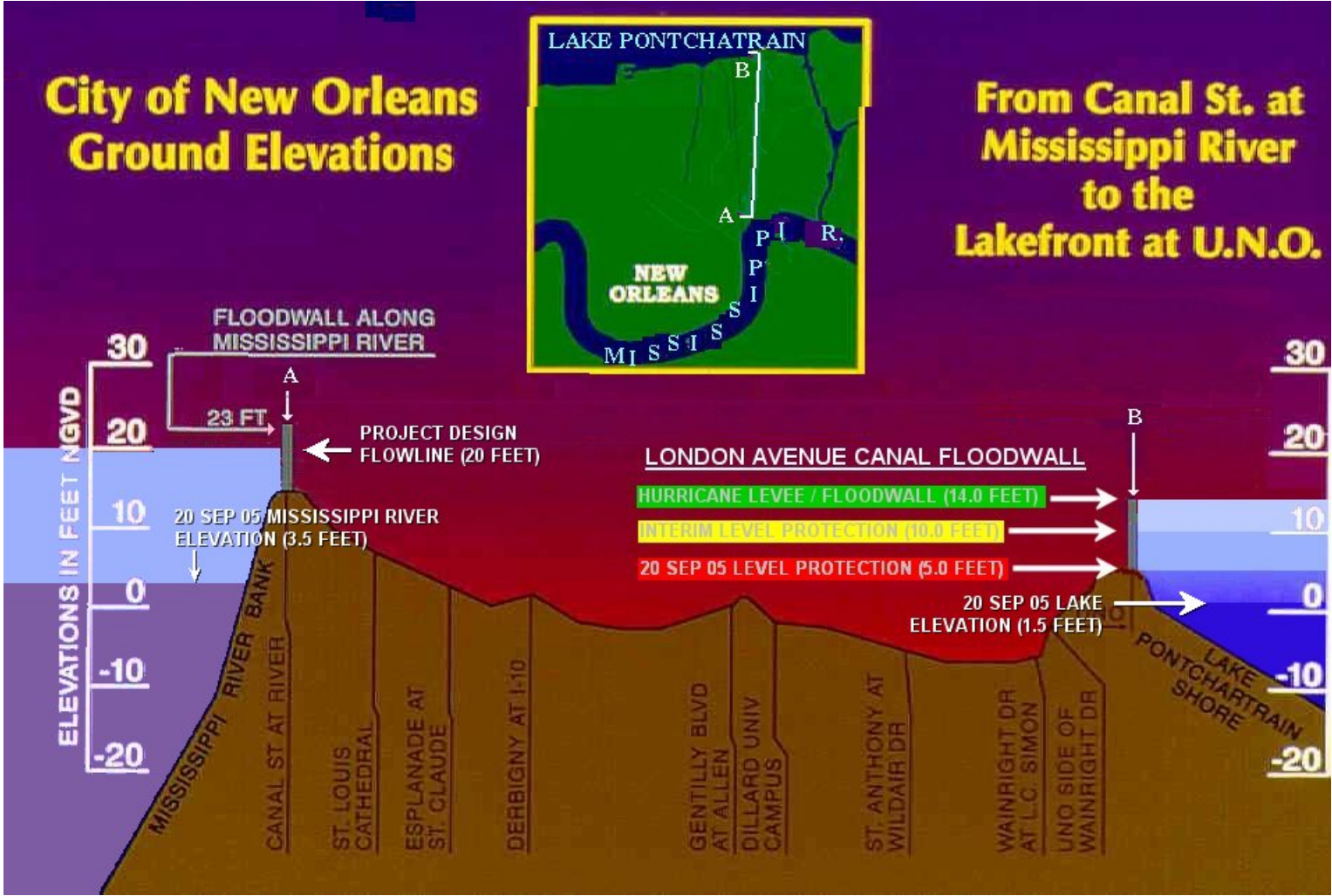
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2005 Protection

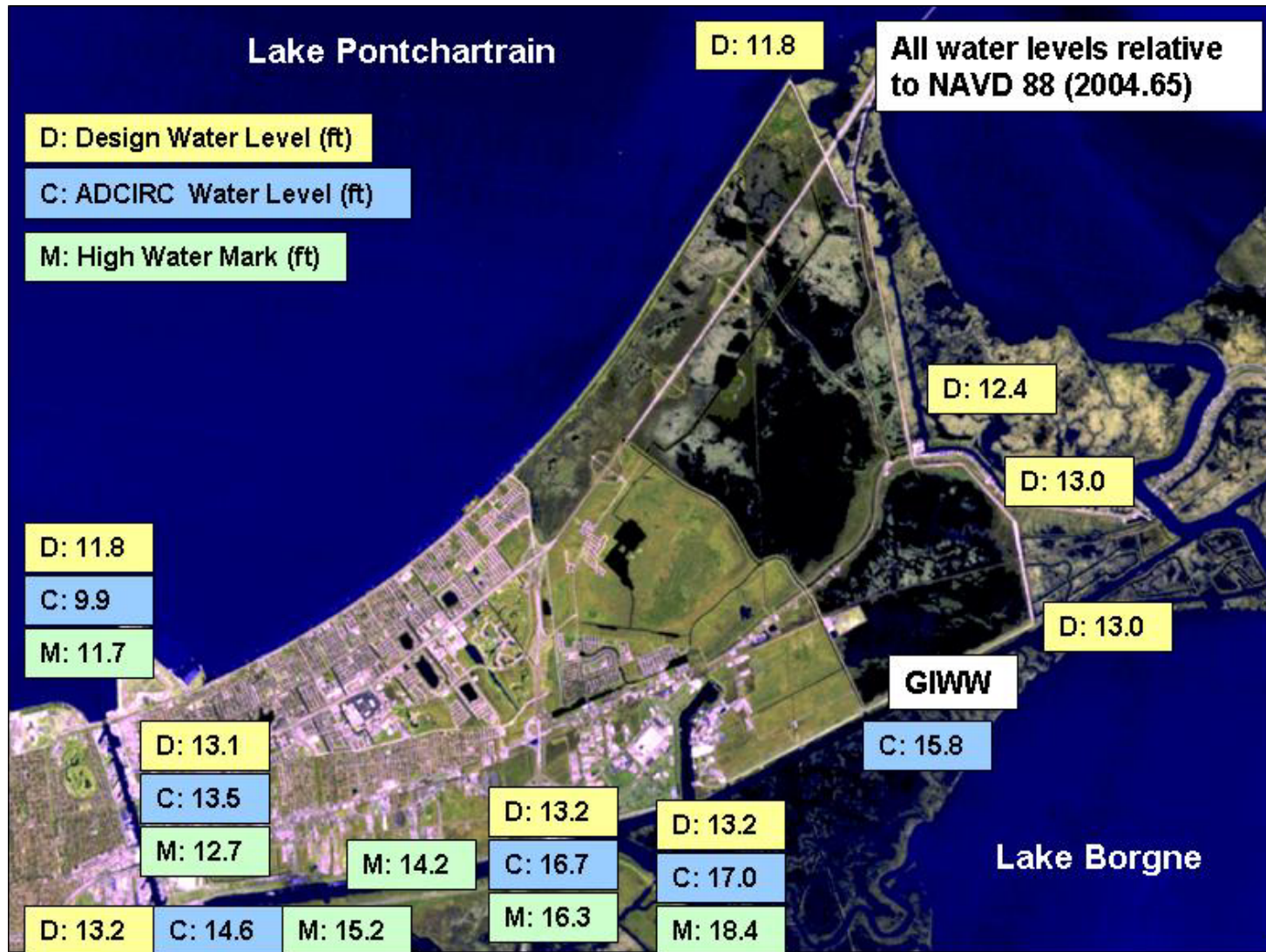


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Cross Section



New Orleans East Water Levels



Overtopping



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Post Katrina Condition



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Overtopping Breach



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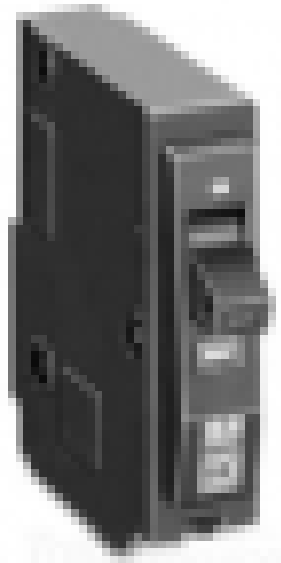
Adjacent Floodwall



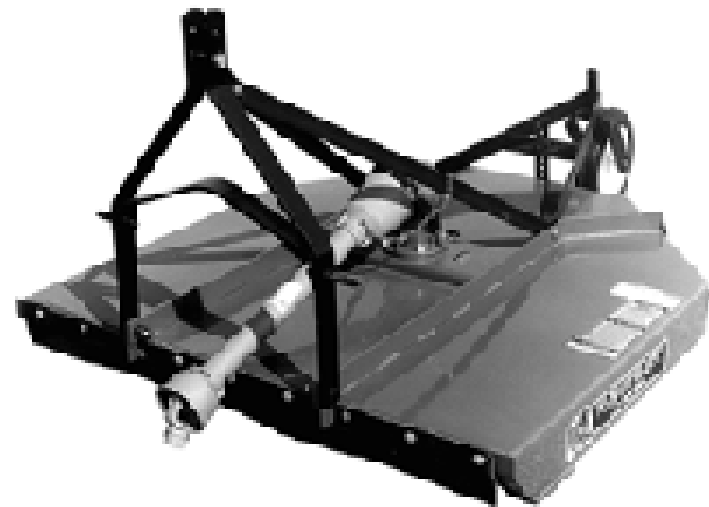
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Multi-Hazard Engineering - Design FOR Failure

- **Circuit Breaker**



- **Bush Hog**



Multi-Hazard Framework

- **ASCE 7-02: “...sustain local damage with the structural system as a whole remaining stable...”**
 - **Energy-absorption**
 - **Redundancy**
 - **Continuity**

