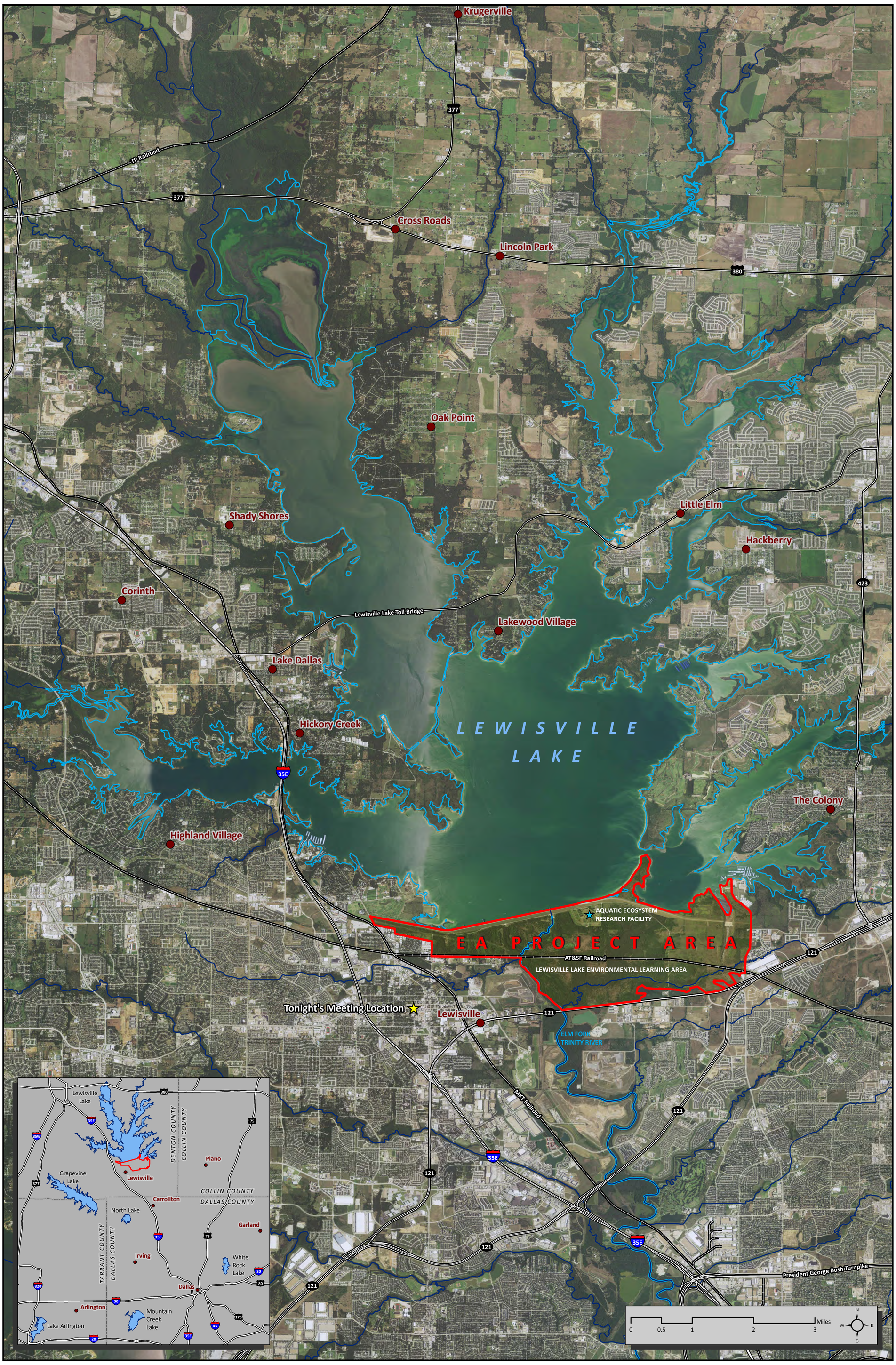
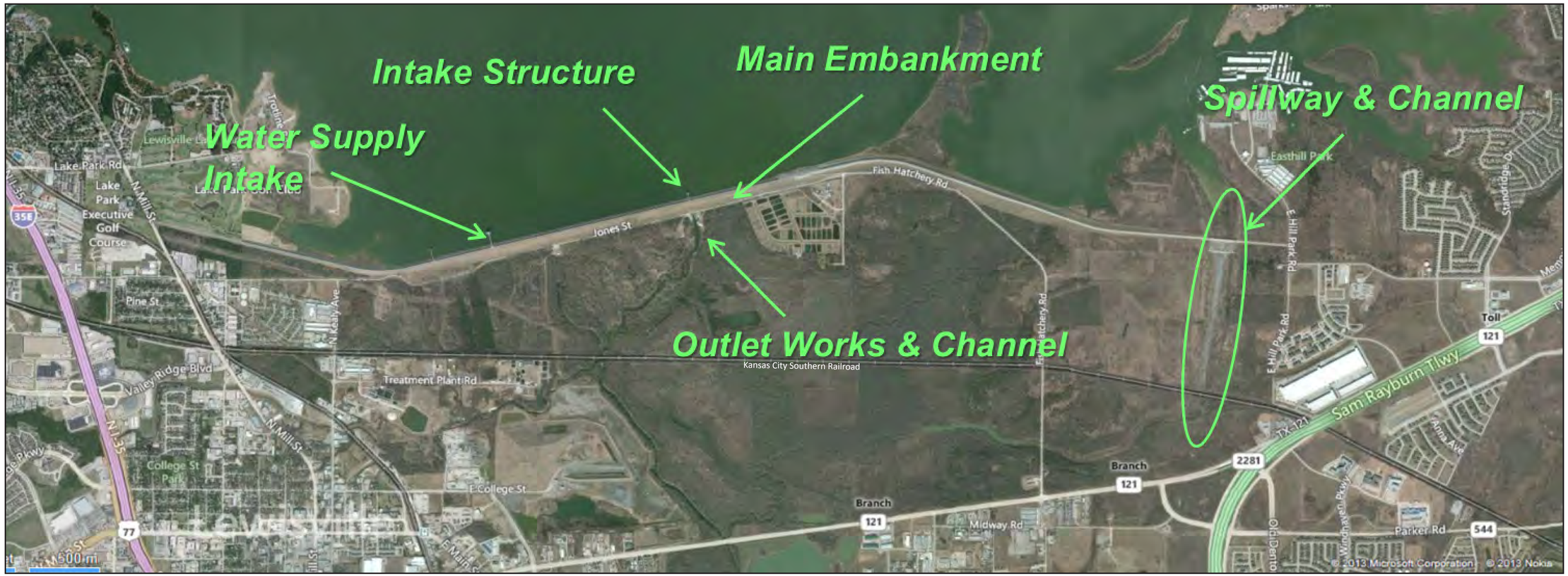
Lewisville Lake and Project Area



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 in 2015.
- The dam provides $725.1 million in annual public benefits including water supply, flood damage reduction, recreation, and 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, 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 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.

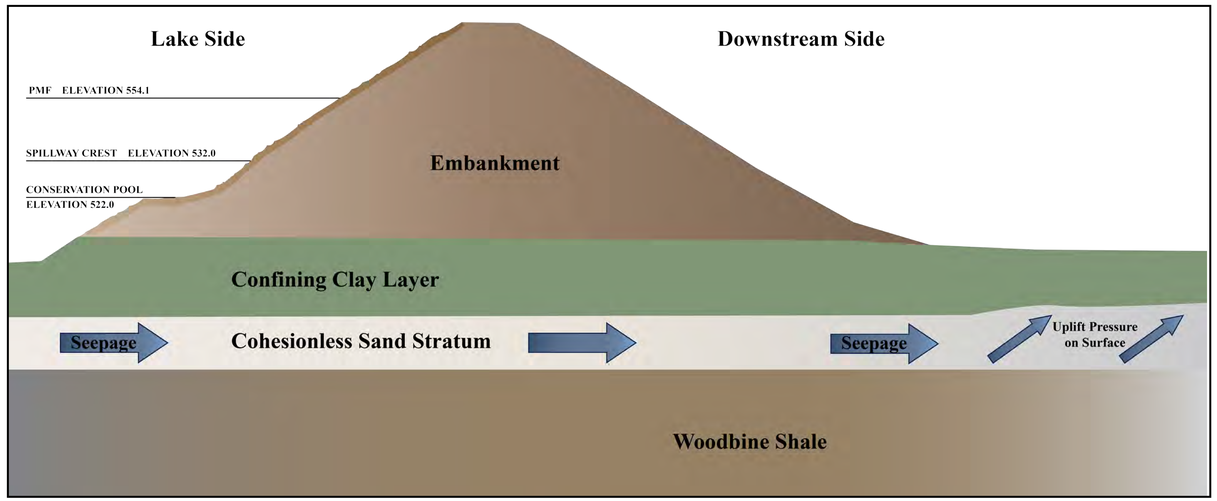
The Lewisville Dam is currently functioning as designed. The proposed modifications would serve to further reduce risks associated with the dam operations and extend longevity of the dam.

Looking south towards the City of Dallas from the Lewisville Dam embankment.

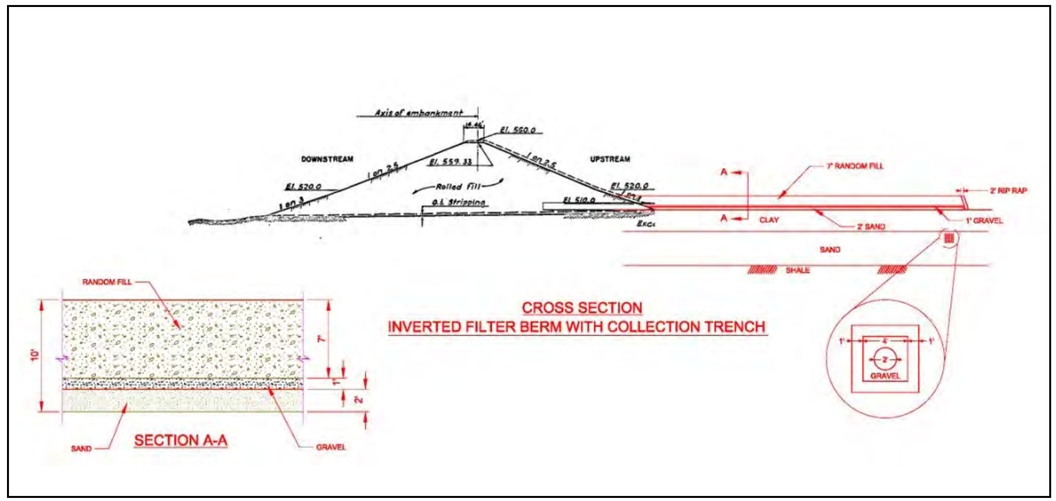
Water going over the Lewisville Dam Spillway after the May 2015 storms.

Embankment Seepage

- **Problem:** Embankment seepage is what occurs when water is able to seep 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.



- **Proposed Measure: Filter Berm with Toe Drain**
  - Installation of a drain along the downstream toe of the 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.



Filter Berm with Toe Drain

Spillway Instability

- **Problem:** The uplift pressures from groundwater acting on the spillway weir have the potential to initiate progressive failure of the spillway components and the underlying foundation materials.

Spillway and Apron

- **Proposed Measure**: **Anchor Weir and Apron**
  - Installation of four post-tensioned anchors through the concrete into the foundation to prevent sliding.
  - 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.

- **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 the spillway components and the underlying foundation materials.

Cracks in the Spillway Apron

- **Proposed Measure: Slab Overlay**
  - Overlay the existing apron slabs with new concrete slabs and install a drainage system in between the layers of concrete.

- **Problem:** High flow events scour the spillway channel, reducing the stability of the spillway apron and damaging the channel.

Scour Downstream of the Spillway Apron

- **Proposed Measure: Barrier Walls**
  - A pair of barrier walls would be constructed to interrupt flow. The first wall would be entirely underground and abut the spillway apron. The second wall would be approximately 1,000 feet downstream, and rise 3-4 feet above ground.
  - The downstream wall would also serve as a low-water vehicle crossing for operations and maintenance purposes.

Conduit Repair and Slope Stability Improvements

Outlet Conduit Erosion

- **Problem:** There is the potential for erosion of the Lewisville Dam embankment along the outlet conduit.

Lewisville Lake outlet conduit at full discharge.

Proposed Measure: Conduit Filter

- Surround the existing conduit with a fine horizontal filter and two outlets on each side. The fine filter would extend downstream along the basin wall and convert to a two-stage filter along the weep holes in the basin walls.
- The two-stage filter would allow the weep holes to discharge any collected seepage and prevent the piping of the fine filter through the weep holes.
- Design and construction would be planned to minimize any interruption to conduit flow.

Slope Stability

- **Problem:** Instability of the upstream embankment slope contributes to a risk of slope failure that would lower the top of the dam at the site of a slide, should one occur.

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

Proposed Measure: Slope Stability Improvements

- Install an upstream embankment berm on parts of the embankment. Crest modification would occur along the same embankment.
- Construct an embankment berm to an elevation of 537.0 with a 15-foot top width and 4:1 upstream slope, and with rock riprap protection on the upstream slope to protect against wave erosion.
- Modify the crest of the embankment including removal of the existing pavement and removing and replacing approximately 6 feet of the embankment. The material from the embankment would be lime-treated and replaced. The crest would be sloped to the downstream side and a geomembrane added prior to repaving the crest road.

Project Features Required for all Potential Failure Modes Measures

Several actions are anticipated as a required part the Proposed Action, including:

♦ **Access Roads**

- Construction access would be along Fish Hatchery and Jones Roads.
- A single-lane gravel road would be constructed parallel to Jones Road to maintain public access during construction.
- A haul road parallel to the Kansas City Southern Railroad would be established for access to borrow sites.

♦ **Railroad Crossing Bridge**

- A modular or prefabricated bridge would be placed as a superstructure over the current Fish Hatchery Road bridge spanning the Kansas City Southern Railroad.
- While the existing bridge structure is sound, the proposed prefabricated bridge would allow for heavier, more frequent crossings by trucks traveling to and from the borrow sites.
- Establishment of the bridge would take 1-2 days; coordination with the Kansas City Southern Railroad is ongoing to minimize disruption of freight rail.

Existing temporary bridge superstructure serving Fish Hatchery Road over the Kansas City Southern Railroad. This bridge is scheduled to be removed by the end of 2016.

♦ **Relocation of Utilities**

- Waterlines operated by the City of Lewisville currently encroach on the embankment and present a risk to embankment stability if the lines were to leak.
- Overhead utilities pose a potential safety risk to construction equipment entering and leaving the Project Area.
- Utilities would be relocated to reduce impact to the Lewisville Dam and construction, operations, and maintenance activities.

♦ **Vegetation Clear Zone**

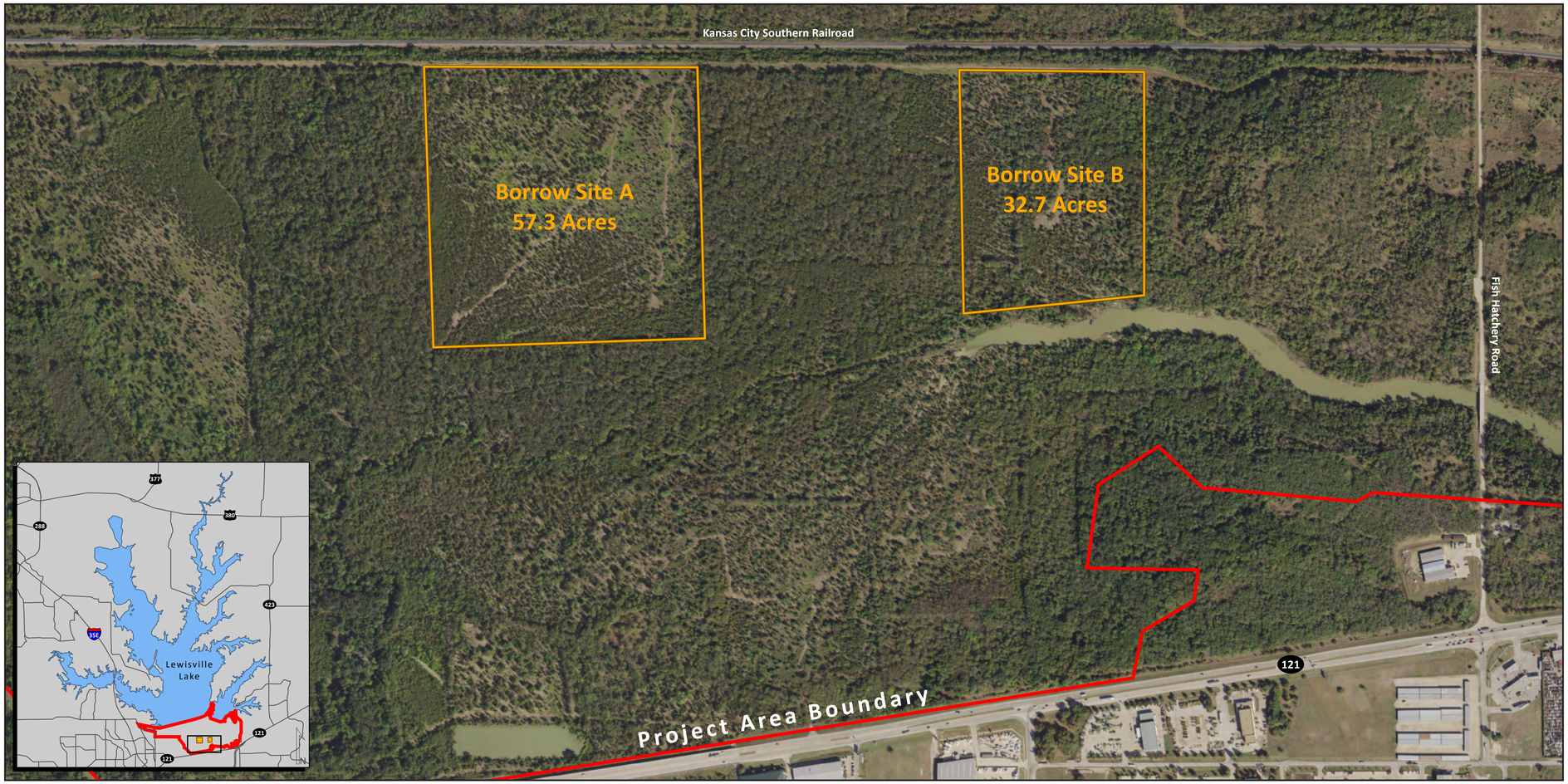
- Dam safety guidance requires a 50-foot wide “vegetation clear zone” be established along the toe of the embankment to reduce the potential for trees and larger plants from establishing and undermining the stability of the embankment.
- The vegetation clear zone would be maintained by regular mowing.
- To minimize environmental impacts, utility relocations and access roads would be sited within the vegetation clear zone when possible.

Overgrown vegetation and low overhead utility lines impede safe and efficient dam maintenance operations.

Fish Hatchery Road would be the primary haul route between the borrow sites and the construction areas.

Potential Borrow Sites

- 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.
- Two areas have been identified. Borrow Site A would be the first choice for material, Borrow Site B would be second.



Habitat Measures

- After the dam safety measures have been implemented, the USACE would contour the borrow sites to resemble the natural surrounding terrain, and seed and plant trees on the disturbed land.
- The plantings would be intended to create a landscape more consistent with historic prairie and savanna conditions, as well as to foster habitat useable for the pollinators on which the habitat depends.
- Planting would use native species with a substantial milkweed component to support monarch butterfly migration, as well as other important pollinators.
- Species to be planted are to be determined via coordination with U.S. Fish and Wildlife Service, Lewisville Lake Environmental Learning Area, and the Lewisville Aquatic Ecosystem Research Facility.

Photo credit: **Bud Hensley**

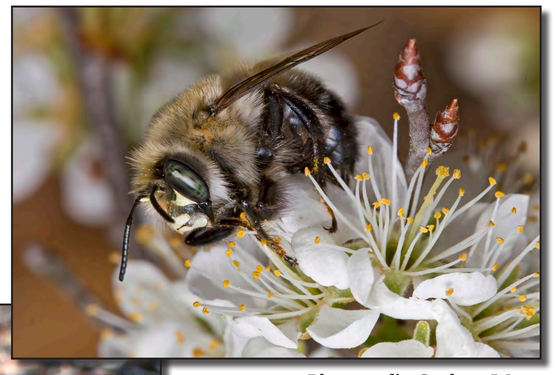


Photo credit: **Graham Wyatt**

Photo credit: **Seth Anderson**

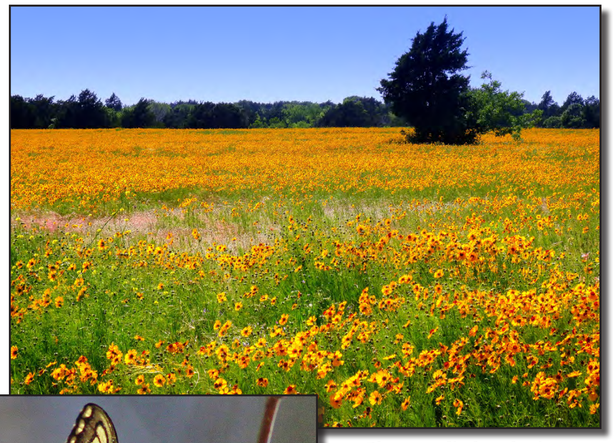


Photo credit: **hevelonian.com**

Photo credit: **anps.org**

Photo credit: **Ben Cox**

Photo credit: **Ben Sandifer, dallastrinitytrails.com**

Resource Areas Analyzed in the EA

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

- 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 LLELA

Lewisville Aquatic Ecosystem Research Facility

Construction of the Lewisville Dam (1952)

Wildlife at Lewisville Lake

Environmental Consequences

Geology and Soils

- *Less than significant impacts.*
- Borrow sites were selected based on suitability of fill and coordination with Lewisville Lake Environmental Learning Area organizations and Lewisville Aquatic Ecosystem Research Facility to identify locations least likely to interfere with sensitive habitats, recreation, and educational usage of Project Area.
- Material excavated from identified borrow sites would be used within the Project Area.
- Any excess material would be returned to the borrow sites to moderate changes in topography.
- The proposed embankment improvements would reduce risk of both internal and external erosion.

Public Health and Safety

- *Beneficial impacts.*
- Implementation of the Proposed Action would result in improved embankment stability and resiliency, and would reduce risk and potential for emergency management measures by the USACE.

Water Resources

- *Temporary, less than significant impacts.*
- No lowering of lake levels below conservation pool is proposed.
- Best management practices would reduce impacts associated with surface runoff and drainage at the borrow sites.
- Use of a cofferdam for any activities on the upstream side of the dam avoids and minimizes potential impacts.
- No significant impact to hydrology and hydraulics; the Proposed Action would not substantially alter the hydrograph associated with releases from Lewisville Lake.

Air Quality

- *Less than significant impacts.*
- Construction activities would result in temporary increases in criteria pollutant emissions.
- Emissions would not exceed *de minimis* thresholds.
- No long-term increase in mobile or stationary source emissions in the region would occur.

Biological Resources

- *Temporary, less than significant impacts during construction; beneficial impacts during operations.*
- No federally threatened or endangered species are present in the Project Area.
- Initial clearing of borrow sites would reduce habitat by up to 90 acres.
- Post-construction, the proposed Habitat Measures would create high value habitat for pollinators in the region.
- At completion, implementation of Habitat Measures would result in a more diverse and high quality landscape as compared to the poor quality grassland and upland savanna currently observed.

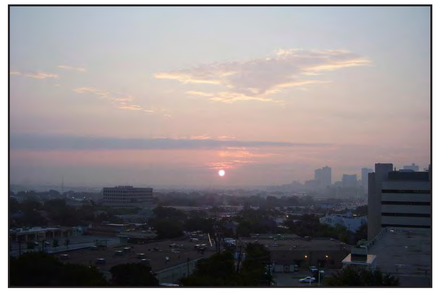


Photo credit: **KERA News**

Environmental Consequences

Utilities

- *Less than significant impacts.*
- Construction activities under the Proposed Action could result in temporary and localized impacts to utility services.
- Utility customers would be informed of temporary outages prior to any potential interruption.
- The USACE project team has been meeting frequently with utilities to discuss any utility relocation that would be required.

Transportation

- *Less than significant impacts.*
- Localized increase the amount of construction-related traffic (e.g., workers and equipment deliveries) within the region of influence.
- The majority of construction trips would be haul trips between the borrow and construction sites, and would thus be confined to Lewisville Lake Environmental Learning Area (LLELA).

Socioeconomics and Environmental Justice

- *Less than significant impacts.*
- The Proposed Action would create temporary construction jobs for the duration of the project.
- The Proposed Action is not anticipated to disproportionately or adversely impact minorities, children, or the economically disadvantaged.

Photo credit: **LLELA**

Recreation

- *Less than significant impacts.*
- Access to LLELA would be maintained, and educational operations would be unaffected.
- Recreational fishing activities at the outfall would be temporarily disrupted during construction.

Photo credit: **Steve Southwell**

Cultural

- *No impacts anticipated.*
- Cultural resource investigations of the action areas within the Project Area did not identify any historic or archeological sites.

Climate

- The Proposed Action would incrementally contribute to global emissions for a limited period of time, but the emissions themselves are not of such magnitude as to make a direct correlation with climate change.
- Climate models predict an increase in extreme heat and extreme rainfall events, which combine to have a potentially adverse impact on the embankment.
- The USACE would continue to employ careful monitoring of the embankment stability throughout the year, and especially during rain events to ensure the safety of those depending on the embankment for flood risk reduction.

Photo credit: **@courtneyluth33**

The National Environmental Policy Act (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 EA 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 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

Preparation of Draft EA

Notice of Availability of Draft EA

Public Review Period
Sept 16, 2016 - Oct 15, 2016

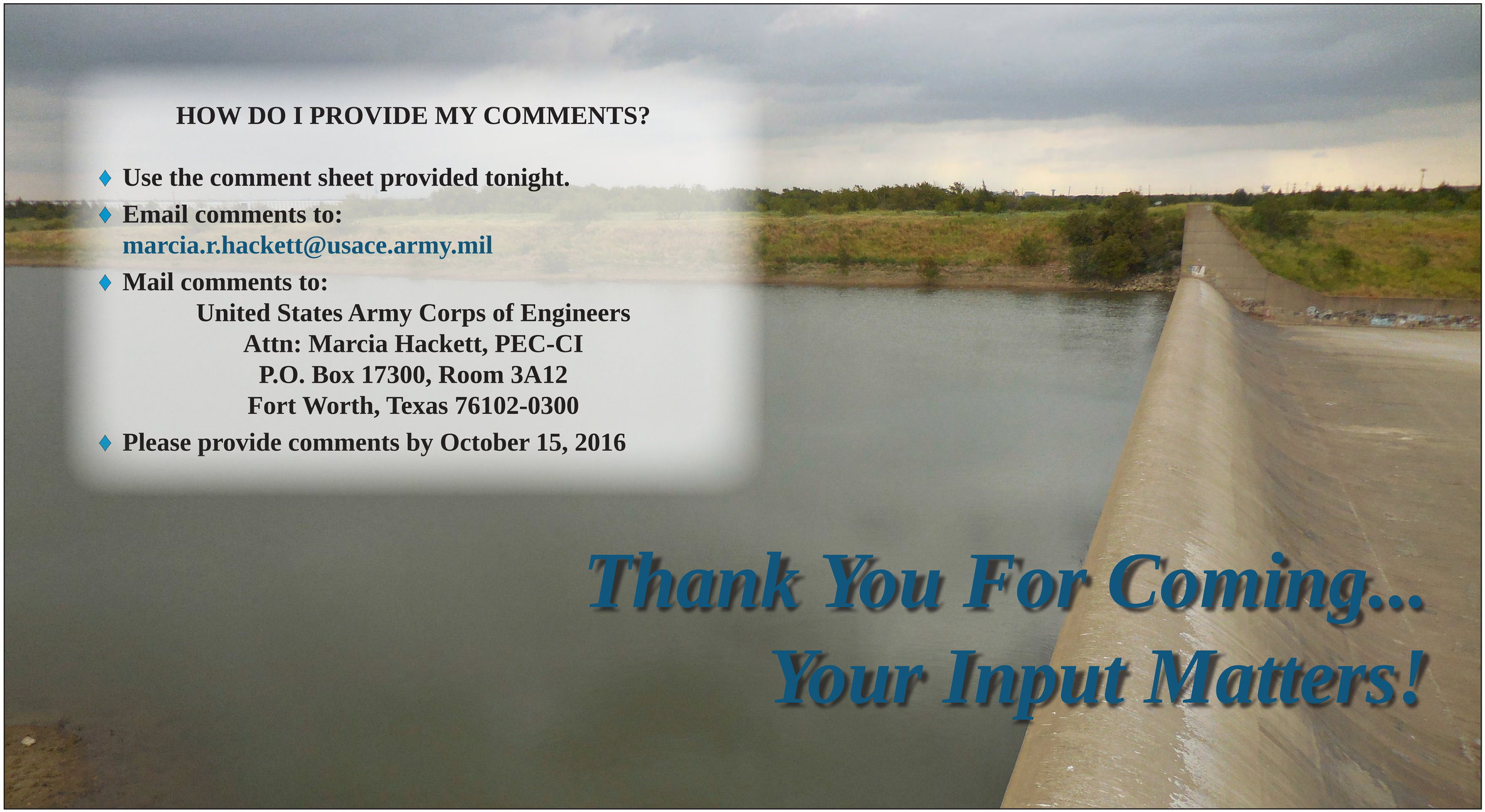
We Are Here

Finding of No Significant Impact

Design and Construction 2018-2025

Notice of Intent to Prepare an Environmental Impact Statement

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-CI
  P.O. Box 17300, Room 3A12
  Fort Worth, Texas 76102-0300
- Please provide comments by October 15, 2016

Thank You For Coming...
Your Input Matters!