Healthy People. Healthy Communities

February 12, 2018

VIA CERTIFIED MAIL (INSERT CERTIFIED MAIL TRACKING NUMBER FOR GIVEN OWNER) and Email

Bruce Lake Development, LLC
C/O Leigh Colyer, III

Subject: Inspection of BRUCE LAKE DAM, D2857, Greenville County, Significant Hazard Class

Dear Mr. Colyer:

The South Carolina Department of Health and Environmental Control (the Department/DHEC), through our engineering contractor CDM Smith, inspected your dam on December 12, 2017 and the report of their findings is enclosed. Subsequently, an Emergency Inspection was conducted by Department staff on February 7, 2018 after receiving notification concerning overtopping of the dam adjacent to Poinsett Highway. **Based on the observation of the dam's condition from the February 7, 2018 inspection, you are required to continue to take the necessary steps to safely lower the reservoir level until the necessary inspections, permits and repairs are made and submitted to the Department for final approval before raising the water level.**

The inspections identified significant deficiencies with the dam and requires the involvement of a Professional Engineer licensed to practice engineering in South Carolina. A list of engineers familiar with the design and permitting of dams in South Carolina is enclosed as a courtesy. **The Department requires the submission of a Plan of Action, on or before February 16, 2018,** that will include the necessary steps to continue to lower the water level, as well as, maintaining the reservoir at a safe level until final approvals are issued by the Department to begin impounding water. In addition, the department is requiring that a detailed inspection of the dam be performed by a S.C. Licensed Professional Engineer. This inspection should include their findings on the deficiencies noted in the Inspection Summary below. No action can be taken to repair the dam until you have received a Department-issued permit. **The Department requires the submission of a Detailed Inspection no later than March 15, 2018 to repair and/or remove the dam.**

Below are specific findings from the CDM Inspection and the Department's Emergency Inspection. Please contact Dam Safety Program Staff to discuss these findings.

Inspection Summary

Overall Rating: Unsatisfactory

- Engage an engineer to evaluate condition of embankment, auxiliary concrete chute, and inlet/outlet structures. The current primary spillway and outlet works are filled with debris and are inoperable.
- Repair animal burrows on downstream slope, erosion up to 2.5 feet deep on the downstream slope and upstream slope, outlet pipe, plunge pool erosion, and concrete chute sidewalls.
- Develop and implement tree management plan to remove trees larger than 4" diameter.
- Address and monitor beaver activity.
- Cut and remove brush, woody vegetation, and trees less than 4" diameter.
- Remove debris from inlet structure, outlet pipe, and auxiliary concrete chute.
- Establish grass cover or erosion protection on embankment

Your dam is currently a Significant-hazard (i.e., a Class 2) dam and its overall condition was assessed as **"Unsatisfactory"**. This rating, as established by the U.S. Army Corps of Engineers for the National Inventory of Dams, means "A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution."

In closing, failure to maintain the dam in a safe condition is a violation of the SC Dams and Reservoirs Safety Act, S.C. Code Ann. 49-11-110, et seq., (2008). Failure to comply may result in the Department taking an enforcement action, which may include the assessment of civil penalties pursuant to the S.C. Dams and Reservoir Safety Act, S.C. Code Ann. 49-11-110, et seq. (2008) and Regulation 71-1, et seq. (2012).

Should you have questions regarding the content of this letter, or wish to discuss any of the findings, requirements, schedules, and/or deadlines contained herein, please feel free to contact me at (864) 372-3092, (864) 561-1395, or by email at Owensc2@dhec.sc.gov.

Please submit all documents/correspondence to:

Davis Farmer
Bureau of Water – Dam Safety Program
2600 Bull Street
Columbia, SC 29201

Or

via e-mail to: farmerdm@dhec.sc.gov

Sincerely,

Chuck Owens
Dam Safety Regional Associate Engineer

Enclosure: BRUCE LAKE DAM (D2857) Preliminary Inspection
BRUCE LAKE DAM (D2857) Emergency Inspection

List of Engineers

cc: John McCain, PE, BOW (via email McCainJM@dhec.sc.gov)
Paul Wise, BOW Enforcement (via email Wisepf@dhec.sc.gov)

File: D2857

BRUCE LAKE DAM : D2857

Dam Emergency Inspection Form

Inspector: Charles Owens
Start Date: 02/11/2018

Emergency Inspection Form	
Initial Visit or Subsequent Visit?	Initial Visit
1. Dam Number	D2857
2. Inspector(s)	Charles Owens
3. Date	02/07/2018
4a. Damage Caused By Emergency Event (Emergency Event Only)	
4b. Not Emergency-Event Condition: (OPTIONAL - Deficiencies not caused by the emergency event.)	
5. Breach	Not Breached
6. Water Level	Above Normal Pool, Overtopping
7. Outlet Flow Volume	None

Primary 4x4 riser structure located approximately 30 feet from the water's edge is completely submerged and filled with debris. No flows were observed at the outlet channel. The six foot concrete auxiliary spillway at the abutment was also clogged causing the earthen auxiliary spillway to engage on the section of the dam nearest Poinsett Highway. Primary outlet pipe is also clogged at the plunge pool.

Emergency Inspection Form



Photo Taken: 2/7/2018 1:08:02 PM
GPS Latitude: 34.8949388888889
GPS Longitude: -82.4285055555556
GPS Altitude: 291.109243697479 meters
GPS Azimuth: 126.463035019455 degrees



Photo Taken: 2/7/2018 1:19:17 PM
GPS Latitude: 34.89495
GPS Longitude: -82.4285444444445
GPS Altitude: 291.109243697479 meters
GPS Azimuth: 21.9348148148148 degrees



Photo Taken: 2/9/2018 3:01:15 PM
GPS Latitude: 34.9068555555556
GPS Longitude: -82.4211888888889
GPS Altitude: 302.866788321168 meters
GPS Azimuth: 10.8545095457538 degrees
GPS Orientation: 270 degrees

Emergency Inspection Form

8. Debris	Major - No Removal, Debris Obstructing Outlet Flow

Violation Determined: 2/11/2018
DAMMAINTREP

9. Repairs	None
10. Rainfall Quantity (24-48 hrs)	Greather than 2"
11. Seepage	Initial Inspection - Site Observed

Violation Determined: 2/11/2018
DAMMAINTREP
Seepage was observed under the existing outlet pipe in the outfall channel.

12. Erosion	Initial Inspection - Sites Observed

Violation Determined: 2/11/2018
DAMMAINTREP
Severe erosion was observed at the transition of the concrete flume and earthen portion of the channel. Also, the plunge pool at the primary outlet is severely eroded. End section of the 24 inch concrete pipe had previously fallen off and separation of the next joint of pipe was observed at the embankment..



Photo Taken: 2/10/2018 11:47:47 AM
GPS Latitude: 34.9068111111111
GPS Longitude: -82.420775
GPS Altitude: 300.315151515152 meters
GPS Azimuth: 65.0031746031746 degrees

Emergency Inspection Form

13. Given the condition of the dam, should a PE be required?	Yes - PE Assessment Should Be Required, Yes - Detailed Inspection Should Be Required

Violation Determined: 2/11/2018
DAMMAINTREP

14. Overall Comments

On 2/7/17 at approximately 11:45 am, the Greenville regional office was notified that Bruce Lake was overtopping. Department staff arrived around 12:10 pm and observed water flowing across emergency spillway at the abutment closest to Poinsett Highway. The owner of record was notified about the event and it was determined that the Primary riser structure was clogged and not visible. In addition to the primary riser, the 6 foot concrete emergency spillway at the left abutment was also clogged, which was caused the earthen auxiliary spillway to engage.

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Inspection Information

1. Date of Inspection	12/12/2017
2. Inspectors Present	A. Harding, A. Keough

3. Other Persons Attending Inspection

Name	Phone	Owner/Engineer/Other
Owner was not present during the inspection.		

4. Is this a follow-up inspection?	☐ Yes ☑ No ☐ NA

Observation/Instrumentation

1. Estimate the current level of the water in the reservoir:	Normal Pool

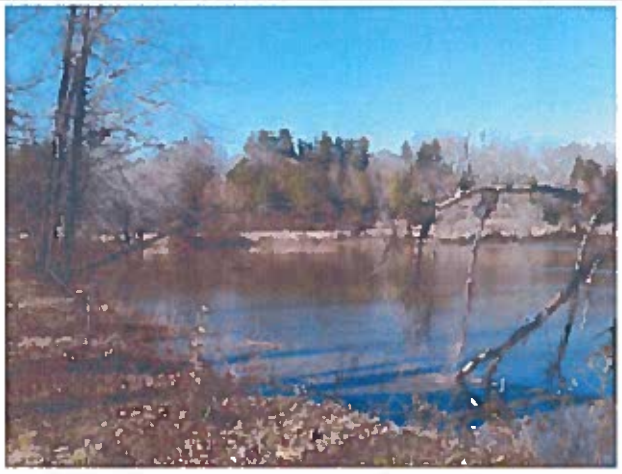

Photo Taken: 12/12/2017 1:16:53 PM

2. Describe the current weather & conditions:	58 Degrees F and sunny.
3. Recent rainfall quantity:	None
4a. Are Piezometers or Observation Wells present?	☐ Yes ☑ No
4b. (If Present:) Condition of Piezometers/Observation Wells	
5a. Is a Staff Gauge or Recorder present?	☐ Yes ☑ No
5b. (If Present:) Condition of Staff Gauge or Recorder	
6a. Are Measurement Weirs Present?	☐ Yes ☑ No
6b. (If Present:) Condition of Weirs:	
7a. Number of Spillways Present	3

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Observation/Instrumentation

7b. Type of Spillways Present	Drop-Inlet, Concrete Chute, Earthen Overflow/Runaround
8. Other:	
9. Additional Comments (Refer to item number if applicable)	

Embankment: Crest

Is this section applicable for this dam? ☑ Yes ☐ No

Crest Length: 275'
Crest Width: 15'-17'
Dam Height: 17'
Freeboard: 2'
Hazard Classification: Class II (Significant Hazard)



Photo Taken: 12/12/2017 1:16:58 PM



Photo Taken: 12/12/2017 1:18:25 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Crest

1. Grass Cover Monitor

Less than 70% grass cover, greater than 6", with heavy leaf litter.



Photo Taken: 12/12/2017 1:16:58 PM



Photo Taken: 12/12/2017 1:19:14 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Crest

2. Deleterious Vegetation Monitor



Photo Taken: 12/12/2017 1:18:25 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Crest

3. Trees Monitor

Several trees observed on the upstream side of the crest near the center; roots observed on the crest.



Photo Taken: 12/12/2017 1:34:02 PM



Photo Taken: 12/12/2017 1:46:01 PM

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer

Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Crest

4. Animal Activity	Investigate

Animal burrow observed on the upstream side of the crest near the center.



Photo Taken: 12/12/2017 2:04:02 PM
GPS Orientation: 270 degrees

5. Surface Cracking	No Deficiency
6. Horizontal Alignment	No Deficiency
7. Settlement	No Deficiency
8. Sinkhole	No Deficiency
9. Erosion	No Deficiency
10a. Are Alterations/Repairs Present?	☐ Yes ☑ No
10b. (If Present:) Alterations/Repairs Condition	
11. Other:	
12. Embankment: Crest Condition	Regular Monitoring Necessary, Needs Maintenance

Violation Determined: 12/12/2017
DAMMAINTREP

13. Additional Comments (Refer to item number if applicable)

Concrete/Masonry Dams: Crest

Is this section applicable for this dam?	☐ Yes ☑ No
1. Surface Conditions	
2. Horizontal Alignment	

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Concrete/Masonry Dams: Crest	
3. Vertical Alignment	
4. Condition of Joints	
5. Unusual Movement	
6a. Are Alterations/Repairs Present?	☐ Yes ☐ No
6b. (If Present:) Alterations/Repairs Condition	
7. Other:	
8. Concrete/Masonry Dam Crest Condition	
9. Additional Comments (Refer to item number if applicable)	

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope

Is this section applicable for this dam? ☑ Yes ☐ No

Upstream slope: near vertical.



Photo Taken: 12/12/2017 1:18:37 PM



Photo Taken: 12/12/2017 1:50:31 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope

1. Grass Cover Monitor

Little to no grass with heavy leaf litter.



Photo Taken: 12/12/2017 1:50:31 PM



Photo Taken: 12/12/2017 1:52:56 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope

2. Deleterious Vegetation Monitor

Moderate brush and woody vegetation coverage throughout the upstream slope.



Photo Taken: 12/12/2017 1:18:37 PM

Embankment: Upstream Slope

3. Trees Monitor, Investigate

Less than 50% tree coverage across the upstream slope, up to 12" in diameter; several fallen.



Photo Taken: 12/12/2017 1:18:37 PM



Photo Taken: 12/12/2017 1:21:26 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope

4. Animal Activity — Monitor

Beaver trails observed near the inlet/outlet alignment.



Photo Taken: 12/12/2017 2:14:47 PM

5. Surface Cracking — No Deficiency

6. Subsidence, Sinkhole — No Deficiency

7. Slide, Slough, Scarp — Monitor

Erosion scarp observed along the upstream slope; see item 9 (Erosion).

Embankment: Upstream Slope

8. Groins Monitor

Trees, brush, and woody vegetation observed in the groins.



Photo Taken: 12/12/2017 1:56:19 PM



Photo Taken: 12/12/2017 1:58:52 PM

9. Erosion Investigate

Nearly vertical wave action erosion scarp observed along the length of the upstream slope up to 24" deep. Some undercutting observed beneath trees growing along the upstream slope.

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope



Photo Taken: 12/12/2017 1:20:14 PM



Photo Taken: 12/12/2017 1:50:31 PM



Photo Taken: 12/12/2017 1:52:56 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Upstream Slope



Photo Taken: 12/12/2017 2:04:35 PM

10a. Slope Protection/Armoring Present?	☐ Yes ☑ No
10b. (If Present:) Slope Protection/Armoring	
11a. Alterations/Repairs Present?	☐ Yes ☑ No
11b. (If Present:) Alterations/Repairs Condition	
12. Other:	
13. Embankment: Upstream Slope Condition	Regular Monitoring Necessary, Needs Maintenance, Needs Permitted Repair(s)

Violation Determined: 12/12/2017
DAMMAINTREP

14. Additional Comments (Refer to item number if applicable)

Concrete/Masonry Dams: Upstream Face

Is this section applicable for this dam?	☐ Yes ☑ No
1. Surface Conditions	
2. Condition of Joints	
3. Unusual Movement	
4. Abutments	
5a. Alterations/Repairs Present?	☐ Yes ☐ No
5b. (If Present:) Alterations/Repairs Condition	

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Concrete/Masonry Dams: Upstream Face

6. Other:

7. Concrete/Masonry Dams: Upstream Face Condition

8. Additional Comments (Refer to item number if applicable)

Embankment: Downstream Slope

Is this section applicable for this dam? ☑ Yes ☐ No

Downstream slope: 1.5H:1V to vertical



Photo Taken: 12/12/2017 1:19:55 PM



Photo Taken: 12/12/2017 1:20:36 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Downstream Slope

1. Grass Cover Action Required

Little to no grass cover; heavy leaf litter.



Photo Taken: 12/12/2017 2:29:55 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Downstream Slope

2. Deleterious Vegetation — Investigate

Dense brush and woody vegetation throughout the downstream slope, preventing full inspection.



Photo Taken: 12/12/2017 1:19:55 PM



Photo Taken: 12/12/2017 2:33:44 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Downstream Slope

3. Trees Investigate

Greater than 50% tree coverage, up to 20" in diameter.



Photo Taken: 12/12/2017 1:19:34 PM



Photo Taken: 12/12/2017 2:30:03 PM

4. Animal Activity Investigate

Animal burrows and pathways observed above the outlet works, otherwise, dense brush and woody vegetation prevented full inspection.

Embankment: Downstream Slope



Photo Taken: 12/12/2017 2:15:03 PM



Photo Taken: 12/12/2017 2:18:18 PM



Photo Taken: 12/12/2017 2:23:19 PM
GPS Orientation: 270 degrees

Embankment: Downstream Slope



Photo Taken: 12/12/2017 2:27:30 PM

5. Surface Cracking

Dense brush and woody vegetation prevented full inspection, none observed in visible areas.

6. Subsidence, Sinkhole

Dense brush and woody vegetation prevented full inspection; none observed, in accessible areas.

7. Slide, Slough, Scarp

Dense brush and woody vegetation prevented full inspection; some erosion scarps observed above the outlet works (see item 9, Erosion).

8. Groins Investigate

Trees and dense vegetation in downstream groins.



Photo Taken: 12/12/2017 2:34:58 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Downstream Slope

9. Erosion Investigate

Erosion scarp observed, extending down to the outlet works, up to 2.5' deep. Otherwise, dense brush and woody vegetation prevented full inspection.



Photo Taken: 12/12/2017 2:25:23 PM

10a. Slope Protection/Armoring Present? ☐ Yes ☑ No

10b. (If Present:) Slope Protection Condition

11. Wet Areas

Dense brush and woody vegetation prevented full inspection; none observed in visible areas.

12a. Seepage ☐ Yes ☐ No

Dense brush and woody vegetation prevented full inspection; none observed in visible areas.

12b. (If Present): Seepage Flow

13a. Drainage System Present? ☐ Yes ☑ No

13b. (If Present:) Drainage System Condition

14a. Alterations/Repairs Present? ☐ Yes ☑ No

14b. (If Present:) Alterations/Repairs Condition

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Embankment: Downstream Slope

15. Other: Monitor

Asphaltic concrete slab observed on the right with cracks and vegetation growth.



Photo Taken: 12/12/2017 2:06:19 PM

16. Embankment: Downstream Slope Condition Regular Monitoring Necessary, Needs Maintenance, Needs Permitted Repair(s), Condition Prevented Full Inspection

Violation Determined: 12/12/2017
DAMMAINTREP

17. Additional Comments (Refer to item number if applicable)

Concrete/Masonry Dams: Downstream Face

Is this section applicable for this dam? ☐ Yes ☑ No

1. Surface Conditions

2. Condition of Joints

3. Unusual Movement

4. Drains

5. Leakage

6. Abutments

7a. Alterations/Repairs Present? ☐ Yes ☐ No

7b. (If Present:) Alterations/Repairs Condition

8. Other:

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Concrete/Masonry Dams: Downstream Face

9. Concrete/Masonry Dam: Downstream Face Condition

10. Additional Comments (Refer to item number if applicable)

Downstream Area

Is this section applicable for this dam? ☑ Yes ☐ No

Is Downstream Area clear? ☐ Yes ☑ No

1. Trees Investigate

Greater than 50% tree coverage throughout the downstream area.



Photo Taken: 12/12/2017 1:19:55 PM



Photo Taken: 12/12/2017 2:30:03 PM

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Downstream Area

2. Deleterious Vegetation — Investigate

Dense brush and woody vegetation observed throughout the downstream area, preventing full inspection.



Photo Taken: 12/12/2017 1:20:36 PM

3. Wet Areas

Dense brush and woody vegetation prevented full inspection.

4a. Seepage — ☐ Yes ☐ No ☐ NA

Dense brush and woody vegetation prevented full inspection.

4b. (If Present): Seepage Flow

5a. Boils — ☐ Yes ☐ No ☐ NA

Dense brush and woody vegetation prevented full inspection.

5b. (If Present): Boil Flow

6a. Alterations/Repairs Present — ☐ Yes ☑ No ☐ NA

6b. (If Present:) Alterations/Repairs Condition

7. Other:

8. Downstream Area Condition — Regular Monitoring Necessary, Needs Maintenance, Needs Permitted Repair(s), Condition Prevented Full Inspection

Violation Determined: 12/12/2017
DAMMAINTREP

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Downstream Area

9. Additional Comments (Refer to item number if applicable)

Spillways: Erodible Channel

Is this section applicable for this dam? ☑ Yes ☐ No

Secondary auxiliary earthen runaround on the right (Width: 25').



Photo Taken: 12/12/2017 2:05:20 PM



Photo Taken: 12/12/2017 2:05:55 PM

1. Location

34.907215, -82.421792 (per Google Earth).

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Erodible Channel

2. Grass Cover Monitor

Greater than 70% grass cover, more than 6" tall, throughout the secondary spillway.



Photo Taken: 12/12/2017 2:05:55 PM

3. Deleterious Vegetation Monitor

Brush and woody vegetation observed at the secondary auxiliary spillway approach.

Spillways: Erodible Channel

4. Trees Monitor

Tree observed on the downstream side of the auxiliary secondary spillway.



Photo Taken: 12/12/2017 2:06:40 PM



Photo Taken: 12/12/2017 2:09:01 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Erodible Channel

5. Animal Activity	Monitor

Animal burrow and some small anthills observed.



Photo Taken: 12/12/2017 2:04:02 PM
GPS Orientation: 270 degrees



Photo Taken: 12/12/2017 2:04:35 PM

6. Subsidence, Sinkhole	No Deficiency
7. Slide, Slough, Scarp	No Deficiency
8. Erosion	No Deficiency
9. Debris	No Deficiency
10. Flowing?	☐ Yes ☑ No ☐ NA
11a. Alterations/Repairs Present	☐ Yes ☑ No ☐ NA
11b. (If Present:) Alterations/Repairs Condition	
12. Other:	

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Erodible Channel

13. Spillway: Erodible Channel Condition

Regular Monitoring Necessary, Needs Maintenance

Violation Determined: 12/12/2017
DAMMAINTREP

14. Additional Comments (Refer to item number if applicable)

Spillways: Non-Erodible Channel

Is this section applicable for this dam? ☑ Yes ☐ No

Auxiliary concrete chute on the left (Width: 7.5').

1. Location

34.906909, -82.420776 (per Google Earth).

Spillways: Non-Erodible Channel

2. Approach Area — Monitor

Debris observed across and throughout the approach.



Photo Taken: 12/12/2017 1:27:25 PM



Photo Taken: 12/12/2017 1:28:52 PM

3. Weir/Control

Not applicable.

4. Sidewalls — Investigate

CMU block sidewalls (three course); trees growing above blocks with roots and vines extending into sidewalls.

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Non-Erodible Channel

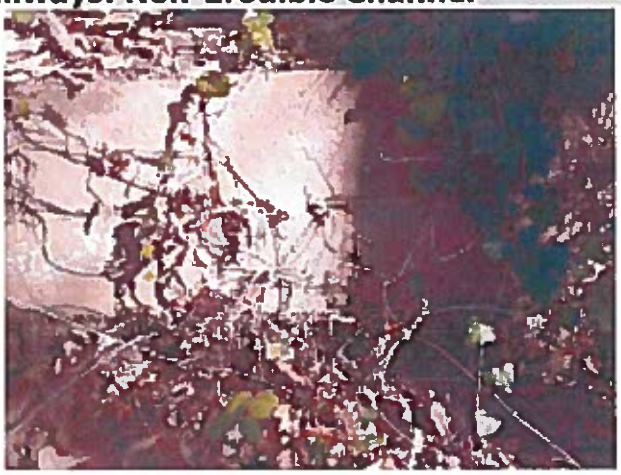

Photo Taken: 12/12/2017 1:27:42 PM



Photo Taken: 12/12/2017 1:29:33 PM



Photo Taken: 12/12/2017 1:36:25 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Non-Erodible Channel



Photo Taken: 12/12/2017 2:27:49 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Non-Erodible Channel

5. Channel Floor Investigate

Channel floor covered with debris, preventing full inspection.



Photo Taken: 12/12/2017 1:28:59 PM



Photo Taken: 12/12/2017 1:29:14 PM

6. Condition of Joints

Debris observed throughout spillway prevented full inspection; see photos above.

7. Surface Condition

Debris observed throughout spillway prevented full inspection; see photos above.

8. Unusual Movement

Debris observed throughout spillway prevented full inspection; see photos above.

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Non-Erodible Channel

9. Discharge Channel — Investigate

Deep erosion observed in the discharge channel, greater than 36" deep.

Photo Taken: 12/12/2017 1:30:07 PM



10. Debris — Monitor

Debris observed throughout the spillway; see photos above.

11. Flowing? — ☐ Yes ☑ No ☐ NA

12a. Boils — ☐ Yes ☑ No ☐ NA

12b. (If Present): Boils

13a. Alterations/Repairs Present — ☐ Yes ☑ No ☐ NA

13b. (If Present:) Alterations/Repairs Condition

14. Other:

15. Spillway: Non-Erodible Channel Condition — Regular Monitoring Necessary, Needs Maintenance, Needs Permitted Repair(s), Condition Prevented Full Inspection

Violation Determined: 12/12/2017
DAMMAINTREP

16. Additional Comments (Refer to item number if applicable)

Spillways: Inlet Structure

Is this section applicable for this dam? — ☑ Yes ☐ No

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Inlet Structure

1. Location

34.907070, -82.421177 (per Google Earth).

2a. Intake Structure

Drop-inlet appears to be spalling at the corners and in poor condition.



Photo Taken: 12/12/2017 1:20:54 PM

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Inlet Structure

2b. Intake Structure Types	Drop Inlet, Stop-Log Overflow

4' x 4' concrete drop-inlet with stop-logs.



Photo Taken: 12/12/2017 1:18:37 PM

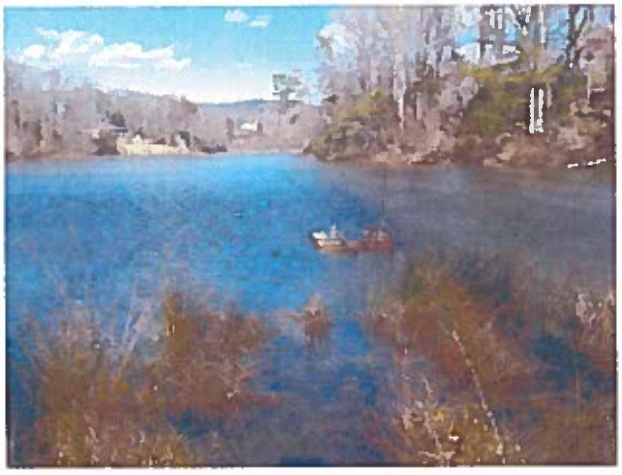

Photo Taken: 12/12/2017 1:21:14 PM

3. Trashrack	Not Present
4a. Low-Level Valve Present?	☐ Yes ☐ No ☑ NA
4b. (If Present:) Low-Level Valve Condition	
5. Debris	Monitor

Debris observed surrounding and on the drop-inlet; see photos above.

6a. Repairs/Alterations Present	☐ Yes ☑ No ☐ NA
6b. (If Present:) Alterations/Repairs Condition	
7. Other:	

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Outlet Works

2a. Outlet Structure Investigate

Approximately 5' segment of pipe in the water; end segment of pipe separated approximately 3" to 4".



Photo Taken: 12/12/2017 2:17:09 PM



Photo Taken: 12/12/2017 2:29:24 PM

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Outlet Works

2b. Outlet Structure Type Pipe

24" RCP.



Photo Taken: 12/12/2017 2:25:15 PM

3. Outlet Pipe Investigate

Pipe separated at end approximately 3" to 4"; debris and woody vegetation observed growing on top of and surrounding pipe.



Photo Taken: 12/12/2017 2:22:30 PM

4. Primary Closure/Control

Not applicable.

5. Secondary Closure/Control (If Applicable)

Not applicable.

6. Unusual Movement Investigate

See item2a (Outlet Structure) and item 3 (Outlet Pipe).

BRUCE LAKE DAM : D2857
Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Spillways: Outlet Works

7a. Seepage ☐ Yes ☐ No ☐ NA

Dense brush, woody vegetation, and steep plunge pool slopes surrounding pipe prevented full inspection.

7b. (If Present): Seepage

8. Stilling Basin Investigate

Plunge pool; erosion sidewall scarping around plunge pool up to 2.5' to 3' deep.

Photo Taken: 12/12/2017 2:26:58 PM



9. Normal Flow Quantity Monitor

Flow estimated at 50-75 gpm.

10. Low-Level Flow Quantity

Unknown; stop-logs in place.

11a. Alterations/Repairs Present ☐ Yes ☑ No ☐ NA

11b. (If Present:) Alterations/Repairs

12. Other:

13. Outlet Works Condition Regular Monitoring Necessary, Needs Maintenance, Needs Permitted Repair(s), Condition Prevented Full Inspection

Violation Determined: 12/12/2017
DAMMAINTREP

14. Additional Comments (Refer to item number if applicable)

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Emergency Action Plan

Is this section applicable for this dam?	☑ Yes ☐ No
1. Date of last update of emergency plan:	03/26/2015
2a. EAP provided by owner?	☑ Yes ☐ No ☐ NA
2b. (If EAP was not provided, was a copy of the EAP form left with the owner?)	☐ Yes ☐ No ☑ NA
3. Does EAP contain emergency alert plan?	☑ Yes ☐ No ☐ NA
4. Does EAP contain specific actions to take if the dam has failed or is failing?	☑ Yes ☐ No ☐ NA
5. Additional Comments (Refer to item number if applicable)	

Downstream Hazard Check

1. Satellite Imagery ☑ Yes ☐ No ☐ NA

Photo Taken: 12/14/2017 2:39:02 PM



2. Inundation Map ☑ Yes ☐ No ☐ NA

SCDHEC inundation map.

3. Structures/Developments ☑ Yes ☐ No ☐ NA

Multiple residential homes and commercial structures within possible inundation area.

4. Roads/Railways ☑ Yes ☐ No ☐ NA

Multiple downstream roadways are within the possible inundation area.

5. Utilities ☐ Yes ☑ No ☐ NA

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Downstream Hazard Check

6. Consider For Reclass? ☑ Yes ☐ No ☐ NA

Consider reclassifying due to possible overtopping of main and secondary roadways and multiple residential and commercial structures within the possible inundation area.

7. Additional Comments (Refer to item number if applicable)

Inspection Summary

*1. Overall Condition (*Per National Inventory of Dams Definition)* UNSATISFACTORY

----------NID Definitions----------
(SATISFACTORY) No existing or potential dam safety deficiencies are recognized.
Acceptable performance is expected under all loading conditions in accordance with
state engineer's rules and regulations for dams or tolerable risk guidelines.

(FAIR) No existing dam safety deficiencies are recognized for normal loading
conditions. Rare or extreme hydrologic and/or seismic events may result in a dam
safety deficiency. Risk may be in the range to take further action.

(POOR) A dam safety deficiency is recognized for loading conditions, which may
realistically occur. Remedial action is necessary. A POOR condition is used when
uncertainties exist as to critical analysis parameters, which identify a potential dam
safety deficiency. Further investigations and studies are necessary.

(UNSATISFACTORY) A dam safety deficiency is recognized that requires immediate
or emergency remedial action for problem resolution.

(NOT RATED) This should only be used if it is not possible to assess to dam's
condition due to site constraints on visibility on the day of inspection. If vegetation is a
problem the owner should be ordered perform maintenance to remove it before the
next visit.

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Inspection Summary

3. Final Comments

Engage an engineer to evaluate condition of embankment, auxiliary concrete chute, and inlet/outlet structures.
Repair animal burrows on downstream slope, erosion up to 2.5' deep on downstream slope and upstream slope, outlet pipe, plunge pool erosion, and concrete chute sidewalls.
Monitor and address beaver activity.
Develop and implement tree management plan to remove trees larger than 4" diameter.
Cut and remove brush, woody vegetation, and trees less than 4" diameter.
Remove debris from inlet structure, outlet pipe, and auxiliary concrete chute.
Monitor growth of woody and deleterious vegetation.
Establish grass cover (or erosion protection) on embankment.
Maintain/manage vegetation by mowing regularly.

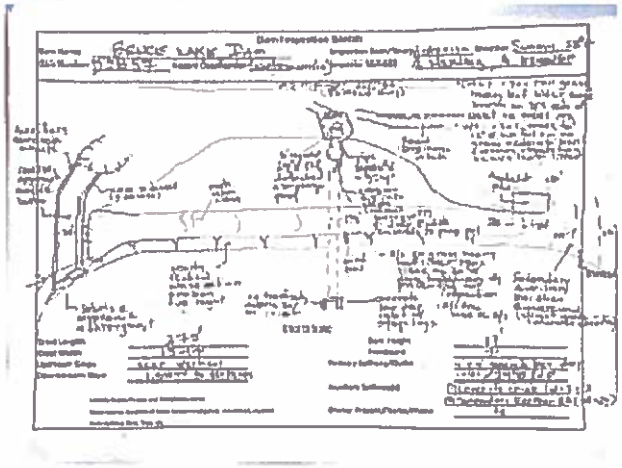

Photo Taken: 12/14/2017 2:35:34 PM

BRUCE LAKE DAM : D2857

Dams Preliminary Inspection Form

Inspector: John Boyer
Start Date: 12/12/2017 Completed Date: 01/04/2018

Inspection Summary

Preliminary Dam Inspection Disclaimer:

The information contained in the preliminary inspection report is intended as an aid to identify those dams that require maintenance and/or repair actions to reduce their danger to human life or property only. It is not intended as professional engineering or consulting advice for conditions or situations present at individual dams. It is not a substitute for a detailed inspection, nor does it replace the need for services provided by registered professional engineers. If your dam is experiencing an unusual situation consult with engineering professionals to find an appropriate remedy. Preliminary inspections conducted by South Carolina Department of Health and Environmental Control (the Department) are provided "AS IS" and "as available", without warranties of any kind, either express or implied. Preliminary inspections consist only of a visual but technical examination of the dam and its appurtenant works. All findings are based solely on visual observations of the inspector at the time of the inspection. Common law holds that the storage of water is a hazardous activity and the Department does not assume any responsibility or risk for your actions or inactions. Dam owners are responsible for the safe operations and maintenance of their impoundment structures.

BRUCE LAKE DAM (D2857)

Violation List

Form	Determined	Description	Sec. #
Dams Preliminary Inspection Form	12/12/2017	**Reference: DAMMAINTREP**	
Dams Preliminary Inspection Form	12/12/2017	**Reference: DAMMAINTREP**	
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