

Oakenholt Reservoir Flintshire

Management Plan and Environmental Risk Assessment for the Drawdown of Oakenholt Reservoir

Essity UK Ltd

Issue 1



FAIRHURST

CONTROL SHEET

CLIENT

Essity UK Ltd

PROJECT TITLE:

Oakenholt Reservoir

REPORT TITLE:

**Management Plan and Environmental Risk
Assessment for the Drawdown of Oakenholt
Reservoir**

PROJECT REFERENCE:

111845-300

Issue and Approval Schedule:

ISSUE 1	Name	Signature	Date
Prepared by	Neil Sproat	<i>N Sproat</i>	22.07.2021
Reviewed by	Matt Foster	<i>M Foster</i>	22.07.2021
Approved by	Mark Hayward	<i>M Hayward</i>	22.07.2021

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Issue	Date	Status	Description	By	Chk	App

This report has been prepared in accordance with procedure OP/P02 of Fairhurst's Quality Management System.

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The report has been produced for Essity UK Ltd. But should any other parties rely on the findings they do so at their own risk unless confirmed by Fairhurst in writing from a Partner that they can do so.

Contents	Page No.
1.0 Introduction.....	4
2.0 Site Activity.....	5
3.0 Environmental Impacts Plan and Controls	8
4.0 Incident event Management Plan	10
5.0 Maintenance Checklist.....	12
6.0 Complaints.....	12

1.0 Introduction

- 1.1 The site is located to the west of Paper Mill Lane in the village of Oakenholt, Flintshire. The Grid Reference is SJ263712 and a nearest post code of CH6 5SZ. See figure 1. The site is owned and operated by Essity UK Ltd and is used as part of their manufacturing process. Drawing 111845/7100 in Appendix A shows the reservoir and Essity's site boundary.
- 1.2 This management plan is for the drawing down of the reservoir for different scenarios so that works can be undertaken in a safe and controlled manner to the reservoir and dam structure.



Figure 1 – Site location

2.0 Site Activity

- 2.1 There are six different scenarios where the owner will require a drawdown environmental permit which are;

The owners wish to get a permit for;

- A 6 hour Drawdown Test (with 14 day prior notice to NRW) as required to assist in Emergency Planning – justification to secure Public Safety.
- Drawdown up to 3 m below Spill Level to assist data gathering by Geophysical Surveys – justification to secure Public Safety.
- Drawdown to 1 m below Spill Level to assist any construction or any future maintenance works to the Spillways or any other part of the dam structure (with 14 day prior notice to NRW) – justification Contractor Safety during a project to secure Public Safety.
- Drawdown by Pump (not the Scour Valve) to 1 m below Spill Level to assist Hydraulic Testing during the construction of the Auxiliary Spillway (water will return to the Lead Brook Watercourse).
- An overarching Provision for drawdowns on future occasions with prior notification to NRW in an Emergency situation.
- Exercising of the scour valve for a maximum of 20 minutes on up to 12 occasions per annum as required by the Supervising Engineer or All Reservoir Panel Engineer appointed under the Reservoirs Act 1975 discharging 16m³ (222 l/s for 20 minutes).
- An additional drawdown to 1 m below Spill Level for the anchoring of the Mussel Rope installation of an eel passage required by NRW to meet the requirements of Eel Regulations (England and Wales) 2009 as amended.

- 2.2 The activities in Section 2.1 may need to be carried out more than once at any time of the year.

- 2.3 The operational procedure for all but one of the tasks will be identical, only the duration will be vary between them. For the 6Hr drawdown, 3m below spillway level, overarching provision and the draw down for the top anchoring are laid out in Table 1. Table 2 shows the operational procedure for the drawdown by pump. These procedures should be reviewed and updated on a yearly basis.

2.4 Table 3 shows the environmental impact each item in Section 2.1

Table 1 -Operational procedure for drawdowns via the scour valve.		
Activity		Comments
1.	Assess the need for the operating of the scour valve.	Is it planned or emergency requirements.
2.	Contact the necessary people/organisations	NRW must be contacted on any event. The reservoir engineer should also be notified for comment.
3.	Complete all the necessary documentation i.e. H&S documents, Risk Assessments etc	Must be done prior to any drawdown.
4.	Check the spillway channel and downstream watercourse for any obstructions which could cause blockages.	Any debris which could cause blockages and lead to flooding of the downstream area, are to be removed prior to any drawdown.
5.	Make note of time of day and level of the reservoir	
6.	Using the correct tools to open scour valve	This must only be done by a competent designated person.
7a.	Measure level in reservoir every 15 minutes until draw down level reached then close scour valve	This is the procedure should a 1/3m drawdown be required.
7b.	After 6Hrs close scour valve	This is the procedure should a 6Hr drawdown be required.
8.	Make note of time and day and inform all necessary parties that the activity has been completed.	
Table 2 -Operational procedure for the drawdown via pump.		

Activity		Comments
1.	Assess the need for the drawdown.	Either planned or emergency requirements.
2.	Contact the necessary people/organisations	NRW must be contacted on any events. The reservoir engineer should also be contacted.
3.	Complete all the necessary documentation i.e. H&S documents, Risk Assessments etc	Must be done prior to any drawdown.
4.	Check the spillway channel and downstream watercourse for any obstructions which could cause blockages.	Any debris which could cause blockages and lead to flooding of the downstream area, are to be removed prior to any drawdown.
5.	Make note of time of day and level of the reservoir	
6.	Proceed with the pumping	
7.	Measure level in reservoir every 15 minutes until pumping is completed	
8.	Make note of time and day and inform all necessary parties that the activity has been completed.	

		Table 3 – Site activity environmental impact									
The key pieces of environmental legislation affecting this sector are:			Reservoirs Act 1975, Environmental Protection Act 1974.								
Processes / Activities / Equipment at your site: (insert H or M or L where applies) Processes / activities /equipment required. (H) high impact, (M) medium impact, or (L) low impact in the • Emissions to Air (including dust) – A • Emissions to Water – W • Energy Usage (e.g. electricity, gas, oil) - E • Waste Disposal - D • Land Contamination - L • Nuisance (i.e. noise or odour) - N • Resource Consumption (e.g. water chemicals, not energy) - R	Activity		A	W	E	D	L	N	R		
	1	6 hour drawdown test	L	L	L	H	L	M	L		
	2	3 m below spill way level	L	L	L	H	L	M	L		
	3	Drawdown by pump 1 m below spill level	M	L	M	H	L	H	L		
	4	An overarching provision for drawdowns	L	L	L	H	L	M	L		
	5	Drawdown for the top anchoring of the mussel rope	L	L	L	H	L	M	L		

3.0 Environmental Impacts Plan and Controls

- 3.1 The environmental impacts plan and controls for each activity identified in Table 3 are shown in Table 4.

Table 4 – Environmental impact plans and controls.

Activity	Potential impact	Is impact controlled by equipment	Is equipment included on maintenance checklis	Is impact controlled by a procedure	Person using the procedure received training	Comments
1, 2, 3, 4 & 5	Large release of reservoir water	The water release can be controlled by the scour valve	Yes – The scour valve is on a maintenance schedule	Yes	Yes	This process will only be carried out once the NRW has been notified
1, 2, 3, 4 & 5	noise impact at the scour valve on the surroundings	No	n/a	Yes	Yes	The source of the noise is from the scour valve. This is located some distance from any dwelling which should minimise its impact.
4	Energy use to operate the pump	Yes	Yes	Yes	Yes	This would only occur on rare occasions.
4	Emissions to air – The pump would be an engine driven pump	Yes	Yes	Yes	Yes	This would only occur on rare occasions.

4.0 Incident event Management Plan

- 4.1 As the activities only include the drawdown of water from a reservoir it is unlikely that pollution will enter the downstream watercourse. In the unlikely event of a pollution event Table 5 is a standard form to be filled in in the event of such an occurrence.

Table 5 - Oakenholt Reservoir incident event.	
Location of incident event; Sketch below or on attached separate plan the location of the event including OS grid reference.	
Type of event	
Were the following organisations contact? And names of people contacted.	
Essity Head Office – NRW – HSE – Local authority – Adjacent landowners Any other persons – Specialist advisers i.e. reservoir engineer –	
What actions were taken during the incident event?	
Evaluation of the cause of the event and steps taken to avoid such event in the future?	

5.0 Maintenance Checklist

- 5.1 The site currently has a maintenance checklist of the operational equipment of the reservoir and its associated equipment, this can be found in Appendix A. It is considered that this will not needed to be amended to cater for any of the new operating procedures.

6.0 Complaints

- 6.1 As the proposed operations include a large release of water from the reservoir, it is beneficial to record complaints so as to better refine the operational procedure to the benefit of the local community. Table 6 is a basic form which can be completed and logged for future investigation of any possible procedures which can be modified to mitigate future complaints as much as reasonably possible.

Table 6 Scour valve operation Complaints record

Who made the complaint	Name:	
	Address:	
	Contact No:	
	Email Address:	
Date and time of the complaint:		
What was the complaint about:		
Was anyone else is aware of this, i.e. other neighbours, own staff etc, if so who?		
Does the complaint relate to this site:		
Does the complaint relate to significant pollution event? If so was anyone contacted i.e. NRW, HSE, Local Authority etc		
What has been done to mitigate future occurrences?		

Appendix A

Maintenance Procedure



Reservoir Checks And Scour Valve Operation



Revision Number:	1	Origin Date:	07/09/2016
Reason for Update:			
Area Owner Approval:	Mike King	CBA Originator:	Nick Arundell
Approval Date:		Last Revision Date:	

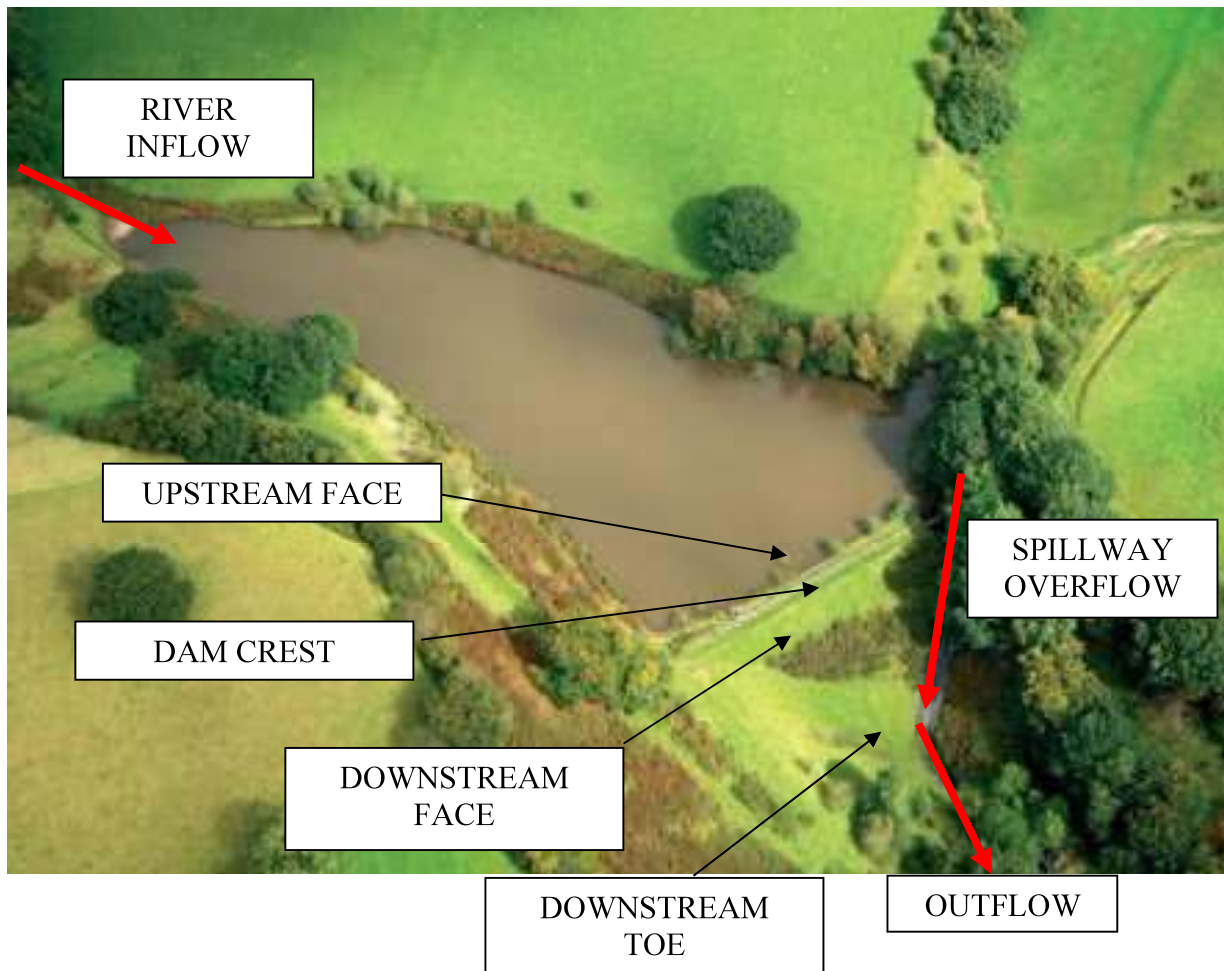
Business Objective:	To monitor the reservoirs dam integrity by doing relevant weekly checks and tests to ensure that any issues relating to the structure or integrity of the dam are identified.	
Related JSAs JSPs:		
Related CBAs, CPEs, Cis or Lubes:		
Tools Required:	• Piezometer – <i>From environmental department office</i> • A tape measure • A phone – with the ability to take photos	
Parts Required:	Material Name	Material Number
Resources Needed:	• 2 X Operators	
Time Needed:	30 – 45 minutes	

Owner:

Introduction

SITE

Under the Reservoirs act 1975 it's the reservoir owners duty to ensure that damn embankments integrity is maintained as such to prevent the dam failing. The consequence of a failed dam can be severe.



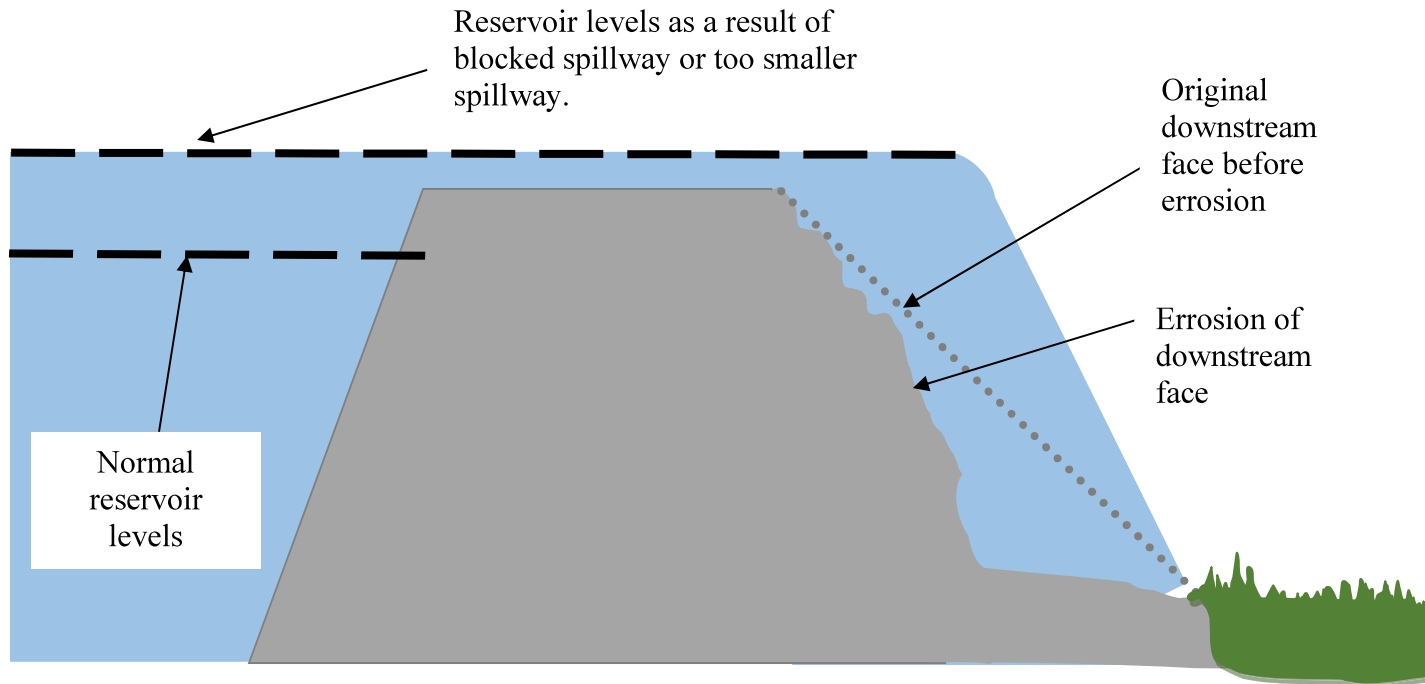


Reservoir Checks And Scour Valve Operation

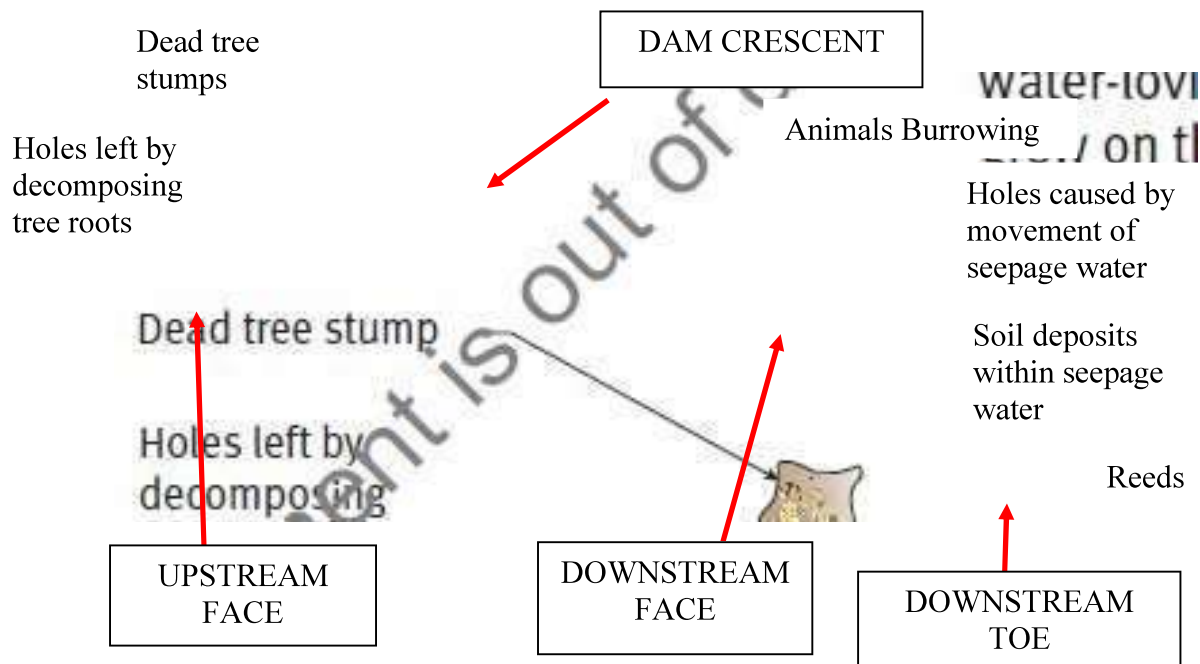


There are two common reasons why embankment dams fail.

1. **Overtopping** – The reservoir level reaches a height that spills over the top of the dam crest and down the downstream face. This can eventually erode the downstream face reducing the support of the dam to the point upon which it can no longer support the pressure of the water it's holding in. Overtopping can be the result of:
 - a. Blocked spillway
 - b. Too small spillway to deal with quantities of water coming through the spillway.



2. **Internal Erosion** – The pressure of the water in the reservoir manages to create a seepage path through the embankment and can cause erosion from within the dam itself. These seepage paths can be as a result of:
 - a. Tree roots growing through the embankment
 - b. Animals burrowing into the embankment
 - c. poor construction of a clay core/embankment or plastic





Reservoir Checks And Scour Valve Operation



Purpose

This procedure gives a list of checks that help to identify any tell tale signs of the problems that are or could eventually occur within the dam. It also gives advice on what maintenance is required and when it is required. The checks should take place once per week (on any day) however the scour valve test is every 3 months.

Scope

This procedure covers the reservoir checks and scour valve operation

References

- Reservoirs act 1975
- The owners guide to reservoir safety

Procedure

1. Collect all the equipment required for doing the reservoir checks this includes:
 - i. The piezometer
 - ii. A mobile phone with a camera
 - iii. Tape measure
2. Inform the guardsman in security that you and the name of the other operator are going up to the reservoir.
Ensure that the guardsman has the mobile number of the phone you are carrying up to the reservoir. The operator must be contactable at all times. The operator with the phone must have the contact number of security in their phone as well.
3. The entrance to the reservoir can be found just beyond the unifibre pulp storage area on the top yard. It's locked off by the metal door and gating. The metal door has a padlock on it to prevent unauthorized access.
4. The access code to the padlock is "0000" (4 zero's).



BE VIGILANT WHEN WALKING UP TOWARDS RESERVOIR BE AWARE OF SLIPS & TRIP HAZARDS ESPECIALLY DURING ADVERSE WEATHER





Reservoir Checks And Scour Valve Operation



Spillway





Reservoir Checks And Scour Valve Operation



Dam Crest



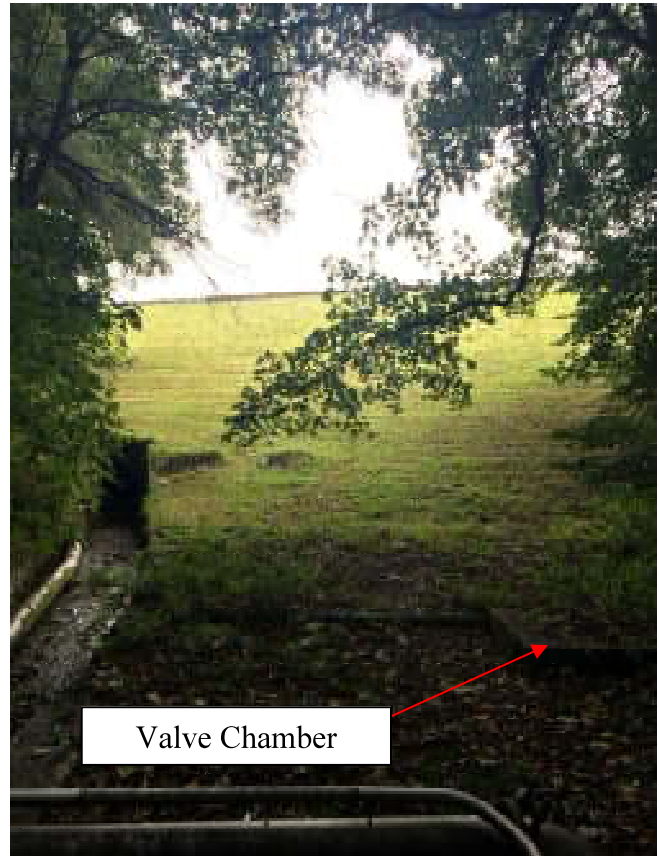
Upstream face



Downstream face



Downstream face toe & Valve Chamber





Reservoir Checks And Scour Valve Operation



VISUAL RESERVOIR CHECKS		
LOCATION	CHECK REQUIRED	CORRECTIVE ACTION
Spillway	Check to see if there any large objects or shrubbery that is blocking or reducing the size of the spillway or that could prevent water passing through the spillway.	Take photo and inform site services and environmental department who will then get gardener to clear.
Dam Crest	Check for sink holes, cracks or low spots, significant movements to the dam crest wall. These indicate internal erosion	Take photo and contact environmental department who should seek advise from QCE and supervisor engineer.
Dam Crest, Downstream face and Upstream face	Ensure that the grass length of the dam crest is healthy and short (ideally between 50-150mm) as this allows for early detection of problems but also discourages animal activity. Ensure there is no vegetation.	Take photo and inform site services and environmental department who will contact gardener
Valve chamber	There are three drains in the valve chamber. Check and record to see the flow rate and the clearness of the water coming out of them. A turbidity to the water can signal internal erosion.	Record and monitor. If there is a drip or flow report this to the environmental department.
Downstream face & Toe	Check for any reeds or other water-loving vegetation	Take photo and inform environmental department who will monitor more closely.
All	Any excessive damp patches	Take photo of location and contact environmental department.
Upstream face	Any dips, depressions or erosions.	Take photo of location and contact environmental department who will monitor more closely.
Dam crest & downstream face	Check for any burrowing animal activity. E.g. mole hills	Take photo and record what you see and contact environmental department.



Reservoir Checks And Scour Valve Operation



PIEZOMETER CHECKS

Piezometers checks are to measure the depth of groundwater.

1. Looking up towards the reservoir from the downstream toe you will be able to see three poles sticking out of the ground, one on the left hand side, one in the middle, and one on the right.



Climb up towards the left pole.

2. Turn the piezometer on by turning the nob so that the volume marker is at 10





Reservoir Checks And Scour Valve Operation



3. Confirm the piezometer is working by pressing the “test” button, you should hear a beep sound.



4. Lower the line into the pipe using the handle and the wheel.





Reservoir Checks And Scour Valve Operation



5. When the piezometer beeps it means water has been detected, at this point you must immediately stop lowering the line into the pipe.
6. The line has a centimeter graduation scale written on it (like a tape measure). Read the value on the line that is at the level of the top of the pipe. (for example if the line reads 904 at the top of the pipe it means that the depth of water detected is 904cm). Record the value and label it LHS pipe.



7. Repeat steps 5, 6 and 7 for the middle pipe. Record the value and label it MID pipe.
8. Repeat steps 5, 6 and 7 for the pipe on the right. Record the value and label it RHS pipe.



Reservoir Checks And Scour Valve Operation



RESERVOIR LEVEL

The depth level of the reservoir is recorded relative to the spillway.

1. Measure the depth level against the spillway. The measurement should be made in centimeters. If the level is below the spillway then it's recorded as a negative number. If the level is above the spillway then it's recorded as a positive number. This can be done by either visually estimating or by using a measuring tape.





Reservoir Checks And Scour Valve Operation



TESTING THE SCOUR VALVE

If you spot a serious problem at your dam, it's often a good idea to lower the water level in the reservoir so that pressure on the embankment is reduced, and any leakage/seepage flows reduce or stop. The opening of the scour valve allows you to do this. It's important to ensure that the scour valve is operational for use in emergencies.

The testing of the reservoir scour valve should take place every 3 months. The dates upon which this should be carried out are specified in the **environmental schedule for checks & tests**. Please see link below:

[I:\02. Environment\1.Environmental Folder](#)

1. Locate the brown metal bridge that sits lying across the spillway.



2. A metal wheel is chained and padlocked on to the spillway bridge. Unpadlock this by using the access code which is "0135"





Reservoir Checks And Scour Valve Operation



3. Attach the wheel onto the blue pole that sits in front of the bridge.



4. Rotate the wheel in the direction stated on the wheel itself until the valve is fully open. This requires a fair number of rotations of the wheel to get the valve to open.
5. Record how long it takes for the water to go from dirty to clear. (If it's dirty at all).
6. Close the valve off by rotating the wheel in opposite direction. Again, the direction is stated on the wheel.



If for whatever reason you are unable to open the scour valve this must be immediately reported to the environmental department.

UPON RETURN



Reservoir Checks And Scour Valve Operation



1. Chain up and padlock the wheel to the bridge.
2. Padlock the door to the reservoir
3. Inform guardsman in security that yourself and the other operator are now back on site.

Records

All checks and maintenance should be recorded in the reservoir weekly checks spreadsheet. This can be found on the idrive at the location shown below:

I:\02. Environment\1.Environmental Folder\Reservoir Water & Pandy\Reservoir\Reservoir checks

All photos of any issues of concerns can be sent directly to the environmental department.

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