



DAM SAFETY SECTION CRITICAL INFRASTRUCTURE DIVISION

Dam Safety Inspection Report

GENERAL INFORMATION

INVENTORY No.: TX03775

DAM: Frog Pond Lake Dam

OWNER: Frog Pond Lake WCID

STREAM: Wolf Creek

BASIN: Neches River

COUNTY: Tyler

GENERAL LOCATION: 2 Miles southeast of Colmesneil

DAM HEIGHT: 19-ft

SIZE CLASSIFICATION: Small

NORMAL CAPACITY: 410 ac-ft

MAXIMUM CAPACITY: 867 ac-ft

NORMAL WATER LEVEL: 200 ft-msl

CURRENT WATER LEVEL: 200.8 ft-msl

PREVIOUS INSPECTION DATE: July 16, 2014

CURRENT INSPECTION DATE: March 28, 2018

INSPECTION BY TCEQ PERSONNEL: Levi Best and John Davis

PERSONNEL CONTACTED: Stan Evans – Vice President, Frog Pond Lake WCID
Kate Johnson – Local Resident

SUMMARY

Frog Pond Lake Dam, a small size earthen dam, was inspected by TCEQ staff on March 28, 2018, at the request of the owner. The owner was notified of the inspection on February 28, 2018. The dam was found in overall fair condition. The primary issues of concern included: minor bare areas along the crest; minor benching and erosion along the upstream slope; large trees, bare areas, and surface erosion along the downstream slope; a significant overgrowth of trees and brush along the downstream toe; seepage from under the right end wall of the service spillway (as well as from the earthen embankment just beyond the spillway); minor cracking and spalling

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throughout the concrete spillway chute; displaced riprap within the earthen spillway discharge channel resulting in areas of erosion and voids; and standing water (potential seepage or leakage) within the discharge basin of the drain. A verbal exit interview, explaining the results of the inspection, was conducted on the same day of the inspection with Ms. Johnson.

BACKGROUND

According to TCEQ records Frog Pond Lake Dam was constructed in 1957 and has been inspected several times from the early 1970's to early 1990's by the Texas Dam Safety Program. The inspections generally found the dam in similar condition with the deficiencies slowly worsening overtime. The noted deficiencies included: trees and brush along the upstream slope, downstream slope, and spillway discharge channel; seepage along the downstream toe (typically along the left end); animal burrows throughout the dam; open cracks and expansion joints in the concrete spillway chute (vegetation was growing through some of the cracks/joints); a large crack 1.5-inches wide on right side wall of spillway; undermining along portions of the concrete spillway; and flowing seepage at the downstream end of the spillway's concrete discharge basin.

In 1995, Everett Griffith Jr. and Associates, Inc. submitted plans and specifications to the Texas Natural Resource Conservation Commission (TNRCC - a predecessor agency of TCEQ) for the rehabilitation of the concrete spillway. The proposed scope of work included:

- Filling the voids under the spillway with flowable concrete fill.
- Cleaning and sealing cracks throughout the concrete spillway channel.
- Removing and re-constructing the concrete discharge basin.
- Using the old discharge basin (concrete rubble) as riprap erosion protection along the earthen channel of the spillway.
- Installing seepage provisions behind the concrete side walls.

The plans were approved by the TNRCC on April 19, 1995 and construction began on August 8, 1995; however, it is unclear when the modifications were completed.

There have been three additional inspections since the modifications were completed on the dam, which were conducted by the TNRCC on October 23, 2001 and TCEQ on July 5, 2006 and July 16, 2014. The 2001 and 2006 inspections found the dam to be in similar condition with the following deficiencies noted: bare areas along the crest; animal burrows along with an overgrowth of trees and brush along the upstream slope; an overgrowth of trees and brush along the downstream slope; seepage along the left downstream toe; an overgrowth of trees and brush along the spillway side walls and downstream channel; vegetation growth through multiple cracks/expansion joints of the spillway channel, which lacked sealant; multiple areas of minor spalling throughout the spillway channel; and minor seepage from the concrete ledge above the spillway discharge basin.

The most recent inspection was conducted by TCEQ at the request of the owner in 2014, which found the dam to be in overall fair condition. The inspection noted the following observations: a few bare areas along the crest; the majority of the previously noted trees along the upstream slope were removed; areas of erosion

adjacent to the spillways left side wall; minor benching erosion along the upstream waterline; the upper portion of the downstream slope was cleared, but the lower portion was overgrown with large trees and brush; cracks and spalling throughout the spillway chute; minor separation (0.25-inches wide by 8-inches deep) from the spillway chute slab and right side wall; and standing water in the discharge channel of the drain outlet.

PRE-INSPECTION MEETING

A pre-inspection meeting was held with Ms. Johnson, where she explained the ownership change of the dam and a brief history of the dam. It was noted that Frog Pond Property Owners Association originally owned the dam; however, through email correspondence between TCEQ and Mr. Evans, it was explained that after the failure of Lake Amanda, the property owners along Frog Pond Lake voted to form a WCID (Frog Pond Lake WCID). The WCID has taken over maintenance and ownership responsibilities of the dam.

INSPECTION FINDINGS

Figure 1 is a location map of Frog Pond Lake Dam with respect to the City of Colmesneil. Figure 2 is an aerial view with 10-ft contours and stream flow-lines. Figure 3 is an aerial view of the dam indicating photo locations. Note that right and left indications are from the perspective of an observer looking downstream. Field measurements taken during the inspection were done using a hand-level and survey rod. The water level was at approximately 200.8 ft-msl with the reservoir just above the normal pool elevation.

CREST

- The 15-ft wide crest of the dam had a well-maintained vegetated cover with no major deficiencies observed (Photos 1-2).
- A few minor bare areas were noted randomly along the crest; however, it should be noted the size and number of bare areas have decreased since the last inspection.
- The crest was found to be in good condition.

UPSTREAM SLOPE

- The slope varied from 3 horizontal to 1 vertical [3H:1V] along the left side of the dam to 2H:1V along the right end of the dam. It should be noted that some areas of the slope appeared slightly steeper than 2H:1V adjacent to the spillway. Additionally, minor benching (less than 1-ft deep) was observed along the majority of the waterline (Photos 3-4).
- It was noted that the steeper slope (right half) exhibited areas of bare soil with surface erosion (Photo 5).
- A couple of minor erosion rills (approximately 3-ft wide and less than 1-ft deep) were noted randomly along the slope (Photo 6).
- A minor bulge was observed near the midpoint of the dam, which appeared to be from loose soil being placed along the slope.
- The upstream slope was found to be in fair condition.

DOWNSTREAM SLOPE

- The downstream slope generally had a 2H:1V slope with some areas slightly steeper that had an undulated appearance. The slope had a well-maintained vegetated cover with a few large trees; however, the toe was significantly overgrown with large trees and brush (Photos 7-8).
- A few bare areas and surface erosion were observed along the slope.
- It was raining during the inspection; therefore, the current condition of the seepage along the toe could not be determined.
- The downstream slope was found to be in fair condition.

SPILLWAY

- The spillway is located along the right end of the dam and consists of an 80-ft wide concrete chute with a 3.5-ft tall by 10-ft wide concrete box culvert (pilot channel) near the midpoint of the spillway. The spillway chute and box culvert discharge into a riprap lined channel that was overgrown with large trees and brush. Additionally, the box culvert is controlled by a series of stoplogs that maintains the normal pool about 1-ft below the concrete control section of the spillway chute (Photos 9-10).
- Seepage was discharging from underneath the right end wall and the right abutment just beyond the spillway; however, it was raining during the inspection and a complete evaluation of the seepage could not be conducted (Photo 11).
- A pair of 4-inch diameter PVC pipes (one on per side wall) exited the side walls of the discharge basin. It was speculated that the pipes were the outlets of the drain system installed in 1995; however, no flow was discharging from the pipes. Nonetheless, due to the seepage discharging from under the right end wall, there is a potential that the drain system could be clogged or non-functional (Photo 12).
- The downstream end of the left side wall was undermined about 2-ft deep (Photo 13).
- Portions of the riprap within the earthen channel were displaced resulting in multiple areas of minor erosion and voids within the channel (Photo 14).
- Some minor areas of cracking and spalling were observed throughout the concrete portions of the spillway. However, it should be noted that the majority of the spalling and cracking noted in the previous inspection appeared to have been repaired.
- The previously noted separation between chute slab and right side wall was not observed during this inspection; however, the current weather conditions limited access to the chute slab and a complete evaluation could not be conducted.
- The box culvert was engaged during the inspection; therefore, a complete evaluation of the culvert could not be conducted.
- The spillway was found to be in fair condition.

RESERVOIR DRAIN

- The reservoir drain outlet is located to the left of the dam's midpoint and consists of a steel conduit (with a valve at the downstream end), which discharges into an earthen channel. Water was standing within the discharge

basin of the drain; however, it rained prior to the inspection, as well as during the inspection, and it could not be determined if the drain was leaking or if the standing water was from the rain. Nonetheless, the previous inspection also noted water standing within the channel; therefore, there is a potential that the valve is leaking and/or seepage is discharging along the pipe and exiting the toe within the channel (Photo 15).

- The channel downstream of the reservoir drain was completely overgrown with large trees and brush.
- The inlet was submerged in the reservoir and could not be inspected.
- The reservoir drain was found to be in fair condition.

DOWNSTREAM CHANNEL

The channel downstream of the spillway was a significantly overgrown section of Wolf Creek that meandered in an easterly direction for the extent of the predicted inundation limit.

CONFIDENTIAL: DOWNSTREAM HAZARDS

This dam is classified as a low hazard dam with no apparent hazards downstream. There are multiple residences downstream of the dam; however, they appear to be located above the top of dam elevation and do not appear to be at a risk of being inundated in the event of a dam failure. It should be noted that the hazard classification is not a description of the condition of the structure, but rather, a description of the potential for loss of downstream life or property in the event of a failure of the dam. The low hazard classification indicates that no apparent loss of life exists.

HYDROLOGIC/HYDRAULIC (H&H) ANALYSES

This dam is required to safely pass 25% of the Probable Maximum Flood (PMF). A hydrologic and hydraulic study was conducted by the Texas Dam Safety Program in 1995 as part of the proposed construction plan review. The analysis indicated that the dam is capable of passing 25% of the PMF and the dam is considered hydraulically adequate.

OPERATION AND MAINTENANCE (O&M) PLAN

A written O&M plan was not available during the inspection; however, it was evident that routine maintenance is conducted on the dam.

EMERGENCY ACTION PLAN (EAP)

An EAP is not required for this dam and one has not been submitted to TCEQ.

RECOMMENDATIONS

The following requirements and/or recommendations are provided:

- A. The erosion rills along the upstream slope and the surface erosion noted throughout the upstream and downstream slopes should be filled with

compacted soil. The resulting bare areas, as well as the multiple bare areas noted throughout the dam should have vegetated cover re-established.

- B.** The trees and brush within the discharge channels of the drain and spillway should be removed to allow an unobstructed flow.
- C.** The undermining along the left end wall of the spillway should be filled with grout and a form of erosion protection installed to prevent a reoccurrence/continued erosion.
- D.** The areas of erosion and voids within the earthen channel of the spillway should be filled with additional riprap to limit further erosion/voids.
- E.** The owner should have a Licensed Texas Professional Engineer (LTPE) evaluate the spillway drain system to ensure it is functional and not clogged.
- F.** The owner should have an LTPE evaluate the reservoir drain valve to ensure that it is not leaking and/or seepage is not present along the pipe. Additional recommendations may be required after the drain has been evaluated.
- G.** The owner should continue to repair the cracking/spalling as they are discovered in the concrete spillway.
- H.** In the 30 Texas Administrative Code (TAC) Chapter 299, §299.43(a), a written O&M plan is required to be developed. The plan shall include items addressed in the requirements/recommendations portions of this report. The method and the time frame for addressing these items are left up to the owner, and it is recognized that finances may govern when the work can be undertaken. In addition, the following deficiencies need to be monitored:
 - a. Benching along the upstream slope for an increase in height.
 - b. Seepage along the right end wall and downstream of the spillway for an increase in flow or evidence of suspended sediment.

If conditions worsen with any of the deficiencies, then a LTPE should be consulted in order to determine the level of damage and provide improvements if needed.

CONCLUSIONS

The owner of this dam may be liable for downstream damages in the event of a spill or breach. It is the owner's responsibility to maintain the dam in a safe condition in order to prevent loss of life and limit the potential for property loss. In addition, regular maintenance may reduce future rehabilitation and repair costs. This structure will not be scheduled for re-inspection at this time.

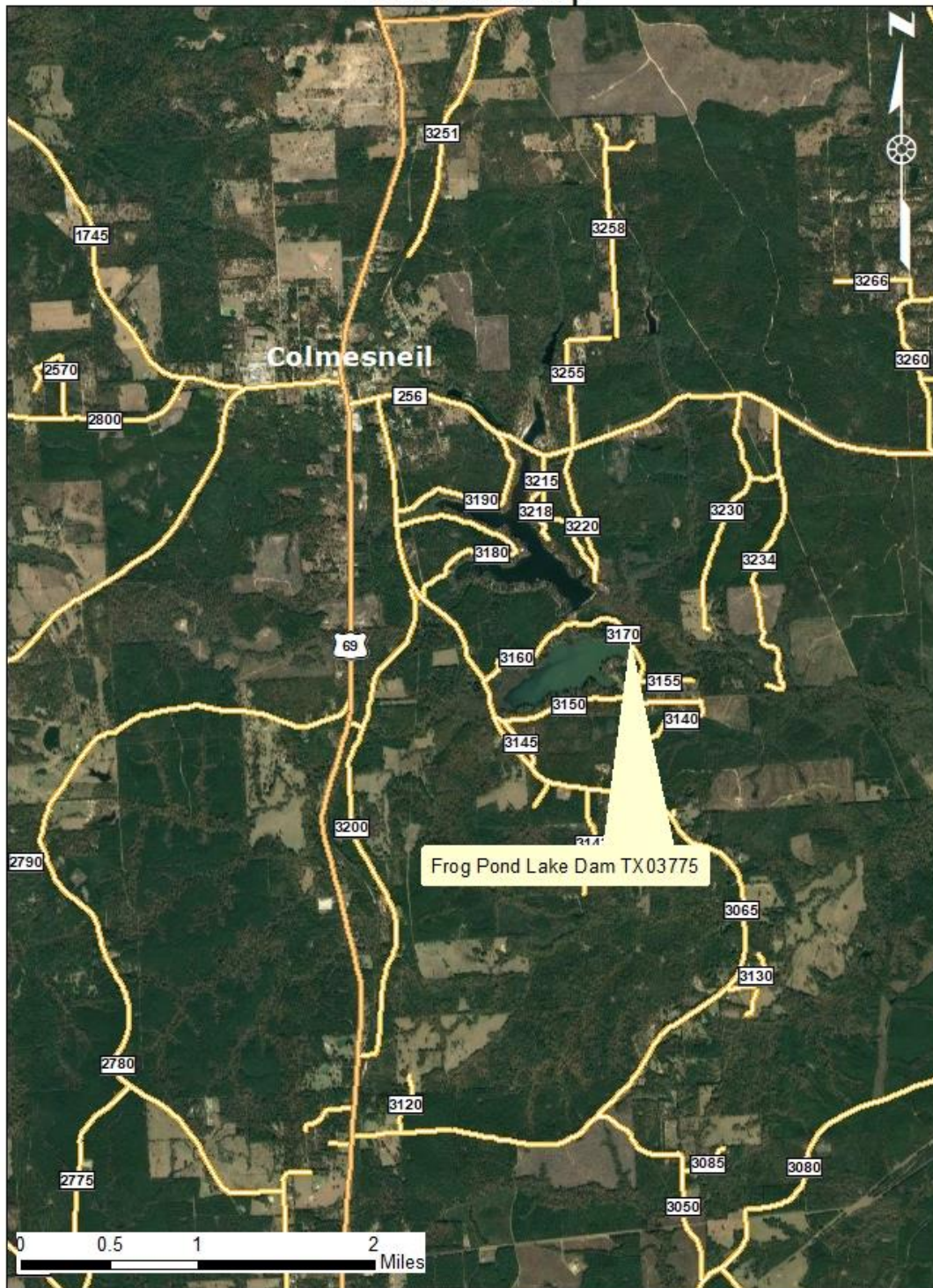


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Figure 1 - Frog Pond Lake Dam TX03775
Location Map

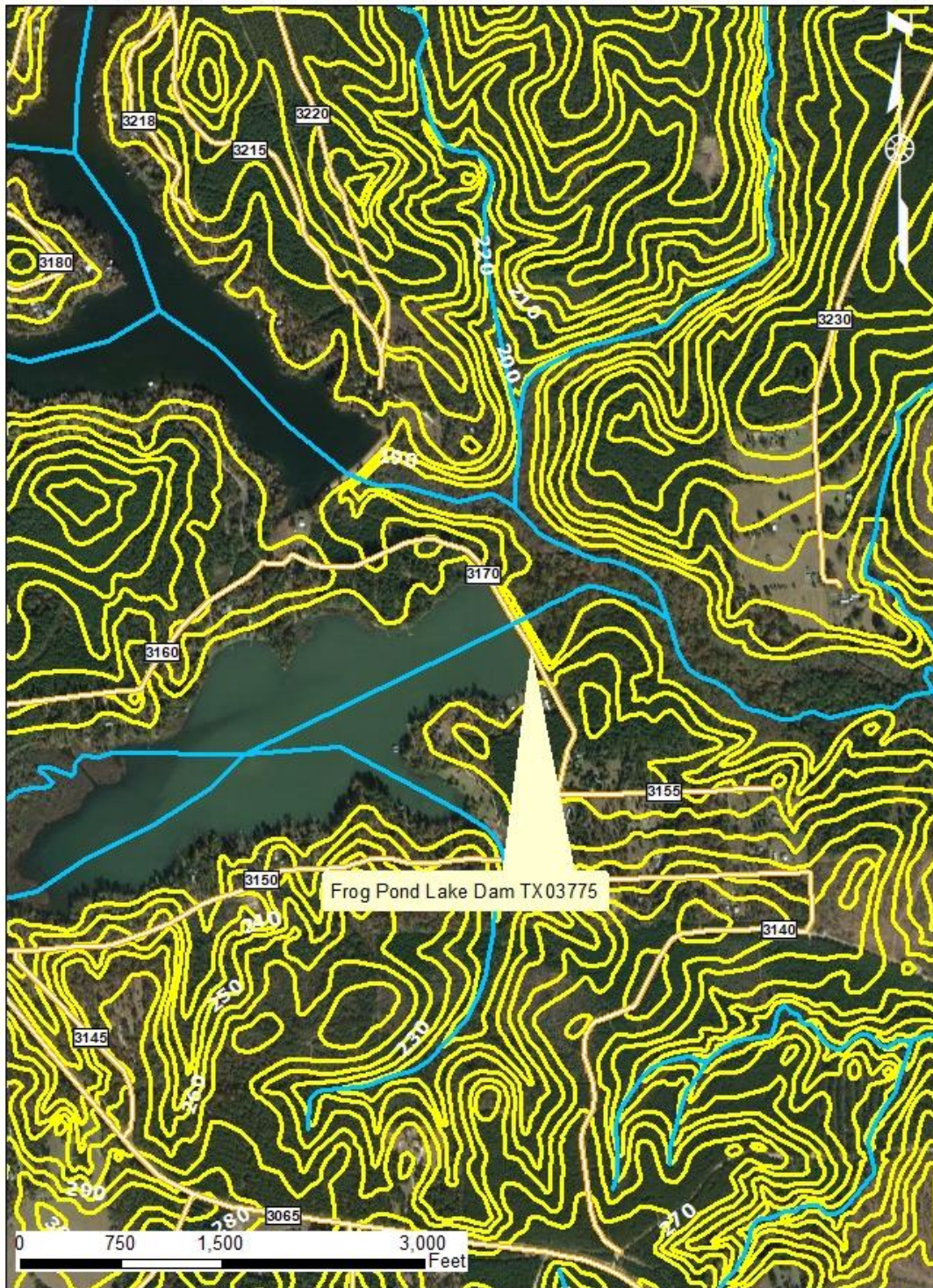


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Frog Pond Lake Dam, TX03775

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Figure 2 - Frog Pond Lake Dam TX03775
2014 Aerial View with 10-ft Contours and Flow Lines



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Figure 3 - Frog Pond Lake Dam TX03775
2014 Aerial View with Photo Locations



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Photo 1: Standing on the left end of the dam looking southeast; a typical view of the well-maintained vegetated cover along the crest.



Photo 2: Another view of the crest from the right end of the dam looking northwest. Note the minor bare areas (arrows) randomly along the crest.



Photo 3: Standing on the left end of the dam looking southeast; a view of the 3H:1V vegetated portion of the upstream slope. Note the approximate location of the bulge is depicted by the arrow.



Photo 4: Standing near the midpoint of the dam looking southeast; a view of the 2H:1V vegetated portion of the upstream slope. Note the bulge near the midpoint of the dam (dashed-line).



Photo 5: Standing on the right end of the upstream slope looking northwest; a view of the slope that lacked a vegetated cover and exhibited some minor surface erosion (circled).



Photo 6: A view of a minor erosion rill (dashed-line) noted along the upstream slope.

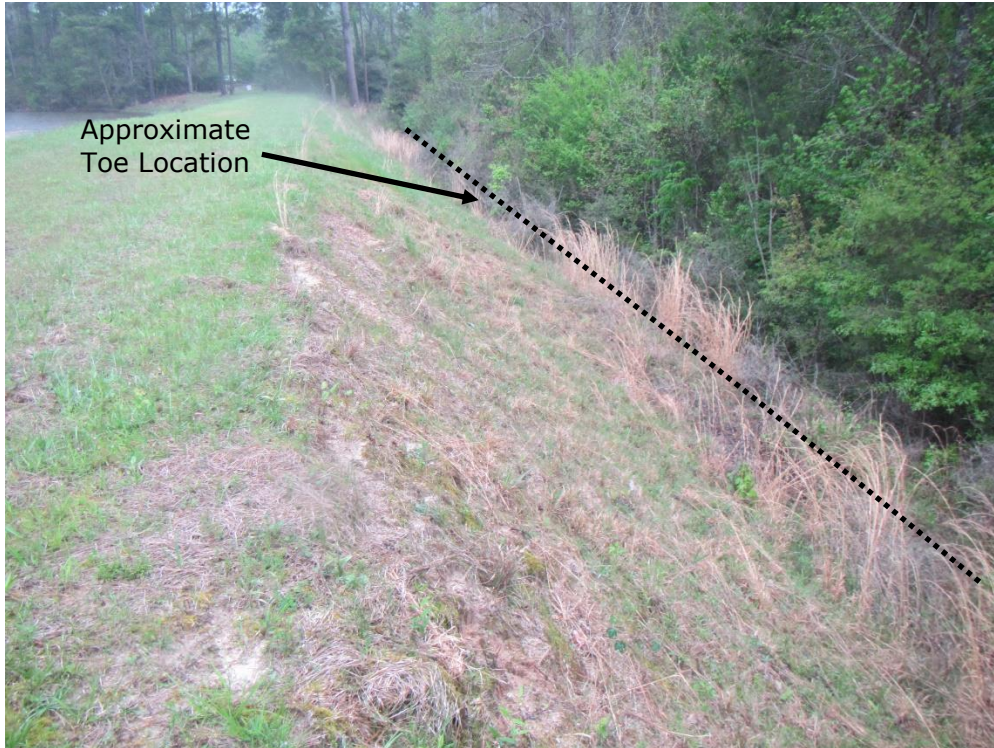


Photo 7: Standing near the midpoint of the dam looking northwest; a view of the vegetated downstream slope. Note the overgrowth of trees and brush along the toe.



Photo 8: Standing on the right end of the dam looking northwest; a view of the large trees growing along the downstream slope.



Photo 9: Standing to the left of the spillway inlet looking southeast; a view of the spillway and box culvert inlets.



Photo 10: Standing on the left side wall of the spillway control section; a view of the concrete discharge slab and riprap lined earthen channel.



Photo 11: Standing at the end of the right end wall looking southwest; a view of the seepage discharging from under the end wall (Arrow).



Photo 12: Standing just downstream of the spillway discharge basin looking southwest; a view of one of the 4-inch diameter pipes exiting the sidewalls of the spillway channel.



Photo 13: Standing just downstream of the left side wall of the spillway channel looking west; a view of the undermined end wall (arrow).



Photo 14: Standing just downstream of the spillway looking south; a view of the riprap lined channel. Note the areas where the riprap was displaced causing erosion and voids within the channel.



Photo 15: Standing on the downstream slope looking northeast; a view of the reservoir drain valve located along the downstream toe. Note the standing water within the discharge channel of the drain.