# Basic Details

### Publish Date

05 September 2025

### Case ID#

3243

### Title

Damage to brick-lined culvert during flood

### Nation

England

### Regulator Reference No.

502

### Legal Status

Statutory

### Reservoir Type

Impounding

### Reservoir Capacity

25,000 - 99,999m3

### Year of Construction

1850 - 1899

### Main Construction Type

Earth fill embankment

### Dam Height

5 - 9.99 metres

### Dam Flood Category

B

### Hazard Class

High-risk reservoir

### Reservoir Use

- Other

### Owner Type

Private individual(s)

# Incident Details

## Date & Time of Incident

10 June 2024 - 12:00

## Date Incident Closed

Not provided

## Observations that Caused the Incident to be Declared

- Deformation or instability of embankment or dam wall (slumps, cracks, depressions, etc.)

## Describe the Incident

During the passage of a flood event, damage was caused to a 450mm diameter brick-lined spillway culvert under an earthfill dam embankment. A sinkhole was discovered on the line of the culvert just downstream of the downstream toe of the embankment. The available drawoff facilities are connected into this common outlet culvert that had become blocked therefore, these outlets could not be used to lower the reservoir water level. A pump was deployed to reduce the reservoir water level and the flow passing through the culvert. Fortunately, the dam did not overtop as a result of the incident. Visual inspection from a chamber immediately downstream of the damaged section of culvert found that the brick lining of the culvert had completely collapsed. Excavation revealed the presence of tree roots within the culvert. On clearing the blockage, tree roots were observed to be present in many locations through the crown of the culvert. As a temporary repair, a section of pipe was installed to act as a sleeve past the area of damage until a permanent repair or replacement pipeline can be provided.

## Supporting Photos

# Causes and Impacts

## Natural Processes which Initiated or Contributed to the Incident

- None

## Main Contributing Factors to the Incident Occurring

### Dam Factors

- Deterioration of materials

### External Factors

- None

## Shortcomings

- Maintenance shortcoming

## Root Cause of the Incident

## Impacts on the Reservoir

- External erosion
- Failure or damage to tunnel or culvert
- Internal erosion (adjacent to structures)

## Supporting Photos

No images provided.

# Supporting Contributions and Studies

### Human Factors which Influenced the Incident

### Instrumentation at the Reservoir

### Was Instrumentation Effective?

Not Applicable

### Assistance by External Parties and Impacts on Downstream Population

None

### Summary of Studies or Investigations Undertaken

An initial site investigation was undertaken to determine what had happened in this instance it was fairly obvious what had happened but the reason why could only be assumed and not known.

### Supporting Photos

No images provided.

# Lessons Learnt

## Lesson 1

- Operation and maintenance
- Records and studies
- Surveillance and Monitoring

The main lesson highlighted here would be that the age, construction and size of this culvert all played a part in its demise it would have been difficult to comprehensively assess the structure of the brickwork within the culvert along its entire length. Even if this could have been done successfully, any remedial work would have required excavation from the top down and thus cause a greater level of damage to the structure in order to repair it. This is the only remaining brick culvert within the Undertaker's dam / lake system and when a permanent repaid is complete it will likely have to be replaced in its entirety. , The culvert conveyed water from two draw-off pipes and the overflow. The dam may have failed if the culvert collapsed immediately under the dam embankment. Blockage of a spillway can also lead to failure by flood overtopping. In this case, the undertaker found the damage through a routine surveillance visit. Investigations found that tree roots had penetrated the culvert which would have weakened the crown of the culvert. The incident highlights: the value of routine surveillance visits the need to periodically inspect culverts by CCTV or other appropriate means to assess structural condition one of the risks with mature trees growing on dam embankments If you need to inspect culverts or assess their structural condition it may be necessary to isolate the culvert from the reservoir. Reservoir lowering is likely to allow for this. These inspections are particularly important where pipelines or culverts pass directly under the dam.

## Lesson 2

## Lesson 3

## Lesson 4

## Closing Comments

## Supporting Photos

No images provided.

Information provided has been sent from reservoir owners and engineers, and cleansed of personal information by the enforcement authority. We cannot guarantee the accuracy of the data, but if you find an error please contact the relevant enforcement authority.