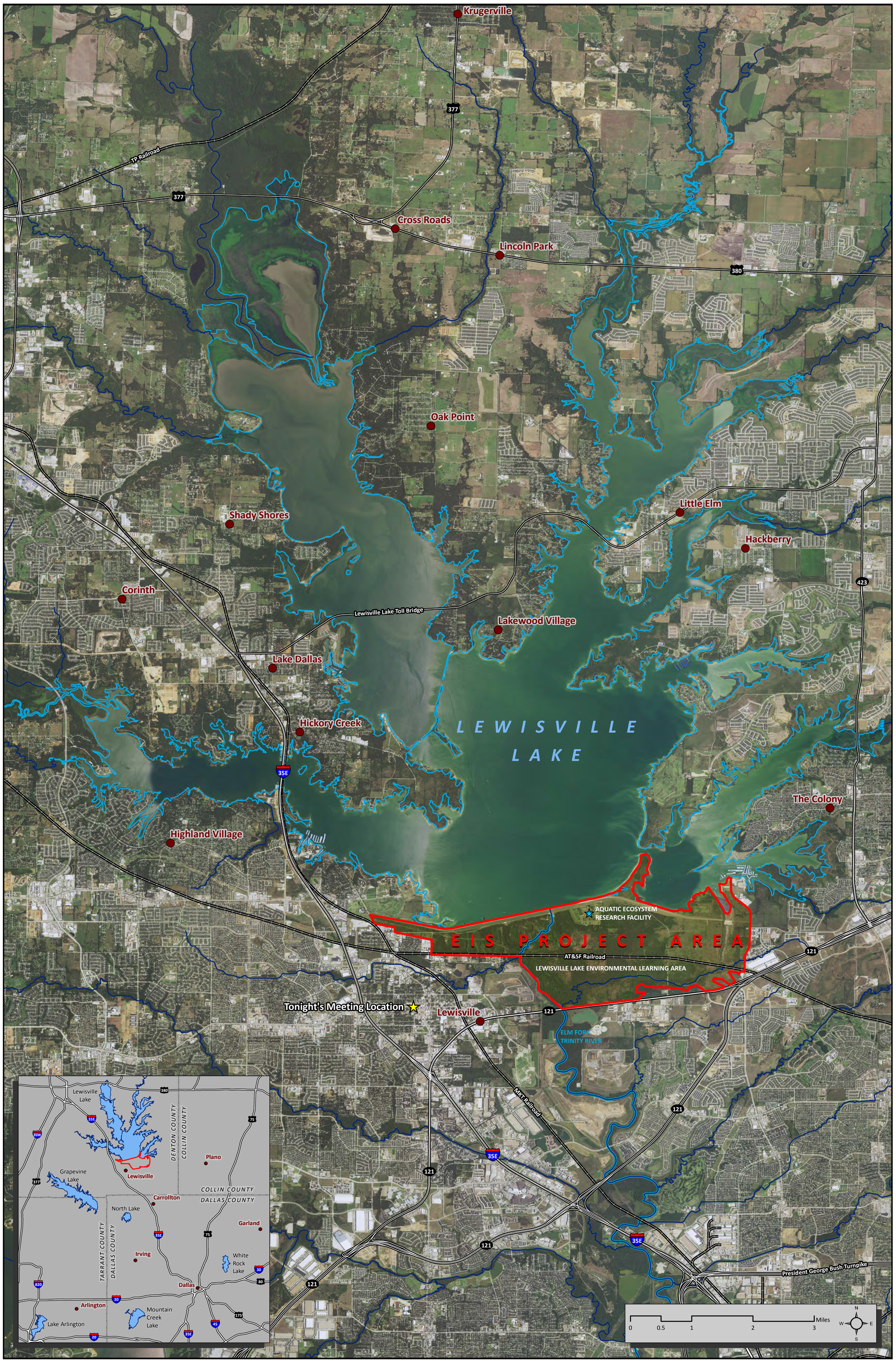
Welcome!

Lewisville Dam Safety Modification Environmental Impact Statement Information Meeting

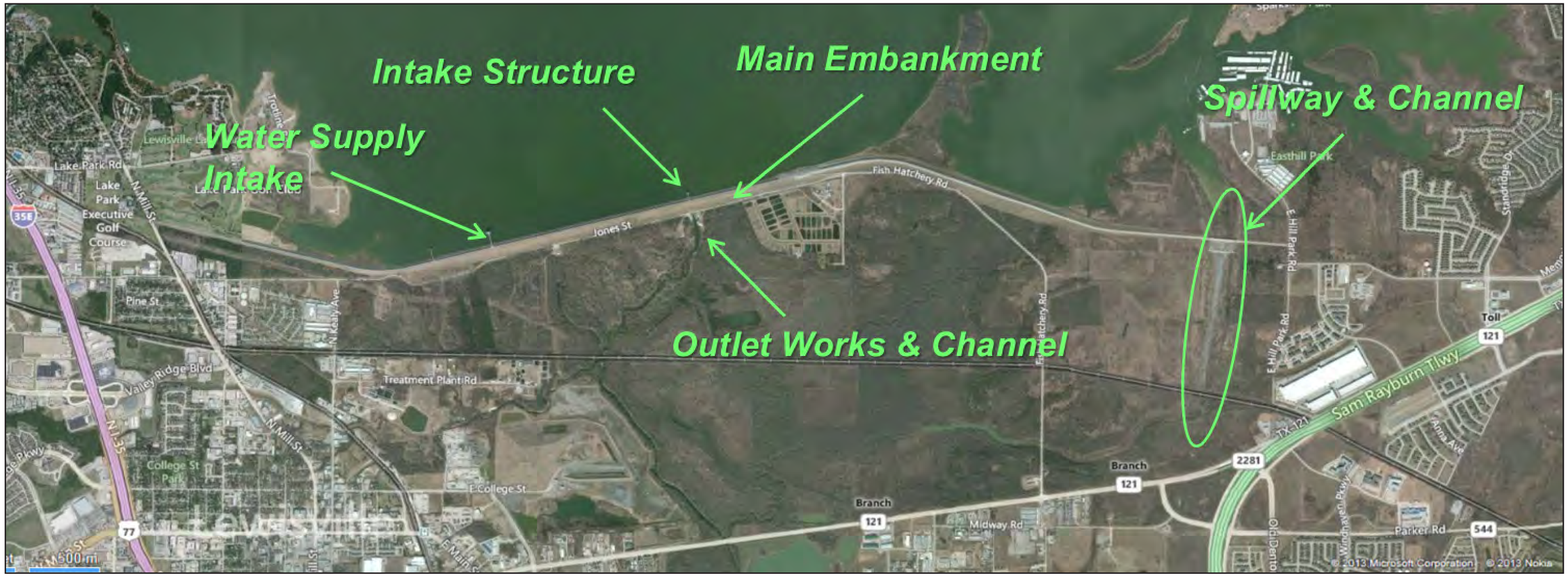
Black Box Theatre
November 16, 2015
6:00 P.M. - 8:00 P.M.

Thank you for coming, we look forward to receiving your input!

Lewisville Lake and Project Area



The Lewisville Dam



- The dam was authorized to improve flood risk management and support water supply. Construction of the original dam went from 1948 through 1955.
- Subsequent authorizations for the dam and lake operations include recreation, environmental stewardship and hydropower.
- The dam has prevented over $31.2 billion in flood damages since completion in 1955, including $2.4 billion prevented so far in 2015.
- The dam provides $725.1 million in annual public benefits including water supply, flood damage reduction, recreation & non-federal hydropower.
- The dam provides camping, boating, fishing, swimming and picnicking opportunities for more than 3 million visitors annually.

Lewisville Dam Safety Modifications Project
Purpose and Need

- Purpose:
  - To minimize the potential for, and consequences of, a catastrophic downstream flooding event associated with dam failure by remediating the seepage and stability deficiencies at the Lewisville Dam. The proposed action would allow the dam to function safely and effectively at authorized capacity, while reducing the risk.
- Need:
  - Reduce underseepage and probability of internal erosion;
  - Improve slope stability and reduce probability of sliding;
  - Repair infrastructure at risk of being compromised by uplift and erosion; and
  - Improve risk communication to reduce consequences.
- Potential Failure Modes:
  - Seepage: Water moving through the foundation could lead to erosion of the embankment.
  - Stability: Portions of the dam may not be stable under higher pool loadings.
- Proposed Action:
  - The USACE is proposing to modify features at the Lewisville Dam in order to reduce risk associated with dam operation and extend longevity of the dam.

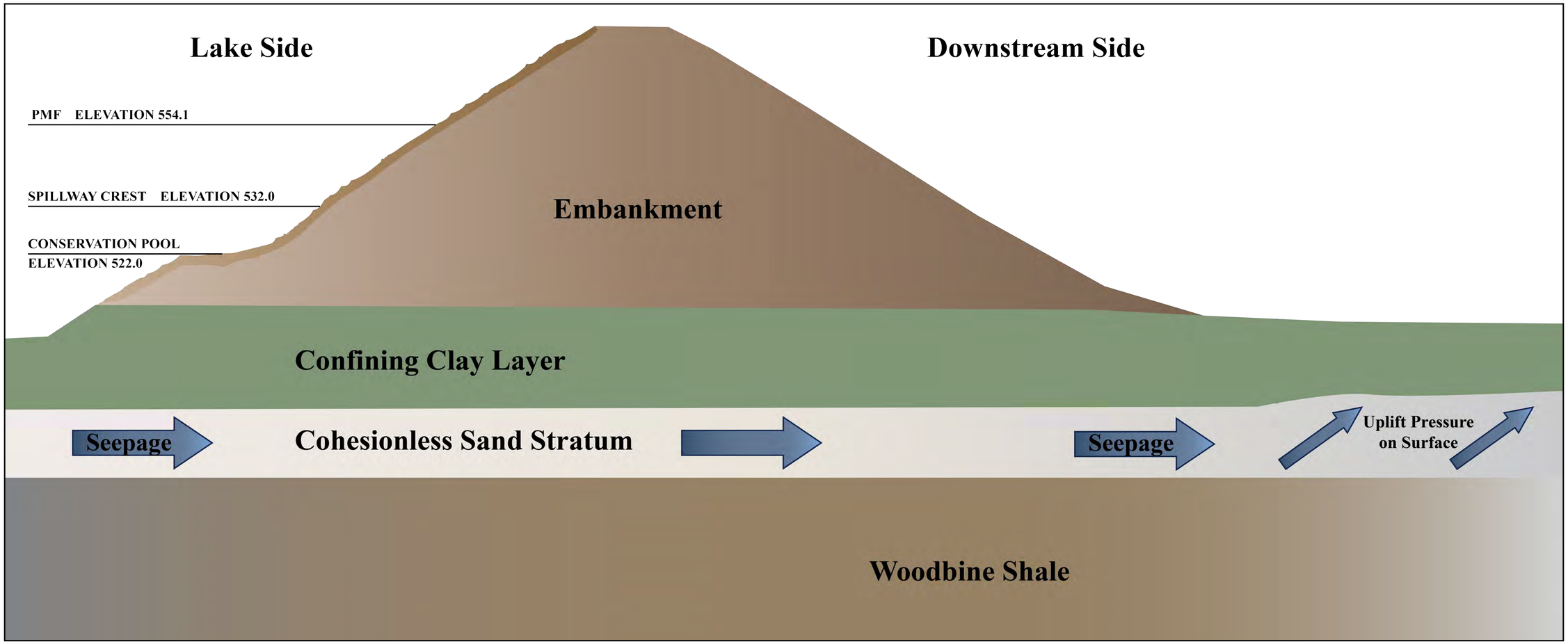
The Lewisville Dam is currently functioning as designed. The proposed modifications would serve to further reduce risk as well as extend the life of the dam.

Ongoing repairs to a slide at Lewisville Lake resulting from the May 2015 storms.

Water going over the Lewisville Dam Spillway after the May 2015 storms.

Embankment Seepage

Embankment seepage is what occurs when water is able to seep under the dam through a layer of sand that lies beneath a clay layer under the dam. This seepage can undermine the stability and function of the dam. Excessive seepage can create internal erosion along sand zones located in the dam's foundation. Seepage pressure can cause instability of the embankment toe, increasing the exit flow. As more water flows under the dam, increasing amounts of the embankment materials are eroded away. If unaddressed this can eventually compromise the ability of the dam to perform as designed.



Options for Addressing Dam Embankment Seepage

Filter Berm with Toe Drain

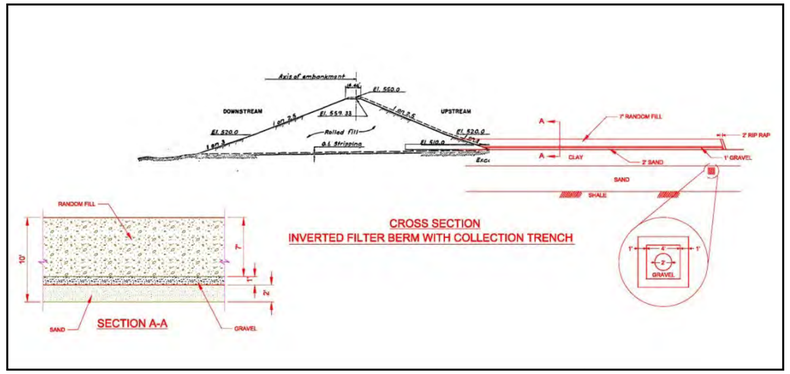
- A drain along the downstream toe of a dam used to collect seepage from the foundation and embankment, and convey it to a safer outlet. The filter serves to slow/stop erosion while allowing seepage flow to continue.
- Potential measure in two seepage areas.

Upstream Cutoff Wall

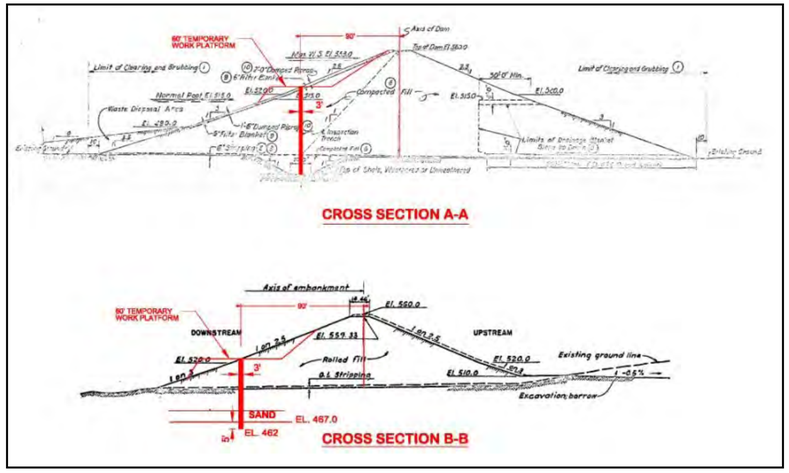
- A wall of impervious material located in the foundation beneath a dam that forms a water barrier and reduces seepage under a dam or spillway.
- Potential measure in two seepage areas.

Relief Well

- Relief wells act like valves to relieve the water pressure and allow excess water to be diverted safely, for example, to a canal. Relief wells work by safely relieving the water pressure while minimizing movement of embankment materials.
- Potential measure in one seepage area.



Filter Berm with Toe Drain

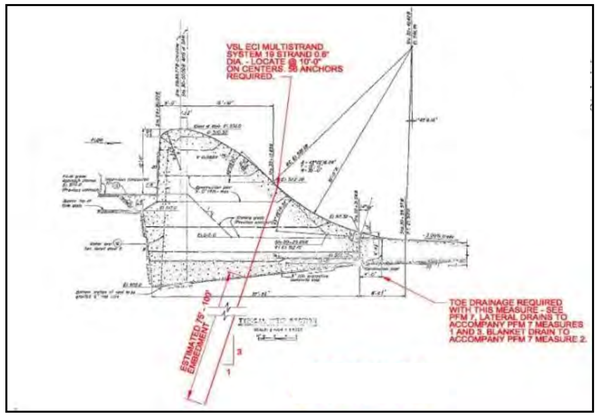


Upstream Cutoff Wall

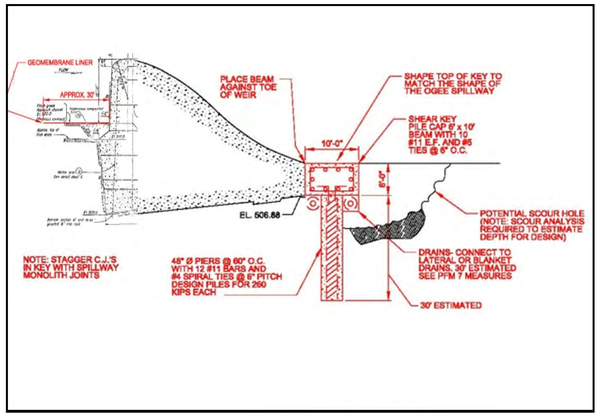
Existing Relief Wells at the Lewisville Dam

Spillway Stability: Problems and Potential Solutions

- **Problem:** The uplift pressures from groundwater acting on spillway weir have the potential to initiate progressive failure of spillway components and the underlying foundation materials.
- **Potential Solutions**
  - Anchor weir and apron
    - Installation of four post-tensioned anchors through the concrete into the foundation to prevent sliding.
  - Buttress with piers
    - A wedge with increased sliding resistance that prevents the sliding of the concrete structures.
  - Upsteam apron
    - A geotextile membrane to reduce the amount of water that gets underneath the concrete structures and change the angle and depth at which groundwater moves under the structure. This reduces uplift pressures.



Anchor Stability



Buttress with Piers

- **Problem:** The uplift pressures from groundwater acting on the apron slabs have the potential to cause one or more slabs to slide and initiate progressive failure of spillway components and the underlying foundation materials.
- **Potential Solutions**
  - Overlay the existing apron slabs with new concrete slabs and install a drainage system in between the layers of concrete.
  - Remove and replace existing apron slabs and install a drainage system.
  - Minimal repairs to existing apron slabs with installation of a drainage system.

Spillway and Apron

Cracks in the Spillway Apron

Alternative Development

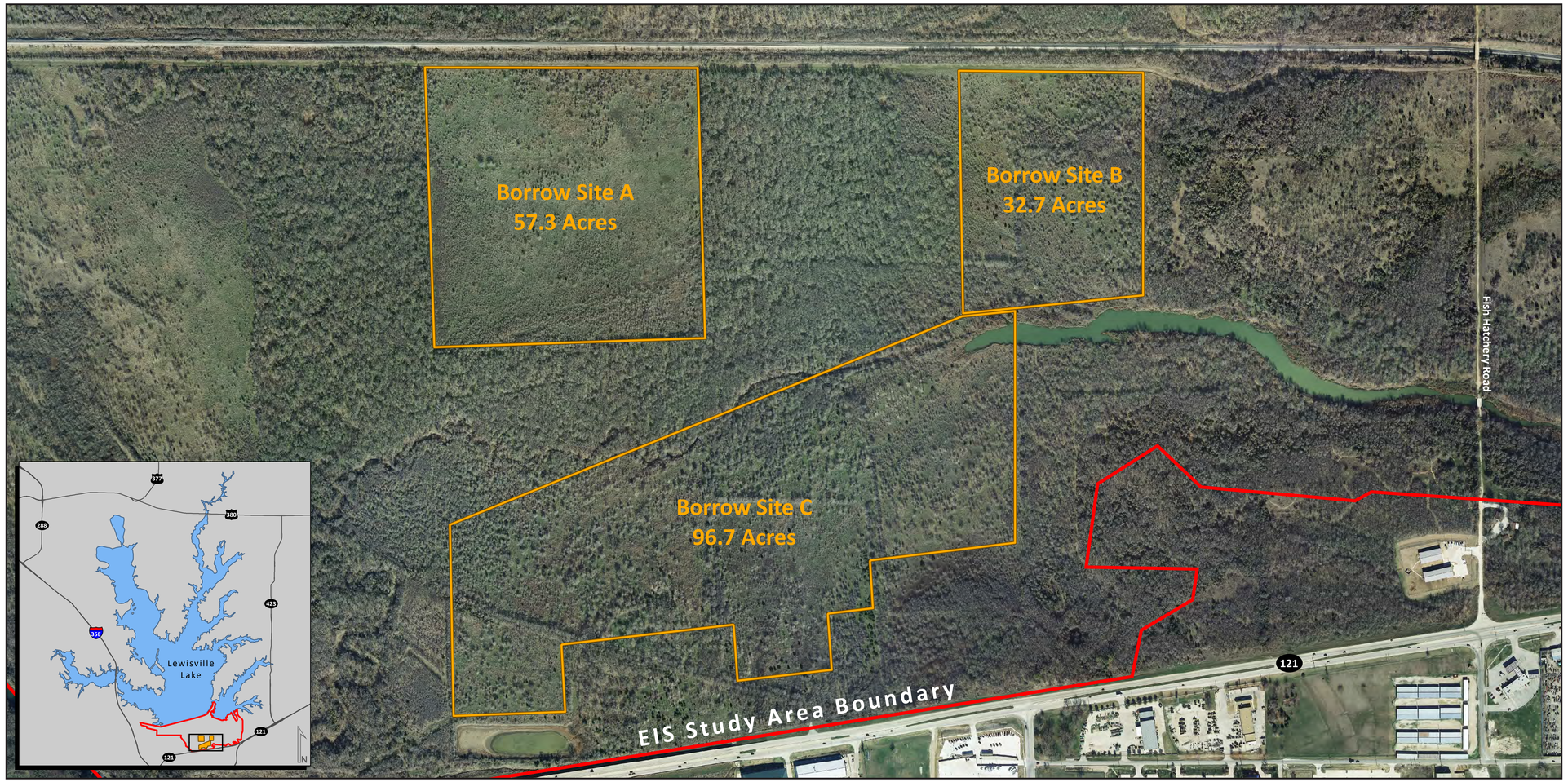
Lewisville Dam is currently functioning as designed. The potential modifications would serve to further reduce risk as well as extend the life of the dam.

Each alternative addresses all of the potential failure concerns, but with different combinations of measures.

Resulting Condition	Alternative to be Analyzed in the EIS	Potential Failure Modes												
		Dam Embankment Seepage Area 1			Dam Embankment Seepage Area 2				Spillway Weir Instability			Spillway Weir Instability Initiated by Apron Failure		
		Upstream Cutoff	Downstream Inverted Filter Berm	Collection Trench (Toe Drain)	Upstream Cutoff	Collection Trench (Toe Drain)	Downstream Inverted Filter Berm	Relief Wells	Buttress with Piers & Drainage	Upstream Cutoff	Post-Tensioned Anchors & Drainage	Remove & Replace	Overlay	Apron Slab Repairs with Lateral Drainage
Unacceptable Risk	**No Action** (Future Without Project Condition)	–	–	–	–	–	–	–	–	–	–	–	–	–
Best	**1**	✓	–	–	✓	–	–	–	✓	✓	–	✓	–	–
	2	✓	–	–	–	✓	–	–	✓	✓	–	✓	–	–
Better	**3**	–	✓	✓	–	✓	–	–	✓	✓	–	✓	–	–
	4	–	✓	✓	–	✓	–	–	–	✓	✓	–	✓	–
	5	–	✓	✓	–	–	✓	–	✓	✓	–	✓	–	–
	6	–	✓	✓	–	–	✓	–	–	✓	✓	–	✓	–
	7	–	✓	✓	–	–	–	✓	✓	✓	–	–	✓	–
Good	**8**	–	✓	✓	–	–	–	✓	✓	✓	–	–	–	✓

Potential Borrow Areas

- Material used for proposed improvements would be excavated from the Lewisville Lake project lands below the dam.
- The areas designated as available for borrow material were developed through a combination of collaborative discussions with the Lewisville Lake Environmental Learning Area users and geotechnical analysis to ensure the suitability of the material.
- Three areas have been identified. Borrow Site A would be the first choice for material, Borrow Site B would be second, and Borrow Site C would be third.

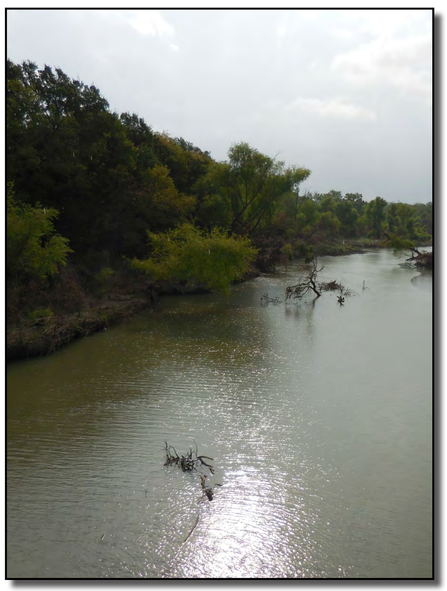


Resource Areas Analyzed in the EIS

High Water at Bittern Marsh in the Lewisville Lake Environmental Learning Area

- Air Quality
- Aesthetics
- Aquatic Resources
- Biological Resources
- Climate
- Cultural Resources
- Geology, Topography, and Soils
- Hazardous, Toxic, and Radioactive Waste
- Hydrology and Hydraulics
- Land Use
- Noise
- Public Health and Safety
- Recreation
- Socioeconomics and Environmental Justice
- Transportation
- Utilities

Bittern Marsh Trailhead



McWhorter Creek in the Lewisville Lake Environmental Learning Area

Lewisville Aquatic Ecosystem Research Facility

Construction of the Lewisville Dam (1952)

Wildlife at Lewisville Lake

The NEPA Process

NEPA GUIDES THE ENVIRONMENTAL IMPACT ANALYSIS PROCESS

NEPA is the federal law that requires federal agencies to evaluate the potential environmental effects of proposed projects, and to inform and involve the public in the decision-making process.

The EIS includes sections describing the:

- Purpose and Need of the Project
- Action Alternatives
- Baseline Conditions
- Environmental Effects

TYPES OF ENVIRONMENTAL EFFECTS

- Direct Effects
- Indirect Effects
- Cumulative Effects

IMPACT ANALYSIS CRITERIA

The U.S. Army Corps of Engineers (USACE) has identified a broad spectrum of general and project-specific criteria with which to analyze the potential impacts of the action alternatives. The criteria groups are as follows:

- Institutional Criteria
- Public Criteria
- Technical Criteria
- Scientific Criteria

WHAT IS THE PURPOSE OF THIS NEPA PUBLIC MEETING?

NEPA is a public process designed to solicit public and agency comments regarding issues that an environmental document should consider.

This NEPA meeting aims to:

- Present the various measures and alternatives (combinations of measures) under consideration.
- Afford opportunities for public and agency input.

We Encourage Your Input During the NEPA Public Review Period!

OVERVIEW OF NEPA PROCESS

Accomplishments and Next Steps

- **Agency Notification Letters**
- **Notice of Intent**
- **Public Scoping Period** — We Are Here
- **Preparation of Draft EIS**
- **Notice of Availability of Draft EIS**
- **Public Review Period**
- **Preparation of Final EIS**
- **Notice of Availability of Final EIS**
- **Record of Decision Signed**
- **Design and Construction**

How to Provide Comments

HOW DO I PROVIDE MY COMMENTS?

- Use the comment sheet provided tonight.
- Email comments to:
  marcia.r.hackett@usace.army.mil
- Mail comments to:

United States Army Corps of Engineers
Attn: Marcia Hackett, PEC-TN
P.O. Box 17300, Room 3A12
Fort Worth, Texas 76102-0300

Thank You For Coming...
Your Input Matters!