Texas Medical Center

Texas Medical Center's Preparation and Recovery for Hurricane Ike

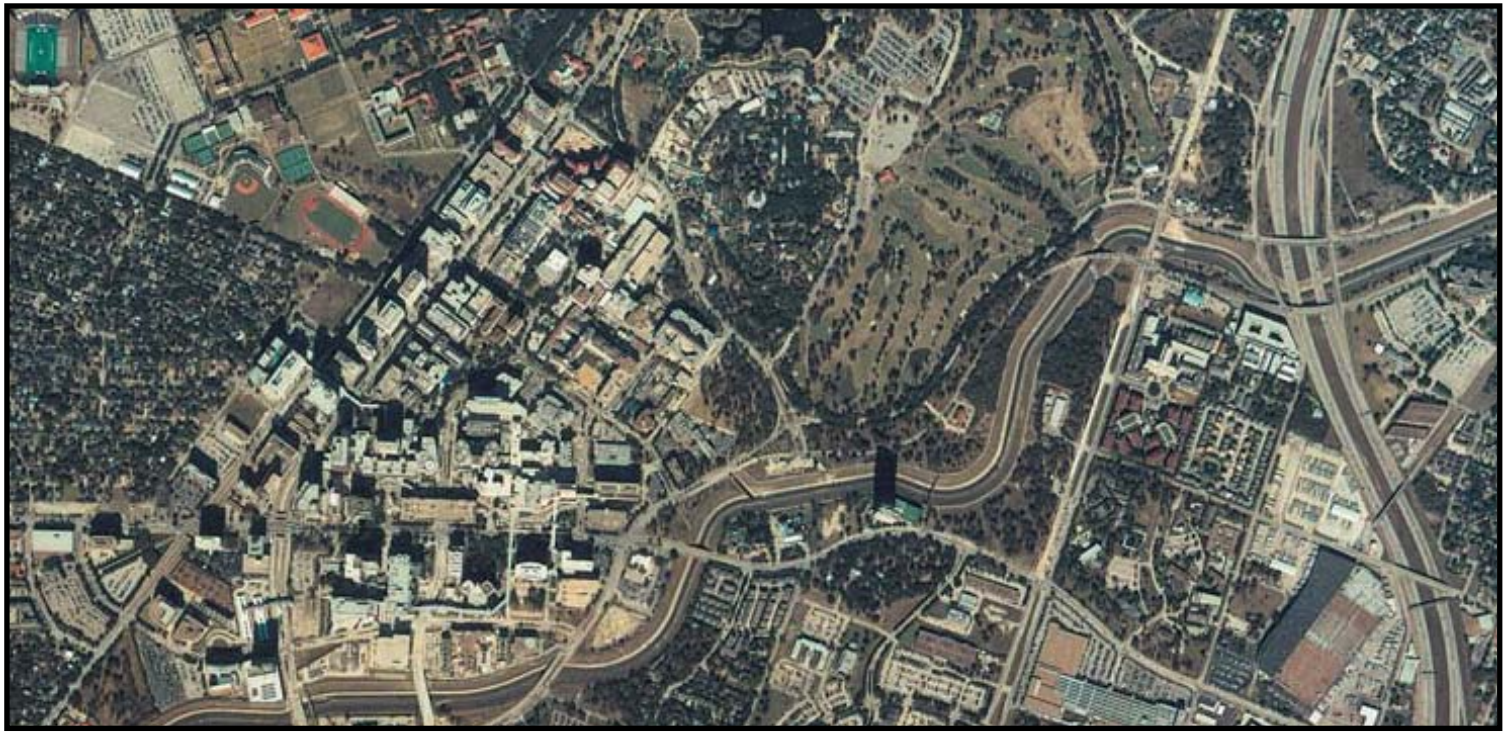
Gary Ellison

Topical Overview

- TMC Flood Dynamics
- Infrastructure Improvements
- Pre-planning Actions
- Ike Related Actions
- Recovery
- Forward Planning

TMC Flood Dynamics

- Harris Gully
  - Area of 3,500 acres that drains through TMC
  - Consists of two 15’ x 15’ box culverts under TMC
  - “Tail-water” concerns as Brays Bayou raises



Harris Gully Outfall

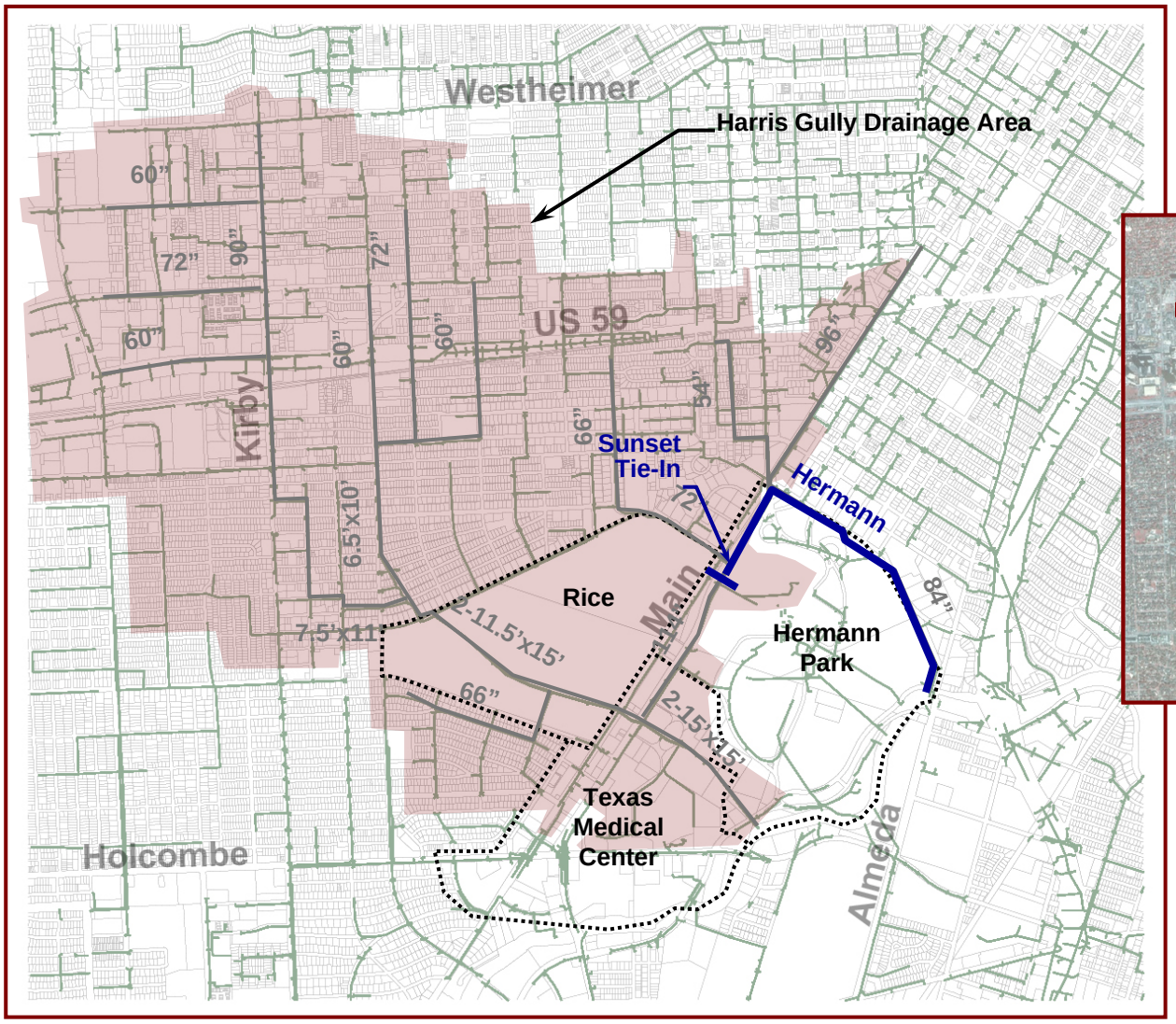
Left: Normal

Below: 10:00 am September 13, 2008

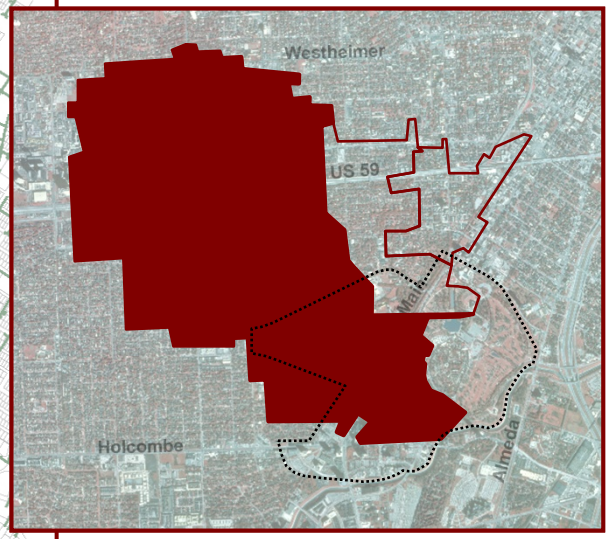
Infrastructure Improvements

- Improved Drainage – Stormwater Projects
  - MacGregor Tunnel
  - Hermann Drive
  - Kirby
- Partnerships with Impact
  - Concept from TMC Hazard Mitigation Master Plan: Enhanced drainage into the Brays Bayou
  - FEMA mitigation projects with matching funds provided by City of Houston, Baylor College of Medicine, and The Methodist Hospital System
  - City of Houston Public Works Department

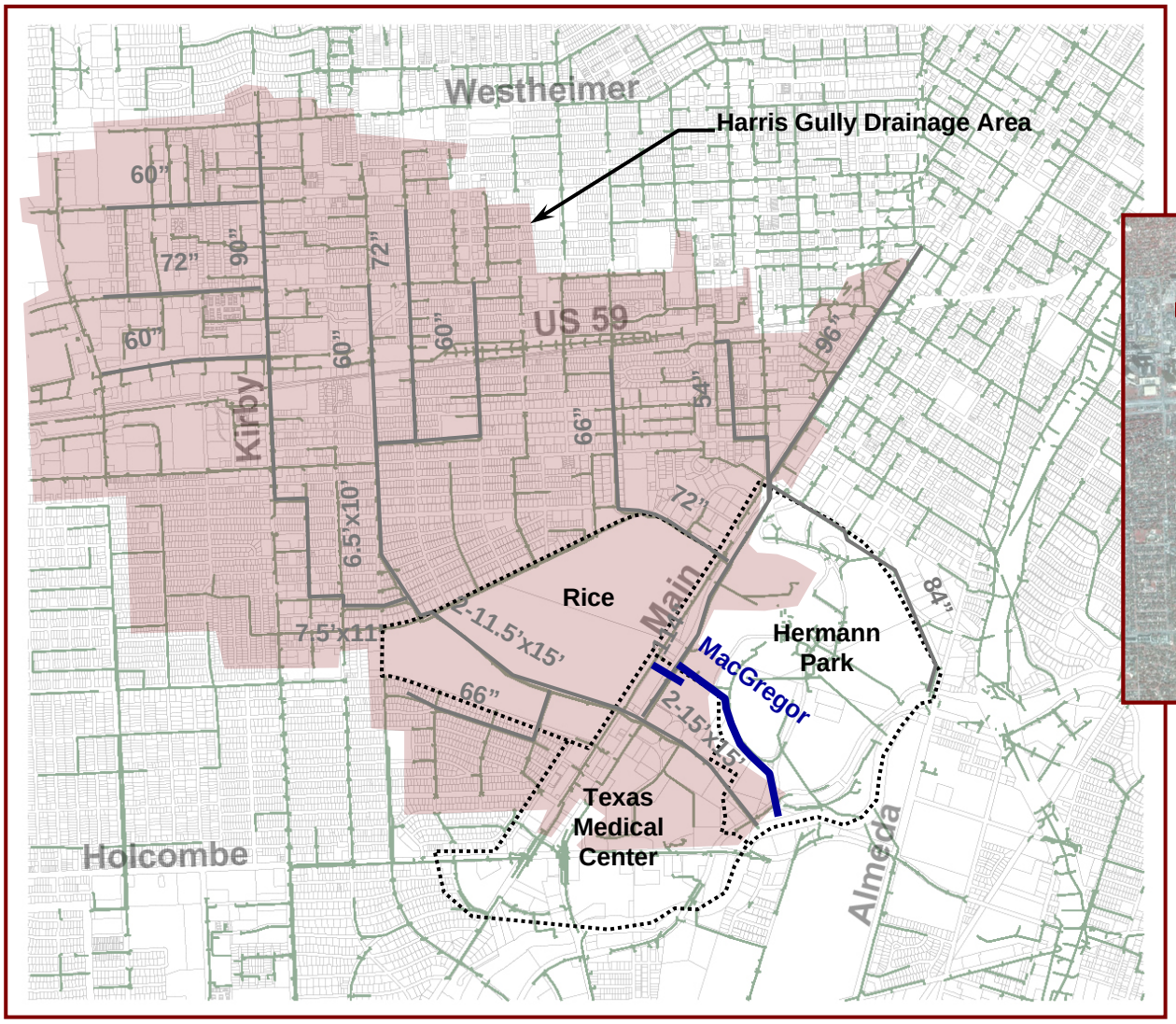
Hermann Drive Relief



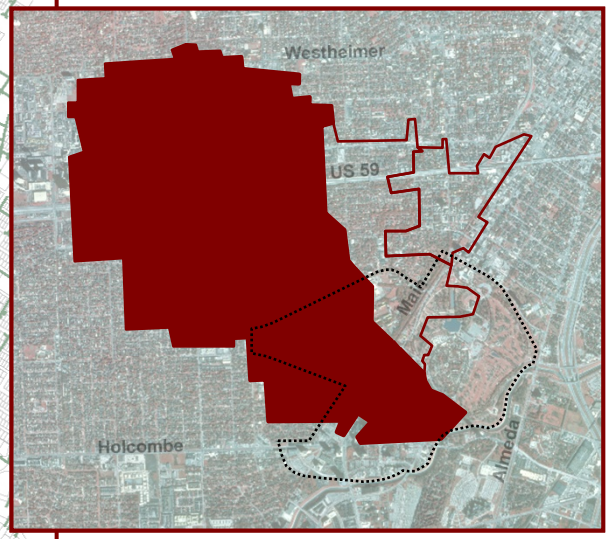
Drainage Area Relief



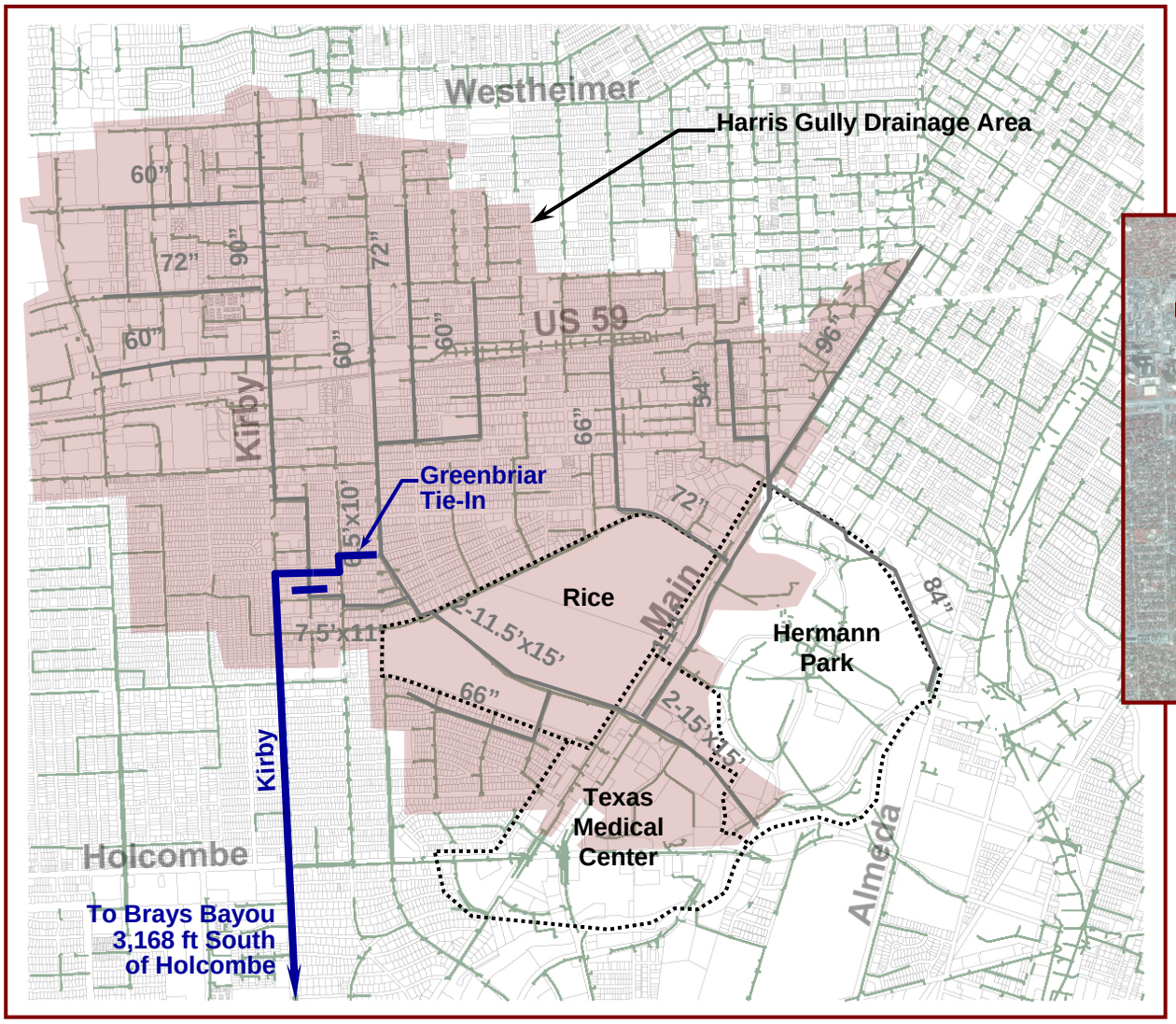
MacGregor Drive



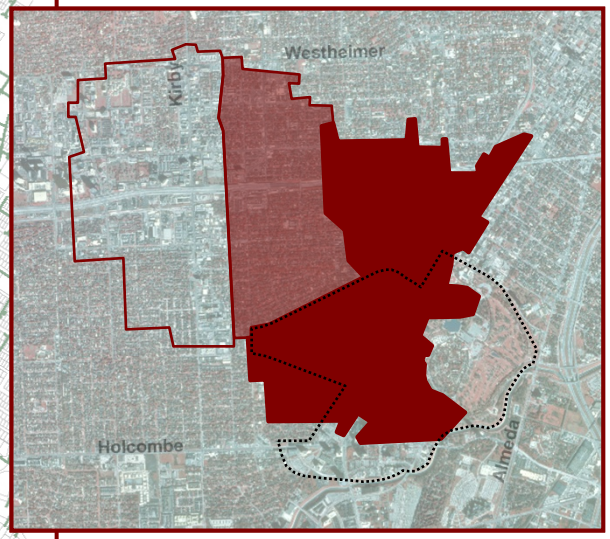
Drainage Area Relief



Kirby Drive Relief



Drainage Area Relief



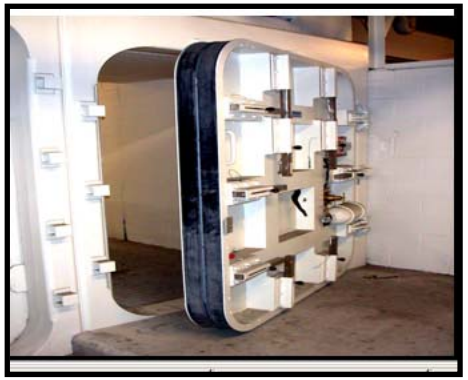
Infrastructure Improvements- In Progress

- Project Brays
  - Multi-year, $450 million project
  - Widens Brays Bayou, increasing capacity
  - Creates additional stormwater detention basins
  - Impacts a number of bridges

- Richard E. Wainerdi Bridge
  - Improved Access
  - Drainage

Flood Protection

- Perimeter Protection
  - Active and passive flood protection systems protect the buildings and the underground tunnel system
  - Tunnel Group Policy



Pre Planned Organizational Functions & Actions

County and City of Houston Emergency Management

- Harris County Emergency Operations Center – Transtar
  - Stations TMC staff member(s) at TRANSTAR during a major event that impacts Texas Medical Center
  - Functions within a Joint Information Center (JIC); gathering and disseminating information pertinent to TMC and the community while coordinating with the HCOEM and TMC Public Information Officers
- City of Houston Emergency Operations Center – HEC Center
- Regional Hospital Preparedness Council
- Catastrophic Medical Operations Center (CMOC)
  - Staffed during local disasters, hurricanes or major storms
  - Coordinates all interactions and requests from TMC and non-bedded TMC institutions
  - Works closely with Regional Hospital Preparedness Council at CMOC
- TMC Unified Command Center

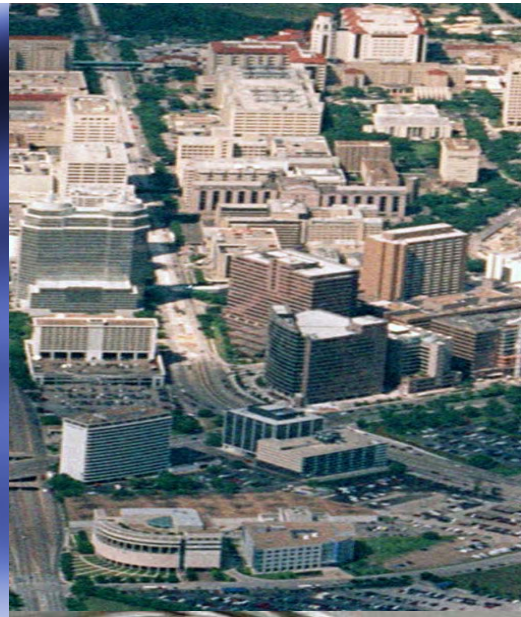
Resources

- Impact Weather
- Essential Personnel Badges
- Flood Alert System Two (FAS-2)
- TMC Communications, Operations and Mobility Center; Brays Bayou monitoring
- Deployment of National Incident Management System (NIMS) structure, Incident Command System
- City of Houston Debris Plan
- TMC Hurricane Parking Plan

TMC Communications, Operations and Mobility Center

- TMC Command Center
  - Staffed 24 x 7; State-of-the-Art Facility
  - Disaster Management
  - Brays Bayou Alerts
  - Severe Weather Alerts

Texas Medical Center



Texas Medical Center's Parking Preparation and Recovery for Hurricane Ike

From Chaos…

Hurricane Rita

- Removed gate arms to provide immediate access
- Overcrowding in Garage 2 and Garage 4
- Lack of space for essential hospital employees
- METRO abruptly ended service

…To Clarity!

Parking Operations Plan

- Entrance gates down
- Signage posted “essential personnel”
- Ambassadors will staff entrances
- ONLY essential employees allowed access
  - Each institution decides who is essential

Parking Operations Plan

- Current contract holders allowed access
- Only 1 vehicle per essential employee
- No access for
  - Vehicles with pets
  - Families of staff or patients
  - Non-essential employees
  - Emergency room access

Additional Pre Planning

- Department specific plans in place
  - Pre-season items: NIMS training, flood door training, etc.
  - Tasks in place for 96 hours out, 48 hours out, 24 and 8 hours out
  - Support logistics in place (food, generator fueling etc.)
  - Recovery tasks assigned
- Plans in place for company transition to storm ride-out
  - 72 ride-out team members
  - Key contractors on site, e.g. tree trimming crews w/ chainsaws
  - CenterPoint Energy on site
- Recovery relief crews and roles broadly defined

Dynamics of TMC Disaster Prep Potential for Wind Damage

- Approximately 10.9 million gross square feet is currently under construction at 20 sites
- Wind damages are caused by wind-borne material, often from rooftops, construction sites, or hardscape elements such as park benches and trash cans

Potential for Wind Damage

Fencing

Floor Deck and Form Work

Potential for Wind Damage

Cranes

Signage

Barricades

Ike Related Actions

During and Immediately after the Storm:

- 4,700 (almost 40%) of the hospital beds within Harris and Galveston County were unavailable due to power outages, storm damage and flooding
  - Impacted workload on the TMC patient care institutions that remained open
  - Coastal area health care facilities sustained catastrophic damage (University of Texas Medical Branch, Shriners Hospital for Children Galveston, and Mainland Medical Center)

During and Immediately after the Storm:

- Patients with home health and chronic care needs, such as dialysis and portable oxygen were at risk due to power outages, closing of health facilities and transportation issues.
- A “M*A*S*H” facility was set up at Rice University to handle non-acute healthcare needs

TMC Member Institution Needs

- Lack of water pressure became an issue to keep water chillers operating for air conditioning
- Concern over water quality kept one TMC hospital from re-opening until the Thursday after the storm
- Damaged overhead electrical lines affected the Michael E. DeBakey VA Medical Center, the Houston Hospice and St. Dominic Village. All three were close to evacuating their facilities post storm. Fortunately power was restored by Monday afternoon or earlier
- Lost power to flood camera at Harris Gully
- Power to TMC's remote parking lots was not restored until several days after the storm

TMC Member Institution Needs

- Water damage at TMC's IT operation necessitated shutting down computer operations, including e-mail for 48 hours
  - E-mail, electronic information and contact lists were unavailable
  - Utilized hard copy information
  - External website shut down
  - Phone communication channels more essential
- School closings created a need for child care services for children of essential staff
  - YMCA opened up facility to provide care for up to 150 additional children

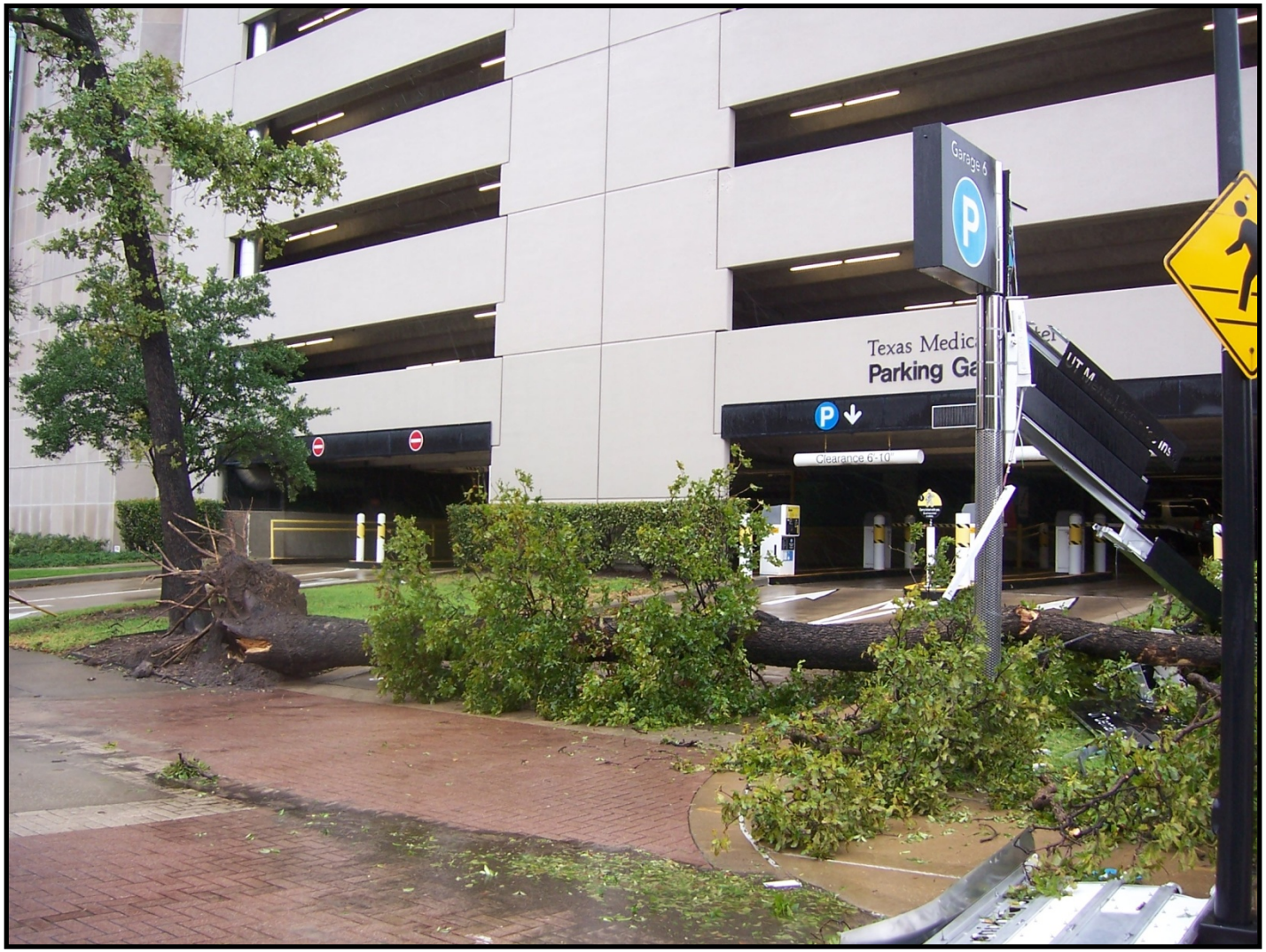
Ike Recovery Actions

Recovery

- The Facilities Operations Group, along with our contracted partners, began clearing debris as soon as it was safe
  - Cleared streets of trees and other debris to provide access to critical healthcare facilities
  - Cleared storm drain inlets to allow for faster drainage and open traffic flow to TMC
  - Assisted institutions as requested

Braeswood Blvd. at Moursund

University of Houston School of Pharmacy



Garage 6 Entrance

MDACC Building on Pressler Street

Managed Fueling Operations

- Texas Medical Center was prepared to maintain clean-up operations by having both gasoline and diesel fuel
- City of Houston assisted with providing expanded gasoline fueling services to the TMC member institution employees
- For several days, TMC met a critical need for essential personnel and official company vehicles, supplying roughly 4,000 gallons of fuel
- METRO & Fort Bend Transit provided services to assist TMC employees

Forward Planning

Lessons Learned

- Explore options for underground electrical service at Michael E. DeBakey VA Medical Center, John P. McGovern Campus, Houston Hospice, and Ronald McDonald House
- Need for more robust wind speed indicators
- Need for more robust barometer pressure indicators
- Address power reliability issue with Brays Bayou/Harris Gully flood camera
- Formalize plan for providing gasoline on an emergency basis
- Increase capacity of TMC generators

Key Conclusions

- Texas Medical Center remained operational
- Underground electrical power is very effective in high wind events
- Plans were adapted to address unplanned needs (e.g. gasoline for employees)
- TMC staff, member institutions, CenterPoint, State of Texas, City of Houston, and Harris County all worked together in a well managed, coordinated effort to meet TMC's recovery needs
- Good planning pays off