



WILLIAMSON COUNTY MULTI-HAZARD MITIGATION PLAN



FEMA



Meeting 2
October 19, 2021
2:00 PM

Agenda

1. Welcome and Introductions
2. Multi-Hazard Mitigation Planning Updates
Tyler Carpenter, Environmental Planning Director, Greater Egypt
3. Hazard Ranking Review
Kelsey Bowe, Environmental Planner, Greater Egypt
4. Williamson County Hazard Modeling
5. Introduction to Mitigation Strategies
6. Mitigation Strategies Exercise
7. Adjourn

Multi-hazard Mitigation Planning Updates

Tyler Carpenter, Environmental Planning Director - Greater Egypt

- **Timeline**

[illegible]

Match Requirements

- 75% Federal Dollars for Planning
- 25% Local Match Needed
- Match is Met by Your Participation
 - Meeting Attendance
 - Outside Work on Plan
 - Travel
 - Other Costs
- Current Match: 69% (\$5,748/8,333)
- MHMP Match Survey

MHMP-Salary and Benefit Request

As you are aware, Greater Egypt has contracted with Williamson County to assist with the completion of the 5-year update to the Multi-Hazard Mitigation Plan. As a federally-funded project, 25% of the cost of the update must be met by Williamson County and other local agencies that participate in the plan update. The match is met through in-kind support or "sweat equity" by the representatives of the participating agencies who attend meetings and take part in the update process. IEMA and FEMA require the actual salary and benefit rates to be used to calculate the cost.

We respectfully request that you provide the names and compensation information for the employees and representatives of your agency who have attended meetings so far, or who have not attended meetings but will eventually be involved in the update process. Please provide this information in the Salary and Benefit Request. This information will remain in strict confidence and will only be utilized to complete the required reports for the IEMA grant manager in Springfield.

For questions regarding this request, feel free to contact Greater Egypt at 618-997-9351.

* Required

Email *

Your email

First Name *

Your answer

Last Name *

Your answer

Responsibilities of Planning Partners

- ~~Represent an authorized jurisdiction in the county~~
- ~~Attend two meetings during planning process~~
- ~~Complete Hazard Ranking exercise for your jurisdiction~~
- Propose two mitigation strategies for each hazard
- Assist with meeting match requirements through participation
- Assist with data collection for hazard modeling

Hazard Ranking Review

hazard	avg risk index	# of lists included	total # lists	% importance	Weighted rank
tornado	14.40816327	49	52	0.942307692	13.57692308
epidemic	14.59459459	37	52	0.711538462	10.38461538
earthquake	11.32608696	46	52	0.884615385	10.01923077
thunderstorm	7.127659574	47	52	0.903846154	6.442307692
winter storm	6.680851064	47	52	0.903846154	6.038461538
flooding	6.761904762	42	52	0.807692308	5.461538462
extreme heat	5.925	40	52	0.769230769	4.557692308
ground failure	6.324324324	37	52	0.711538462	4.5
hazmat release	5.65	40	52	0.769230769	4.346153846
terrorism	5.625	24	52	0.461538462	2.596153846
dam failure	5.777777778	18	52	0.346153846	2
wildfire	4.75	12	52	0.230769231	1.096153846
infestation	3.285714286	14	52	0.269230769	0.884615385
levee failure	6.285714286	7	52	0.134615385	0.846153846
meteor	4.1	10	52	0.192307692	0.788461539
cyber attack	6.8	5	52	0.096153846	0.653846154
utility disruption	10	3	52	0.057692308	0.576923077
invasive spp	2.153846154	13	52	0.25	0.538461539
microburst	7	2	52	0.038461538	0.269230769
landslide	2	2	52	0.038461538	0.076923077
drinking water pollution	4	1	52	0.019230769	0.076923077

Hazard Ranking Review

- Vote on final hazard ranking
 - Last chance to add or remove any hazards for the Plan
- | | |
|---|---|
| 1. Tornado/derecho | 10. Terrorism |
| 2. Disease outbreak/epidemic | 11. Dam failure |
| 3. Earthquake | 12. Wildfire |
| 4. Severe thunderstorm
(including microbursts) | 13. Infestation & invasive species |
| 5. Severe winter weather | 14. Meteor |
| 6. Flooding | 15. Cyberattack |
| 7. Drought & extreme heat | 16. Utility disruption/power
outages |
| 8. Ground failure (mine
subsidence) | 17. Landslides |
| 9. HazMat release | |

Hazard Modeling

- Earthquakes: Hazus 5.0 (FEMA software)
 - County can decide magnitude and epicenter location
- Hazardous Material Release: Aloha (EPA software)
 - *Aloha can only model 1 chemical at a time
 - Each county must decide which chemical(s) they want to model
- Tornadoes: ArcGIS
 - Any EF rating and path direction can be modeled
- Floods: Hazus 5.0
 - Floods will be modeled on a case by case basis if the county does not rank the hazard in the top 4
- Heat: Google Earth Engine
 - Land surface temps can be mapped from LandSat8 data for a desired date range

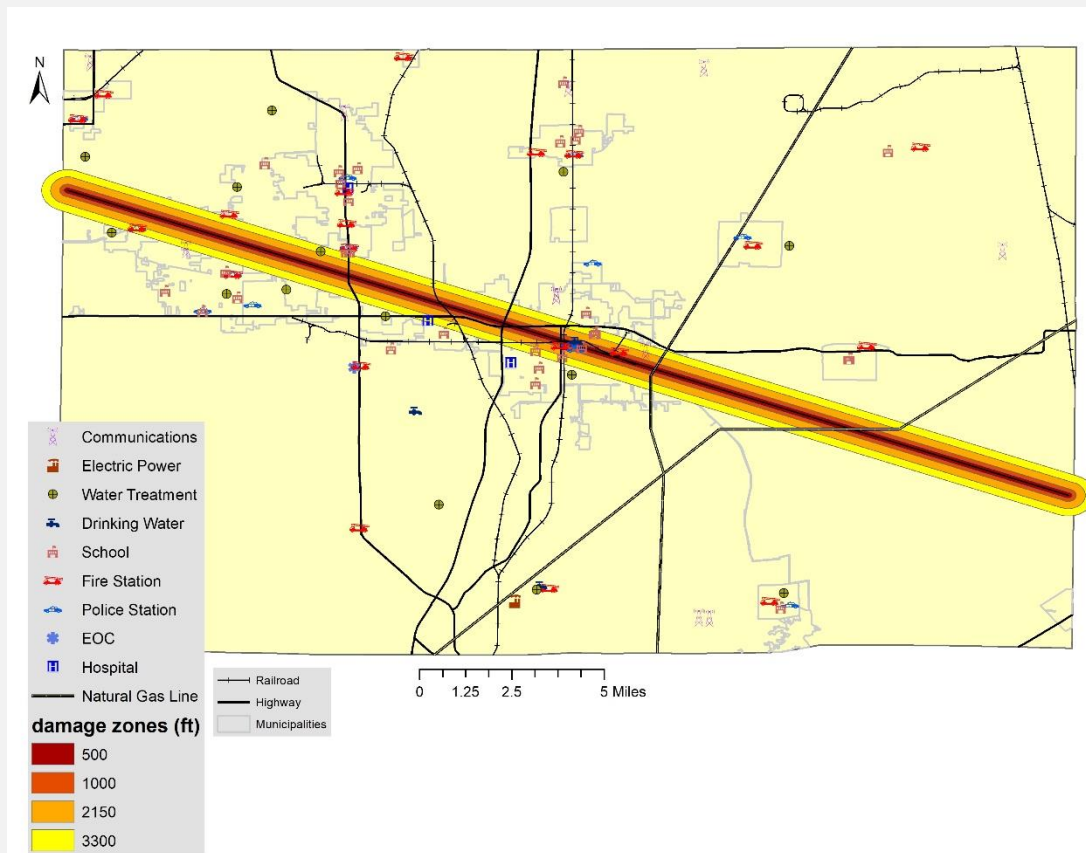
**Greater Egypt will not model pandemics/disease outbreak. Detailed information and maps of positivity rates for Covid19 are widely available from the CDC and Illinois Department of Public Health*

Reminder – Hazus Datasets: Last Chance to Update

- **Updating is optional**
 - Can make models more accurate
 - May be useful in determining mitigation strategies
 - Anything built after 2010 is likely not included in current datasets
- **Features of the datasets that are estimated (from aggregated census and homeland infrastructure data):**
 - Building & foundation type
 - Square footage
 - Replacement value
 - Number of stories
- **Potentially important structures currently not included in models:**
 - Nursing homes or other live-in care facilities
 - Urgent care clinics
 - City halls, courthouses
 - Dams & levees
 - Military buildings

Example Tornado Path

- Model EF4 tornado
 - Average path length: 32 miles
 - (path on right is 23 miles)
 - Average path width: 3271 feet
 - Based on all U.S. tornadoes reported from 2007-2013
- **Assessor's/parcel data (with building values) required for detailed estimates of damage**
- Planning partners can request other paths and tornado EF ratings



Historic Tornadoes – Williamson County

Location	Date	Rating	Deaths	Injuries	Property Damage
	12/18/1957	F4	0	10	2500000
	4/3/1968	F1	0	0	25000
	6/2/1973	F2	0	0	250000
	5/29/1982	F4	10	181	250000000
	11/19/1991	F3	0	16	25000000
MARION	6/12/1998	F1	0	0	100000
PULLEYS MILL	10/18/2004	F1	0	0	25000
CORINTH	5/8/2009	EF1	0	0	0
WOLF CREEK	2/29/2012	EF2	0	0	100000
CREAL SPGS	10/31/2013	EF1	0	0	40000
PULLEYS MILL	4/3/2014	EF1	0	0	10000
CRAINVILLE	2/28/2017	EF1	0	0	6000
CARTERVILLE	4/5/2017	EF1	0	0	35000
CRAINVILLE	4/3/2018	EF1	0	0	250000
PITTSBURG	4/3/2018	EF1	0	0	40000
CORINTH	4/3/2018	EF1	0	0	7000
JOHNSTON CITY	6/28/2018	EF0	0	0	35000

EF4 and EF5 tornadoes are rare

- (average of 8/ year and 1/year for the entire United States) - but devastating when they do occur (Elsner et. al 2014)
- 24 EF4/EF5 tornadoes in IL since 1950

The Marion Tornado of 1982 (Williamson/Perry County) killed 10 and injured nearly 200

- Path length 17mi and width 400ft (NOAA Storm events database)

Historic Tornadoes - SolL

- Tri-State Tornado of 1925
- 625 deaths and 2,000+ injured
- 15,000 homes destroyed

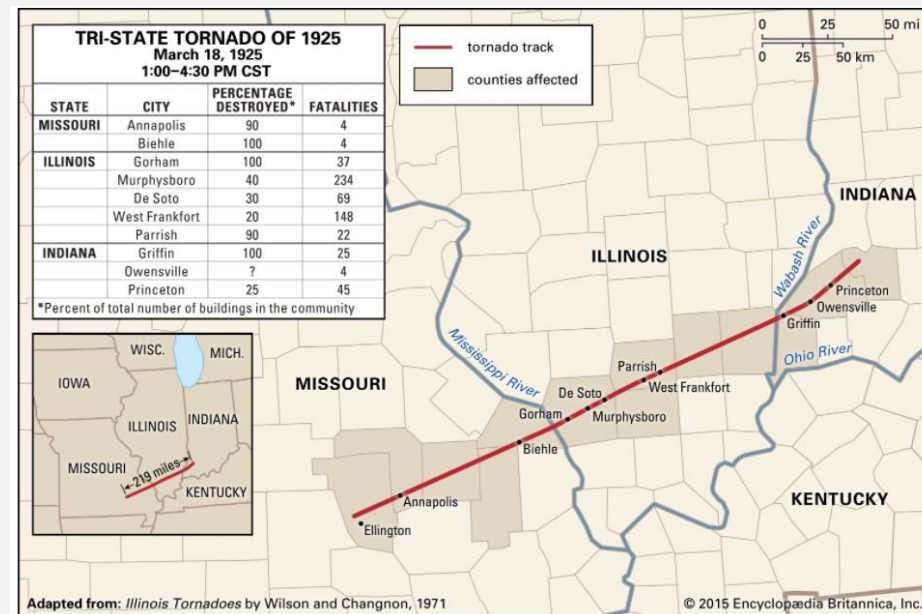
THE SOUTHERN ILLINOISIAN SUNDAY, MARCH 18, 2012

Contact Us: paul.newton@thesouthern.com 9A



Damage is shown in De Soto after the 1925 Tri-State Tornado.

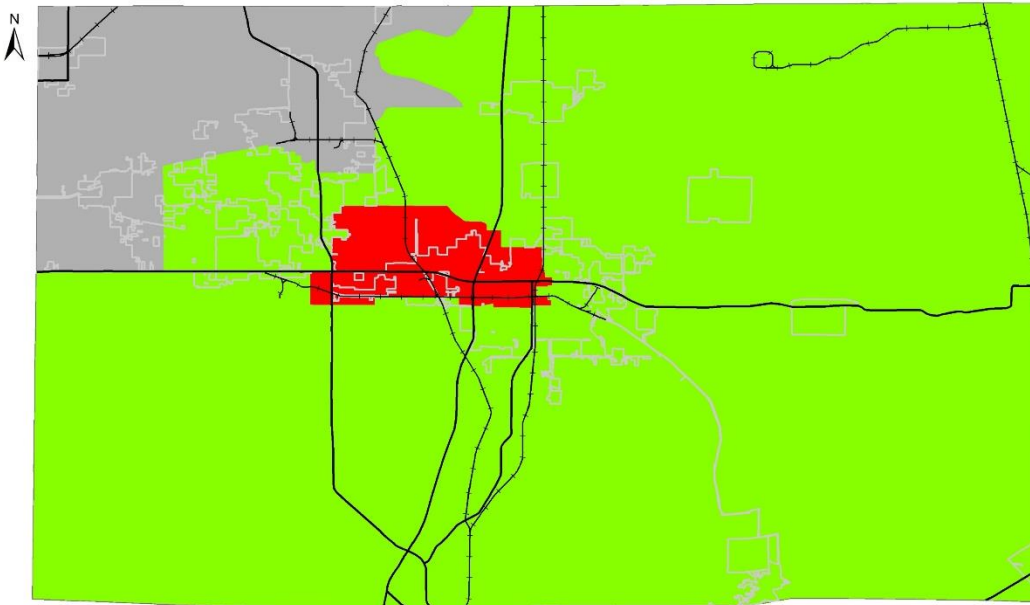
PROVIDED BY JACKSON COUNTY HISTORICAL SOCIETY



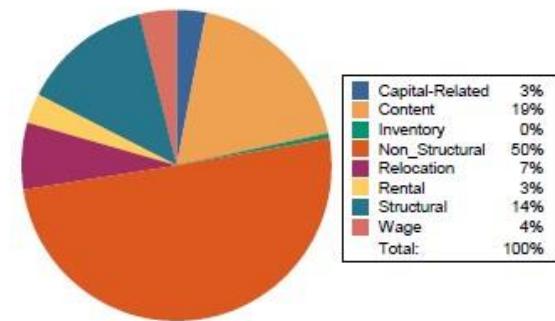
Earthquake Preliminary Models

- Arbitrary Earthquake Model (Hazus 5.0)
- Epicenter: Marion, IL
 - Most populous city chosen to estimate damages in a worst case scenario
- Magnitude: 6
 - Any higher magnitudes are extremely unlikely
- Depth: 10km
 - This is the average, or “fixed depth” of earthquakes as determined by USGS
- Attenuation Function: CEUS 2008
 - The rate of loss in energy from the epicenter
 - CEUS 2008 was designed for the Eastern/Central United States

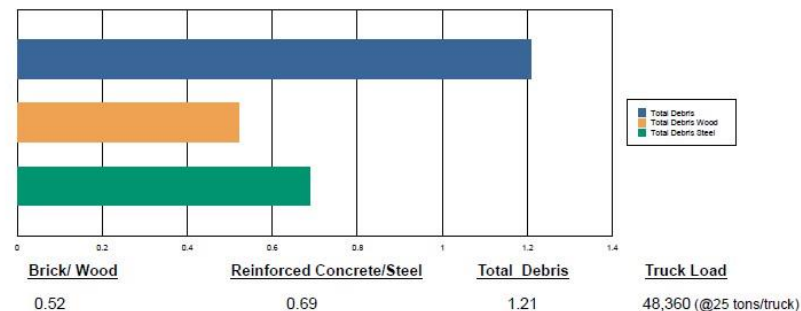
Earthquake Preliminary Models



Earthquake Losses by Loss Type (\$ millions)



Earthquake Debris (millions of tons)



Damage Categories by General Occupancy Type

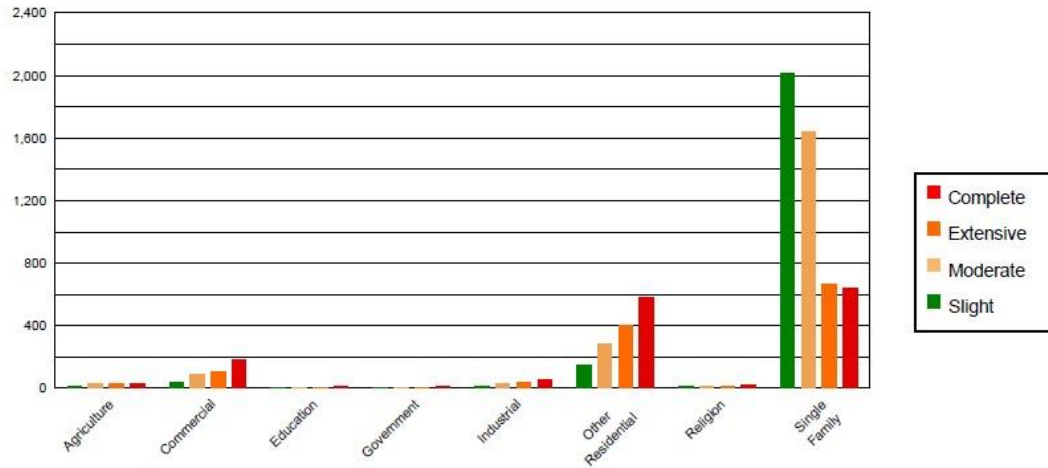
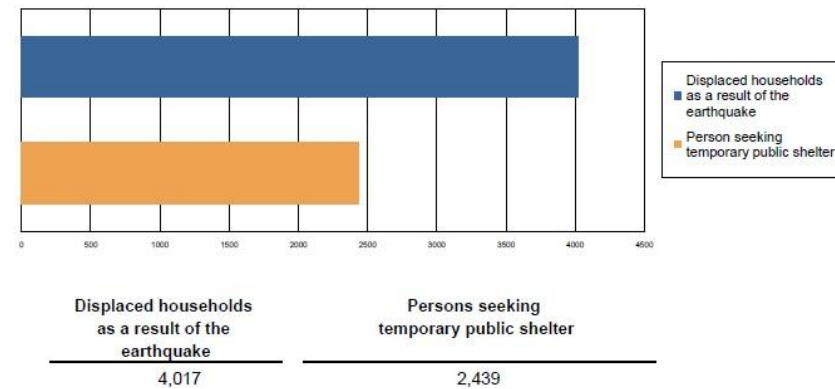


Table 3: Expected Building

	None		Slight
	Count	(%)	Count
Agriculture	13.33	0.53	13.06
Commercial	23.62	0.94	33.02
Education	1.72	0.07	1.93
Government	2.21	0.09	2.71
Industrial	7.30	0.29	9.68
Other Residential	113.27	4.50	149.70
Religion	12.02	0.48	11.53
Single Family	2342.84	93.11	2017.91
Total	2,516		2,240

Displaced Households/ Persons Seeking Short Term Public Shelter



Injury Estimations

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	26.88	8.23	1.28	2.51
	Commuting	0.06	0.09	0.14	0.03
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	25.86	7.86	1.21	2.37
	Other-Residential	448.22	124.17	14.87	28.19
	Single Family	869.92	255.93	39.66	78.22
	Total	1,371	396	57	111
2 PM	Commercial	1636.19	501.71	78.30	152.83
	Commuting	0.55	0.80	1.26	0.25
	Educational	587.83	185.58	30.79	60.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	190.08	58.34	9.03	17.53
	Other-Residential	106.94	30.22	3.82	7.05
	Single Family	215.59	65.23	10.49	19.76
	Total	2,737	842	134	257
5 PM	Commercial	1167.65	359.07	56.50	108.79
	Commuting	9.34	13.58	21.57	4.24
	Educational	60.66	19.17	3.18	6.21
	Hotels	0.00	0.00	0.00	0.00
	Industrial	118.80	36.46	5.64	10.95
	Other-Residential	170.03	48.00	6.06	11.17
	Single Family	351.32	106.31	17.10	32.20
	Total	1,878	583	110	174

Level 1: Treatable with basic first aid
 Level 2: Hospitalization, not life threatening
 Level 3: Hospitalization, life threatening unless treated quickly
 Level 4: killed by earthquake

2 AM: Population at home
 2 PM: Population at work/school
 5 PM: Population Commuting

*General trends of peak occupancy loads
 **This model does not estimate casualties of livestock or pets

Damages to essential and critical facilities

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	4	4	4	0
Schools	30	30	19	0
EOCs	1	1	1	0
PoliceStations	13	12	6	0
FireStations	20	18	8	0

Total Transportation losses: \$105million

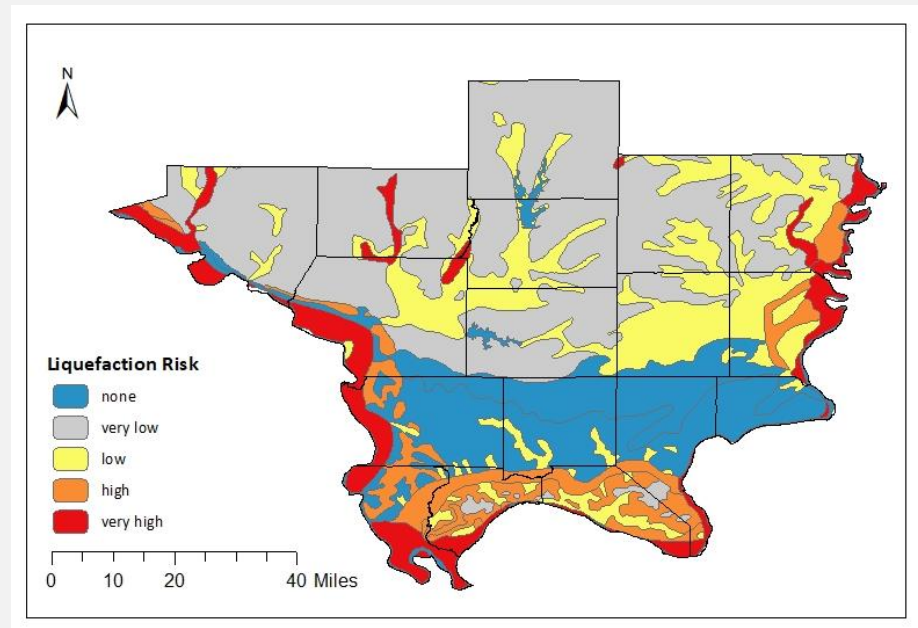
- Damages to highway & rail bridges, train facilities, airport

Total Utility system losses: \$63.5million

- Damages to drinking water plant
- No other utility damages estimated

Liquefaction Risk

- Occurs when sandy soils behave like a liquid during ground shaking events
- Can cause severe damage to buildings and infrastructure



Data source: IL state geological survey

Historic Earthquakes – Williamson County

Historic Earthquakes in Williamson County:

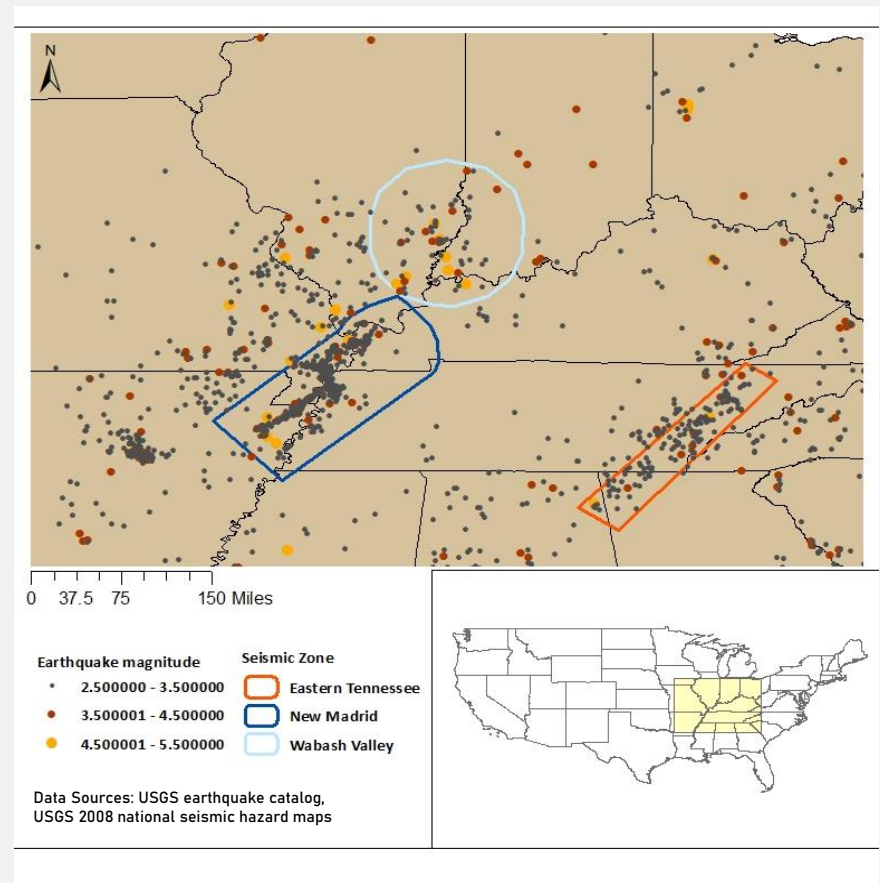
Mag 3.4 6/9/1981

Mag 3.0 3/10/1988

Mag 2.9 6/28/1989

Mag 2.7 1/11/2013

- Severe earthquakes (magnitude 7 or higher) within the New Madrid or Wabash Valley seismic zones may be felt hundreds of miles away from the epicenters

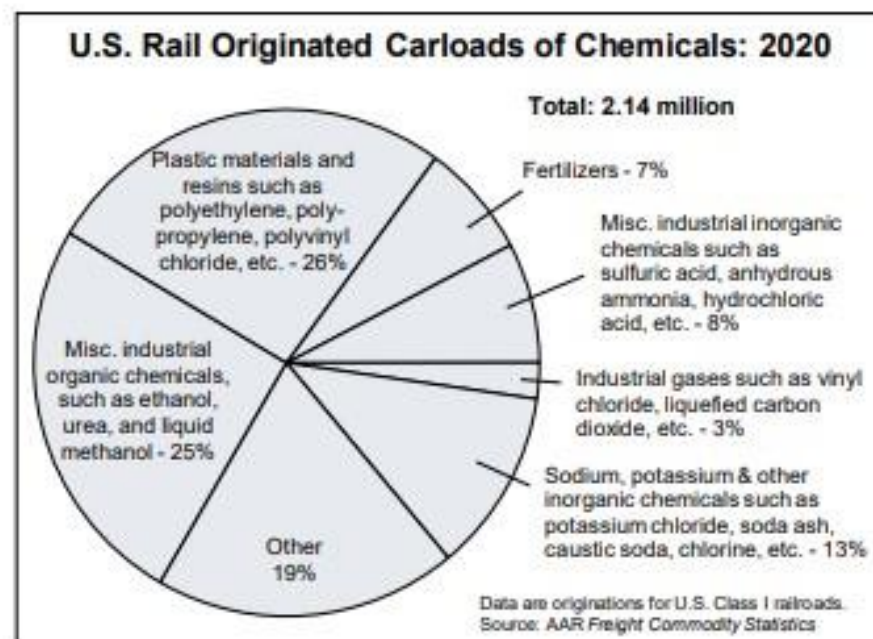


Historic Earthquakes – New Madrid

- December, January, February of 1811-1812
 - 3 large earthquakes, estimated magnitude 7, with hundreds of aftershocks
 - The February earthquake destroyed the town of New Madrid MO
 - Among the 5 worst earthquakes to ever occur in the lower 48 states
 - Earthquakes of this severity are estimated to occur only every ~500 years

Hazardous Materials Model

- ALOHA – Areal Locations of Hazardous Atmospheres
- Models toxic cloud dispersal
- Estimates fires and explosions (depending on scenario)
- 1,000 hazardous chemicals to choose from
 - Cannot be modeled in combinations
 - Cannot model further than 6 miles from release spot
 - Cannot take topography into account



Example 1- ethanol tank explosion

Text Summary

SITE DATA:

Location: MARION, ILLINOIS
 Building Air Exchanges Per Hour: 0.79 (unsheltered single storied)
 Time: October 12, 2021 1356 hours CDT (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
 CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
 ERPG-1: 1800 ppm ERPG-2: 3300 ppm ERPG-3: N/A
 IDLH: 3300 ppm LEL: 33000 ppm UEL: 190000 ppm
 Ambient Boiling Point: 172.1° F
 Vapor Pressure at Ambient Temperature: 0.062 atm
 Ambient Saturation Concentration: 63,403 ppm or 6.34%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from 230° true at 3 meters
 Ground Roughness: urban or forest Cloud Cover: 5 tenths
 Air Temperature: 70° F Stability Class: D
 No Inversion Height Relative Humidity: 50%

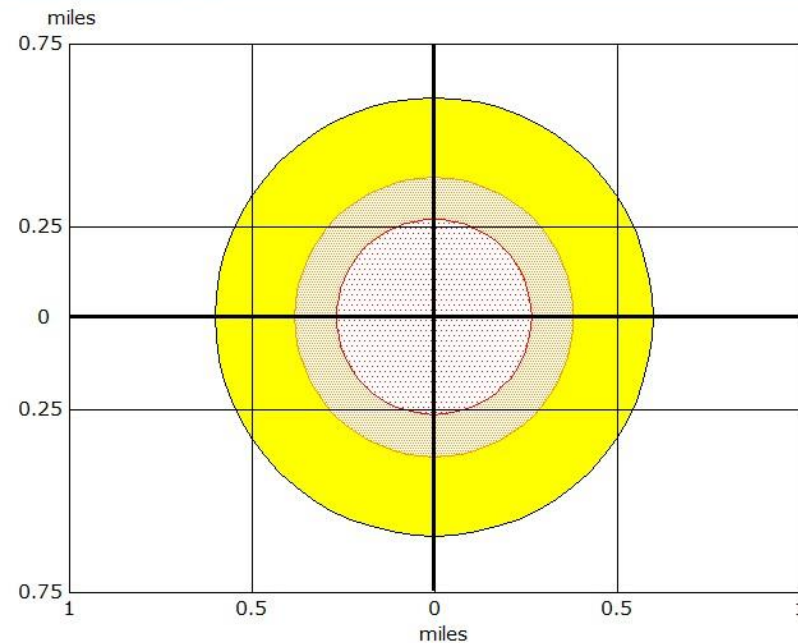
SOURCE STRENGTH:

BLEVE of flammable liquid in horizontal cylindrical tank
 Tank Diameter: 10 feet Tank Length: 52 feet
 Tank Volume: 30,551 gallons
 Tank contains liquid
 Internal Storage Temperature: 70° F
 Chemical Mass in Tank: 190000 pounds
 Tank is 94% full
 Percentage of Tank Mass in Fireball: 100%
 Fireball Diameter: 280 yards Burn Duration: 15 seconds

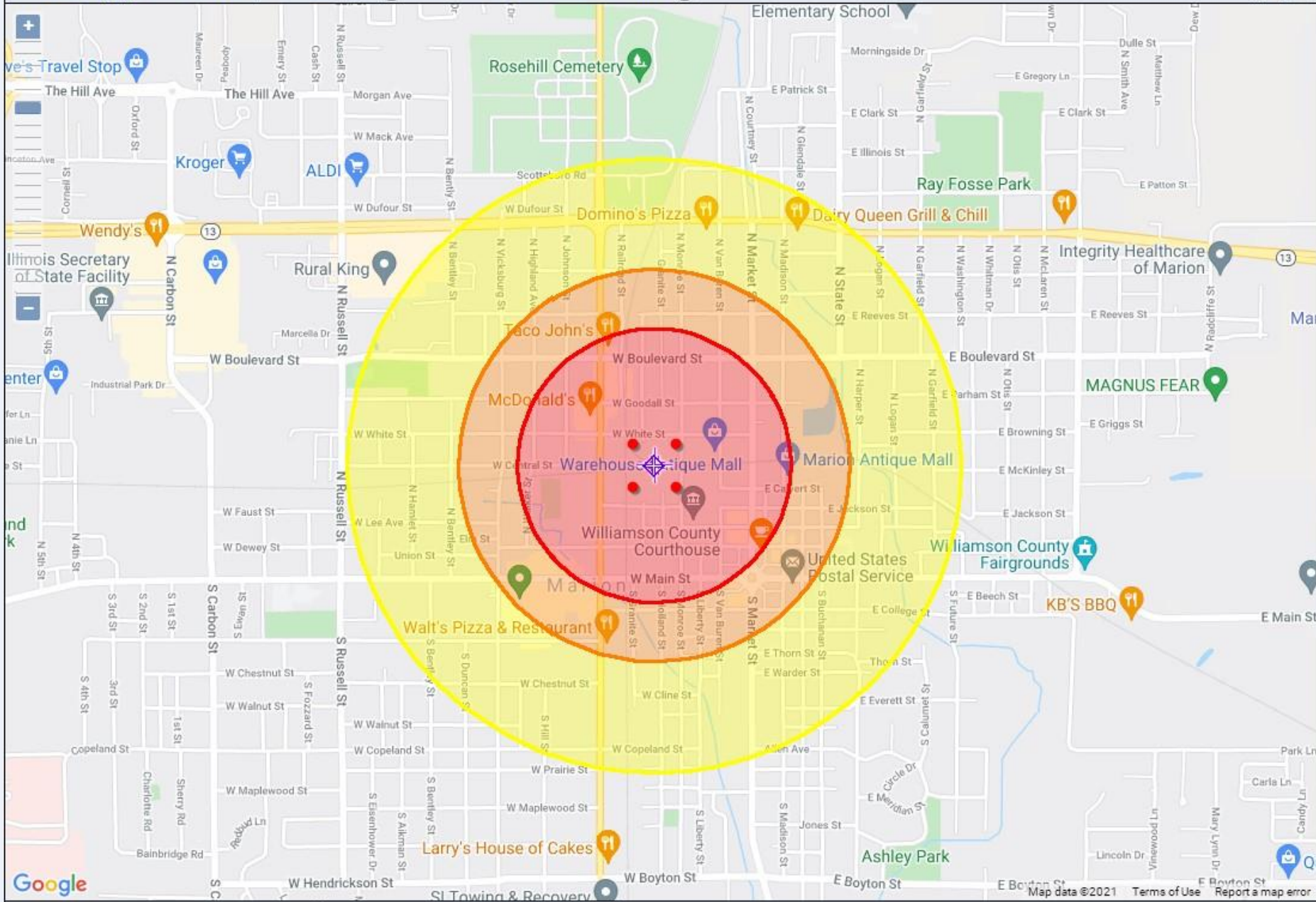
THREAT ZONE:

Threat Modeled: Thermal radiation from fireball
 Red : 471 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
 Orange: 673 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
 Yellow: 1057 yards --- (2.0 kW/(sq m) = pain within 60 sec)

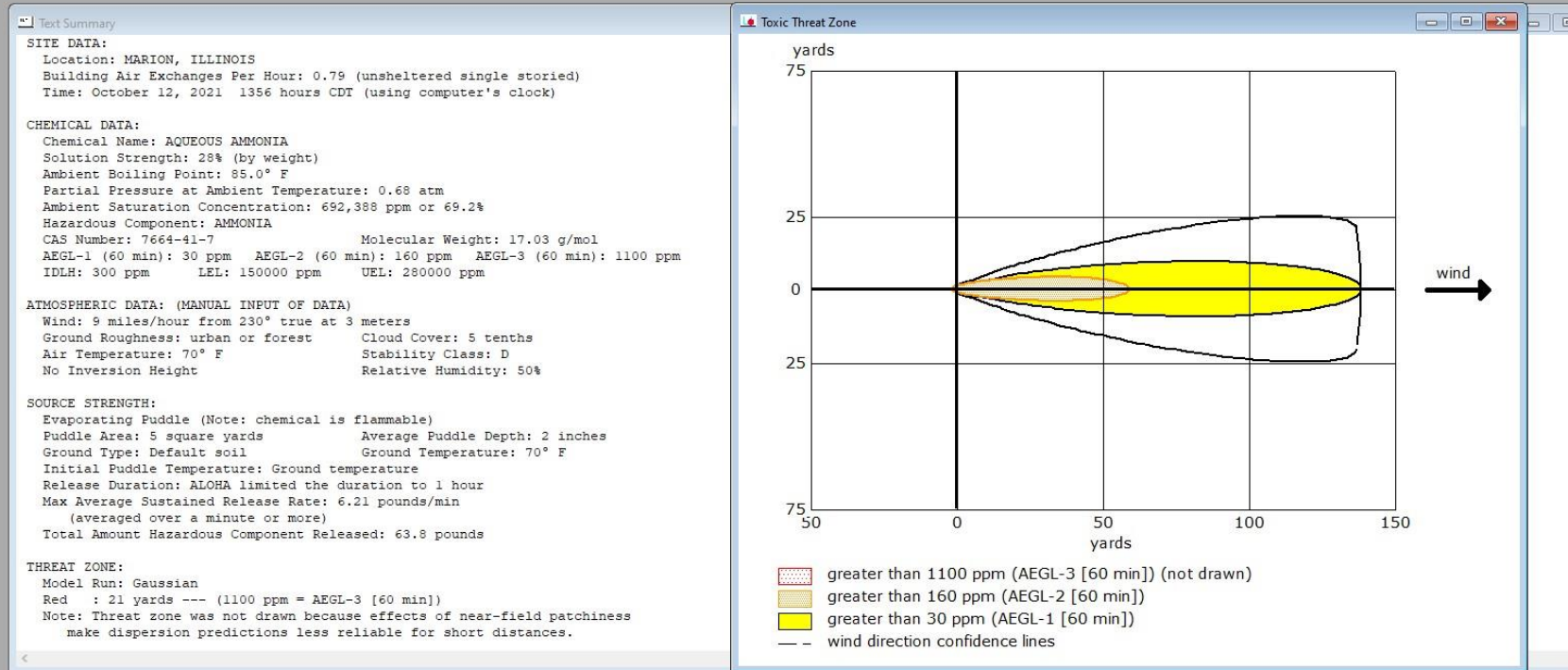
Thermal Radiation Threat Zone

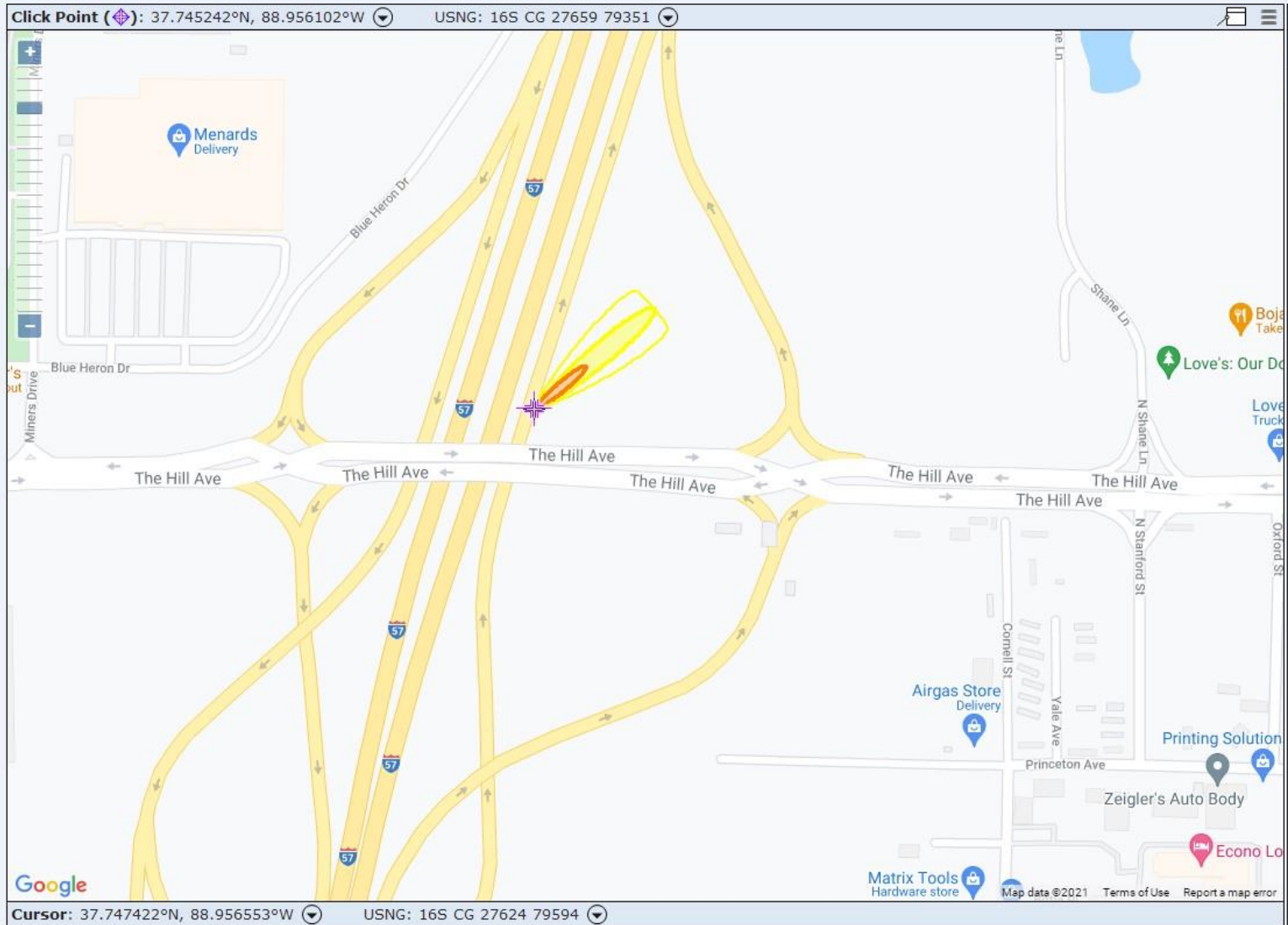


Click Point (📍): 37.734016°N, 88.930673°W USNG: 16S CG 29873 78059



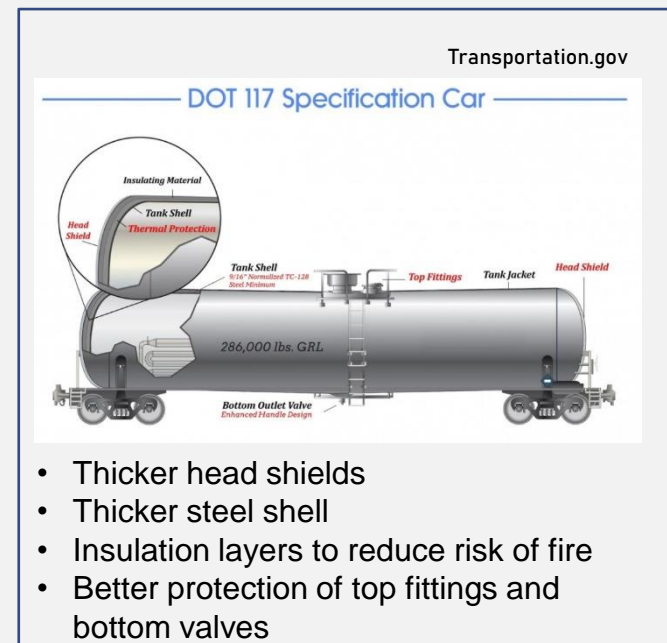
Example 2 – aqueous ammonia spill





Hazardous Materials Release – Historic Data

- 2 train derailments in Williamson County since 1972
 - None of which involved hazardous materials
 - Railway safety has greatly improved over the last decade
- Other risk areas include highways, factories, warehouses, and mines
- 299 total IEMA reported incidents from 1987-2011
 - Majority of incidents were spills/leaks of gasoline, diesel fuel, or crude oil
- Extent and impacts depend on the material and amount released



Floods

- Currently ranked 10th for Perry county
- Can model upon request by county or census block
- Hazus software cannot model dam failures



5 minute break

Notice! Funding period for BRIC and FMA opens Sept 30th

- Building Resilient Infrastructure, Communities (BRIC)
 - \$1 billion available, competitive applications
 - Many projects types supported
 - Preference for underserved or at-risk communities; or those at high risk of climate change related disasters
- Flood Mitigation Assistance (FMA)
 - \$160 million available, competitive applications
 - Preference for underserved communities
 - Communities (and specific locations) seeking these funds MUST have current NFIP policies in place
- New application preferences part of President Biden's Justice40 Initiative
- See FEMA.gov or grants.gov for detailed NOFOs
- Contact Greater Egypt for assistance in applications
- Apps due no later than Jan 28, 2022



FEMA

Notice to county and city officials

- We are missing NFIP statistics for each county
- This is a FEMA requirement for Hazard Mitigation Planning
- Data request letter will be sent after meeting

Mitigation Strategies

The purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources. (Stafford Act Title 44, Chapter 1, Part 201).

Mitigation Strategies

Hazard Mitigation is any sustained action taken to reduce or eliminate long-term risk to human life and property from a natural hazardous event.

Hazard Mitigation Planning is a 4 step process that requires community input

- Organize resources
 - Creation of planning team, securing IEMA funds for updating plan (early 2020)
- Assessing risks
 - Review of historical hazards, hazard ranking exercise (meeting 1)
- Developing a mitigation plan (we are here)
 - Final hazard ranking, mitigation strategies worksheet (meeting 2)
- Implementing the plan and monitoring progress
 - Adoption of Plan by each jurisdiction & count
 - Applying for grants and undergoing projects

Mitigation Strategies

Each Jurisdiction is required to come up with 2 mitigation strategies per hazard

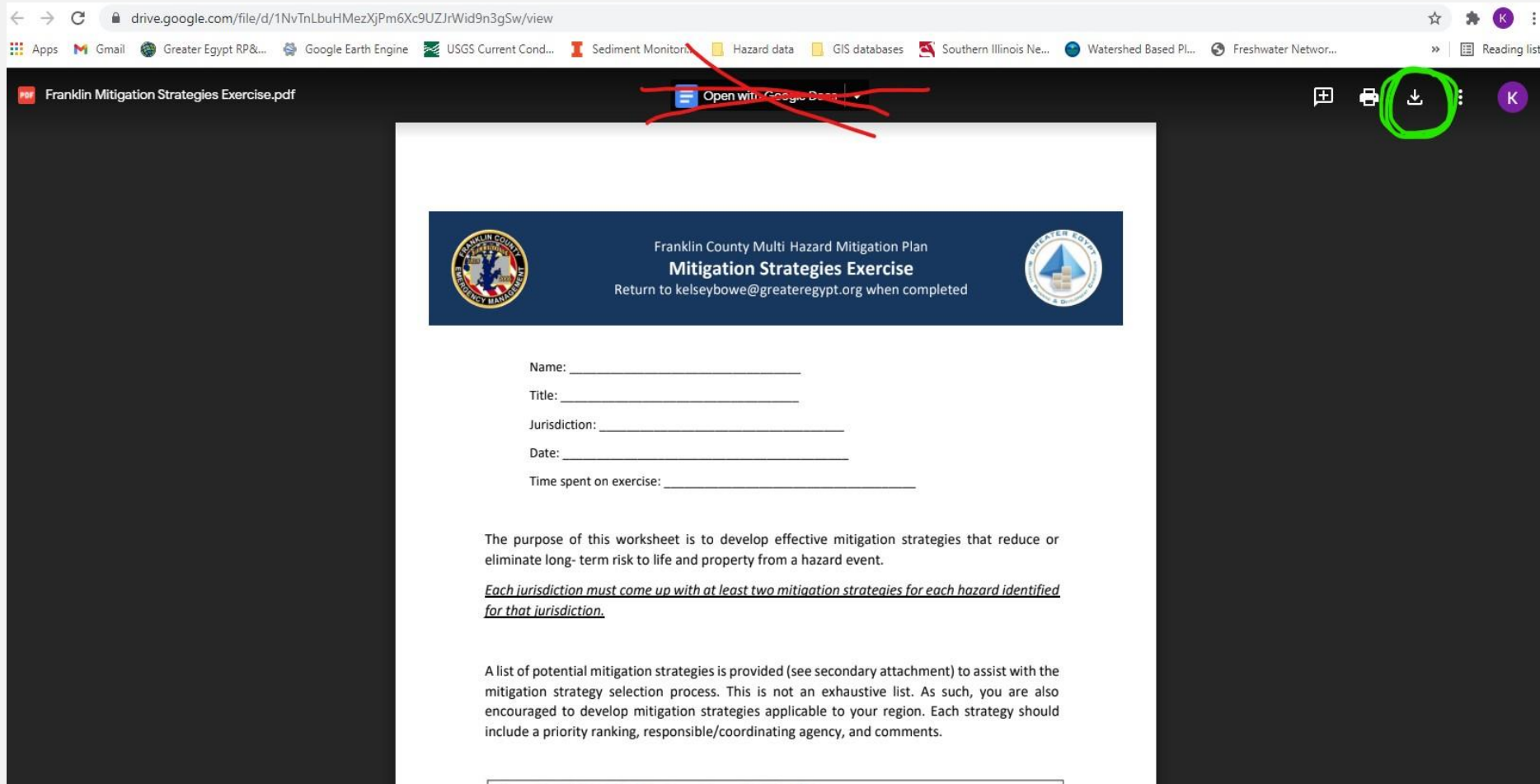
This does not mean you are required to implement them

This is designed to be a brainstorming exercise, and the final list of strategies will be an outline for the County EMA and cities/villages or other jurisdictions to apply for grant funds later.

Any and all ideas are encouraged, the goal is to make Williamson County better prepared to endure and respond to hazards, and more resilient after one has occurred.

Mitigation Strategies Exercise

- **Do NOT “open with google docs”, click the download icon in top right corner!**



drive.google.com/file/d/1NvTnLbuHMezXjPm6Xc9UZJrWid9n3gSw/view

Apps Gmail Greater Egypt RP&... Google Earth Engine USGS Current Cond... Sediment Monitor... Hazard data GIS databases Southern Illinois Ne... Watershed Based Pl... Freshwater Networ... Reading list

Franklin Mitigation Strategies Exercise.pdf

Open with Google Docs

Franklin County Multi Hazard Mitigation Plan
Mitigation Strategies Exercise
Return to kelseybowe@greateregyp.org when completed

Name: _____
Title: _____
Jurisdiction: _____
Date: _____
Time spent on exercise: _____

The purpose of this worksheet is to develop effective mitigation strategies that reduce or eliminate long- term risk to life and property from a hazard event.

Each jurisdiction must come up with at least two mitigation strategies for each hazard identified for that jurisdiction.

A list of potential mitigation strategies is provided (see secondary attachment) to assist with the mitigation strategy selection process. This is not an exhaustive list. As such, you are also encouraged to develop mitigation strategies applicable to your region. Each strategy should include a priority ranking, responsible/coordinating agency, and comments.

Mitigation Strategies Exercise

Example Mitigation Strategy: Hazard- Flooding

Mitigation Strategy: *Institute a buy-out plan for repetitive loss properties*

Check One:

☒ Proposed ☐ Ongoing

Priority Ranking:

☐ High ☒ Medium ☐ Low

Funding Source:

☒ Local ☐ State ☒ Federal ☐ Private

Responsible & Coordinating Agencies: *Franklin County EMA*

Comments: Franklin County will apply for FEMA HMA funds to acquire repetitive loss properties. The properties will be demolished and the land will be deed-restricted to remain as open space. The non-federal share of the grant will be sought from local funds.

Questions or Comments?

Thank you for attending!

Please remain in the zoom call to complete the exercise if time allows