

Plum Creek Dam

MOCK
EAP TABLETOP EXERCISE



July 24, 2025



Objectives



EAP familiarity



Responsibilities defined



Notification contacts (When/Who)



Practice; Revise to address gaps

Introductions

- Dam Owner: Plum Creek Conservation District
- EMC: Hays County
- Dam Safety Engineer: Freese and Nichols
- TCEQ Dam Safety
- National Weather Service
- TDEM
- TxDOT



Tabletop Exercise

Agenda



- EAP Case Studies
- Dam Overview
- EAP Review
- Break
- Scenario and Discussion
- Notification Flowcharts Review
- Next Steps and Closing

Housekeeping



Emergency Exits



Questions / Discussions are Welcome



Group discussions are the goal; no “wrong” answers



Note taker for after-action report

Emergency Action Plan (EAP)

Required by TCEQ Dam Safety for significant and high hazard dams:

- To plan for expedited, effective response to prevent failure of the dam
- To protect lives from an uncontrolled release of the reservoir





Lake Dunlap Dam Spillway Failure



Central Michigan Dam Failures

EAP Case Studies



Lake Dunlap Dam Spillway Gate Failure

- May 2019
- Cause determined as “aging structural steel”
- Significant drop in lake levels
- EAP Activation:
 - ✓ Warnings issued for high-velocity flows and rising lake levels downstream
 - ✓ Downstream property owners notified (no evacuations necessary)
 - ✓ Temporary water conservation notices

Edenville and Sanford Dam Failures

- Central Michigan, May 2020 excessive rainfall
- Edenville Dam failed; flood wave overtopped Sanford Dam
- Pre-failure erosion mitigation efforts at Edenville Dam
- Early initiation of evacuation of 11,000 people
 - **No** reported fatalities or serious injuries
- Damages
 - 3,000 homes affected, 150 lost
 - \$190 million for residents
 - \$55 million to public infrastructure



EAP Activation

“The success of the emergency response can be principally attributed to a prudent, proactive, and cautious decision by the Midland County emergency manager (EM) to initiate early evacuations.”



“The evacuations were reportedly well organized and orderly. The EMs attributed this, at least in part, to an EAP exercise conducted in 2019 and evacuations plans developed as a result of that exercise.”

[Independent Forensic Team]

Plum Creek Dam Overview

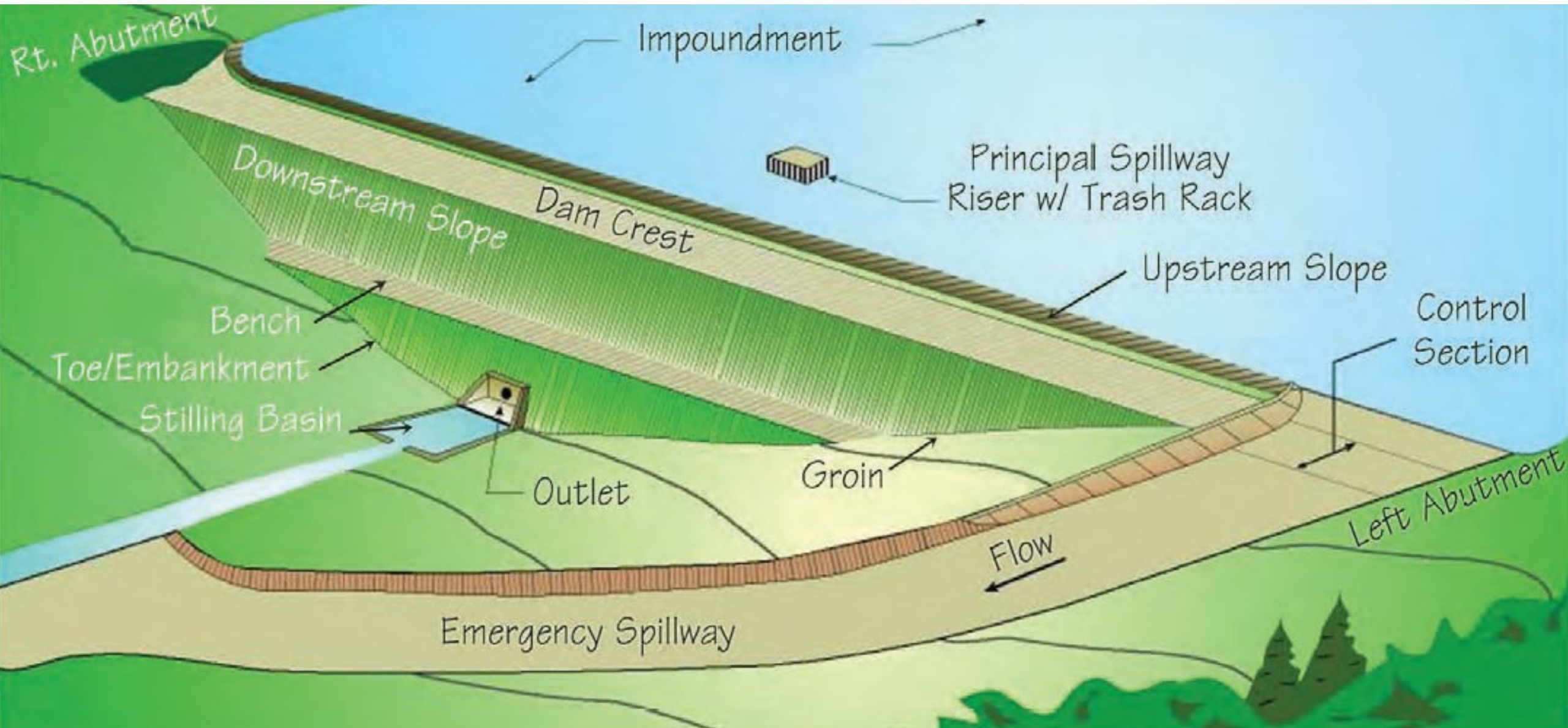
TX12345

Dam Overview

- Constructed in 1960
- Modification in 2010
- Hazard Classification: **High Hazard**
- Size Classification: Intermediate
- Drainage Area: ~2,800 square miles
- Reservoir Surface Area: 500 acres



Typical Embankment Dam



Embankment

Downstream Toe

Upstream Toe



Spillways

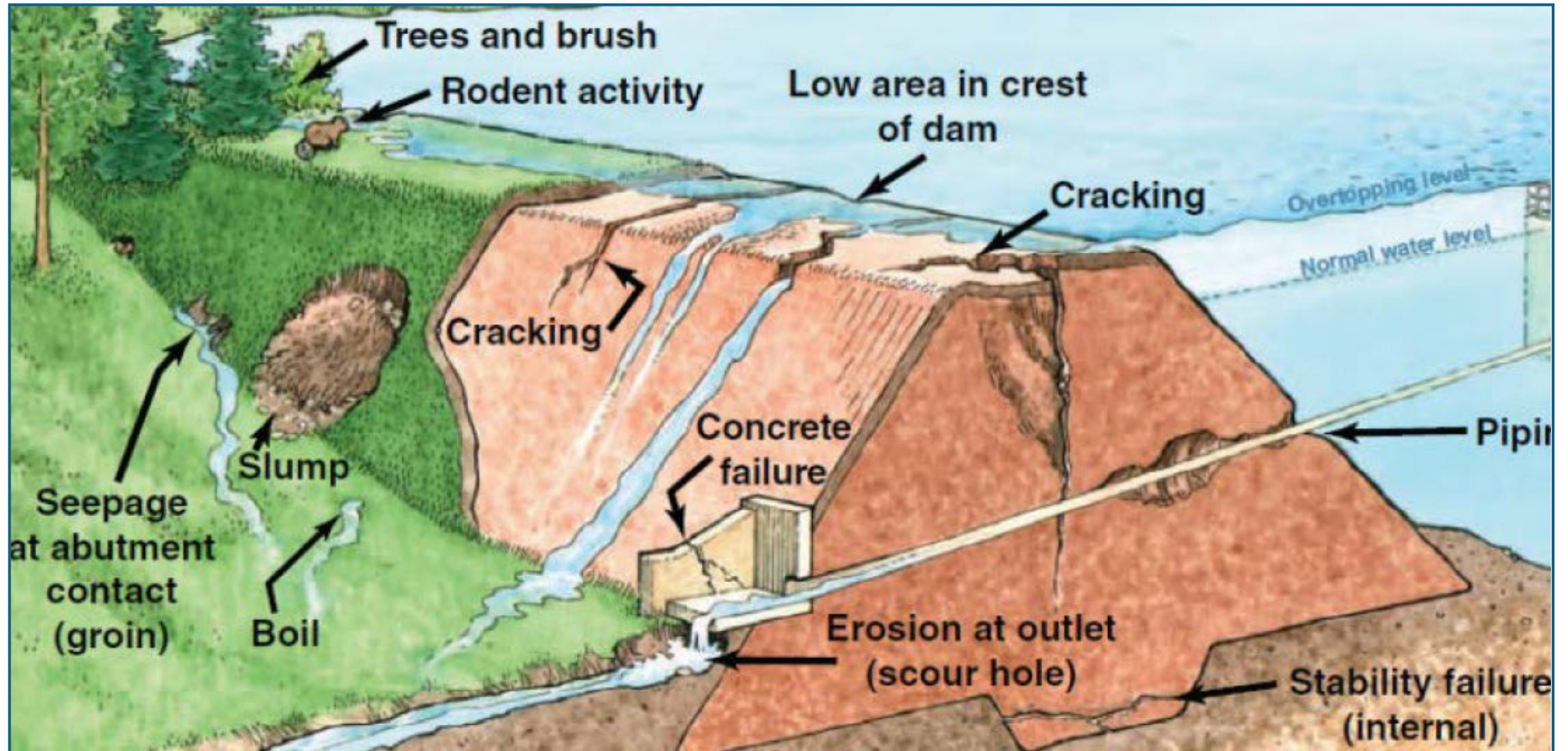
Principal Spillway
Outlets

Auxiliary
(Emergency)
Spillway



Embankment Failure Modes

20% of U.S. dam failures have been caused by **piping** (internal erosion caused by seepage)



Piping Case Study – Teton Dam



10:30 am 6/5/76



11:57 am 6/5/76



Within minutes!

Photos of Teton Dam failure by Eunice Olson and BuREC

Preventative actions



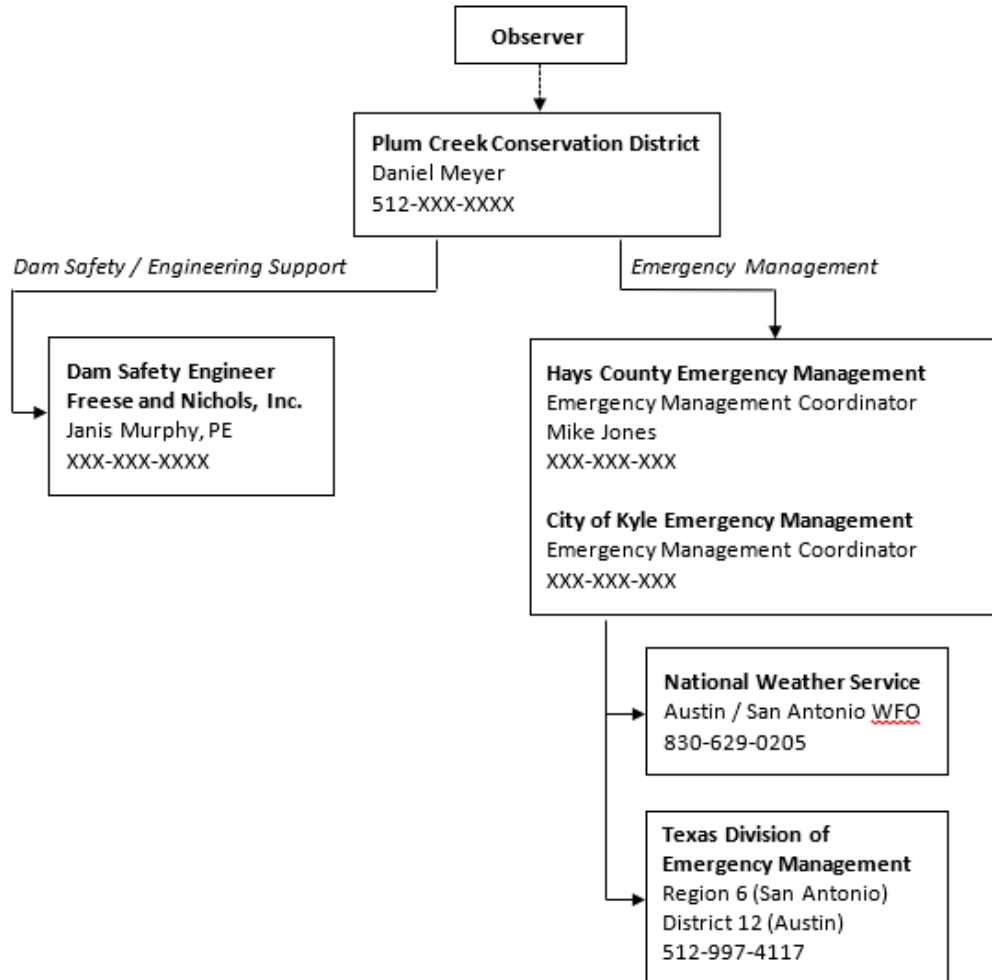
Regular Observation

✓ First Line of Defense

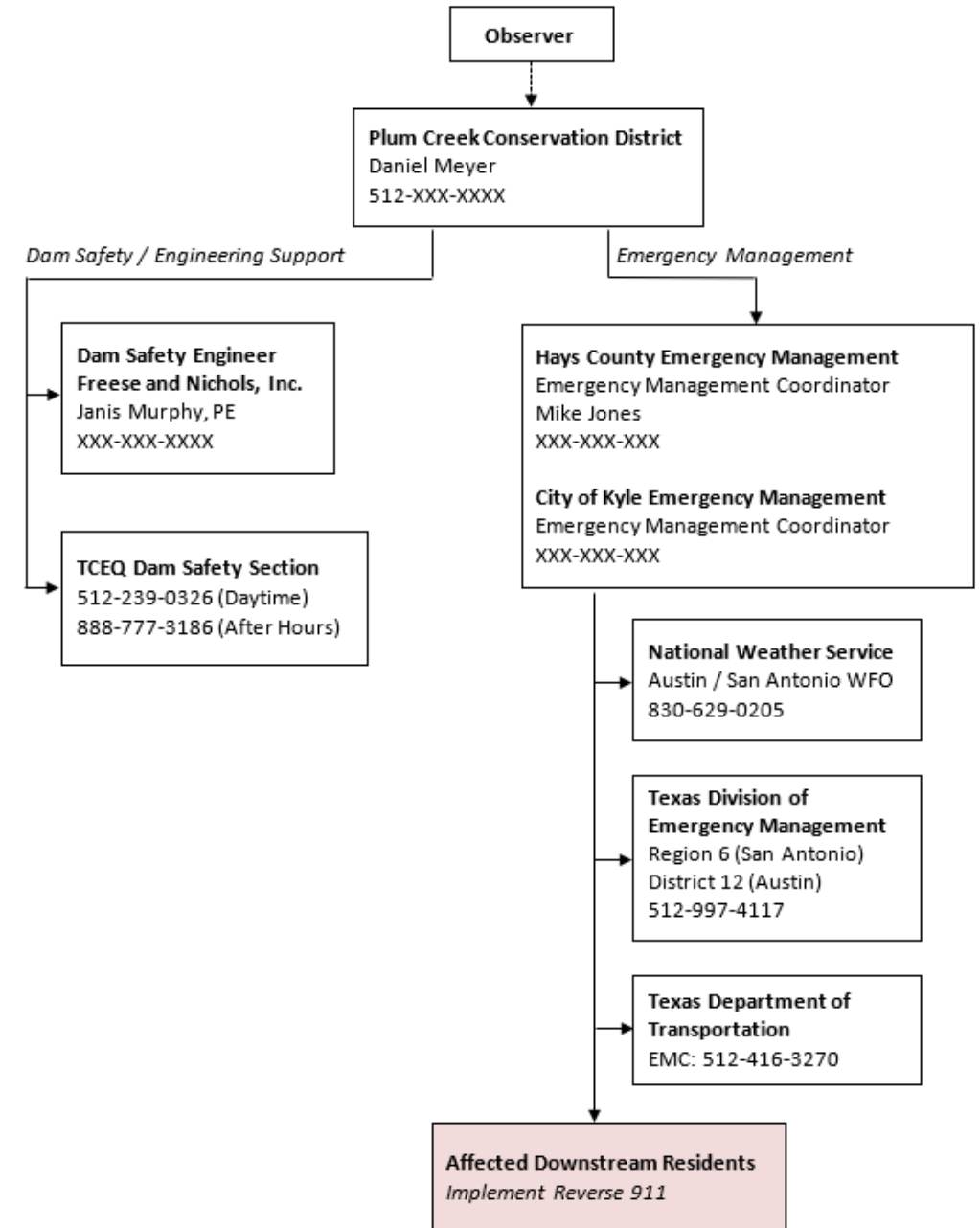
EAP Overview

Notification Flowcharts

WATCH CONDITION



POSSIBLE, IMMINENT, OR DAM FAILURE



Inundation Area



**Who / what
is impacted if
the dam
fails?**

Where does the water go?

What structures and bridges
are impacted?

Who needs to be evacuated?

Breach Analysis

Breach Analysis based on:

- Dam Height
- Reservoir Storage
- Discharge Flow from Breach
- Inundation Length

Scenarios

- Sunny Day Breach
- PMF Breach

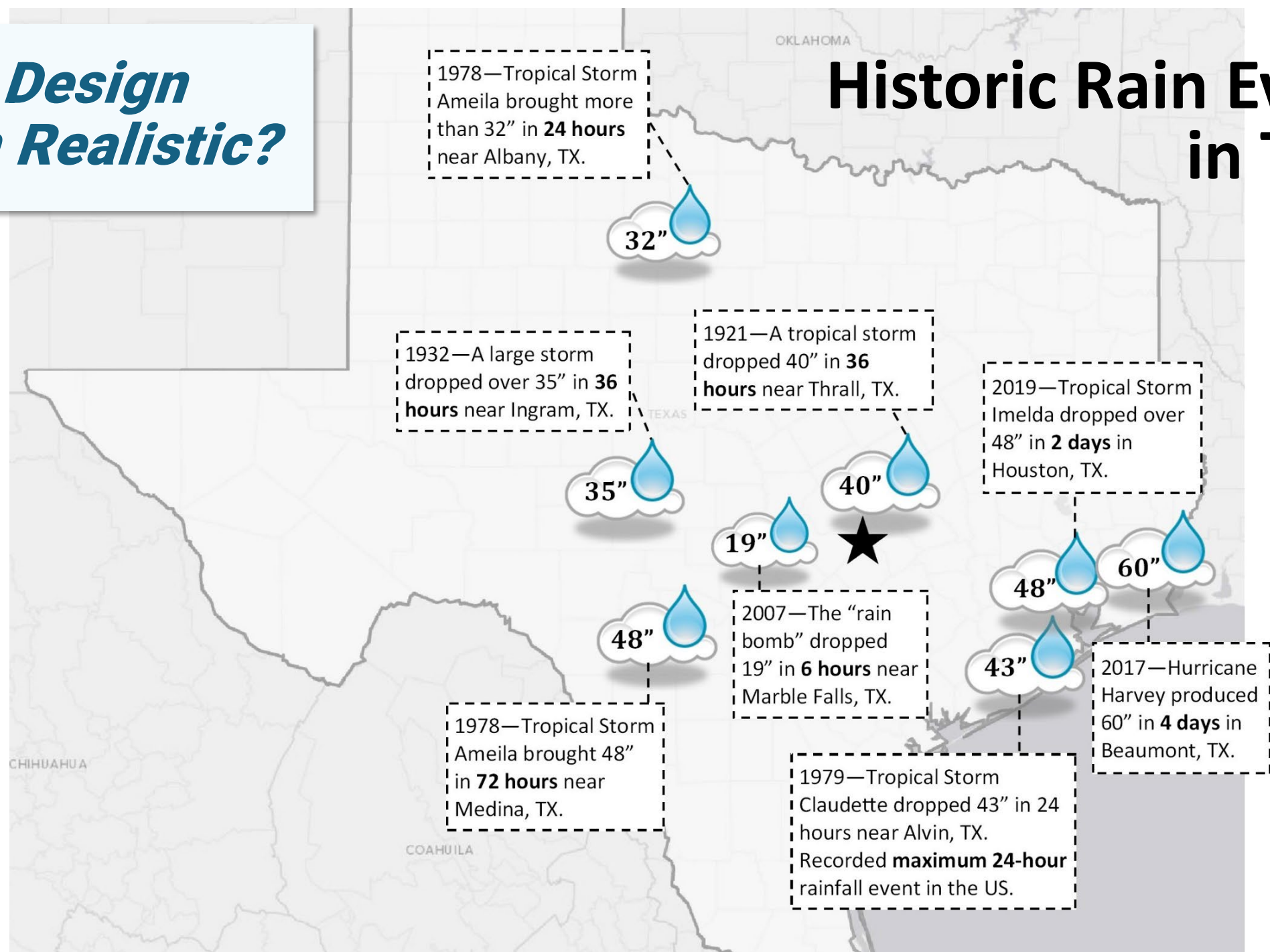
- High hazard dam must pass 75% of the PMF without overtopping

- 75% PMF for Dam = **30" rain in 24 hours**

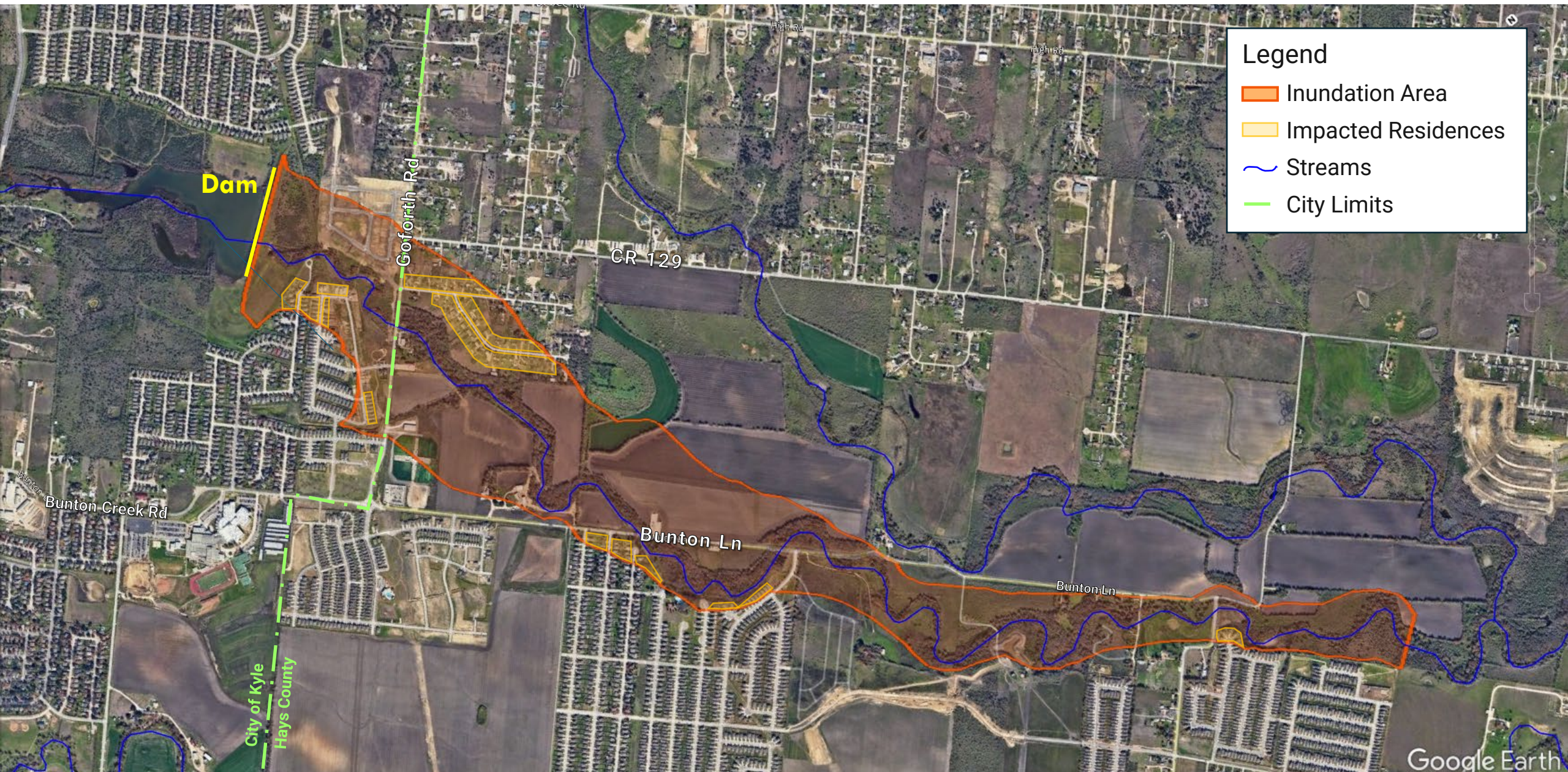
- Analysis provides water elevations and time to impact

Is the Design Storm Realistic?

Historic Rain Events in Texas



Breach Inundation Map





Tabletop Exercise

Goals



Verify communication protocol, including Notification Flowchart



Confirm ability to evacuate inundation zone

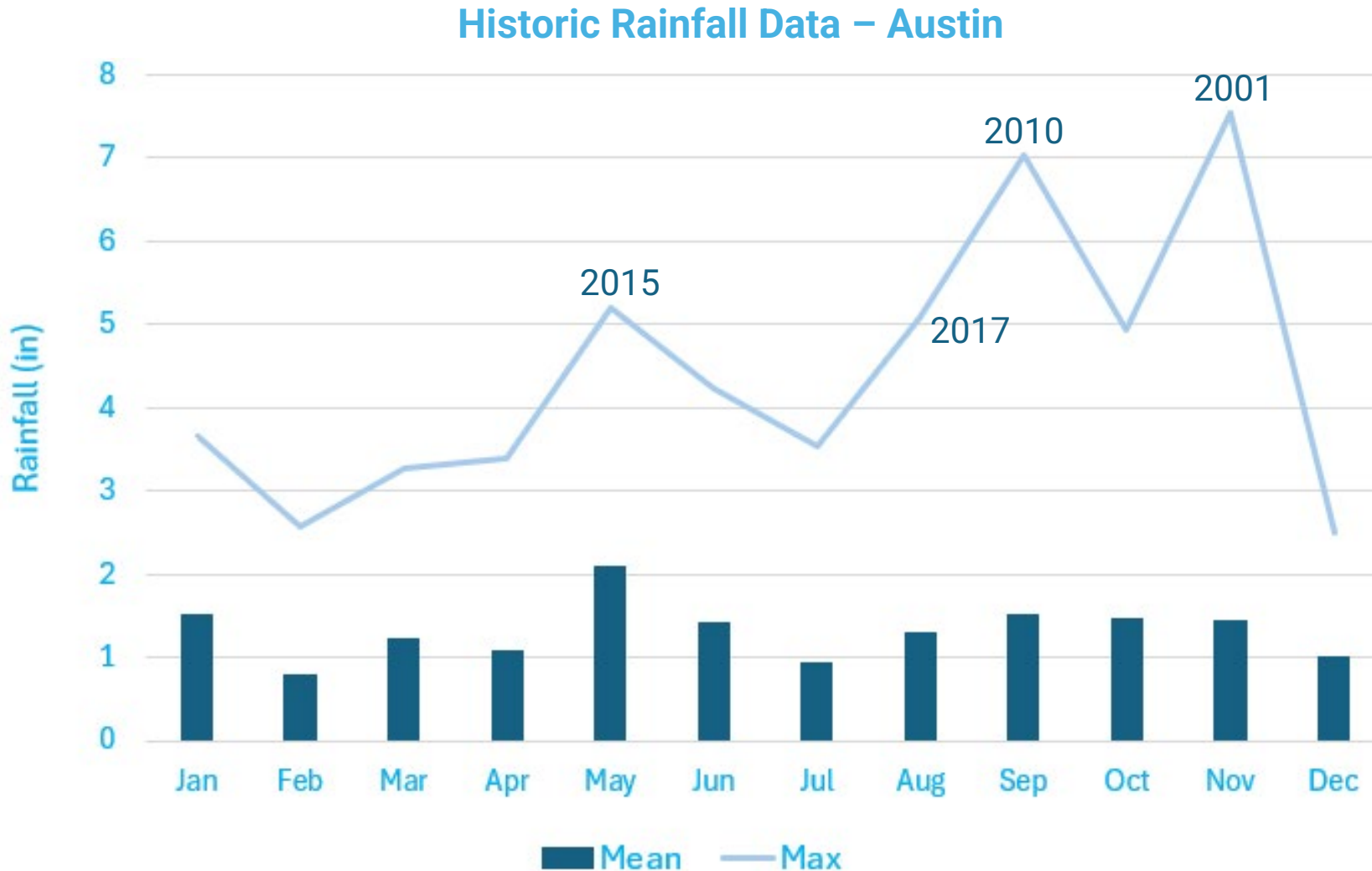


Confirm ability to warn people at risk



Review key takeaways and revise EAP as needed

Background



Scenario



Conditions

Thursday

It is raining

It has been a wet week: 5 inches of rain

Lake is 1 foot above normal pool

Updated Conditions

Friday 10 am

Seepage Near Service Outlet

Seepage is Clear



Seepage Area

**Principal
Spillway
Outlets**

Seepage



What Now?

TAB 4: EVIDENCE OF DISTRESS

General Observation	Specific Observation	Condition	Emergency Action	Equipment, Material and Supplies	Data to Record
Seepage	Minor seepage of clear water at toe, on slope of embankment, or at the abutments	Abnormal	Closely check entire embankment for other seepage areas. Use wood stakes or flagging to delineate seepage area. Try to channelize and measure flow. Look for upstream whirlpools.	Wood stakes, flagging	Site, location, and approximate flow.
	Additional seepage areas observed flowing clear water and/or increasing flow rate.	Watch	Initiate 24-hour surveillance. Monitor as described above. Construct measuring weir and channelize all seepage through weir. Attempt to determine source of seepage.	Dozer and shovels	Site, location, and approximate flow.
	Seriously or rapidly increasing seepage, underseepage, or drain flow.	Possible Failure	Continue 24-hour monitoring and remedial action as described above. Initiate emergency lowering of the reservoir. Construct a large ring dike around the seepage area. Advise EMC to issue a warning to downstream residents.	Dozer, shovels, source of earthfill	Site, location, and approximate flow.
	Additional seepage areas with rapid increase in flow and muddy water.	Imminent Failure	Downstream evacuation. Utilize all available equipment to attempt to construct a large ring dike around the seepage area.	Dozer, shovels, source of earthfill	Site, location, and approximate flow.

See Notification Flowchart for contact information

Updated Conditions

Friday 4 pm

Rain continues

Seepage has increased in size.

Seepage is still clear.

Seepage



What Now?

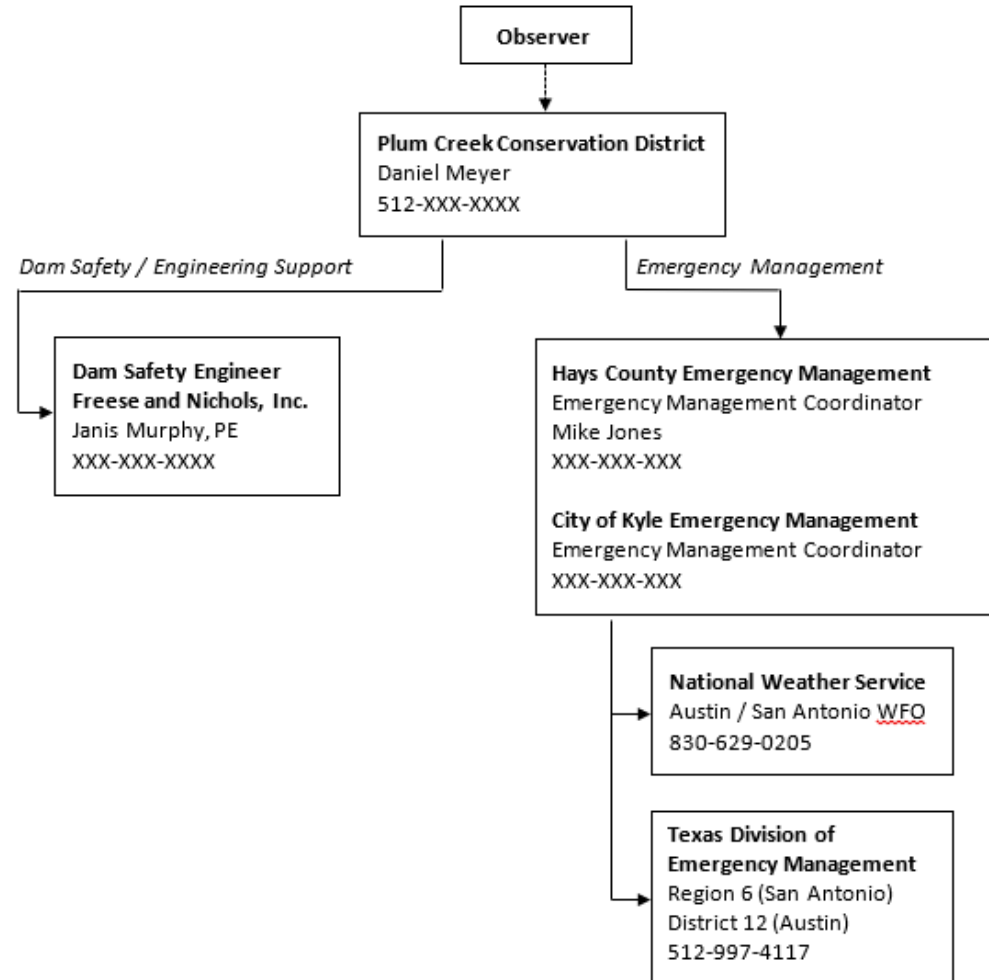
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See Notification Flowchart for contact information

Notification Flowchart

WATCH CONDITION



Updated Conditions

Saturday 10 am

Heavy rain overnight

Lake level is 3 feet over normal pool

Seepage has increased and is now
cloudy.

Seepage



What Now?

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See Notification Flowchart for contact information

Construct Ring Dike



Equipment and Supplies

EQUIPMENT/SUPPLIES	LOCATION
Backhoes Dump trucks Portable welding equipment Generators Bulldozers Excavators Loaders Motor graders	United Rentals 4542 IH 35 South San Marcos, TX 78666 (512) 353-1111 Hays County Road Department Jerry Borcharding (512) 393-7385 Caldwell County Road Department Dwight Jeffrey (512) 398-7269 Office (512) 738-2178 Cell
Crane	United Rentals 4542 IH 35 South San Marcos, TX 78666 (512) 353-1111
Sandbags	L and M Supply Company Texas 126 Texas Ave. Building #2 San Marcos TX. 78666 512-667-6635 www.landmsupplytx.com
Rock riprap	Yarrington Materials 1401 Yarrington Rd. San Marcos, TX 78666 (512) 754-3573
Fill Material	Yarrington Materials 1401 Yarrington Rd. San Marcos, TX 78666 (512) 754-3573
Other - Ready-Mix	Home Depot 3730 Dry Hole dr. Kyle, TX 78640 (512) 295-8170
Water Pumps	Bruce Frank Rental Lockhart, TX 78644

Emergency Contractor Support

Contractor	Title/ Responsibility	Contact
Austin Engineering Co.	Central Texas Civil and Dam Contractor	Austin Keller 512-XXX-XXX xxx@aecoi.net
Austin Filter Systems	Central Texas Civil and Dam Contractor	Craig Bond 512-XXX-XXXX xxx@austinfiltersystems.com
Jay-Reese Contractors, Inc.	Central Texas Civil and Dam Contractor	xxx@jayreese.net 512-XXX-XXXX
Jerdon <u>Enterprise</u> , LLC.	Central Texas Civil and Dam Contractor	281-XXX-XXXX xxx@jerdonlp.com

Updated Conditions



Sunday, 10 am

Slide on downstream slope

Seepage is muddy



**Seepage
Area**

**Principal
Spillway
Outlets**

Slide Area

What Now?

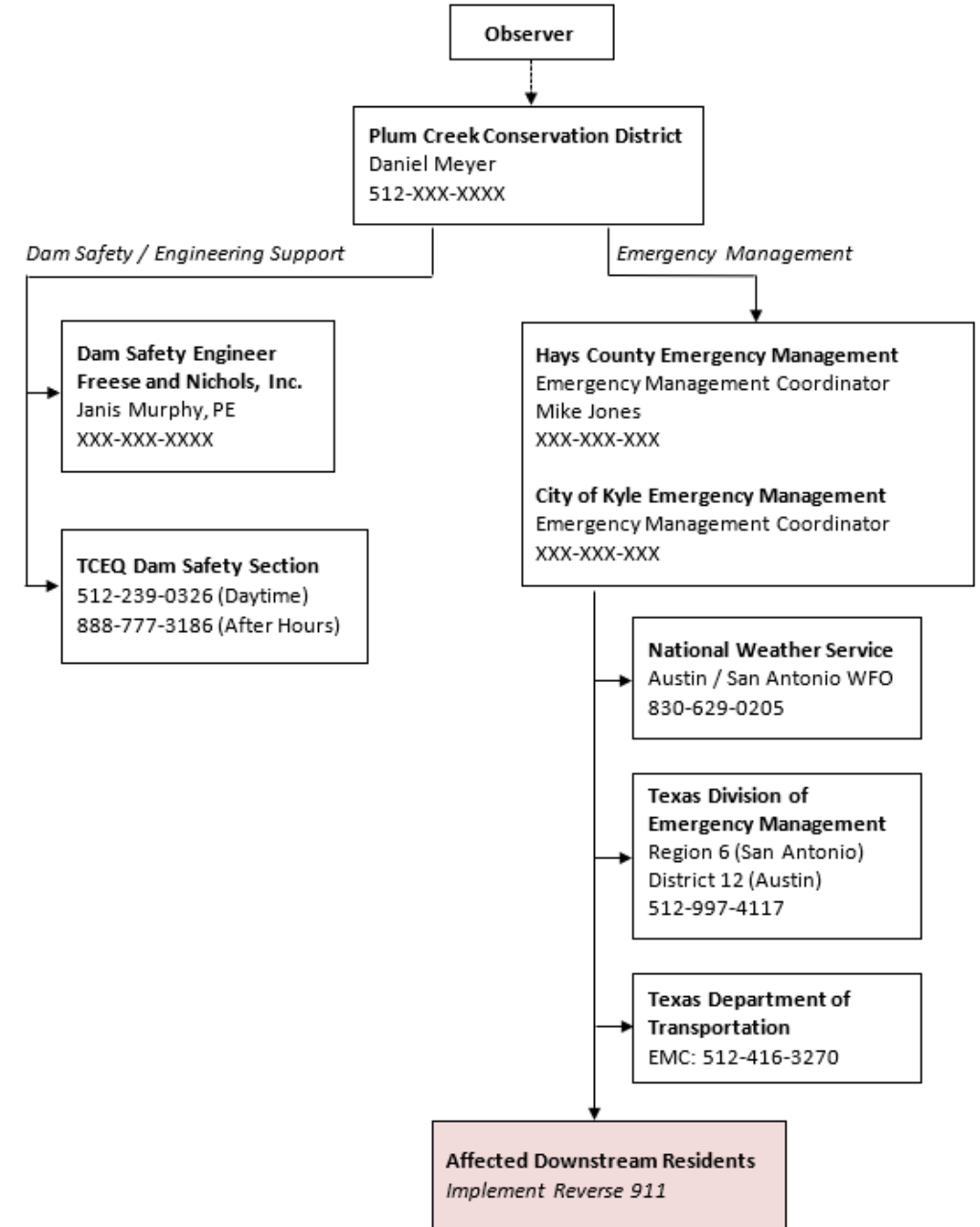
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Notification Flowchart

POSSIBLE, IMMINENT, OR DAM FAILURE



Updated Conditions



Sunday, 4 pm

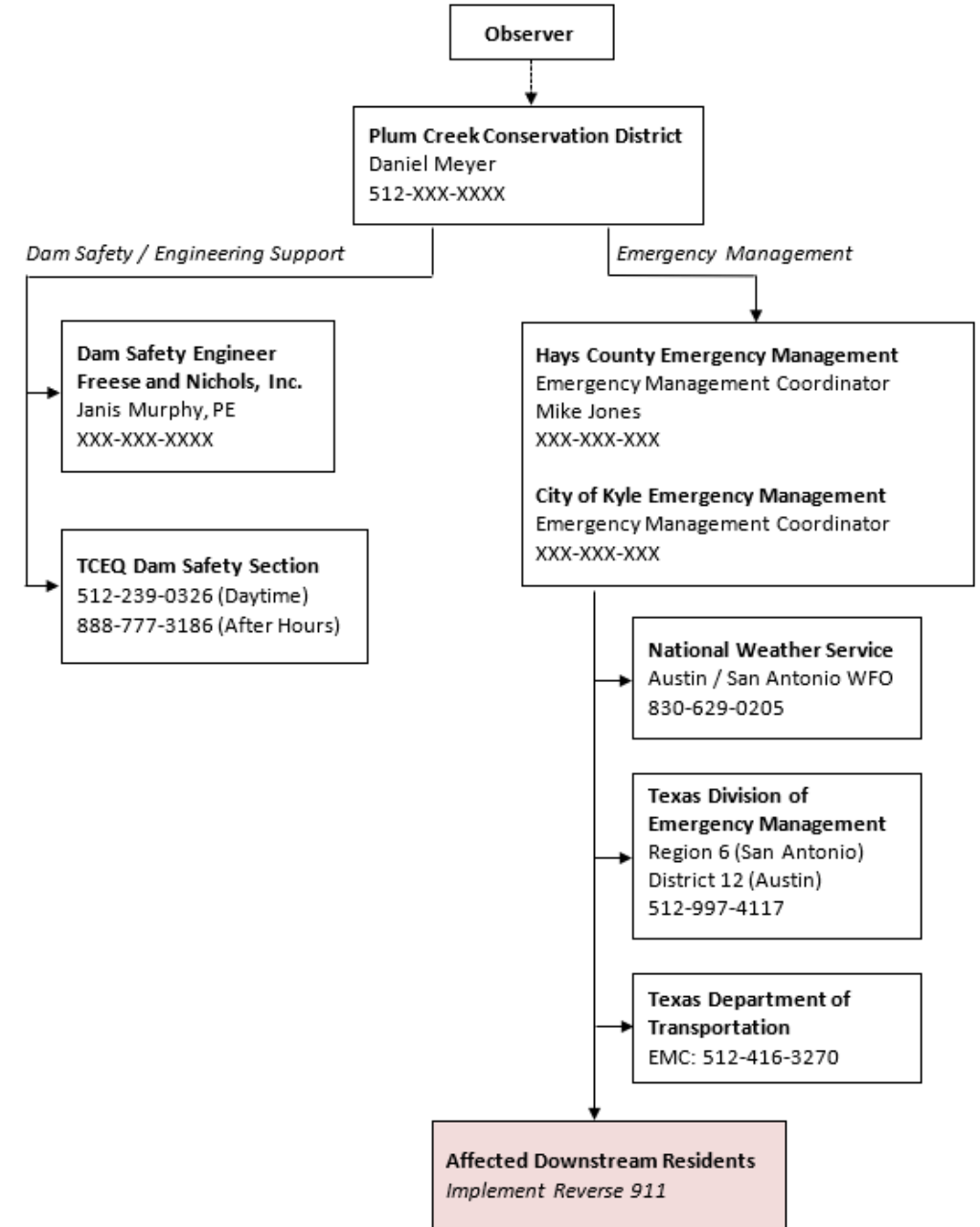
Slide worse and cutting into crest

Slide

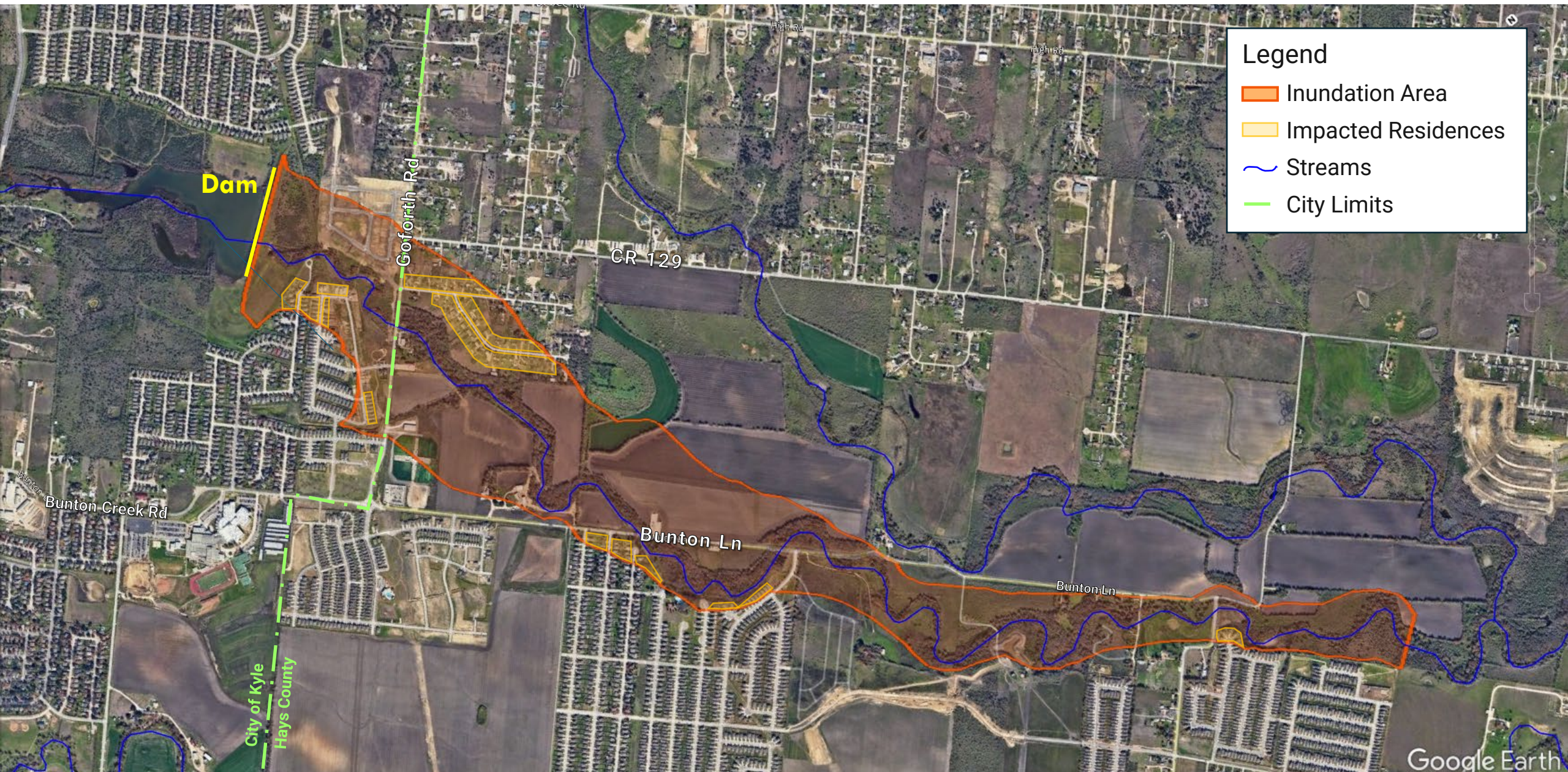


Notification Flowchart

POSSIBLE, IMMINENT, OR DAM FAILURE



Breach Inundation Map



Updated Conditions

BREAKING
NEWS

Texas Dam Fails

Sunday, 9 pm

Erosion cuts through the crest and
the embankment fails

Flood wave is sent downstream

Social Media





Discussion & Review

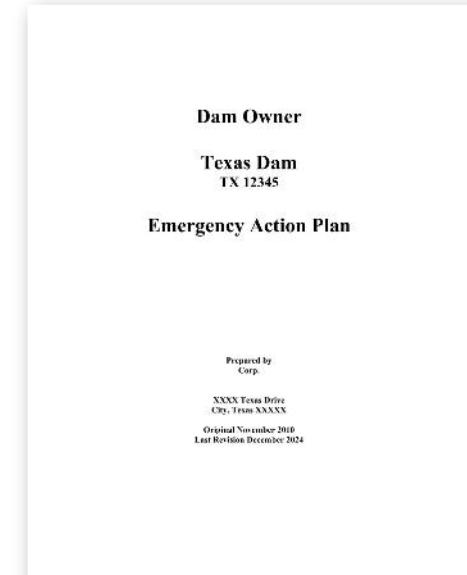
Overall Plan Review



IDENTIFY SUCCESS



IDENTIFY AREAS
FOR IMPROVEMENT



MAKE UPDATES &
SUBMIT TO TCEQ

What's in the Inundation Area?



EAP Next Steps



Testing

- At least every 5 years
 - Follow-up:
Update the EAP and distribute updates



Training

- Ongoing with new staff

Updating

- Every year

Mock Tabletop Key Takeaways

Be Prepared

- ✓ Update and stay familiar with your EAP
- ✓ Train personnel
- ✓ Know what's in your inundation area
- ✓ Know your EMC
- ✓ Know what resources are available

In an Emergency

- ✓ Refer to your EAP during an emergency
- ✓ People are resources
- ✓ Emergency repairs are temporary



Thank you



Plum Creek Conservation District

