Eskom	Scope of Work	Engineering

Title: **Appointment of Approved Professional Person for Feasibility study and inspections of Kendal Power Station Dams**

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1. Introduction

1.1 Background

Kendal Power Station is required to conduct statutory dam safety inspections in compliance with the Department of Water and Sanitation (DWS) and Section 123(1) of the National Water Act (Act 36 of 1998). This includes periodic dam safety evaluations, conducted by an Approved Professional Person (APP), at prescribed intervals depending on the dam hazard classification.

The station was designed and constructed prior to the promulgation of Government Notice Regulation 704 (GN 704), which introduced requirements to prevent or minimise groundwater contamination, including the lining of pollution control dams. As the majority of the dams at Kendal are currently unlined, there is a need to assess and implement appropriate measures to achieve regulatory compliance.

Kendal operates an integrated water management system comprising the Dirty Water Dam, Emergency Dam, Clean Water Dam, Coal Stockyard Dam, and Maturation Dam. These facilities are used to contain polluted water, manage stormwater, and prevent environmental discharge, with controlled reuse of water for operational purposes. However, the current condition and configuration of these dams, together with the absence of lining in key areas, present potential risks related to seepage, structural integrity, and regulatory non-compliance.

This project therefore combines the statutory dam safety inspections with a feasibility assessment for dam lining and related interventions. The objective is to evaluate the structural condition, compliance status, and environmental performance of the dams, while identifying technically and financially viable solutions to ensure long-term compliance, operational efficiency, and risk mitigation.

Table 1: Kendal Power Station Dams for Statutory Safety Inspection

Dam	Capacity (ML)	Category
Raw Water Reservoirs (1&2)	412	II
Clean Water Dam	90	I
Dirty Water Dam	226	II
Emergency Water Dam	55	I

Table 2 Dams to Conduct Lining Feasibility Studies

Dam	Capacity (ML)
Raw Water Reservoirs (1&2)	412
Clean Water Dam	90
Dirty Water Dam	226
Emergency Water Dam	55
Maturation dam	
Coal stockyard	

2. Supporting Clauses

2.1. Purpose

The purpose of this document is to define the Scope of Work (SoW) to be executed by the Approved Professional Person (APP). The scope includes conducting statutory dam safety inspections and evaluations of Kendal Power Station dams ("station dams"), as well as undertaking a feasibility study for the implementation of dam lining and related interventions.

This will involve assessing the current structural condition, operational performance, and regulatory compliance of the station dams, and evaluating the technical and financial viability of lining solutions and other remedial measures aimed at preventing seepage, minimising environmental impact, and ensuring compliance with applicable legislation.

The feasibility study must take into account that the power station remains fully operational, and therefore must include an assessment of constructability, sequencing, and the potential impact of proposed interventions on ongoing operations. The APP will further assess and provide recommendations on existing station plans and strategies to improve the condition and performance of the dams.

2.1 Objectives

- Conduct statutory dam safety inspections and evaluations for the station dams and produce a comprehensive report on their condition and compliance status.
- Assess the structural integrity, operational performance, and potential risks associated with the dams, including seepage and environmental impacts.
- Undertake a feasibility study to evaluate suitable dam lining options and associated interventions, considering technical, environmental, and financial aspects.

- Assess constructability of proposed solutions, including methodology, sequencing, and practical implementation within an operating power station environment.
- Evaluate the impact of proposed interventions on station operations, including risks, constraints, required outages, and mitigation measures to minimise disruption.
- Provide recommendations on appropriate lining solutions and remedial measures to ensure regulatory compliance, operational continuity, and long-term sustainability.
- Review and assess existing station strategies, plans, and projects related to the dams, and provide guidance on improvements where required.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] Kendal Power Station Water Use License (WUL) 21 July 2025.

[2] Occupational Health and Safety Act (No. 85 of 1993).

[3] ISO 9001 Quality Management Systems.

[4] National Water Act (NWA), 1998 (Act No.36 of 1998)

[5] National Environmental Management: Waste Act, 2008 (Act No.59 of 2008) (NEMWA)

2.2.2 Informative

[1] 559-190455451: Generation Engineering Policy.

[2] ICOLD General Principles and Framework for Dam Safety.

[3] 240-99527377 Inspection Manual for Civil Work at Eskom Power Stations

[4] DWS Guidance & Technical Manuals.

[5] TADS. Preparing to Conduct a Dam Safety Inspection

[6] 240-82332389: Civil Inspection Manual for Dams and Waterways (Including Dam Safety Inspection Procedure)

2.3 Applicability

This document is applicable for the specified affected areas at Kendal Power Station.

2.4 Effective Date

This document will be effective from its authorisation date.

2.5 Classification

Controlled Disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.6 Abbreviations

Abbreviation	Description
DWS	Department of Water & Sanitation
DSO	Dam Safety Office
APP	Approved Professional Person
NWA	National Water Act
SoW	Scope of Work

2.7 Definitions

2.7.1 Approved Professional Person (APP)

These are Professional engineers, technologists or technicians who are registered in terms of the Engineering Profession Act (No. 46 of 2000) and approved by the Minister of Water and Sanitation in the Department of Water & Sanitation (DWS) after consultation with the Engineering Council of South Africa (ECSA) and the Dam Safety Office (DSO).

2.7.2 Dam Safety Office (DSO)

The Dam Safety Office, a division of the Department of Water and Sanitation (DWS), is responsible for safeguarding the people, properties, and infrastructure downstream of dams.

2.7.3 High Risk Dams

In terms of Section 117(c) (i) of the National Water Act, 1998, a dam with a safety risk contains, or can store more than 50,000 m^3 of water and has a wall with a vertical height of more than 5m.

2.8 Roles and Responsibilities

2.8.1 Employer

- Appoints contractor to provide services to Kendal Power Station.
- Functions as the client of the appointed contractor
- Reviews and accepts documentation pertaining the services rendered by contractor.
- Accepts the works done by contractor via inspections.

2.8.2 Contractor

- Execute the works defined by the Employer in the scope of work according to contractual agreements.
- Submits all relevant documents pertaining to the services they are contracted on to the Employer.

3. Scope of Work

3.1 Dam Safety Inspection

The proposed work will be carried out as outlined below:

- Review of documents pertaining to the station dams, such as, previous dam safety & design base review reports.
- Site visit to all station dams as listed in Table 1, and their associated infrastructure such as channels, silt traps and diversion berms.
- During the site visit, inspection of all dam structures: dam walls, dam embankments, dam crests, spillways, overflow, inlet & outlet structures, attenuation ponds, valve chambers, silt traps/silting basins, and dam lining conditions.
- Prepare and compile report for all station dams using site visit data. The report should address the safety, freeboard, hydraulics, storage capacity curves, seepage collection facilities, recommended remedial measures, technical specifications to address dam leaks, and actions required to improve the conditions of the station dams. The actions should have action plans, elaborating the most feasible approaches to achieving them.
- The report should include photographs, sketches, tables, calculations/analysis, sketches, and any other attachments relating to the report contents.
- The report should meet the requirements & criteria of DWS and other relevant authorities prior to submission. This means copies of the DW19 & DW149E forms with APP recommendations and comments will form part of the attachments.
- The Employer will appoint the APP to assess, review, comment on the effectiveness of the strategies, plans and projects concerning station dams, and offer recommendations.

3.1.1 Submission & Acceptance

The Contractor (APP) will send the Employer a signed soft (pdf) and hard copy of the station dams compiled report prior submission to DWS and other relevant authorities. Details pertaining to the station dams safety inspection & evaluation and their associated infrastructure, which are not expressly included in this SoW, but which, in the opinion of the APP, will be necessary for the completion and proper execution of the works are to be included by the APP and submitted to the Employer for acceptance. All safety critical findings must be communicated to the Employer immediately or at the end of that day of inspection.

For structural elements requiring remedial actions, the report shall make use of the condition category and prioritisation on Table 2 for classification.

Table 3: Condition Categories

Category	Description	% Original Condition	Type Remedial Action
1	The plant assets are in excellent condition or have slight evidence of deterioration/deformation, but to an extent that there is no expected reduction in strength.	100	None Required
2	The plant assets have some deterioration/deformation, to an extent that could lead to a slight reduction in strength. Safe use of the plant assets is assured.	95-100	Repaint, tighten bolts, other minor work
3	The plant assets show deterioration/deformation, to an extent that could lead to some reduction in strength and safe use of the plant assets. Repair must receive attention in maintenance scheduling.	75-95	Repair, repaint, tighten bolts, other minor work
4	The plant assets show severe deterioration/deformation, to an extent that could lead to a major reduction in strength and result in an unsafe use of the plant asset and/or continued use of the plant asset will result in Environmental contraventions. The structure should not be exposed to full load. Urgent attention must be given to repair.	50-75	Repair or replace components

5	The plant assets show severe deterioration/deformation, to an extent that could lead to little or no useful residual strength. Safe use of the plant is impossible and/or continued use of the plant asset will result in Environmental contraventions. The structure should not be exposed to any operating loads (where required to be barricaded off for safety reason). Urgent attention must be given to repair.	< 50	Repair or replacement of components required urgently

Table 4: Prioritisation of Elements

Priority	Description
X	Where a plant asset or portion thereof cannot be used for its intended purpose in its current condition, but may not be required to be used for some time, it must be recorded as Priority X.
A.	All members in condition category 5, any primary structural members in conditions category 4, and any other members where the deterioration leads to risk to personnel safety must be recorded as Priority A. Repair or replacement of the structural members, or other recommended work, requires urgent, immediate action.
B.	All secondary or tertiary members in condition category 4, and any other structural members requiring repair or replacement in the short term must be recorded as Priority B.Repair or replacement of the structural members, or other recommended work, should be scheduled as soon as possible, but not later than one year from date of this report.
C.	All secondary or tertiary members in condition category 4, and any other structural members requiring repair or replacement in the short term must be recorded as Priority B. Repair or replacement of the structural members, or other recommended work, should be scheduled as soon as possible, but not later than one year from date of this report.

The Employer requires 7 days for reviewing and commenting on the report prior submission to DWS and relevant authorities. The review date however will depend on the amount of work supplied at the given time. After Employer review & acceptance, the APP will submit the report to the DWS and other relevant authorities.

3.2 Feasibility Study Scope of Work – Dam Lining

- **Technical Viability and Constructability**
  - Assess suitable dam lining options (e.g. geomembrane, concrete, clay liners) based on site conditions and dam functionality.
  - Evaluate the compatibility of proposed lining systems with existing dam infrastructure and materials.
  - Develop preliminary design concepts for selected lining options.
  - Assess constructability within an **operational power station environment**, including:
    - Access constraints and site logistics
    - Construction sequencing and phasing
    - Working within confined or partially dewatered conditions
  - Identify requirements for temporary works (e.g. diversion systems, bypass pumping, temporary storage).
  - Evaluate the need for partial or full dam dewatering and associated risks.
  - Assess the impact of construction activities on **ongoing station operations**, including:
  - Production constraints
  - Water management system performance
  - Required outages or operational adjustments
  - Propose mitigation measures to minimise disruption to operations during implementation.

- **Economic Assessment**
  - Develop high-level capital cost estimates for each feasible lining option, including:
    - Materials and installation costs
    - Temporary works and enabling infrastructure
  - Estimate operational and maintenance (O&M) costs over the lifecycle of each option.
  - Conduct a lifecycle cost analysis comparing different lining alternatives.
  - Identify potential cost risks and uncertainties.
  - Provide a cost-benefit analysis, considering:
    - Reduction in seepage losses
    - Improved compliance
    - Avoidance of environmental penalties or remediation costs

- **Environmental Assessment**

- Evaluate potential environmental impacts associated with current unlined conditions (e.g. seepage, groundwater contamination).
- Assess environmental benefits of implementing lining solutions.
- Identify potential environmental impacts during construction, including:
  - Disturbance of existing materials and sediments
  - Handling and disposal of contaminated materials
- Recommend mitigation measures to minimise environmental risks during construction and operation.
- Ensure alignment with applicable environmental legislation and licence conditions.

- **Desktop Studies**
  - **Hydrogeological Assessment**
    - Review existing hydrogeological data and groundwater monitoring records.
    - Assess seepage pathways and potential groundwater contamination risks.
    - Evaluate the impact of lining on groundwater flow and quality.
- **Geotechnical Investigation**
  - Review existing geotechnical information and conduct additional investigations if required.
  - Assess foundation conditions and suitability for lining installation.
  - Identify geotechnical risks (e.g. settlement, slope stability, subgrade preparation requirements).
- **Engineering LiDAR and Bathymetric Survey**
  - Conduct LiDAR surveys to capture accurate topographical data of the dam and surrounding areas.
  - Perform bathymetric surveys to determine dam profiles, sediment levels, and storage capacity.
  - Develop updated as-built models to support feasibility analysis and preliminary design.
- **Geophysical Studies**
  - Undertake geophysical investigations to identify subsurface conditions, voids, seepage zones, and anomalies.
  - Support the assessment of dam integrity and foundation conditions.

3.2.1 Deliverables

- Feasibility Study Report including:
  - Technical assessment of lining options

- Constructability and operational impact assessment
- Cost estimates and lifecycle analysis
- Environmental considerations

- Recommended preferred option with justification
- Preliminary implementation strategy, including phasing and high-level programme
- Risk assessment and mitigation measures

4. Health & Safety

All individuals accessing the Kendal Power Station site for work purposes are required to attend safety induction training prior to commencing any work. The induction shall familiarize all personnel with the applicable safety rules, emergency procedures, site hazards, and control measures relevant to the project environment. During site inspections, the APP will be companied by the relevant Plant Engineer.

It is the responsibility of the Contractor to ensure that:

- All their employees, subcontractors, and visitors under their control have completed the mandatory site safety induction training and hold valid proof of attendance.
- Workers are informed of their duties as outlined in Section 14 of the OHS Act, including the obligation to take reasonable care for their own health and safety and that of others who may be affected by their acts or omissions.
- The Contractor complies with all relevant provisions of the OHS Act and Construction Regulations, 2014, including but not limited to provision and maintenance of appropriate personal protective equipment (PPE).
- They have prepared a risk assessment prior to commencement of the site inspection, to identify any hazards and risks that may be encountered, and to develop risk mitigation measures.

5. Acceptance

This document has been seen and accepted by:

Name	Designation
Mzwandile Gcaleka	Auxiliary Engineering Manager
Maxwell Makhanya	Snr Civil Engineering Technologist
Kellie Kwinika	Civil Engineer
Funeka Grootboom	Chief Engineer - Civil
Luvuyo Msizi	Civil Engineer in Training

6. Revisions

Date	Rev.	Compiler	Remarks
April 2026	0.0	KN Kwinika	Report for review
April 2026	1.0	KN Kwinika	Report for final review

7. Development Team

The following people were involved in the development of this document:

- Kellie Kwinika
- Luvuyo Msizi