

SEWERAGE & WATER BOARD OF NEW ORLEANS



Association of Metropolitan Water Agencies
**Infrastructure Resilience and Renewal in
Response to Extreme Events**

October 29, 2013

Infrastructure Resilience and Renewal in Response to Extreme Events

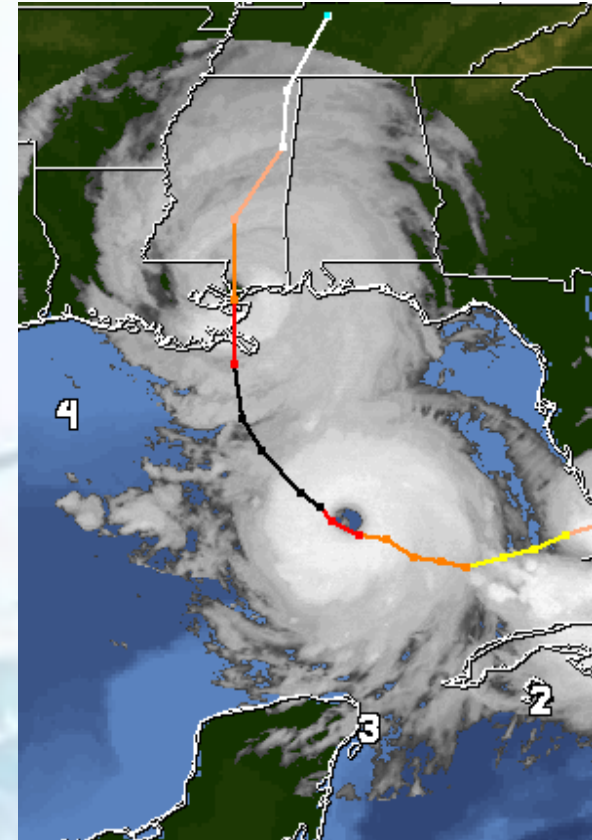
- Hurricane Katrina August 29, 2005
- Building Smarter
- Building for Resiliency
- Building for Redundancy
- Infrastructure Renewal
- Business Process Rebuilding



Hurricane Katrina

August 29, 2005

- One of the Most Devastating Storms to Ever Hit the U.S.
- One of the Most Massive Utility and Recovery Projects Ever Undertaken



Hurricane Katrina

August 29, 2005

- 80% of the City Flooded When Several Levees Breached
- Flood Waters Destroyed More Than 200,000 Homes and Businesses



Devastation Was Much Worse Than Could Be Depicted in the Media



The Board Suffered Extensive Damage to Facilities, Machinery, and Equipment



Disaster- Infrastructure Damage

- Water Purification Plants
- Waste Water Treatment Plants
- Sewerage Pumping & Lift Stations
- Power Generation & Distribution Facilities
- Waste Water Collection System
- Water Distribution System
- Drainage Pumping Stations
- Customer Base



Primary Goals

- To repair damaged parts of the field systems so that services would be available to citizens and businesses still in the City
- To accommodate the rebuilding and restoration of the City through building a smarter and more resilient infrastructure and business processes



Drinking Water System

- As more and more people returned to the City, water was needed for personal and safety needs, as well as clean-up efforts and fire fighting



Drinking Water Treatment System

- Sodium Hypochlorite Facility
- Reduce Risk
- Reduce Supply Interruptions



Reliability

- At the Carrollton Water Purification Plant the Sodium Hypochlorite Bulk Storage & Feed Facility eliminates the need for transporting chlorine by rail and storing it at the plant.



Drinking Water Distribution System

- Strategies to Reduce Water Hammer Impact
- Water Towers
- Reconfiguration of Distribution Pumps



Waste Water Treatment

- 120 MGD Plant Destroyed
- 18+ Feet of Water
- Discharged Untreated Product until October 15, 2005



Waste Water Treatment

- Primary Treatment Restored
October 15, 2005
- Secondary Treatment Restored
November 16, 2005



Waste Water Treatment Resilient Features

- New Berm
- 4 MW Generator
- Relocation of All Electrical Functions



Waste Water Treatment & Storm Surge Protection

- Wetlands Assimilation Project
 - Beneficial Reuse of Treated Effluent
 - Restoration of a Barren Wetlands
 - Protection for the Plant from Future Storm Surges



Waste Water Collection System



Waste Water Collection

- Rehabilitation of 83 Sewer Pump and Lift Stations
- Relocation of Underground “Can Stations”
- Installation of Emergency Disconnect Valves



Power Generation

- \$141 Million Hazard Mitigation Grant
- Implement Long-term Hazard Mitigation Measures after Major Disaster Declaration
- Enhance Production and Increase Reliability of Power Generation Systems

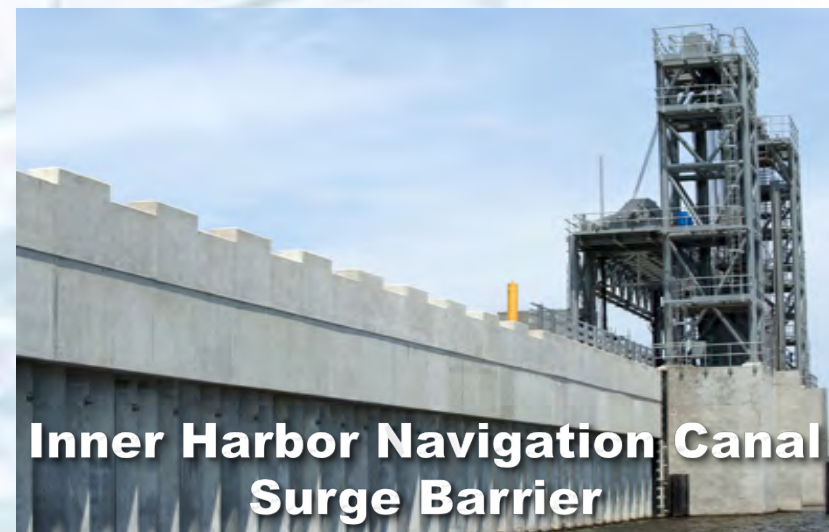
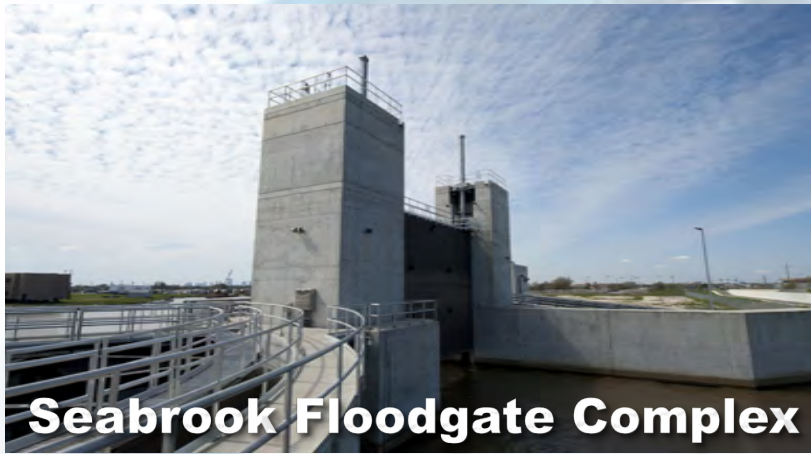


Hazard Mitigation Grant Power Plant Projects

- Generator for Turbine 4
- Electrical Conduit from Carrollton Water Purification Plant to Drainage Pumping Station 1 for Turbine 6
- Update Feeder Network
- Emergency Fuel Storage
- Upgrade of Turbine & Boilers
- Power Plant Hardening



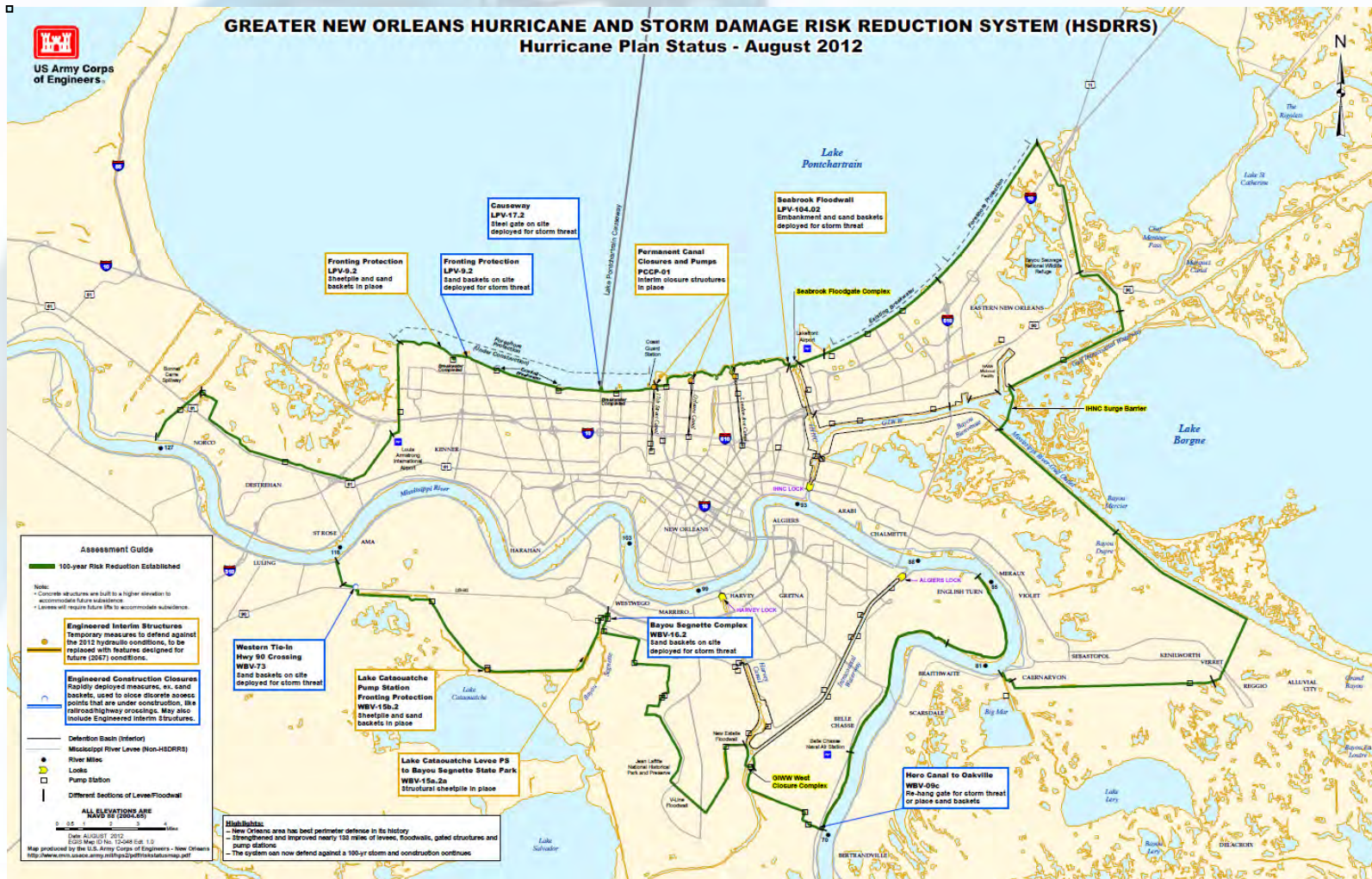
100 Year Hurricane & Storm Damage Risk Reduction System



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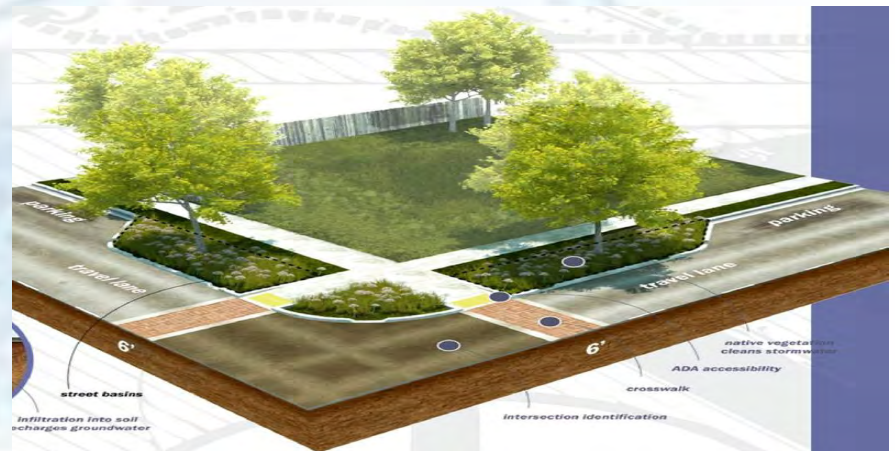
Managing Water As a Resource For Economic Growth

- Creating A One Water Solution for a More Sustainable and Resilient New Orleans
- Leveraging Water Investment to Spur Economic Growth



Paradigm Shift

- Transforming Street Flooding into Storm Water Storage
- Green Infrastructure
- Improve Water Quality
- MS4 Permit Compliance
- Improve Quality of Life



Paradigm Shift

- Pump and Dump
- Using Storm Water to Reduce Subsidence
- Reduction of Pipe Repair
- Stabilization of Street Surface





<http://swbno.org>

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Resiliency

- Drainage Pumping Station No. 7 on Marconi Drive near City Park now has a new 4,023 horsepower, 3 megawatt generator to run one of its pumps in case commercial power is interrupted



Building Smarter



Communications

- Base station antennas and antenna mounts that were damaged during Hurricane Katrina have been replaced with hardened antenna mountings.
- The power supply will run off of both 25Hz and 60Hz power so redundant power can be achieved easily.



Business Processes

- Entire Neighborhoods Swept Away
- Reduced Customer Base
- Inability to Read Meters
- Inability to Communicate with Customers



Business Processes

- Establishment of New User Rate Structure for Sewerage & Water Systems
- Eight Years of 10% per year Increases
- Rebuilding of Bond Ratings
- Decision to Convert to Electronic Metering System
- Development of a New Customer Billing System
- Re-Establishment of Employee Training Program



Business Processes

- Establishment of Pay Stations
- Development of Financial Policies to Include Cash Reserves
- Improve Customer Communications
- Establishment of A Business Continuity Plan
- Promotion of the Water Systems Role in Economic Development



Partial Cost of Rebuilding

- Almost \$2 billion in funding has been dedicated to rebuilding the system.
- The total estimated project cost amount for all FEMA-related activity to date is approximately \$739 million. Of this amount approximately \$573 million is obligated by FEMA.
- Corps funding has included \$1.1 billion for SELA and \$145.8 million for storm proofing.
- About a million dollars of stimulus funds has also been received.



Building Stronger, Better for Sustainability and Resilience

Recovery is about better handling the storms we face in the future, and about being a better place to live before, during, and after those storms. So, a recovery without resilience is not a real recovery, and resilience without sustainability is not resilience. So it's critical to our recovery that we invest in not only rebuilding back what we had before, but also investing in making sure that that rebuilding is safer, stronger, and smarter than we had before, with a better understanding of our relationship to the environment in which we live. Sometimes "Safer, stronger, smarter" means a tweak to an existing idea, like elevating a building out of the floodplain, or adding solar panels to housing so it can be more affordable; but at other times a tweak isn't enough and we're required to reimaging our very relationship with our environment and how we adapt to it.

Pat Forbes
Executive Director
Office of Community Development
Division of Administration



Moving Forward

**New Orleans Is Not the
“Victim of Disaster”**

But Is

The Poster Child for How to Recover



New Orleans is a Great Place



SEWERAGE & WATER BOARD OF NEW ORLEANS



Re-Building the City's Water Systems for the 21st Century