



Quarterly Dam Inspection Report

Murphey Candler Park Dam, City of Brookhaven

December 14, 2020

SUBMITTED BY:

Dewberry

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SUBMITTED TO:

**City of Brookhaven Parks &
Recreation**

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12/14/2020

Dewberry Engineers Inc.

COA#: PEF002398

Expires: 06/30/2022

Embankment (Earth) Dam Inspection Form

Name of Dam: Murphey Candler Park Dam Inspection: 12/14/2020 9:00 am

Location of Dam (County): DeKalb County, GA

Inspected by (Print Name): Daniella Llinas/David Taylor

Weather: Overcast

If an inspection item requires further action on your part, place a check mark to the left of the number of the item.

A. Crest (refer to Glossary for description)

1. How would you describe the vegetation on the crest? (Check all that apply)

Recently Mowed _____ Overgrown _____ Good Cover _____ Sparse _____

Other/Corrective Action (describe): The crest of the dam has a 20-ft wide asphalt paved road at the center with a concrete pedestrian walkway on either side. The narrow areas between the asphalt road and the pedestrian walkway is covered by sparse, recently mowed grass.

2. Are there any trees or other inappropriate or excessive vegetation on the crest? Yes _____ No

If yes, describe (type of vegetation, size, location, etc.)/Corrective Action: _____

3. Is there a paved road or driveway on the crest? Yes No _____

If yes, describe the condition (for example, good condition, numerous cracks, newly paved)/Corrective Action: The road is functional and in good condition (See Photos 1 and 2). Some minor cracks were observed on the paved road at a few locations as described in section 5 of this report (See Photos 3- 5).

4. Are there any depressions, ruts or holes on the crest? Yes No _____

If yes, describe (size, location, etc.)/Corrective Action: There is a minor depression at the downstream left side of the crest by the end of the road guard rail. This depression appears unchanged since the previous report in September. (See Photo 5). Cracks remain in the concrete sidewalk pavement and the asphalt road at this location. These do not appear to be in any area of critical concern but should continue to be monitored.

5. Are there any cracks on the crest? Yes No _____

If yes, describe (length and width, location, direction of cracking, etc.)/Corrective Action: The cracks in the paved road on the dam crest noted most recently in the September inspection remain. There is no indication they have grown wider. Existing cracks located on the left end of the bridge measuring approximately 17-ft and 13-ft in length (See Photo 3) are similar in appearance to last inspection. A crack in the centerline of the roadway running parallel to the direction of the dam was also observed near the left (east) end of the dam. This crack should be monitored to ensure it does not increase in size or otherwise worsen. (See Photo 4). Depressed area at the left, downstream edge of the dam crest has created a semi-circular crack in the pavement. (See Photo 5). All cracks appear to be unchanged since September inspection. These cracks should be monitored to ensure they do not increase in size or otherwise worsen.

6. Other observations on the crest/Corrective Action: _____

B. Upstream Slope (refer to Glossary for description)

1. What is the reservoir level today? At Normal Pool _____ Above Normal Pool 0.5 Feet Below Normal Pool _____ Feet

2. How would you describe the vegetation on the upstream slope? (Check all that apply)

Recently Mowed _____ Overgrown Good Cover _____ Sparse _____

Other/Corrective Action (describe): The upstream slope is primarily covered with unevenly distributed riprap and vegetative growth. The vegetation on the upstream slope was noticeably sparser than September inspection, although this appears to be due to die back from recent low temperatures as opposed to maintenance performed to remove vegetation. (See Photos 6 and 7).

3. Are there any trees or other inappropriate or excessive vegetation on the slope? Yes No

If yes, describe (type of vegetation, size, location, etc.)/Corrective Action: Woody vegetation remains that should be removed. This vegetation has in some cases dropped its leaves but will likely resume growing in warmer temperatures unless removed. (See Photos 8 and 9). Several young trees reported in the July inspection have not been removed and continue to grow. (See Photo 10). As more vegetation is allowed to take root and mature on the upstream face of the dam the potential for damage caused by roots is increasing. It is recommended that woody vegetation and saplings be cut down to the base or extracted from their roots to prevent growing back in the future.

4. Are there any depressions, bulges, ruts or holes (such as animal burrows) on the slope? Yes No

If yes, describe (size, location, etc.)/Corrective Action: Multiple depressions due to inadequate riprap coverage were observed along the upstream face of the dam. See comment in item 7 of this section for more detail.

5. Are there any eroded areas on the slope (such as wave erosion along the shoreline)? Yes No

If yes, describe (size of area, location, severity, etc.)/Corrective Action: Significant erosion of the soil beneath the riprap was observed near the left wing wall of the concrete spillway. The erosion depth is up to 2-ft vertically in some locations immediately adjacent to the end of the left wing wall (See Photos 11- 13). There is both undercutting and erosion perpendicular to the wall. It appears that some of the riprap in this area has shifted slightly since previous inspections, though it is difficult to determine with certainty due to density of vegetation present in September's inspection. Future rain and high flow events can cause increased erosion and undercutting. Corrective actions are required and include filling and compacting the soil and placing a filter material and additional well-graded riprap to avoid further erosion near the concrete spillway. Repairs are necessary to prevent further erosion. Dense vegetation in this area remains despite the lower temperatures and should be cut back. There is insufficient riprap coverage in the area immediately adjacent to the right wing wall also, as noted in the previous inspection report from July 2020. (See Photo 30).

6. Are there any cracks, sloughs or slides (vertical cliffs) on the slope? Yes _____ No

If yes, describe (length, width, height, location, etc.)/Corrective Action: _____

7. Is there any type of slope protection along the shoreline (such as riprap)? Yes No

If yes, describe what type and its condition (for example, riprap - adequate, inadequate, sparse)/Corrective Action: Coverage of riprap is inconsistent across the width and height of the dam face (See Photo 14). The upper section of the dam face lacks adequate riprap coverage to provide protection at higher water levels. Recommend replacing riprap as needed across dam face to create uniform coverage up to sidewalk elevation. Notable areas include: 1) The right (west) side of the dam near the concrete spillway where it is visibly sparse compared to the rest of the dam face (See Photo 15), 2) Several makeshift pathways leading from the pedestrian walkway to the water near the upstream left abutment and near the principle spillway riser. (See Photo 16). Corrective action includes placing riprap along the dam face to create adequate uniform coverage of slope up to sidewalk elevation.

8. Other observations on the upstream slope/Corrective Action:

C. Downstream Slope (refer to Glossary for description)

1. How would you describe the vegetation on the downstream slope? (Check all that apply)

Recently Mowed Overgrown _____ Good Cover Sparse _____

Other/Corrective Action (describe): The downstream slope of the dam is covered in well maintained recently mowed grass (See Photo 17 and 18). Several patches of missing grass on the right side of the downstream slope have exposed the underlying soil (See Photos 19 and 20). Recommend these areas be re-seeded and monitored to ensure that they don't grow larger or lead to increased erosion.

2. Are there any trees or other inappropriate or excessive vegetation on the slope? Yes _____ No

If yes, describe (type of vegetation, size, location, etc.)/Corrective Action: _____

3. Are there any depressions, bulges, ruts or holes (such as animal burrows) on the slope? Yes _____ No

↑ Check if corrective action is noted/required.

If yes, describe (size, location, etc.)/Corrective Action. The repairs to the damaged utility box adjacent to the electronic speed sign and surrounding soil appear to be holding up well with no signs of erosion. (See Photo 21).

4. Are there any eroded areas on the slope (such as along abutment contacts)? Yes No

If yes, describe (size of area, location, severity, etc.)/Corrective Action: Minor erosion/bare spots were observed in high-traffic areas such as near the sprinkler box, the batting cages, principal spillway outlet box and near the right downstream abutment (See Photo 23). Corrective actions in these areas includes filling in bare spots, compacting and grassing or adding a layer of gravel if grass continues not to grow.

5. Are there any cracks, sloughs or slides (vertical cliffs) on the slope? Yes No

If yes, describe (length, width, height, location, etc.)/Corrective Action: _____

6. Are there any wet areas or areas of hydrophilic (lush, water-loving) vegetation? Yes No

If yes, describe (size of area, location, etc.)/Corrective Action: _____

7. Do any wet areas indicate seepage through the dam (such as rust-colored, stained water)? Yes No N/A

If yes, describe (for example, new area of seepage, no change from past observations, size of area, location) /Corrective Action: _____

8. Are there any leaks (flowing water) from the slope or beyond the toe of the dam? Yes No

If yes, describe (location, rate of flow, turbidity of flow)/Corrective Action: _____

9. Other observations on the downstream slope/Corrective Action: An animal guard on the toe drain located roughly at center of downstream dam face should be straightened and secured from bottom to provide adequate barrier against small animals entering the drain pipe (See Photo 24). Previously noted minor damage to a utility box adjacent to a small concrete marker on the right side of the downstream face near the dam crest remains with no evidence of repair. (See Photo 22). A hole has formed in the fiberglass structure on the downstream side of the box. This hole should be repaired to ensure erosion does not occur around the utility box. Once repaired, the soil around the box should be backfilled and compacted to avoid any future erosion.

D. Plunge Pool (refer to Glossary for description)

1. Is there any type of erosion protection around the plunge pool (such as riprap)? Yes No

If yes, describe what type and its condition (for example, riprap - adequate, inadequate, obstructed by vegetation) Chute blocks and baffle blocks are used to dissipate the water energy. Additionally, riprap is used downstream of the stilling basin to protect the natural channel bottom from erosion. The current channel erosion protection measures appear adequate and functional.

2. Is there any erosion and or seeps around or going into the plunge pool? Yes No

If yes, describe (size of area, location, severity, etc.) /Corrective Action: There is potentially a cavity forming beneath the lower right (west) face of the spillway directly above the plunge pool (See Photo 43). During the December 2019 inspection striking the face of the spillway with a survey rod produced a hollow tone in this location, distinct from solid sounds produced by striking elsewhere on the spillway. There is no readily apparent cause of the cavity. Further investigation with ground penetrating radar or other suitable non-destructive method is recommended to confirm the existence and size of any cavity. Corrective action includes injecting flowable fill or other suitable material into the cavity and monitoring the area for any signs of worsening condition. Investigation is strongly recommended to determine if corrective action is needed. A cavity in this location poses a significant risk and has potential to cause costly spillway failure if left unaddressed. This area was not examined during this inspection.

3. Other observations around the plunge pool/Corrective Action: __

1). Erosion is observed at the right stream bank downstream of the plunge pool immediately next to the storm drain headwall (See Photo 26). This erosion does not appear to have worsened since the September inspection. Although it is not impacting the dam's safety, it is recommended to stabilize the stream bank and place additional riprap to protect the bank

and prevent further undercutting around the headwall. The inspection report from December 2018 notes that the City was in the process of procuring a consultant to address this, though no evidence of corrective action has since been observed.

E. Principal and Emergency Spillways (refer to Glossary for description)

1. What types of spillways does the dam have (such as corrugated metal, concrete or siphon pipe; concrete or earth channel)?
Principal Spillway 48-inch diameter CMP with concrete standpipe Emergency Spillway Concrete Channel
Other/Corrective Action: _____
2. Has the emergency spillway activated (had flow) since the last inspection? Yes ✓ No _____
If yes describe (date(s) of flow, reason for activation, depth of flow) /Corrective Action: The emergency spillway experiences continuous service flows (See Photo 27).
3. For pipe spillways, is the intake obstructed in any way (such as with excessive debris)? Yes _____ No ✓
If yes, describe (type of debris, reason for obstruction, etc.) /Corrective Action: On 6/21/2017, DeKalb County Fire & Rescue divers inspected the principal upstream riser structure (See Photo 28). The divers did not identify any issues in the outer part of the riser or sluice gate. They did note that the orifice was buried in soft silt. An inspection has not been performed since. Wasps have built a nest inside the riser tube. The wasp nest should be removed to avoid potential hazards during any maintenance or emergency operation of the spillway riser.
4. For pipe spillways, what is the condition of any trash racks (for example, adequate, inadequate, damaged)? /Corrective Action:
Pipe is submerged and could not be observed. Divers on 6/21/17 indicated that trash racks appeared to be in-place and consistent with the plans provided by GA SDP. An inspection has not been performed since.
5. For pipe spillways, are there any visible cracks, separations or holes in the pipe(s) (intake or outlet)? Yes ✓ No _____
If yes, describe (location, width of crack or separation, etc.)/Corrective Action: Crawler type CCTV of the principal spillway pipe captured on March 20, 2020 was provided to Dewberry. Review of this footage indicated deteriorated sections of the pipe, some joint separation and soil intrusion. As previously discussed with city officials, the principal spillway should be rehabilitated. It is not recommended to operate the spillway for non-emergency purposes until this has occurred. In the event of an emergency, operation of the spillway should be performed with extreme caution, including but not limited to closing of the road over the dam, continuous monitoring, and being prepared to fully implement the emergency action plan to mitigate the potential for loss of life in the event of a dam failure. The outlet to the pipe was visually inspected from the brick chamber on the downstream slope. It does not appear that any corrective action has been taken to address issues described above.
6. For pipe spillways, are there any apparent leaks in the pipe(s)? Yes _____ No ✓
If yes, describe (location, rate of flow from leak, etc.)/Corrective Action _____
7. For pipe spillways, how would you describe the overall condition of the pipe(s)? (Check all that apply)
Functioning Normally ___ Not Functional ___ Deteriorated ✓ Damaged ___ Adequate ___ Inadequate ___
8. For concrete or earth channel spillways, is the entrance or channel obstructed in any way? Yes ✓ No _____
If yes, describe (type of obstruction, location, etc.)/Corrective Action: A few scattered logs and some woody debris have collected at the upstream end of the spillway on the spillway platform and against the bridge piers (See Photo 29). This debris should continue to be removed as it collects. The mat of grassy vegetation growing from the right bank into the concrete spillway appears to have been cleared earlier in the year as noted in the September inspection, but small patches have begun growing back. Vegetation and silt are starting to collect again along the right side of the upstream spillway (See Photo 30). Grass should be periodically cut back and removed as it grows back to prevent increased accumulation of sediment and debris in the spillway. Grass previously observed in the concrete spillway appears to have died back from low temperatures. (See Photo 35).
9. For earth channel spillways, how would you describe the vegetation in the spillway? (Check all that apply)
Recently Mowed _____ Overgrown _____ Good Cover _____ Sparse _____
Other (describe)/Corrective Action: N/A

↑ Check if corrective action is noted/required.

10. For earth channel spillways, are there any trees or other inappropriate vegetation in the spillway? Yes___ No_____

If yes, describe (type of vegetation, size, location, etc.)/Corrective Action: N/A

11. For earth channel spillways, are there any eroded areas in the spillway? Yes_____ No _____

If yes, describe (size of area, location, severity, etc.)/Corrective Action: _____

12. For concrete channel spillways, are there any cracks or holes in the spillway? Yes No_____

If yes, describe (width of crack or hole, location, etc.)/Corrective Action: The cutoff wall at the upstream face of the concrete spillway appeared to be in good condition and functioning well. There are multiple areas of uplifting concrete at the joint of the spillway and the masonry wall on the left side of the flume downstream of West Nancy Creek Drive (See Photos 31- 33). Corrective action includes sealing the cracks to prevent widening or lengthening. Concrete is completely separated from one of these locations, leaving a hole 2 to 3 inches deep at the masonry wall joint (See Photo 33). Corrective action includes grouting and patching holes left behind by chipped or concrete spalls. 2) The caulk in the joints between the spillway bottom and the retaining walls along the left side of the spillway is missing or eroded over the majority of the spillway length (See Photo 32). Corrective action includes removing old caulk and reapplying caulk to the joints between the spillway base and the retaining walls of the spillway along its entire length. 3) Along the masonry retaining wall at the left side of the concrete spillway, there are cracks and areas missing grout between many of the stones. Vines and other vegetation previously observed growing on the masonry wall appears to have died back due to low temperatures but may return in warmer months (See Photos 36- 39). Corrective action includes removing any vegetation and re-grouting impacted areas. The prescribed repairs should be considered a provisional solution and the aging masonry wall should eventually be replaced with a concrete wall. 4) Caulk between concrete slabs making up the spillway bottom is peeling and working loose from the lateral seams in multiple locations. The lateral seam directly upstream of the West Nancy Creek Drive bridge was observed to be undermined and a cavity roughly 6 inches deep directly under the joint was observed. As noted in previous reports, caulk is also peeling from the lateral seam downstream of the bridge. (See Photos 40 and 41). Corrective action includes removing old caulk and replacing with new caulk. 4) Some of the trees and vegetation growing along the fence line on both sides of the spillway were previously cut back (See Photos 42). . . Previously noted regrowth has halted due to lower temperatures but is likely to continue in warmer months. Corrective action includes cutting/removing trees/vegetation including the remaining lower trunks of cut trees to prevent new growth. Any holes must be filled and compacted. It is recommended that any trees within 15 feet of the spillway walls be removed. Grass previously observed growing between lateral seams in the spillway slabs has died back in the colder weather but will likely return in warmer months (See Photo 35). All grassy vegetation should be cleared from the spillway channel and joints resealed. Previously completed repairs to spillway slab adjacent to concrete wall appear to be holding up well (See Photo 34). The right wing wall downstream of the plunge pool is showing beginnings of minor erosion at the top edges (See Photos 44-45). This area should be backfilled and compacted and monitored to ensure the erosion does not worsen.

13. For concrete channel spillways, are there any leaks or evidence of undermining (flow under the concrete)? Yes_____ No

If yes, describe (location, rate of flow from leak, indicators of undermining, etc.)/Corrective Action: _____

14. For earth or concrete channel spillways, how would you describe the overall condition of the spillway? (Check all that apply)

Functioning Normally Not Functional_____ Deteriorated___ Damaged ___ Adequate___ Inadequate___

15. Other observations on the spillways/Corrective Action: _____

F. Instrumentation (refer to Glossary for description)

1. Are there any toe drains at the downstream toe or any other seepage drains on the dam? Yes No_____

If yes, describe the condition (for example, clogged, free flowing, deteriorated, good condition) /Corrective Action: There is a toe drain near the center of the downstream slope (See Photo 24). There is no flow from the toe drain and it appears clear of large debris. Additionally, there are six spillway underdrains located on the spillway face above the plunge pool.

Minor flows were observed from some spillway underdrains but were not measured due to access (See Photo 43). A small toe drain at the right side of the plunge pool was observed to be emitting a rust colored liquid (See Photo 25). This may be evidence of rusted or otherwise compromised pipes, possibly related to the potential void behind the face of the plunge pool wall.

For drains, is an animal guard installed at the outlet of each drain? Yes _____ No ✓

If no, which drains lack animal guards? /Corrective Action: The damaged animal guard at the toe drain located near the center of the downstream slope observed in previous inspections has not been repaired (See Photo 24), it is recommended that the bars be straightened and secured at the bottom of the pipe to function effectively Animal guards are missing from three of the spillway underdrains on the right side of the spillway (See Photo 43). Corrective action includes replacing missing animal guards.

3. For drains, measure the rate of flow from each drain and record below (use additional pages if necessary):

Designation/Location of Drain	Flow Rate	Flow Rate in GPM*	Turbidity of Flow (describe – clear, muddy, etc.)
Toe drain downstream slope	None	None	None
Primary principal drain	N/A	N/A	N/A

4. Are there any piezometers on the dam? Yes _____ No ✓

If yes, describe the condition (for example, good condition, damaged, etc.)/Corrective Action: _____

5. For piezometers, does each piezometer have a cap with a lock? Yes _____ No _____

If no, which piezometers need caps (to prevent rain water intrusion) and/or locks (to prevent tampering)? /Corrective Action: _____

6. For piezometers, are you able to take a measurement (depth to water) in each piezometer? Yes _____ No _____

If yes, record depth to water (in feet) in each piezometer, record on a separate page, and attach to this form.

7. Are there any other monitoring devices on the dam? Yes _____ No ✓

If yes, describe what type and the condition (for example, monitoring wells - good condition, damaged) /Corrective Action: _____

8. Other observations on instrumentation/Corrective Action: _____

*GPM (gallons per minute): to convert from oz/sec multiply by 0.4688; to convert from ml/sec multiply by 0.01585

Photographs

At a minimum, photographs should be taken of the crest, upstream slope, downstream slope and any other notable features. List of photographs (be sure to date stamp the photos):



1. Standing on crest of dam looking towards left abutment

2. Standing on crest of dam looking toward right abutment



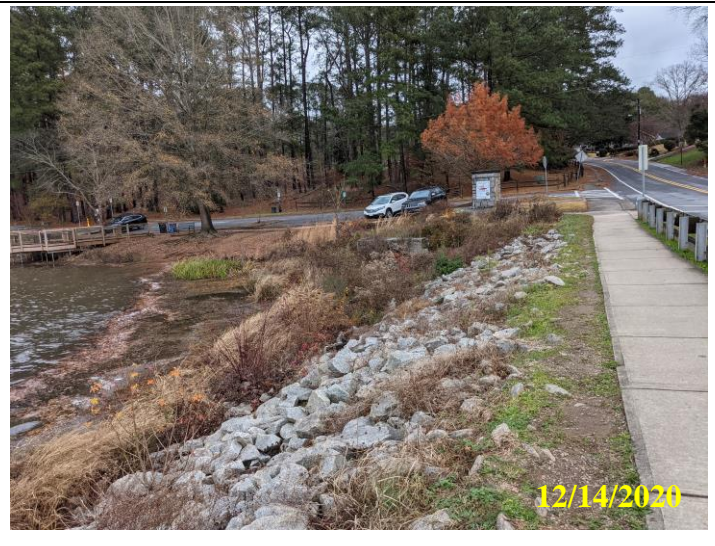
3. Cracks in paved road on dam crest at left bridge abutment.

4. Additional crack in paved road on dam crest.



5. Depressed area on dam crest with crack on road pavement

6. View of upstream side looking towards left abutment.



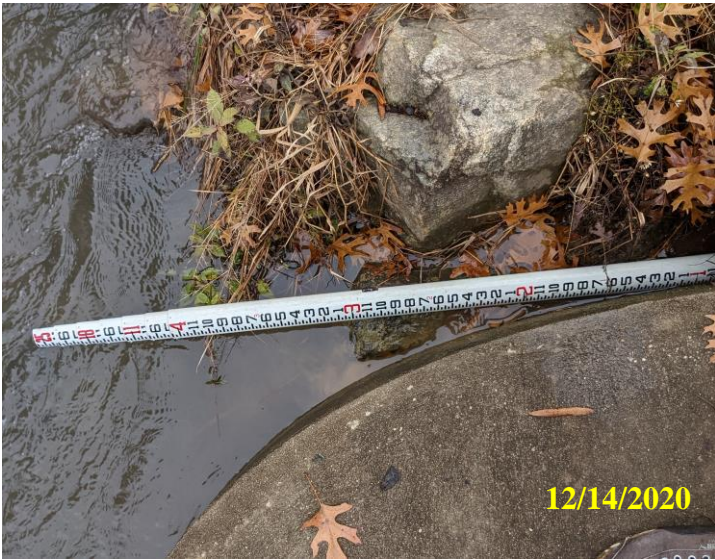
7. View of upstream side looking towards right abutment

8. View of vegetation on the upstream face of the dam



9. View of vegetation on upstream face of the dam

10. View of bare woody vegetation on upstream face of the dam



11. Inadequate riprap grading at the left wing wall of the concrete spillway resulting in erosion and undercutting of riprap. See Photo 12 for location of this photo

12. Inadequate riprap grading at the left wing wall of the concrete spillway resulting in erosion and undercutting of riprap, yellow circled area is location of Photo 11 and red circled area is location of 13



13. Inadequate riprap grading at the left wing wall of the concrete spillway resulting in erosion and undercutting of riprap



14. Sparse riprap near pedestrian walkway



15. Sparse riprap coverage and uneven riprap sizing at right side of upstream dam face



16. Pedestrian pathways showing sparse riprap near principal spillway riser



17. View of downstream slope looking toward right abutment



18. View of downstream slope looking toward left abutment



19. Patches of missing grass on downstream dam face



20. Patches of missing grass on downstream dam face



21. Repaired utility box on downstream face of dam



22. Damaged utility box on downstream face of dam



23. High traffic area at right side of downstream dam face showing erosion and missing grass



24. Toe drain at center of downstream dam face showing damaged animal guard.



25. Toe drain at right side of plunge pool discharging rust colored liquid



26. Erosion and undercutting observed near storm drain headwall downstream of plunge pool



27. View of concrete spillway upstream of bridge crossing



28. Principal spillway riser



29. Small amount of woody debris accumulation in the upstream section of concrete spillway



30. Vegetation and silt obstructing right side of upstream spillway. Sparse riprap along the right wing wall of the spillway



31. Concrete spillway cracking and uplift at masonry wall joint



32. Concrete spillway cracking and uplift at masonry wall joint with exposed seal



33. Concrete spillway cracking and spalling concrete at masonry wall joint



34. Previously completed repairs to spillway functioning well



35. Grass growing between slabs in concrete spillway



36. Missing grout and cracks in masonry wall at spillway entrance



37. Missing grout in masonry wall at bridge crossing



38. Missing grout in masonry wall at bridge crossing



39. Remains of vines and vegetations on masonry wall downstream of bridge crossing



40. Caulking peeling from between spillway slabs at bridge crossing



41. Caulk peeling from between spillway slabs downstream of bridge crossing



42. Trees at spillway fence



43. Spillway face above plunge pool showing locations of toe drains with missing animal guards, yellow circle shows general area of suspected void behind spillway face



44. Minor undercutting and erosion at the end of the concrete spillway wall. See Photo 45 for location



45. Location of Photo 44

