Be Prepared!
37th Annual AHCA Seminar and Expo
October 17-19, 2021

Ken Cates

Principal, Northstar Management Company

314-821-3325

Ken.cates@northstarmgmt.com

Disaster Readiness- Restoring the Joplin Health Care Campus After Tornado

Course Number: **AHCA2021_02**

Credit Designation: 1LU/HSW

AIA CES Provider Number: E240

October 18, 2021

The AHCA seminar has teamed with a registered provider of AIA-approved continuing education under Provider Number E240. All registered AIA CES Providers must comply with the AIA Standards for Continuing Education Programs.

Any questions or concerns about this provider or this learning program may be sent to cessupport@aia.org or 800-242-3837 Option 3.

This learning program is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

AIA continuing education credit has been reviewed and approved by AIA CES. Learners must complete the entire learning program to receive continuing education credit. AIA continuing education Learning Units earned upon completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

1 OBJECTIVE

Be able to discuss the lessons learned regarding disaster preparedness.

---

2 OBJECTIVE

Identify major components of a hospital campus stabilization effort, including securing the campus health care functions, designing temporary health care facilities, and the process of erecting and initiating health care services for the health and safety of all patients.

3 OBJECTIVE

Explain the major elements an architect must undertake in the process of planning and coordinating the expectations and efforts of local, state, and federal government agencies.

4 OBJECTIVE

Be able to apply the practical lessons learned in Joplin to planning and design strategies for future disasters at other health care facilities.

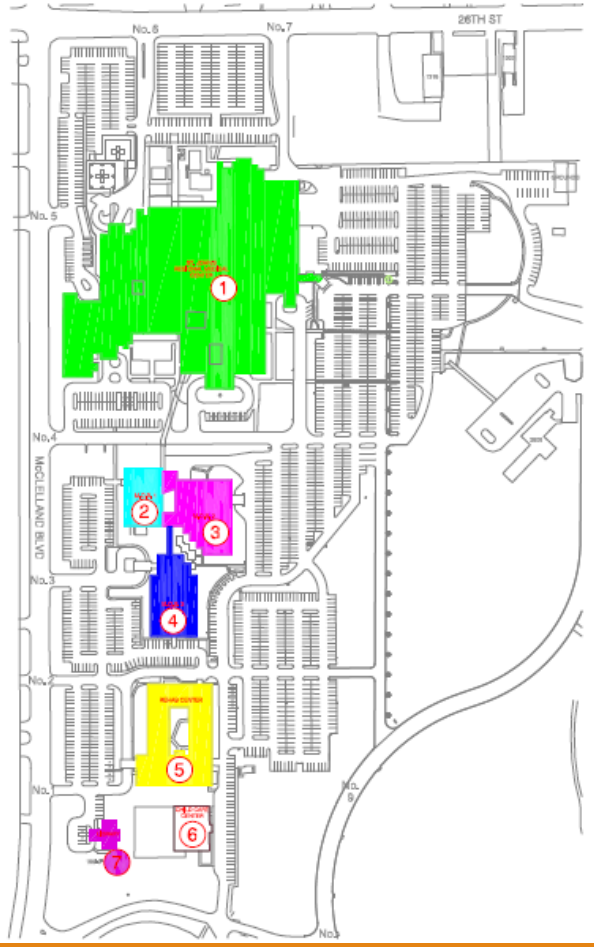
Presentation Outline

Pre-Tornado Status
Immediate Response
Stabilization
Rebuilding
The Future

Joplin – Pre-Tornado Status

Mercy Joplin Campus Stats

- 114 acre campus
- 600,000 SF, 370 bed hospital
- 160,000 SF connected medical office buildings
- Daycare Center
- Foundation Building
- Ground Maintenance Shop



The Disaster

TIME:	Sunday, May 22, 2011 @5:41 PM
HOSPITAL PATIENTS:	183 inpatients, including 25 ED patients
CO-WORKERS:	175 working at the hospital
IMPACT:	EF5 tornado with 200 mph winds, 6 miles long, 1 mile-wide band of complete destruction, 161 fatalities (5 in hospital) 1100+ injured, approximately 8,000 homes damaged/destroyed

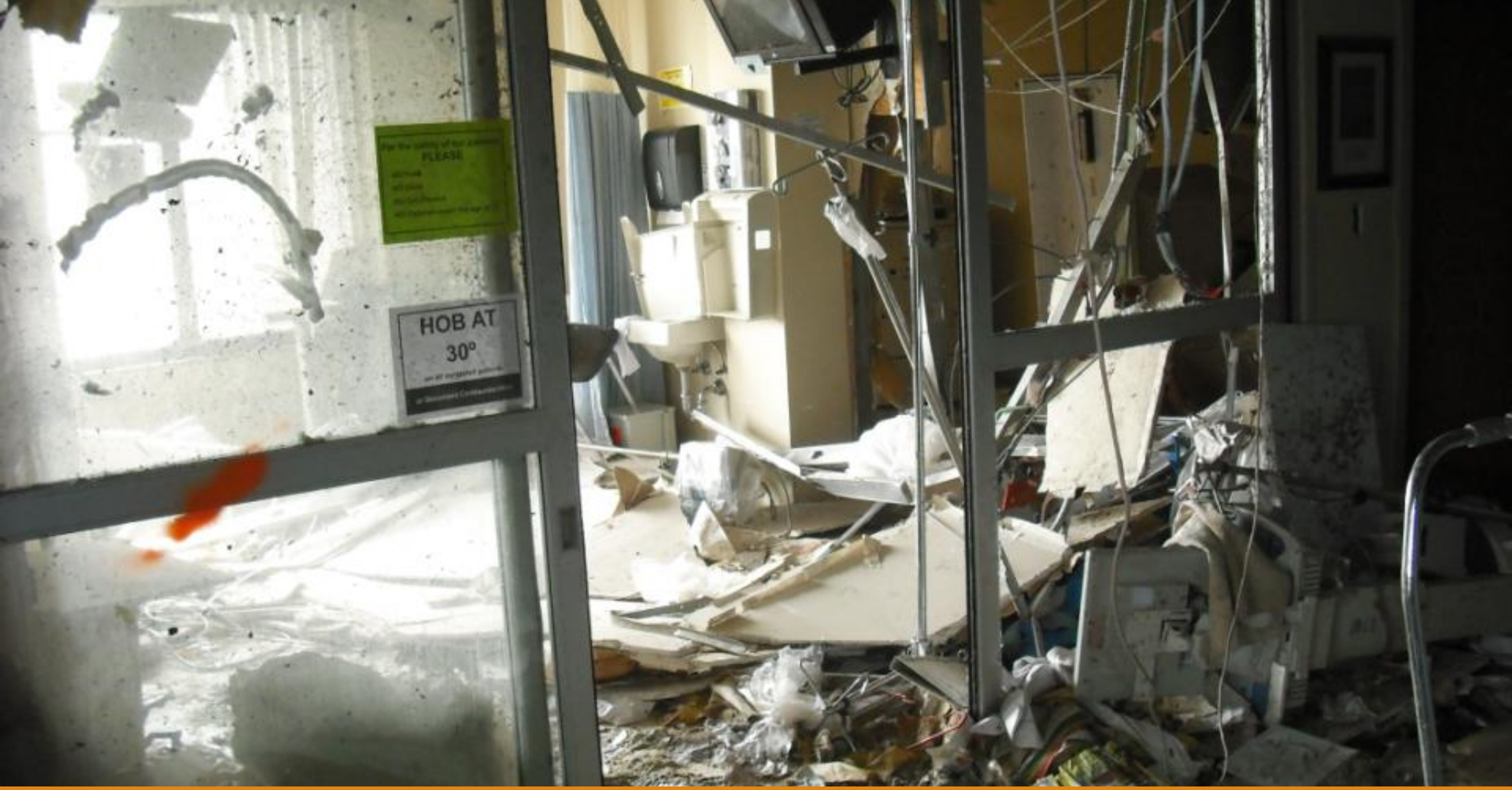
The Impact

- Direct hit to hospital
- Windows and walls blown out
- Roofs pulled off
- Building infrastructure severely damaged
- Generators destroyed
- All communication lost
- Water, sprinkler, gas and sewer pipes disrupted
- Liquid O_2 tanks damaged
- Massive debris throughout building
- 86 physicians' offices destroyed or severely damaged


AMBULANC

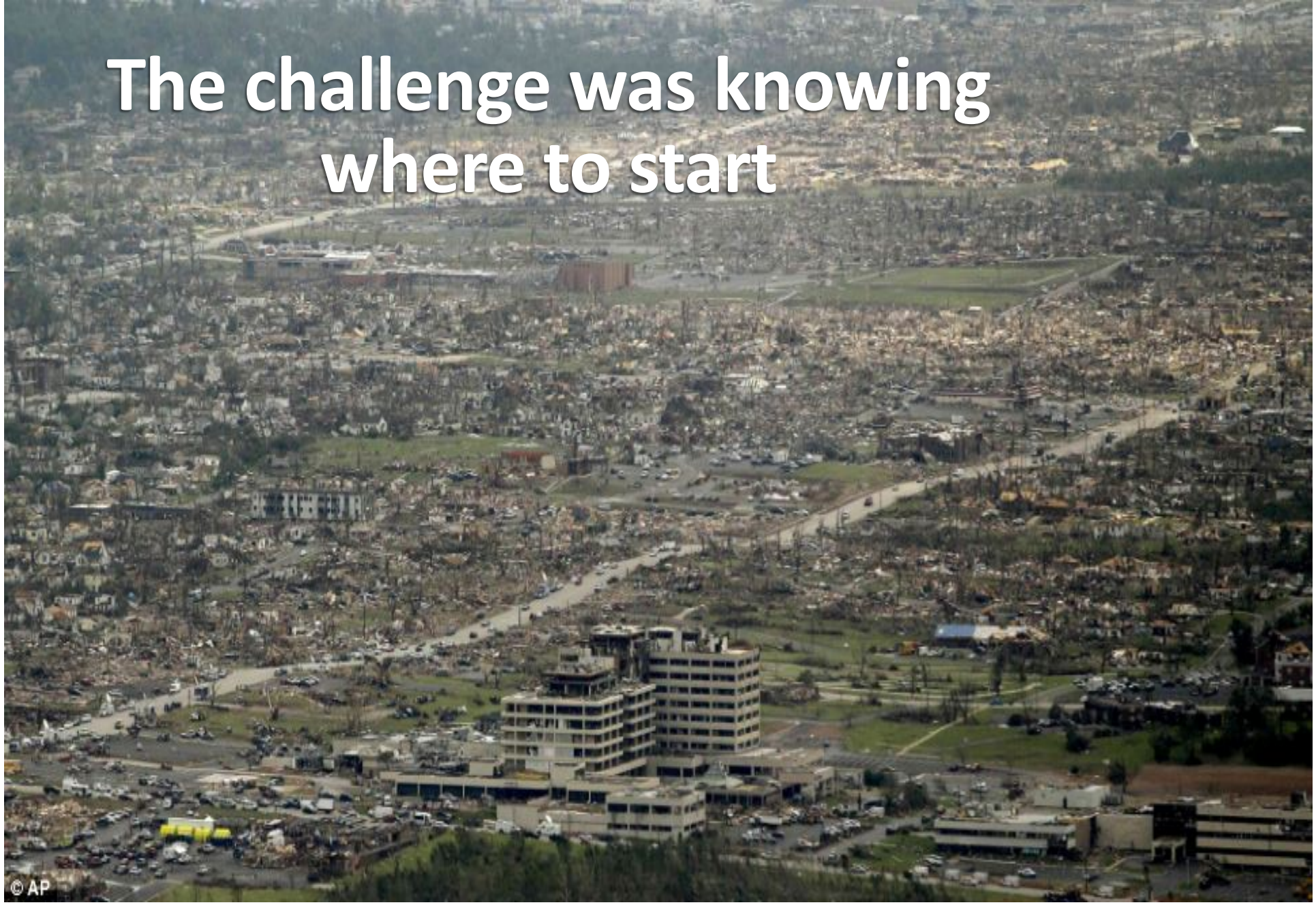
Flying Debris


PRAXAIR
PRAXAIR


HOB AT
30°

Restoring the Joplin Health Care Campus After Tornado

Immediate Response


The challenge was knowing where to start
© AP

The Evacuation

183 patients in the hospital

- 1 surgery in progress
- 1 patient in PACU
- 24 ER patients
- 28 Critical Care patients

Three Collection Points

- West side of building outside Emergency Department
- East side of building
- Conference Center – later to Rehab Building

Patients carried down dark stairways on doors, backboards, wheelchairs, wooden chairs and mattresses - 90 min

Triage

- Ambulatory and wheelchair patients to campus Rehab Building
- Critical patients to nearby Hospital and other regional hospitals
- Emergency tornado injuries treated at triage on the street outside hospital

Emergency Care

- Utilized Town Hall for emergency operations for one week (along with community emergency operations)
- Nearby High School– overflow operation for 48 hours
- Nearby Rehabilitation Center
- Medications, medical supplies and personnel deployed

Disaster Zone Immediate Response

- Search and Rescue
- Establish Security
- Risk Assessment/ Mitigation
- Urgent Recovery Items

Risk Mitigation

- Severe water infiltration
- No lighting
- Massive debris and glass shards in all circulation space
- Falling debris interior and exterior
- Utility services – ensure shut down: Gas, electricity, water, oxygen
- MRI Machines – magnetic fields and cryogen venting

Risk Mitigation

- Refrigerant venting from chillers
- Friable asbestos
- Residual UPS power
- Radioactive materials
- Compressed gasses and leaks
- Grounds – fuel leaking from cars
- Stored chemicals

Urgent Recovery Needs

- Life critical patient care supplies and equipment
- Computer room servers
- Nuclear material from cancer center
- Narcotics
- Medical records
- Security DVRs

Urgent Recovery Needs

- HR records
- ATM and cash registers
- Release liquid O_2 from tanks
- Pathology specimens
- Prosthetics
- Pharmaceuticals
- Biohazards

Stabilization

- Mobilize Contractors for Cleanup
- Establish Onsite Command Center
- Improve Security of Site
- Building Assessments
- Additional Recovery Items

Building Assessment

- Structural Teams
- MEP Engineers
- Environmental Surveys
- Establish PPE Requirements for Building Access

Longer Term Recovery – After First 48 Hours

- Major Medical Equipment
- Vehicles
- Building Contents
- Personal Items
- Insurance and FEMA Assessments

Many Arrived to Offer Assistance

- Regional Emergency Responders
- Military
- Missouri Department of Conservation
- Church Groups
- Volunteers
- Federal, State and Local Agencies

Balance of Crowd Control

- Media
- Dignitaries

What we learned…

Communications

The Good

The Bad

The Lack of

The Good

Prior to storm “prepare for condition gray” was sent out overhead, informing about the storm and putting staff on standby.

As Tornado was noted to be on ground, “implement condition gray” was sent out overhead.

- Staff were calm
- Staff used good judgment
- Patients and visitors were moved into hallways and away from windows
- Critical care patients were moved as far from windows as possible and pillows and blankets covered them in an effort to prevent injury
- EMS crews remained calm; radio traffic was moved to one channel; on-duty supervisor set up in an office across town, providing access to radio and Internet services

The Not So Good and Lack of…

- Radio system at hospital was lost and/or destroyed
- Phone systems ceased to work, severely limiting communication
- As outlying EMS agencies arrived, there was initially no good communication between agencies, mostly due to different radio systems
- Security

Co-Workers

Take care of your yourself and those working with you

- In a large-scale disaster, responders have to deal with a lot of stress (emotional, physical, etc.) and their sense of commitment to help can lead to deprivation of key needs such as:
  - Sleep
  - Nourishment
  - Human Connection (care)

Lessons Learned- Communication

Have alternate off-site command center in addition to the designated on-site command center. If possible, have disaster trailer/supplies stored off-site.

Work with local and State agencies to routinely keep updated contact information.

Have plans in place with cellular service providers and other key service providers for disaster situations.

Establish alternate forms of communication in case electronics do not work in a disaster.

Establish a location, or perimeter, for media.

Lessons Learned-Safety/Well-Being

Take care of yourself and those working with you.

As part of disaster preparedness, plan for services/vendors to provide temporary food/drink stations.

Make sure that responders have proper personal protective equipment (PPE).

Promote in person daily huddles (comradery is important).

Lessons Learned- Security

Immediately declare/post that damaged buildings are off limits until initial assessments are complete.

Establish security measures as soon as possible. Have plans in place with local vendors/suppliers for security needs (lumber/fencing/barricades/etc.).

Have a process in place to secure personal items, narcotics, and cash.

Set up check-in/receiving area at onsite command location.

Establish a check-in location for all that want to volunteer/offer services and ensure due diligence on credentials.

Lessons Learned- Resources

Be skeptical when hiring big national recovery firms that “show up” to offer help. As much as possible, promote use of local trusted resources.

Be very cautious of anyone offering help if you didn’t call them. We found that many of the people offering temporary offices/trailers/tents had very inflated prices.

Proper documentation of all services/materials that you purchase is critical to reimbursement from insurance companies and FEMA. This requires more level of effort than you would estimate. Assign someone focused on doing this.

Lessons Learned- Assets

Analysis of damaged assets is very time consuming. If possible, don't remove any items until witnessed, photographed, and inventoried.

Establish an efficient process with your insurance company to analyze whether or not an item gets repaired/reused or deemed destroyed in the storm.

The securing and/or disposal of the non-narcotic pharmaceuticals, bio-hazards, chemicals, etc. is an important focus. Find a resource that specializes with this service.

Medical records need to be quickly retrieved, inventoried, and restored.

If you have damaged exterior assets, create a secure area onsite for storage/recovery.

Lessons Learned- Storm Hardening

Building Envelope

- Safety Film on existing non-laminated windows
- Roof material- replace ballast system
- Reinforced structures for key equipment/utilities
- Reinforced interior materials for evacuation routes

Disaster Preparedness Planning

- Up to date facility information (sizes, critical items locations, etc.)
- List/Location of all key equipment and hazardous materials
- Updated contact information in known location (agencies, vendors, etc.)

Restoring the Joplin Health Care Campus After Tornado

Rebuilding

Rebuilding

3 Steps for Hospital Services

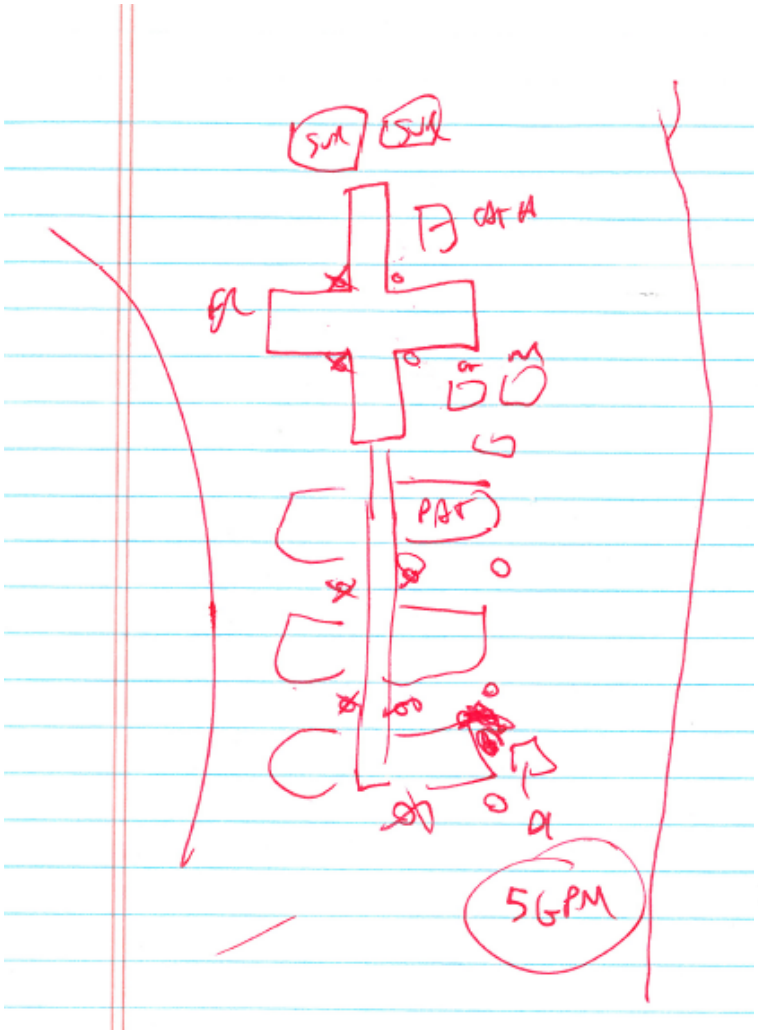
1. Field Hospital – MMU

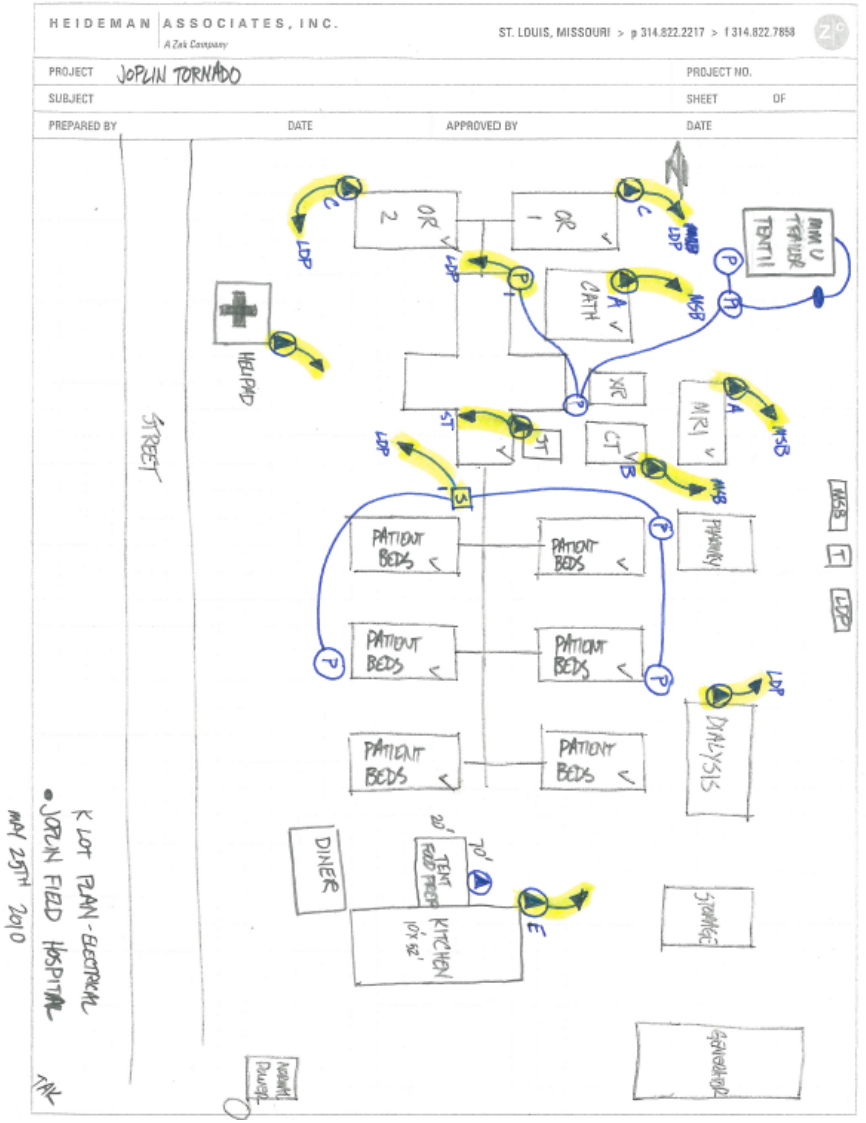
2. Temporary Facilities
   a. Portable Buildings
   b. Component Hospital

3. Replacement Facility

Step 1: Mobile Medical Unit (MMU)

- 60 Beds
- 20 ED Beds
- 40 ICU/Med-Surg Beds
- Full electronic medical records
- Initially totally reliant on generator power
- Opened on May 29th – one week after tornado

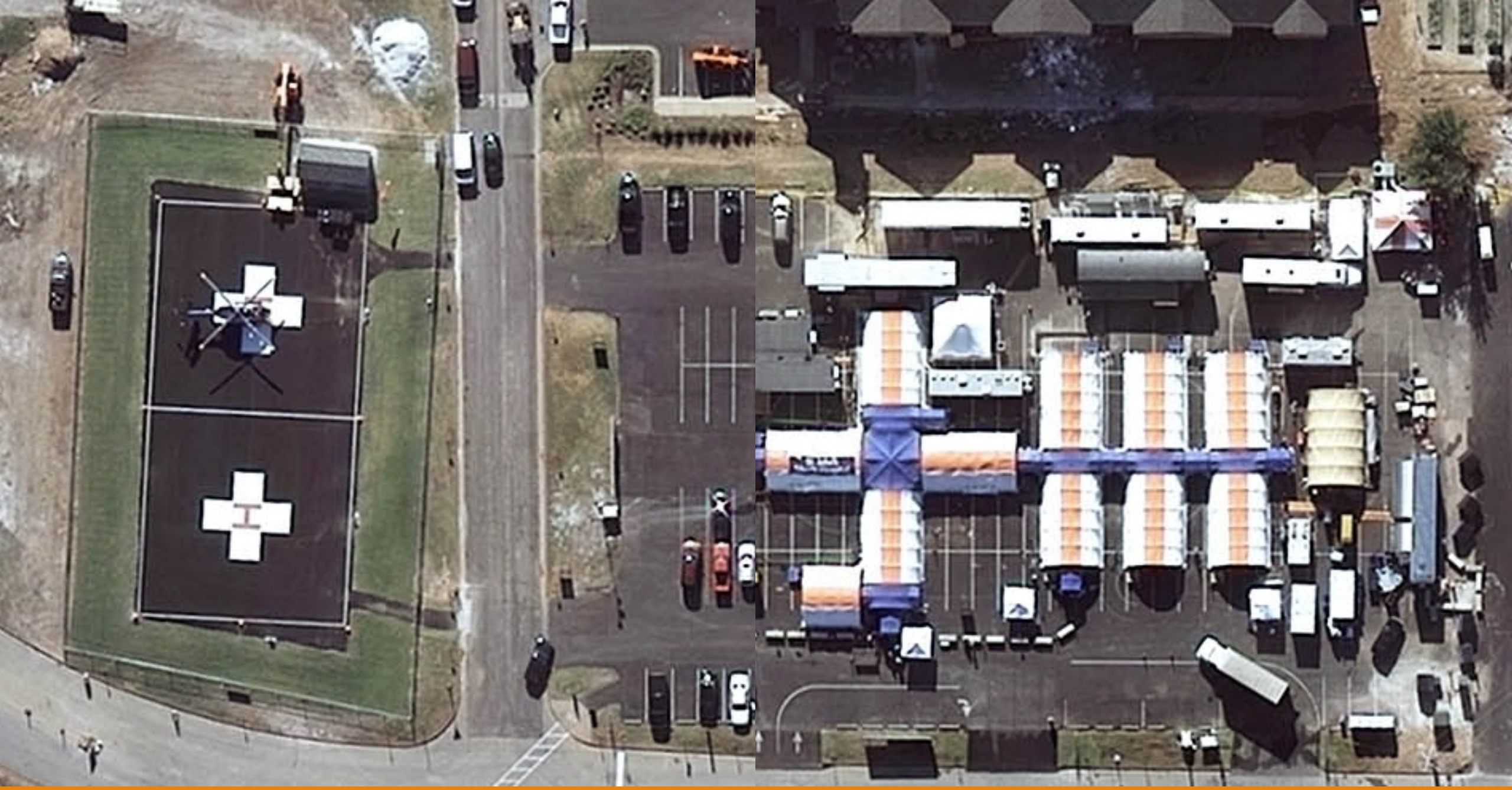

5GPM


HEIDEMAN ASSOCIATES, INC.
A Zak Company
ST. LOUIS, MISSOURI > p 314.822.2217 > f 314.822.7858
PROJECT JOPLIN TORNADO
PROJECT NO.
SUBJECT
SHEET OF
PREPARED BY
DATE
APPROVED BY
DATE
K LOT PLAN - ELECTRICAL
• JOPLIN FIELD HOSPITAL
MAY 25TH 2010
STREET
HELIPAD
OR 2
OR 1
CATH
MRI
CT
ST
PATIENT BEDS
PHARMACY
DIALYSIS
DINER
KITCHEN
STORAGE
LDP
MSB

Add-on Units/Services

- 2 OR trailers
- CATH Lab
- MRI
- CT
- Lab
- Nuclear Medicine
- Pharmacy
- SPD tent
- Visitor & ED waiting room
- Dialysis
- Security & Communication
- Environmental Services
- Toilets
- Showers
- Kitchen & Dining Hall
- Storm Shelters
- Helipads


MOBILE MEDICAL UNIT



Step 2: Portable Buildings

- Hospitals

- Clinics/Administration

Portable Hospital

(Replaced Tented Facility)


MOBILE MEDICAL UNIT
E.M.S.


POLYMETAL
NUDO
POLYMETAL
NUDO
POLYMETAL
NUDO


EXIT

Clinics and Administration

- 35,000 SF of modular buildings operational August 8th
- Family Care building sustained heavy damage and put back in service by July 8th
- Lease Space Conversions:
- 3 Buildings converted for Administration – occupied by end of July
- 1000 Oaks Building renovated to include Sleep Lab, Imaging, Breast Center


SC
601
701
401
301
801

Step 3: Component-Built Facility

Occupied April 2012 (9 month process for design/construction/occupancy)

110 beds

- Expanded OR and Critical Care capabilities
- Trauma Designation
- Resumption of 1^{+} OB, Neurosurgery, Cardiac Surgery, Orthopedic Surgery

Fully functional until new hospital complete

Movable to alternative site


OVERSIZE LOAD


West


MERCY ST. JOHN'S HOSPITAL


Hill-Rom

Other Restored Hospital Services

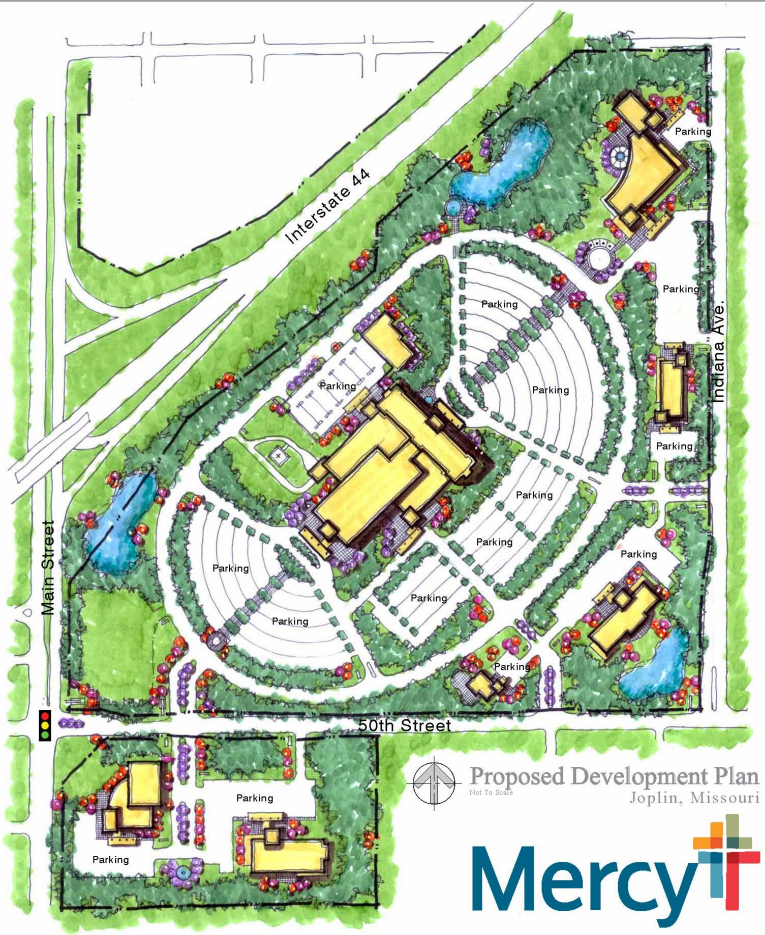
- Nearby Foundation building converted to Infusion Center (opened June 10th)
- Warehouse rented and converted to Clinical Engineering work space, SPD/Med Material Distribution, Scope Processing and Lab
- In and Out Patient Behavior Health Services

Restoring the Joplin Health Care Campus After Tornado

The Future

Final Step in Rebuilding: Replacement Hospital

- New Site
- Groundbreaking in January 2012
- Occupancy in 2015



Storm Hardening Features

- Laminated Glass Windows
- Reinforced Building Core Structure for Defend in Place/Evacuation
  (walls, ceilings, stairwells, materials)
- Concrete Roof Structure
- Reinforced Exterior Structures for Key Equipment and Utilities
  (CEP, Penthouse, etc.)


Hospital Jopli

Steps in Mercy's Rebuilding Process

One week after tornado: 60-bed field hospital, a tent-like structure, is up and running.

August: Modular sectionals arrive on campus and are assembled into hard-sided hospital to replace field hospital.

Spring 2012: Mercy opens component hospital with 120 beds and additional services.

2014: New 327-bed hospital at I-44 and Main opens!

MAY 2011 AUGUST 2011 SPRING 2012 2014

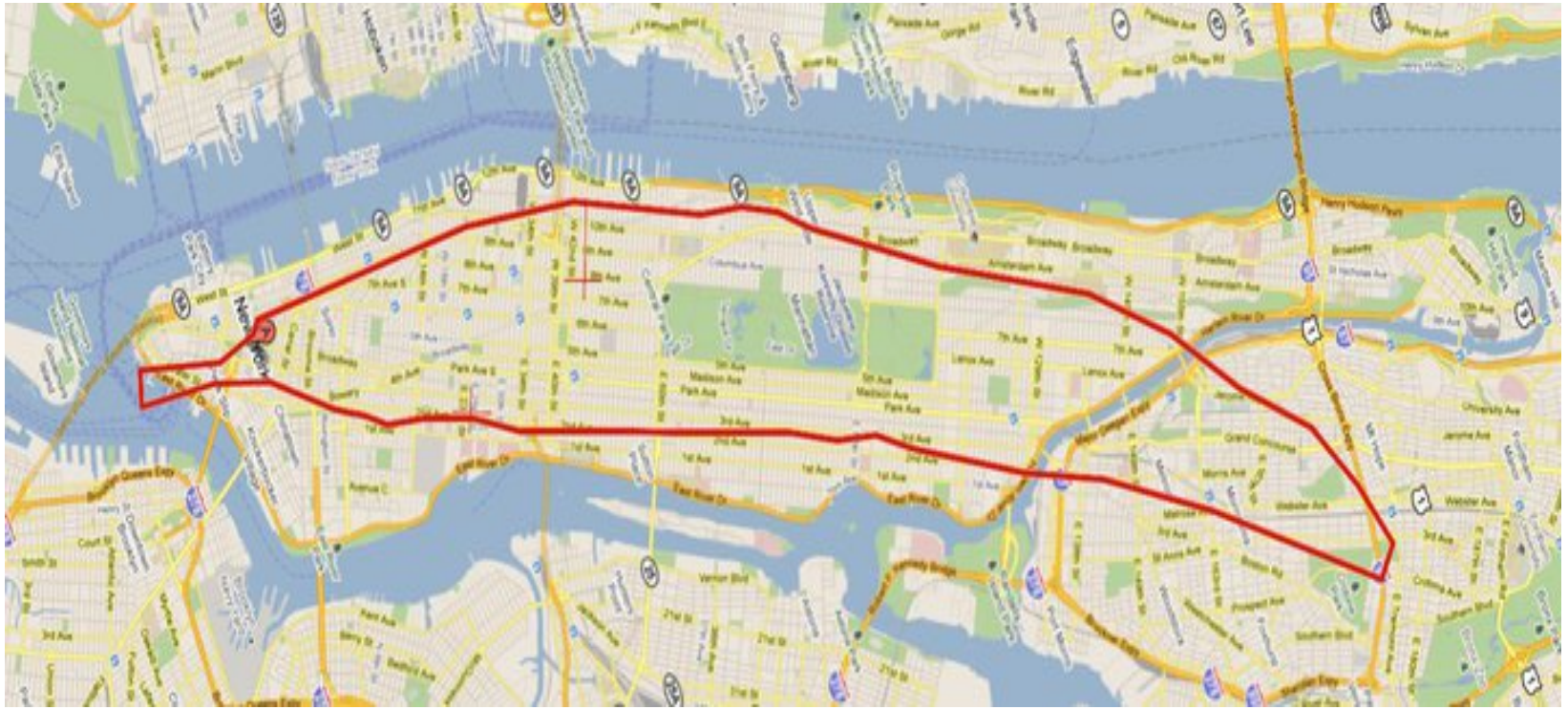
Everyone Came Together

- Friends
- Neighbors
- Strangers
- Fellow Rescuers
- Local, State & Federal response agencies

Time Heals

But we all must remember to PLAN and TRAIN

The Next Disaster- Will You Be Ready?



Path of Joplin Tornado
Placed over Manhattan (to scale)

Thank you for your attention!