



SEWERAGE & WATER BOARD OF NEW ORLEANS

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KATRINA 10

PROGRESS...

DEVASTATION TO RECOVERY
TO RESTORATION TO REBUILDING

A MESSAGE FROM EXECUTIVE DIRECTOR, CEDRIC GRANT

August 29, 2015 New Orleans commemorates the 10th anniversary of Hurricane Katrina. And, the entire country is looking at New Orleans and how far we have come in the rebuilding of our city and its infrastructure. Indeed, we have come a long way in the 10 years of rebuilding. What we have accomplished in these last 10 years is the ultimate testimony to our resilience in the face of insurmountable challenges.

No other American city has ever experienced such massive devastation in the aftermath of a disaster like Hurricane Katrina. But as the saying goes, 'straight roads do not make skillful drivers'. The Sewerage and Water Board has learned valuable lessons on how to deal with large-scale disasters through our experience with Katrina. Since then, we have faced and overcome many other challenges – like Hurricanes Rita, Ike and Gustav and tropical storms Lee and Isaac. New Orleans is America's greatest comeback story and the Sewerage and Water Board is an integral and essential part of that story. The board turned tragedy into an opportunity for change and reform while going from recovery to resilience. For without the quality of life services of water, sewer, and drainage services, there would have been no city in which to return.

The Sewerage and Water Board's mission is to provide safe drinking water to everyone in New Orleans; to remove waste water for safe return to the environment; to drain away storm water; to provide water for fire protection; to provide information about products and services; and to do all of



Employees are shown working to keep the flood waters from the Power Plant. Over 300 Sewerage and Water Board employees stayed on the job during Hurricane Katrina. It was their efforts that dewatered the city in 11 days after the breaches were closed. There are many stories of heroics by employees to keep facilities operating at great risk, while helping citizens and saving the lives of fellow employees.

The drainage pumps were impacted by the brackish flood waters during the dewatering process. It was the employees of Facility Maintenance, a department that manufactures parts for aged equipment, that disassembled and repaired pumps. At the time, this pump had been in service for more than 80 years. Today, it is still in service.



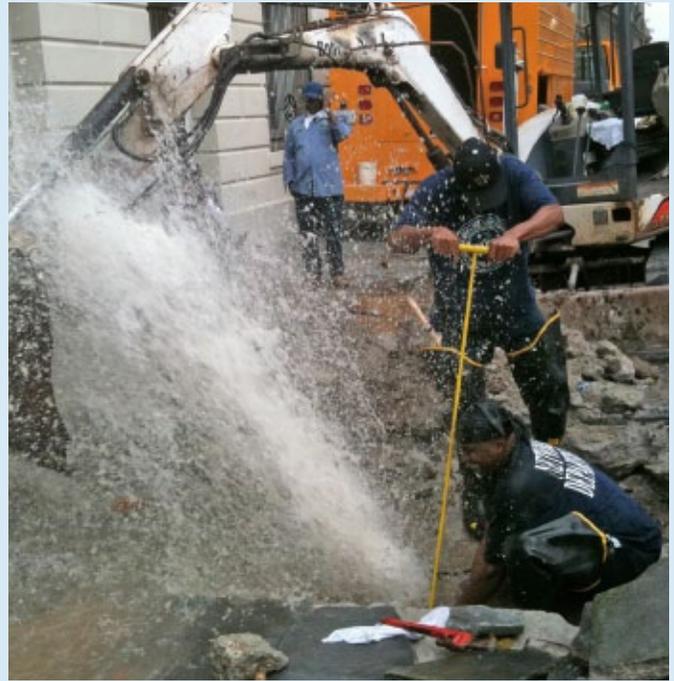
this continuously at a reasonable cost to the community. The aftermath of hurricane Katrina tried to challenge our ability to achieve our mission. But we have faced the challenge and continue to rebuild smarter, stronger, reliable and resilient. We want our customers to get to know us better and we want to remind customers that the board and its employees will always be dedicated and committed to fulfilling its mission.

As we made plans for the future, we envisioned progressive and comprehensive changes and reforms that would positively impact our delivery of services to the customer. A year ago, the Board of Directors was restructured, in order, to diversify and strengthen public advocacy. Additionally, the Sewerage & Water Board has gained efficiency and effectiveness through its integration with the City Department of Public Works. As a result of the restructuring, all capital improvement and infrastructure projects are fully coordinated in construction, acquisition, improvement, maintenance, and promotion of any public improvement or project, specifically including activities related to public utilities, sewerage, flood control, drainage, and streets.

The Sewerage and Water Board has completed the majority of the rebuilding and repairs to its facilities damaged by Hurricane Katrina with funding provided by the Federal Emergency Management Agency (FEMA). To date, FEMA has obligated \$682 million to restoration of the system infrastructure... Vital drainage improvements are ongoing with \$1 billion in SELA urban drainage projects throughout the city. And, an additional \$48 million from FEMA for other drainage projects, a Hazard



The board is dedicated to its mission to provide quality of life services of water, sewer and drainage to the residents of New Orleans, as it continues to rebuild smarter, stronger more reliable and resilient.



Left: International Utility Industry professionals from South Korea recently toured Board facilities for lessons learned. Right; Cedric Grant, Executive Director presents a plaque, during the K10 commemoration week visit, to Frank Schulze of the German Technical Agency for Disaster Relief for their recovery work with employees immediately after the storm.



Mitigation Grant for the Water Hammer Project, designed to reduce the loss of water pressure and the retrofitting and hardening of the power plant further enhance board operations. Our projects on wetlands restoration in Bayou Bienvenue and the green infrastructure grant program for neighborhood organizations have garnered national and international attention.

Committed to aggressive rebuilding, Sewerage and Water Board forces completed over 31,000 work orders and service requests in 2014. This includes over 1,000 emergency requests such as sewer overflows and customers without water. The agency completed nearly 1,200 sewer mains, 1,500 water mains, nearly 10,000 water service requests, over 1,000 hydrants; and 1,100 valves. It met or exceeded all requirements of the consent decree, including 4,800 preventive maintenance activities at 83 sewer stations, inspected and exercised all sewer valves, cleaned nearly 1.5 million feet of sewer mains, inspected 750,000 feet of sewer mains, and inspected over 8,000 sewer manholes.

The federal government has invested \$14.5 billion for a 139-mile flood protection system including the most powerful pumps in the world and a 1.8 mile, 26 foot high surge barrier. Right now, in the city of New Orleans, millions of dollars in water sewer, drainage and roadway improvements are underway. This is one of the largest infrastructure projects ever for the city – one that is creating thousands of jobs requiring new skillsets. And, the GE Foundation has stepped in with a \$1.5 million grant to Delgado College, designed to fund a program to help the board train the next generation of water infrastructure personnel.

The board is moving forward with an on-going Capital Program. It is currently implementing a \$3.3 billion capital improvement program comprised of over 600 projects that will create 25,000 construction jobs across the city. Through the rate increase approved by New Orleans City Council in 2012, bond rating upgrades for sewer and water, and the recent bond sale, S&WB's capital improvement program for water and sewer is funded for the first time in 25 years. This work is being paired with the City's \$1 billion recovery program combining to create one of the largest infrastructure improvement efforts in the history of New Orleans.

We have accomplished so much in the last ten years. And moving forward, we maintain our commitment to the relentless pursuit of progress. To that end, I predict that the Sewerage and Water Board as it marks its 116th Anniversary in August, 2015 will



The Wetlands Assimilation Project, spearheaded by the Environmental Affairs Department, is an innovative partnership between the Sewerage and Water Board and the St. Bernard Parish government to restore 20,000 acres of Bayou Bienvenue. The bayou was severely damaged by Katrina's salt-water surge.



The Green Infrastructure Program is an approach to capture stormwater runoff, maintain healthy waters, provide multiple environmental benefits and support sustainable communities in New Orleans. The board dedicates competitive grant funds to be used by community groups for green infrastructure projects and activities.

continue to be a global model in the recovery of America's Most Interesting City, as we continue to provide quality of life services for over 384,000 residents and 9.5 million visitors a year. There is no better legacy and testament to the strength and the resilience of the Sewerage & Water Board.

S&WB GETS A JUMP ON HURRICANE PREPAREDNESS WITH RELIABLE, COMPLETE AND MULTI-FACETED PLAN

Each spring the Sewerage & Water Board institutes its multi-faceted hurricane preparedness protocols well in advance of the June 1st start of the hurricane season. This year was no different, as the S&WB completed its planning and training exercises several weeks in advance. According to Executive Director Cedric Grant, "the Board's team of emergency responders, managers, directors and crucial employees are prepared to go into action at any time."

Grant added, "Hurricane readiness is an everyday experience for us because of our record-breaking rainfalls in the spring and early summer. Many of these rainstorms often create more runoff than are experienced in hurricanes. However, we still take the early preparedness very seriously. Many goals are built into the plan, including an immediate response to any problems, which may develop, that would interfere with the protection of our city's citizens and the safety of employees. The board's Emergency Management Office and mobile command center further enhanced communications."

The Sewerage & Water Board joined with The Coastal Protection & Restoration Authority of Louisiana, the City of New Orleans and agencies across the metropolitan area for the annual hurricane preparedness press conference held June 1st at the Port of New Orleans. The press conference was the culmination of a coordinated, region-wide preparation effort. Grant said, "S&WB leaders met with the U.S. Army Corps of Engineers and its partners in flood protection, to ensure that coordination of operations and communications between the two were in place and tested. Preparation meetings and tabletop exercises and contingencies that are triggered when a hurricane/ tropical storm enters the Gulf have been completed."



The Emergency Management Department holds regular table top exercises for various emergencies and the department remains ready to mobilize for hurricane preparedness with standard industry best practices for any potential disaster.



Essential board forces that "never leave" prepare for hurricanes, loading trucks with equipment and fuel.

According to Sewerage & Water Board General Superintendent, Joseph Becker, "The Sewerage & Water Board's hurricane preparedness plan is multi-faceted, reliable and complete." Specific preparation efforts included:

- Emergency contracts for pre-staged generators at key facilities;
- Emergency response boats and communication equipment staged at various Drainage Pumping Stations;
- Arrangements for an Emergency Operation Center at the Main Water Plant to coordinate the S&WB's response to emergency events;
- Providing employees with placards for response and re-entry;
- Giving employees a 1-800 call-in number to report their location in the event they have evacuated;
- Building emergency protective Tiger Dams to protect against flooding at the Main Water Plant Power House; and establishment of a Mobile Command Post to be staged in Baton Rouge as an alternate Emergency Operations Center. Grant said, "Management and staff were confident that their team of experts was well-prepared and able to work internally with our own forces and externally with the City's overall Office of Emergency Preparedness Command Center, Corps of Engineers, levee districts and adjacent parishes. The input from those employees who experienced Katrina, Rita, Gustav, Ike and Isaac were invaluable resources in the event a major storm approaches."

At all of the many neighborhood, community, civic and business meetings S&WB teams attended, a prime concern of citizens was the Board's readiness for storms. Staff assured them that everyone knows what to do and when to do it and, yet, the Boards' plan was flexible enough to quickly adjust to unforeseen challenges. The citizens of New Orleans can be confident that the Boards' first responders are ready to go into action when needed.



Facilities have been equipped with boats to use for possible flooding.



Drainage Pumping Station Operators meet to discuss storm preparations and plans on a continuous basis throughout the Hurricane season.

RESTORATION AND RESILIENCE 10 YEARS OF PROGRESS

The last 10 years since Hurricane Katrina has encompassed the most massive and extensive infrastructure restoration and rebuilding effort in the Sewerage and Water Board's 116 year history. Today, the board is building smarter, stronger, more resilient and more reliable.

While much of the systems were damaged or destroyed by Hurricane Katrina, the men and women of the Sewerage and Water Board because of their dedication and commitment stayed on the job and had all the systems back up and running in record time, enabling our citizens to return to the city.

Then the real work began- rebuilding and fortifying our water, sewer, drainage and power systems. Thousands of projects have been completed and many new ones are underway or on the drawing board. Some of the major water, sewer, drainage and power systems initiatives are provided in this report.

This information is designed to help customers know the board better and to understand the comprehensive efforts undertaken to insure delivery of quality of life services to the City of New Orleans.

SEWERAGE & WATER BOARD MAJOR INITIATIVES

WATER SYSTEM MAJOR INITIATIVES

Water Purification Division

- Water Quality Master Plan draft engineering report submitted December 2014.
- Response to DHH Emergency Disinfection Rule successfully implemented. Monitoring and system flushing plan resulted in 100% compliance for 2014.
- Aggressive Operator Certification training program has successfully provided several much needed DHH certified Water Treatment operators for the system. Program will continue to meet system needs.



New Orleans' only source of potable water is the Mighty Mississippi River. The board operates two water plants on the East Bank and West Bank of the city. The men and women of the Board are at work 24 hours a day, seven days a week to produce the water and distribute it through 2,000 miles of pipes, mains, 143,000 service connections and to approximately 16,500 fire hydrants. Water was available after Hurricane Katrina to begin the recovery so residents could return to the city.



The East Bank Water Treatment Water Plant has four basins in which water from the Mississippi is brought in and processed into quality potable water for the city of New Orleans. The basins must be removed from service, periodically, one at a time to perform cleaning and scheduled maintenance.

Facility Maintenance fabricates replacement parts inclusive of paddle shafts, shaft bearings, shaft sleeves, paddle frames, as well as boring and installing new couplings, new gearbox bearings and seals for a turn key basin rehabilitation.

Water quality instrumentation with remote monitoring capability added to Algiers Elevated Tank site

Carrollton Water Purification Plant

G4 flocculation/sedimentation work is completed and is on standby for service.

Staff washed L3 basin. Flocculation basin needed a thorough mechanical overhaul. Facility Maintenance assessed material needs, ordered materials and has completed most repairs.

Floating dredge for in-situ basin cleaning purchased and on-site ready for service.

Water Quality Laboratory

Lab has been inspected for State certification for Total Organic Carbon analysis and anticipating certification approval in early 2015.

Corrosion control monitoring program: Data collection continues to gauge the effectiveness of the treatment processes and any process change on corrosivity.

Lab staff continuing work on establishing a new protocol to analyze halo acetic acids.

Participated in required sampling for EPA's Unregulated Contaminant Monitoring Rule.

Participated in Water Research Foundation Project 4491 – Unintended Consequences of Implementing Nitrosamine Control Strategies

Algiers Water Purification Plant

Additional sodium hypochlorite metering pumps were purchased and are in the process of being installed by staff.

New flow and head loss instrumentation for the Filter Gallery operations were purchased. Half of the instrumentation has been installed by staff and is operational. The second half of the installation is in process.

Additional SCADA node added to Algiers Chemical



The Sewerage and Water Board's staff is constantly developing and exploring new processes to improve its operations. One such project is in operation at the Carrollton Water Purification Plant. The Sodium Hypochlorite Bulk Storage/Feed Facility was completed in 2012. It eliminates the need for transporting chlorine by rail and storing it on the plant grounds. Instead, the Board will use the safer sodium hypochlorite for disinfectant in the purification process and easily store it in a nearby facility. This chemical increases safety for surrounding neighborhoods and Board employees.



Staffed by chemists, microbiologists and technicians, the Sewerage and Water Board Water Quality Laboratory assures the safety and purity of the city's water by testing for some 150,000 organic, inorganic and microbiological compounds. The 8,500 square foot lab is located within the Carrollton Water Plant and monitors river water and finished water sampled from both the East Bank and Algiers. Pictured here, a Laboratory chemist performs water analysis.

Building for process monitoring.

Water Pumping & Power

💧 The \$12.8 M Turbine 4 (20 MW) project replaces the steam path, rotor, auxiliaries and condenser. A new modernized governor control system is included in the project which will add stability and better control to the unit. Additionally, the 20 megawatt, 25 cycle generator is being totally rewound and restacked to like new condition making the entire driver generator package whole. The project is scheduled to be completed by mid-2015.

💧 Turbine 6 (15 MW 60 Hz) is currently in final testing phase. The federally funded project was awarded in November 2009 and will enable the Board to power 60 Hz equipment in the event of commercial power interruption.

💧 The \$2.8 M project to replace boiler pre-heater at the power complex was awarded in November 2011. The project was completed in 2014.

💧 The \$12.7 M reconditioning of the DE Laval steam driven portable water distribution pumps and turbines continues. One pump unit is complete with the second unit scheduled for completion in mid-2015. FEMA also funded addition of a 60 HZ motor and pump reconditioning of No. 2 pump unit at Panola St. High Lift Station. This addition coupled with the complete overhaul of the 48 million gallon/day pump is complete and currently in testing period.

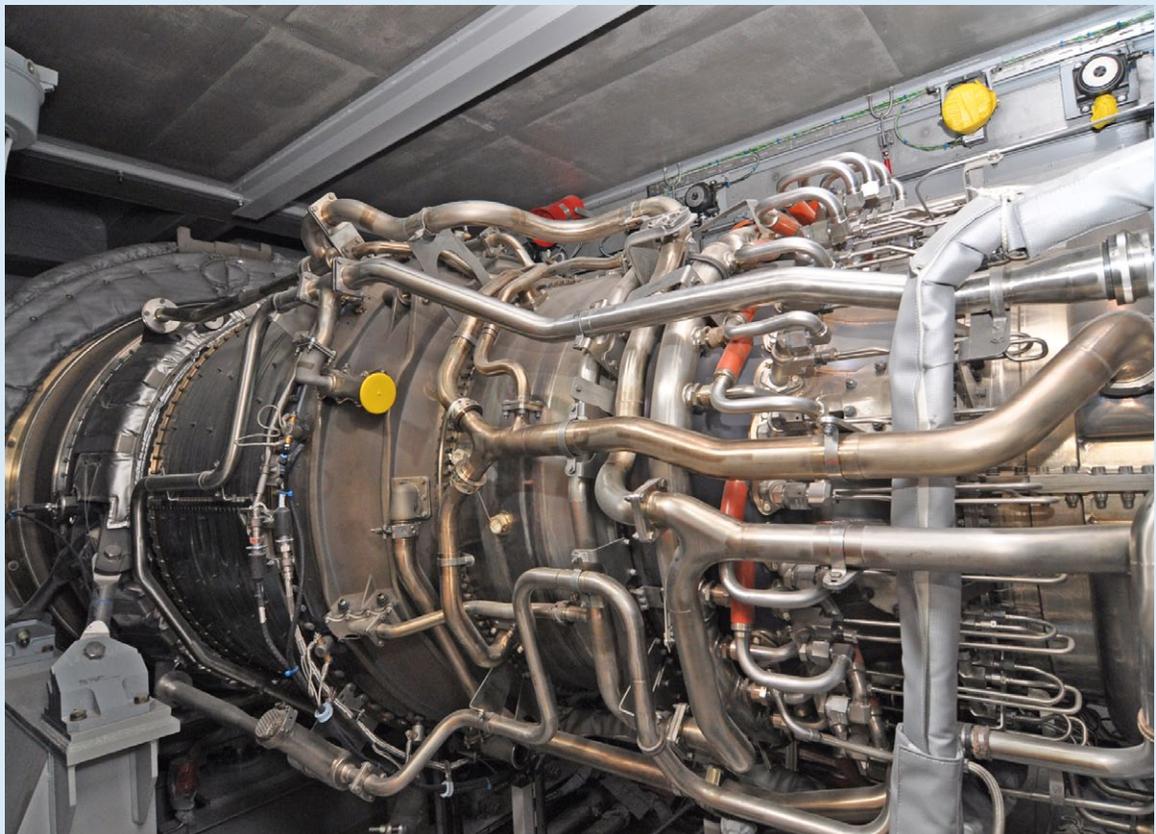
💧 The \$32.6 M FEMA Water Hammer project to repair the pumps at Claiborne and the Panola Pump Stations and add new storage tanks is under design.

💧 Corps storm proofing projects have been completed at the power



These storm proofing measures have been completed with the Power Plant Complex. These measures included, but not limited to, water intrusion protection, roof and wall reinforcement, strengthening of louvers, doors, shutters and ventilation systems and miscellaneous electrical and mechanical equipment storm proofing measures.

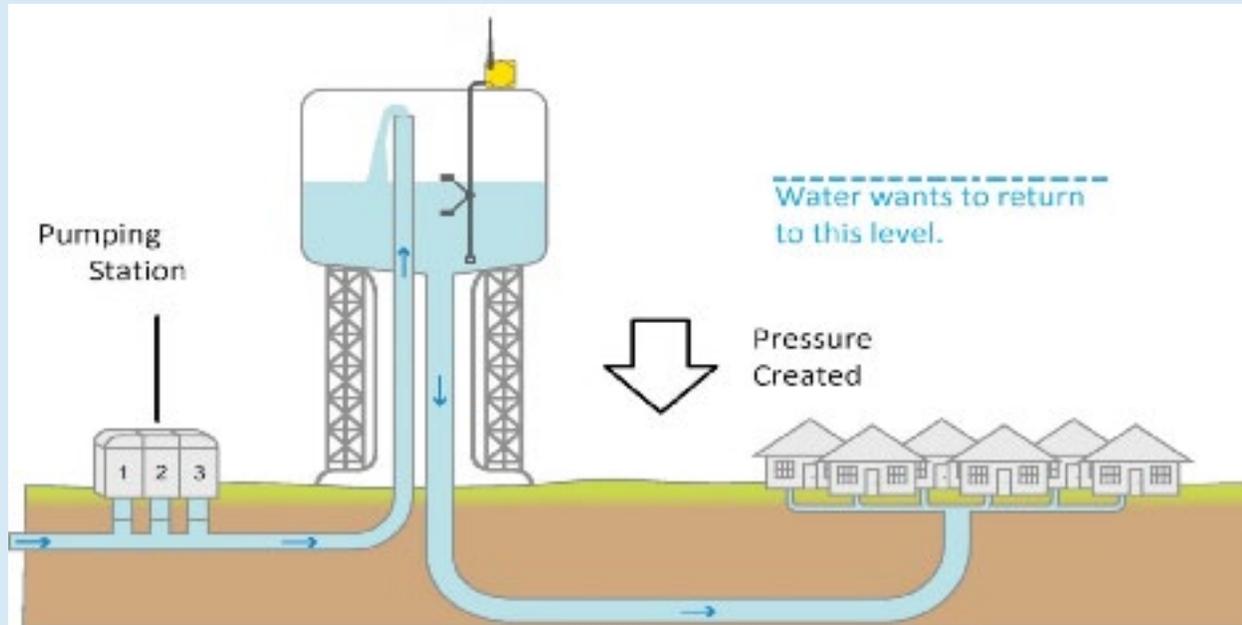
The generator gives the S&WB's Division of Pumping and Power the capability to improve the operation of its drainage, sewerage and water pumping systems in emergencies. The generator, funded 100% by the Corps, is part of a storm-proofing project for Orleans Parish. The project, located on the grounds of the Carrollton Water Purification Plant, costs in excess of \$32 million.



plant, the Oak River and New River Intake Stations, and the plant frequency changer building.

💧 The Retrofit Power Plant Hazard Mitigation Project design is underway for the power plant (boilers, turbines, structural hardening), fuel tank, and power network. Repairs to Generator No. 4 and installation of two 60-HZ feeders are scheduled to be completed in mid-2015

💧 Installation of two new transformers and construction of new electrical duct bank was awarded in December 2014



The Water Hammer Hazard Mitigation Project will minimize power disruptions. When completed in early 2018, upgrades to the water distribution system will reduce future leaks and losses of water pressure. The importance of these upgrades will allow plant personnel time to switch power source generation from commercial power to the Board's own generated power.

Water Distribution System

💧 A new leak detection contract was awarded in 2014.

💧 Over 14,563 work activities occurred in the water system in 2014. These included 309 water leaks investigations, 2,260 water valves inspected, and repairs to 10,221 water service lines, 1,647 water mains, 1,190 valves, 1,074 fire hydrants and 39 water manholes. Also, 3,337 water meters were installed, removed or reset.

💧 Preventative maintenance of fire hydrants is continuing in coordination with the local fire department. The Board has performed preventative maintenance for 3,742 of the 16,500 fire hydrants mapped.

💧 The Board is continuing to coordinate with Department of Transportation (DOTD) and Development and Department of Public Works (DPW) to repair or replace water lines associated with the Submerged Roads Program and other roadway repair projects. FEMA has to date obligated \$188 M for water line replacements.



This photo shows crews replacing a water line in the Lower Ninth Ward neighborhood, an area of the city severely impacted by Hurricane Katrina. This is a part of the larger city-wide multi-year infrastructure repair/recovery effort funded by FEMA. This program is designed to restore the city's water distribution system. To ensure that the city is maximizing available funding, various agencies are involved in the co-ordination efforts of the program. The program is managed on a neighborhood by neighborhood basis. The Sewerage and Water Board co-ordinates with the Department of Transportation and Development (DOTD) and the Department of Public Works.

SEWER SYSTEMS MAJOR INITIATIVES

East Bank Waste Water Treatment Plant

East Bank Wastewater Treatment Plant

- Repairs were made to the fluidized bed incinerator (installation of venturi throat liners, replacement of failed tuyers and rehab of the refractory wall and dome).
- Bids for the new sludge dryer were rejected and the project is being re-evaluated. However, design and construction plans and preparations are underway.
- Influent TSS and BOD concentration are approximately 108 milligrams per liter (mg/L) and 90 mg/L, respectively. Effluent quality has been good with five (5) exceedances: two (2) BOD exceedances in February and April, one (1) TSS exceedance in April, and two (2) daily fecal coliform permit violation occurred in January and December 2015. The East Bank plant has again earned the Silver Award for environmental compliance from the National Association of Clean Water Agencies.
- The Central Wetland Assimilation project is under construction and expected to be completed in 2015.
- The construction of a +17' MSL \$33 M earthen/ structural berm was awarded March 2012 and was completed in early 2015.
- Contract to rehabilitate the Bio-Reactor Train No. 1 was awarded in December 2014.



Before



After



West Bank Wastewater Treatment Plant

- Treatment was exceptional with zero permit violations or process overflows in 2014. This treatment plant has earned the Platinum Award from the National Association of Clean Water Agencies for zero permit exceedances during the past five (5) years.
- Repairs were made to the main breaker for the standby power generator to ensure its continued reliability in the event of a power outage.

Sewage Pumping and Lift Stations

Because of Hurricane Katrina's storm surge the East Bank Wastewater Treatment Plant was almost destroyed. As result of the impact of the storm to this critical facility that provides waste treatment services to the entire East Bank of the city, FEMA funded through its Hazard Mitigation Grant Program a berm/floodwall of +17 feet. The berm/floodwall is designed to reduce the risk of future flood damage by providing protection to the wastewater treatment plant. It replaces a 7 foot high earthen levee that previously surrounded the plant. The berm/floodwall was designed to enhance reliability and resiliency for the future. The new T-Wall berm which includes closure gates that are closed and sealed during flooding events began construction in March 2012 and was recently completed. It is designed to protect 26.4 acres of land. FEMA funding for the project was \$33M.

Michoud Sewer Pumping Station

💧 All the sewer pump stations are operational having undergone FEMA funded rehabilitation, i.e., electrical repair, pump and motor repair/replacement, and flood proofing.

💧 Design funded by hazard mitigation grant is continuing in the elevation and rebuilding of nine sewer pump stations. Eight of the projects are in construction.

Sewer Collection System

💧 Final sewer rehabilitation construction project for the Ninth Ward basin awarded in 2014.

💧 Design continuing for multiple point repair and replacement of sanitary sewers in the Carrollton, Mid-City, New Orleans East and South Shore areas.

💧 Construction projects for replacement of sewer mains from manhole to manhole for various sites throughout Orleans Parish were awarded.

💧 DOTD and DPW coordination in repair of sewer lines (Submerged Roads Program, SSERP, ESSA) as well as routine reconstruction and maintenance.

💧 Preventative maintenance of the collection system included inspection of 976,1301 ft. of sewer line utilizing closed circuit television and smoke testing, cleaning 1,539,899.7 ft., inspection of 9,616 sewer manholes and repairs to 1,276 sewer breaks, inspection and maintenance of 34 air release valves and 390,196 ft. of the force main.

💧 Cathodic protection survey is performed annually on the 22 systems in the collection system. Repairs were completed in 2013.

DRAINAGE SYSTEM MAJOR INITIATIVES

Pump Stations

💧 The Corps (\$23.8 M) project to install two new 300 cfs pumps and a generator at DPS 5 is expected was completed in 2014. The \$15.9 M storm-proofing project for DPS-1, 2, 3, 4 and I-10 was completed by the 2nd quarter of 2014.

💧 Repair work to several of underpasses pumping stations



Before



After

are in progress as part of FEMA funded program.

💧 The Corps began the design build of three new permanent pump stations at 17th Street, Orleans and London Canal at Lake Pontchartrain was awarded.

Canals

💧 Florida Ave. Canal Phases II and III from Peoples Ave. are in design.

💧 Napoleon Ave. Canal Phase II (\$55.1 M) 4,300 ft. canal from S. Claiborne Ave. to Carondelet St. and Phase III (\$38.1 M) 2,800 ft. canal to Constance St. are in construction.

💧 S. Claiborne Ave. Canal Phase I (\$27.1 M) 2,500 ft. canal and Phase II (\$27.8 M) 3,500 ft. canal is from Leonidas St. to Lowerline St. are in construction.

💧 Jefferson Ave. Canal Phase I (\$59.9 M) 4,400 ft. canal and Phase II (\$46.2) 3,200 ft. canal are in construction.

💧 Louisiana Ave. Canal from S. Claiborne Ave. to Constance St. (82.6) is in construction.

💧 Reconstruction of the Florida Canal between Spain & Music Streets began in 2014.

💧 Algiers area drainage improvements Phase I is in design.

💧 Green infrastructure projects from creation of K-4th grade education program, providing professional workshops, and demonstration bio swales, green roofs and rain garden projects were awarded in June 2014.



New Orleans could not exist without a modern and strong drainage system. That is why the S&WB joined with the Corps of Engineers to upgrade or build canals, pumping stations and electrical generator power. One of those projects is canal work underway now Uptown. The work consists of constructing approximately 4,300 linear feet of concrete box canal under the median along Napoleon Ave., from South Claiborne Ave. to Carondelet St. The new canal will parallel an existing box canal and will tie in to the existing canal at South Claiborne Ave. The cost of the project is \$55.1 million, with 65% federal funds and 35% S&WB funds.

Central Yard

Construction of a new Annex Building shall be completed in early 2015.

Construction of a new \$1.8 M site relocation facility was completed in early 2015. The facility shall allow for the temporary relocation of staff and equipment from Garages 1 and 2, the machine and mill, body and tire shop while repairs are being made to those facilities.

Repairs to Garage No. 1 and the Generator Building began in mid-2014.



New Site Relocation Facility at Central Yard.

Pipeline Progress is a quarterly electronic publication produced in January, April, June and September.

For more information, contact Community and Intergovernmental Relations, 504-585-2169.

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