

LSUHSC-NEW ORLEANS

Dental School Campus

TIMELINES AND CONDITIONS THAT IMPACTED RECOVERY

CONDITIONS THAT IMPACTED BOTH CAMPUSES

- August 29, 2005. In the early hours of the morning, Hurricane Katrina made landfall.
- August 30, 2005. In the early hours of the morning of the following day, the flood walls and levees began to fail. Water poured into the city from several breaches. Later estimates show that over 80% of the entire city was flooded. Major failures or breaches included:
 - 17th Street Canal
 - Industrial Canal
 - London Ave. Canal
- The high winds, heavy rain, and flooding that resulted from the failure of the levees protecting the New Orleans metropolitan area following Hurricane Katrina severely impacted and disrupted the State of Louisiana. Extensive displacement of persons, families and essential government services resulted.
- The primary facilities of the LSU Health Sciences Center in New Orleans were severely damaged by the storm. Post-Katrina flooding caused by the levee failures inundated every building and facility at the downtown campus and the Dental School campus. Category 3 “black water” which also contained a high salt content entered every basement and/or the 1st floors of every building. Water remained standing in the city until the Corp of Engineers was able to temporarily seal the breaches in the levees, and power was restored to the city pumping stations.
- Experts warned that the brackish water that stood in the city streets and buildings contained a mix of raw sewage, bacteria, heavy metals, pesticides, toxic chemicals and approximately 6.5 million gallons of oil. News reports frequently noted that rescue workers were experiencing skin infections when open wounds or sores were exposed to the water and not thoroughly cleaned and disinfected.
 - All persons not directly involved in the rescue and immediate clean up were ordered to be evacuated on 9/6/05 by the Mayor.
- The flood waters that inundated the city remained largely unchanged for approximately two weeks while the various levee failures were temporarily plugged and electrical power began to be returned to the city pumping stations. Limited pumping capacity also slowed the pumping out of the city. By the end of 3 weeks following the storm, estimates showed that close to 90% of the city was free of flood water. However, Hurricane Rita struck and additional water entered the city. Specifics include:
 - The 17th Street Canal breach was not sealed until Monday, 9/5/05.

- The threat of Hurricane Rita caused the Mayor to suspend the limited return of business and home owners to the limited number of dry parts of the city on Monday, 9/19/05.
- Hurricane Rita's landfall on 9/21/05 caused additional breaches in temporarily repaired levees/flood walls and additional water entered the city via rain fall and those new breaches.
- August 30, 2005. Civil unrest broke out in the city shortly after the storm passed. Reports of violence, snipers firing at rescue workers, film reports of looting and fires being set were common. The National Guard was mobilized and eventually the 101st Airborne Division was brought into the city to bring the city under control.
- September 2, 2005. Approximately 180 LSUHSC employees and family members were successfully evacuated from the campus, following several days of intense effort and coordination with law enforcement and emergency response organizations.
- For approximately a month, the civil authorities had the city largely shut down to almost all traffic. Approximately a week after the storm, very limited access began to be granted to LSUHSC staff through cooperation of the State Police and the National Guard. This access was used to accomplish critical missions. Examples:
 - The care for and rescue/relocation of the surviving research animals.
 - The removal and transport of critical research specimens and samples to temporary facilities. Also the preservation of other samples via the manual provision of liquid nitrogen.
 - The retrieval of critical records; both paper records and those stored on selected servers.
 - The retrieval of critical equipment that was required for the re-start of operations.
- Emergency operations of the LSUHSC were established in Baton Rouge shortly after the storm passed. However, the mass evacuation of residents of the impacted parishes left LSUHSC with few available human assets to begin the recovery. All forms of communications (data, telephone, etc.) were adversely impacted by the storm and the subsequent loss of electrical power.
 - LSUHSC faculty and staff were scattered across the country.
 - Cell phones with numbers from the storm impacted areas were largely non-functional for weeks. Text messaging was available to limited numbers of people.
 - LSUHSC email systems were down, as the data center was located on the 7th floor of the Resource Center on the downtown campus. The failure of city power, followed by the failure (flood damage) of the emergency generators left the Center on UPS. The batteries were drained within 48 hours.

DENTAL SCHOOL DAMAGE

The LSU School of Dentistry and the two main buildings (and related Power Plant) are critical, essential facilities and functions. The training programs are tightly integrated into the public health care system in the state. Student clinics provide dental care on a sliding scale to address

the needs of the uninsured and those of modest means. The clinical faculty also provides oral surgical support for MCLNO. As the only School of Dentistry in the State of Louisiana, the graduating students are the predominant source of dental health care professionals in the state. The facilities are also involved in a variety of research activities; both clinical and in the basic science arenas. This means that the buildings contain substances that are potentially hazardous; especially when they cannot be refrigerated or preserved.

- The Clinic Building is an 8 story building of just less than 200,000 square feet. The Administration Building is a 4 story building of approximately 68,500 square feet.
- The Clinic and Administration Buildings share a single, common basement of approximately 48,250 square feet.
- The Power Plant is a single story structure of approximately 8,000 square feet and also contains an elevated mezzanine space.

The common basement shared by the Clinic and Administration Buildings was completely filled with flood waters for many weeks. The basement spaces contained a large number of critical and essential functions; the Central Sterilization facility, the morgue, the animal care vivarium, the biomaterials lab, chemical storage, etc. The basement also housed a majority of the critical mechanical, electrical and plumbing components required for basic building operations; electrical switch gear feeding both structures, domestic water pumps, fire pumps, heated and chilled water pumps, medical air and vacuum systems supporting the clinical operations, domestic hot water generators, heating hot water generators, etc.

The 1st floors of both the Clinic and Administration buildings were flooded to a depth of approximately 38" to 40" above the finished floors. These spaces included the Faculty Dental Practice, the Oral/Maxillofacial Surgery center, dental radiography suites, dental hygienist suites, patient reception areas, security sites, a bookstore for students, and food services for the campus.

The Power Plant foundation is on ground level, so the flood waters were much higher than in the Clinic and Administration buildings. Equipment damaged in the Power Plant included steam boilers, steam system accessories, chillers, chilled water pumps, condenser water pumps, water softeners, incinerator and dental air compressors that support the clinical functions.

The buildings also sustained roof damage which allowed water into the buildings from above, and wind blown water penetrated some portions of the building envelope. There was also some window damage which also allowed wind-driven water to enter the buildings.

INITIAL RECOVERY EFFORTS – TASKS & TIMELINES

- 9/12/05. A limited number of LSUHSC Facility Services staff began working on campus to find ways to provide temporary workarounds that would allow basic electrical power and A/C to be provided to major buildings to the extent that it was feasible.
 - A natural gas leak was discovered in the basement spaces at the Dental School. The gas was not shut off until 10/12/05.
 - Entergy New Orleans took several months to restore power to the two substations that feed electrical power to the Dental School.

- The initial environmental assessment of the basements revealed loose asbestos (damage from the flood waters) as well as chemicals and several potentially hazardous biological contaminants from the samples and items stored in the basement. A separate contract was competitively bid to conduct an initial cleaning of the space to allow unprotected individuals to enter the space. Environmental clearances for the basement spaced were not received until 3/3/06.
 - No workarounds were feasible for the Dental School Clinic and Administration Buildings, so a separate contract was bid for a generator and temporary chiller. Limited chilled air was being circulated in these two buildings by 11/8/05.
- 9/12/05. A contract to make temporary repairs to damaged windows was issued. The majority of the repairs were completed by mid-October; the last of the temporary repairs were completed by 10/29/05.
- 9/16/05. A contract through the State's Office of Facility Planning & Control to make temporary roof repairs was in place. Temporary roof repairs began on 10/1/05 and most were completed within a few days. Subsequent inspections revealed additional damage in selected areas and the last of the repairs were completed by 10/29/05.
- 9/16/05. A contract to pump out the basements of the three facilities that had basements (the Dental School, Stanislaus Hall and 1542 Tulane Ave.) was issued. While the initial pumping began promptly, water remained an issue for some time. Acceptably low levels of water in these basements were not established and maintained until 10/24/05.
 - All three LSUHSC facilities continued to get significant amounts of ground water intrusion; presumably due to the high hydrostatic pressures. Lack of city power meant that the normal sump pumps could not operate. Gas powered temporary pumps were used and temporary electrical pumps when temporary electrical power could be made available.
- 9/17/05. Key LSUHSC Animal Care employees returned to the research buildings on both campuses to remove and dispose of research animals that did not survive the post-disaster events. The removal effort was completed on or about 10/17/05.
- 9/19/05. A solicitation was issued to power wash and sanitize exterior and low pressure wash & sanitize interior of basements and 1st floors of 35 buildings on both campuses; the basic building "muck out". The contract was issued shortly thereafter and work was completed everywhere but the basement spaces where water (and some potentially hazardous conditions) remained. The Dental School basement was one of the last spaces where this cleaning could be accomplished.
- 9/20/05. A contract was issued to an environmental consulting firm to make initial assessments of the 35 buildings on both campuses; particularly to determine what levels of personal protection were necessary to allow safe access into the buildings.
 - 10/13/05. The field work was completed in all buildings (except for the basements at the Dental School due to the potentially hazardous environmental conditions).

- 10/14/05. Written reports were received for five of the major buildings; Stanislaus, Residence Hall, Nursing/Allied Health, MEB, and the Resource Center.
- 10/21/05. The remainder of the written reports on all buildings were received, except for the Dental School basement spaces, which were not cleared until March, 2006.
- 9/21/05. A contract was issued to an architectural firm who was very familiar with most of the campus buildings to conduct safety inspections (determine the structural, mechanical and electrical hazards related to entry into the buildings), begin to prepare scope of damage estimates, and document the storm related damage.
 - The field work was completed on 10/24/05. The preparation of written reports began and they were delivered as they were completed.
 - All identified hazards were brought to the attention of LSUHSC as they were discovered during the field work.
- 9/22/05. Bids were solicited for a contract to address the two Library collections; one at the Dental School and one in the Resource Center. Work included remove (as necessary), clean and restore, store off site and return/reshelf when the buildings were ready to receive the collection.
 - 10/10/05. Removal of the collection from the Dental School began. The Resource Center was determined to be stable enough to allow the books to remain until the environmental remediation of the building was underway.
 - 2/14/06. Removal of the collection from the Resource Center began.
 - 5/17/06. The return of the Resource Center collection was begun.
 - 5/26/06. The Resource Center collection has been re-shelved.
- 9/29/05. The existing pest control company was called in to begin aggressive measures to control and then eradicate the increased number of vermin that had moved into the buildings.
- 10/4/05. The decision was made to award the contracts for permanent elevator repairs to the current elevator maintenance contractors. This was done in consultation with the State Elevator Inspector. Each contractor was required to complete a thorough inspection of the elevators for which they are responsible for, and prepare and submit proposals for the needed repairs. Each proposal was reviewed by LSUHSC Facilities and by the State Fire Marshall. Contracts were then issued based on the approved proposals. Contractors receiving contracts began ordering parts and completing repairs as soon as parts were delivered. Long lead times on parts were the norm.
 - 5/30/06. By this time, all of the major downtown campus buildings had two or more elevators certified for use.
 - 6/28/06. The Dental School Clinic and Administration Buildings and 1542 Tulane Ave. are still without reliable building power sufficient to allow repairs to elevators to begin. But the power needs are being addressed and this issue should be behind us shortly.

- 10/11/05. The State of Louisiana, Division of Administration, Office of Facility Planning and Control was instructed to take control of all facility related recovery work and LSUHSC began coordinating their projects with Facility Planning at that time.
- 10/12/05. Bids were solicited for the removal and disposal of flood damaged movable equipment and furniture from buildings on both campuses to help prevent the further spread of mold. The contract also required that salvageable items would be secured off site, cleaned and stored.
 - 12/1/05. The majority of the work had been completed, except for the removal of refrigerators from upper floors of buildings where temporary elevator service was not available.
 - 2/10/06. The last of the punch list items were completed.
- 10/21/06. Bids were solicited and a contract was awarded for the provision of 600 tons of emergency air conditioning to the Clinic and Administration Buildings. This required provision of a electrical generator, as the building and the entire area of the city was without power. This contract was subsequently replaced with a more robust, temporary solution provided by the design team.
- 11/3/06. Bids for the emergency removal and disposal of carpet, loose wall board, and other loose porous & semi-porous materials from basements & 1st floors to prevent further spread of mold were solicited. Contracts were awarded; one of which also addressed storm-related asbestos abatement in the basements of the Dental School Clinic and Administration buildings. (Facility Planning required that environmental remediation work that involved demolition had to be designed by architects, so no demolition could be included in these contracts. The architects for the permanent repairs were selected late in November and early December via the State's competitive process.)
 - 2/1/06. The majority of the work on the downtown campus buildings and on the 1st floor of the Dental School Clinic and Administration Buildings was completed.
 - 2/15/06. The majority of the work in the basements at the Dental School was completed.
 - 3/3/06. Clearances to enter the basements at the Dental School were received.

ARCHITECT SELECTION

- 11/9/05. The State authorized an expedited process to select architects to oversee the permanent repair projects for the downtown and Dental School campus.
 - 11/21/05. The Architect Selection Board selected Duplantier & Meric as the design team for the downtown campus.
 - 12/14/05. The Architect Selection Board selected Morton/Verges as the design team for the Dental School campus.

DENTAL SCHOOL CAMPUS (Architect Selected 12/14/05)

The strategic plan was to get the upper floors of the Clinic and Administration buildings available for re-occupation and use as quickly as possible as a temporary facility.

- Entergy New Orleans took several months to restore power to the two substations that feed electrical power to the Dental School.
- The initial environmental assessment of the basements revealed loose asbestos (damage from the flood waters) as well as chemicals and several potentially hazardous biological contaminants from the samples and items stored in the basement. A separate contract was competitively bid to conduct an initial cleaning of the space to allow unprotected individuals to enter the space. Environmental clearances for the basement spaces were not received until 3/3/06.
- The architects & engineers verified the findings of the LSUHSC Facilities staff that there were no workarounds possible to energize the buildings' electrical system.

Temporary Repairs: The 1st priority for the A/E team was to design the temporary repairs to the critical building systems and complete the environmental remediation of the Clinic and Administration buildings to allow re-occupancy of the upper floors as quickly as possible.

Temporary Repairs to Buildings Electrical System:

- 1/26/06. An approach to making temporary repairs was presented. Bid specifications were refined based on input from Facility Planning and FEMA.
- 2/24/06. A pre-bid walkthrough was conducted for bidders.
- 3/10/06. Bids were opened and evaluated.
- 3/29/06. The contract was awarded and work began.
- 11/06. Work was estimated to be 98% complete. As work contained in the original contract scope was completed and additional assessments/testing of the buildings were completed, additional repair needs were identified. Change orders were developed and reviewed. As the change orders were approved, work was begun. There are some components needed for repairs that have very long lead times, which will extend the time needed to complete some of the remaining repairs.

Temporary Repairs to Mechanical and Plumbing Systems. Also included environmental remediation:

- 1/26/06. An approach to making temporary repairs was presented. Bid specifications were refined based on input from Facility Planning and FEMA.
- 4/5/06. Specs were completed and approved. Prices were solicited via an expedited process and bids opened on this day.
- 4/17/06. The contract was awarded.
- 11/06. The work was estimated to be 98% complete. As work contained in the original contract scope was completed and additional assessments/testing of the buildings were completed, additional repair needs were identified. Change orders were developed and reviewed. As the change orders were approved, work was begun. There are some components needed for repairs that have very long lead times, which will extend the time needed to complete some of the remaining repairs.

Summary of Temporary Repairs Required & Completed or in Progress

- All flood damaged building materials (walls, flooring, ceiling tiles, etc. removed).

- Temporary electrical switch gear was purchased and installed.
 - o New transformers, transfer switches, electrical panels, etc. were required.
 - o All of the connections to the risers feeding upper floors of both buildings were replaced.
 - o All of the electrical connections to the Power Plant were repaired or replaced.
 - o All of the electrical connections to the new temporary mechanical and plumbing equipment that are in the basement were replaced.
 - o New fire walls were constructed around the switch gear.
 - o The old, flood damaged switch gear was demolished and removed.

- A temporary fire pump was purchased and installed.
 - o New connections to the buildings' sprinkler systems were required.
 - o New connections to the buildings' fire stand pipes were required.
 - o The old fire pumps were disconnected and removed.

- Temporary chillers were purchased and installed.
 - o New connections to the existing cooling towers were required.
 - o The existing cooling towers were repaired.
 - o New connections (piping, valves, etc.) from the chillers to the chilled water pumps that feed chilled water to the air handling units were required.

- Temporary domestic (hot and cold) water pumps were purchased and installed. These pumps boost the city water pressure to provide sufficient water pressure to upper floors.
 - o A new hot water expansion tank was purchased and installed.
 - o New connections to the existing water supply pipes were required.
 - o The old domestic water pumps were removed.

- A temporary boiler was purchased and installed.
 - o A new heat exchanger was purchased and installed.
 - o New connections to the heating hot water system were required. (Heat exchanger, expansion tank, mixing valves, etc.)

- Temporary air compressors were purchased and installed.
 - o New air dryers were purchased and installed.
 - o All of the connections to the lines running to the buildings' air handling units were required.
 - o The flood damaged air compressors were removed.

- Temporary chilled water pumps and heating hot water pumps were purchased and installed. These pumps move chilled water and hot water to the air handling units throughout the buildings' to provide air conditioning and heat in the building.
 - o New connections to the chillers, the boiler and the piping systems were required.
 - o The old chilled and heating hot water pumps were removed.

- Temporary medical air and vacuum pumps, along with the related control system were purchased and installed.
 - o A temporary air dryer for the medical air system was purchased and installed.
 - o New connections to the existing medical air and vacuum lines were required.
 - o The old medical air and vacuum systems were removed.
- Temporary sump pumps were purchased and installed in the basement to prevent ground water from flooding the basement.
 - o The old flood damaged sump pumps were removed.
- Temporary exhaust fans were purchased and installed on the roof.
 - o The old exhaust fans were removed and disposed of.
- Temporary soft water pumps were purchased and installed.
 - o New connections to the building soft water system were required.
- Temporary fan coil units were purchased and installed.
 - o New connections and piping were required.
- Temporary Dry Vac system was purchased and installed.
 - o New connections to the building systems were required.
- Temporary Wet Vac system was purchased and installed.
 - o New connections to the building systems were required.
- A temporary dionized water system was purchased and installed.
 - o New connections to the building systems were required.
- A temporary ice system was purchased and installed.
- The buildings' fire alarm system was repaired and connected to the fire pump and sensors on the upper floors.
- All of the new piping that was installed in the basement was insulated and labeled.
- Temporary safety lighting was installed in the basement and 1st floors of the Clinic and Administration buildings.
- The initial round of mold remediation in selected spaces on upper floors was completed.
 - o Additional mold remediation is required as the buildings have experienced additional mold growth since the initial remediation efforts were completed.
- Temporary fire walls were constructed on the 1st floors of both the Clinic and Administration building.

- Repairs to building elevators are underway. Many parts needed are long lead items, and as parts are delivered the related repairs are made.
 - o Several cables have been replaced.
 - o Controls in selected elevator cars have been repaired.
 - o Significant work remains to be done before the elevators can be certified for passenger use.

- A temporary emergency generator was purchased and installed to address the life/safety emergency power requirements for the buildings.

- A temporary motor control system has been ordered and will be installed. (Long term item.) This is the electrical control system that controls the operations of all the pumps (fire, domestic, chilled & heating hot water, etc.).
 - o Short term repairs are being made to the current system to provide an interim solution, while the new control systems are being manufactured.
 - o New connections to all of the pumps that the center will control are required.

- A change order for repairs to and/or replacement of exterior and fire exit doors has been issued and repairs will be underway shortly.