Eskom	Scope of Work	Generation

Title: **Scope of Work for the Dredging of the Dams at Tutuka Power Station**

Document Identifier: **15ENG GEN-2317**

Alternative Reference Number: **N/A**

Area of Applicability: **Tutuka Power Station**

Functional Area: **Engineering**

Revision: **1**

Total Pages: **25**

Next Review Date: **N/A**

Disclosure Classification: **Controlled Disclosure**

Compiled by	Functional Responsibility	Authorized by
Civil Engineer	**Senior Civil Engineer**	**Civil Engineering Manager**
Date: 17/10/2022	Date: 17/10/2022	Date: 17/10/2022

Content

Page

Figures

Tables

N/A

1. Introduction

Tutuka Power Station is a coal fired power station and has 3600MW installed capacity and was constructed in the mid 1980's. The Tutuka Power Station is located within the Standerton magisterial district, approximately 21 km northeast of the town Standerton in the Mpumalanga Province. Hydrologically, Tutuka Power Station is situated within the Quaternary Catchment C11K, which in turn forms part of the Vaal River catchment area. This catchment area falls largely within the Environmental Water Requirement (EWR) Class C (moderately modified) management class.

This scope of work caters to dredge Tutuka power station dams as a measure to prevent the dams to overflow due to large amounts of silt and ash deposition resulting decreasing capacity of the dams. The inadequate capacity of the dam was evident when some of the dams overflowed during the rainy season from 2019-2021 and March 2022 due to high inflows from the station. These overflow incidents are recorded almost on annual basis. From the respective dam overflow investigations, this has been identified as an environmental contravention and a deviation to Tutuka's Water Use License (Licence No: 08/C11K/ABCFGI/1016).

Dredging can be defined as the operation of removing and disposing sediment material from water bodies such as dams, settling ponds and maturation ponds. It is advisable to maintain these water bodies in clean conditions to ensure maximum capacity is available for usage/storing requirements. It is for this reason that a dredging contract is required as soon as possible which will greatly aid in storing dirty water, preventing dam overflows and promoting healthy dam management in keeping with environmental regulations.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to outline the scope of work required to execute the Dredging of the Dams at Tutuka Power Station,

2.1.2 Applicability

This document shall apply to Tutuka Power Station only.

2.1.3 Effective Date

The effective date will be from the authorisation date.

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] ISO 9001 Quality Management Systems

[2] 240-57127951: Standard for the Execution of Site Investigations

[3] ECSA Code of Conduct for Registered Persons: Engineering Profession Act, 2000, (Act No.46 of 2000)

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

[5] Dam Safety Regulations

[6] National Environmental Management Act, Act 107 of 1998

[7] National Environmental Management: Waste Act, Act 59 of 2008

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

[9] SANS 1200 D: Earthworks

[10] 240-99527377 Inspection Manual Civil Works at Eskom Power Station

[11] Government Notice No. 704 of the National Water Act No. 36 of 1998

2.2.2 Informative

[1] Tutuka Water Use Licence (Licence No: 08/C11K/ABCFGI/1016)

[2] Tutuka Integrated Waste Licence 12/9/11/L456/6/R1

[3] 15ENG GEN-280 Tutuka Stormwater Management Plan

[4] Jeffers & Green Tutuka Rain Readiness Report September 2014

[5] Dam Safety Regulations No. R. 139 2012

[6] 0.61/00077-Rev 8. Storm Water Drainage Layout

[7] Bathymetric surveys in Tutuka Eskom Power Station for internal dams namely the South Dam (DB Thermal Dam), North Clean Dam and the Raw Water dam (2019).

[8] 15ENG GEN-280 Tutuka Storm Water Management Plan

[9] 360-TUT-AABB-D00139-80, Tutuka Power Station, Dams Drainage Visual Inspection Report

[10] 0 61/133_Rev 3 Tutuka Drainage System

[11] 21.61/55330 Common Plant Station Drain System PID

[12] 15ENG GEN-2271 Scope of Work for the Tutuka Dam Safety Inspections

[13] 240-99527377 Inspection Manual Civil Works at Eskom Power Station

[14] Conceptual Design of Suction Forebay, Earth Berm Wall and Assessment of Station Dirty Water Dam and Pump Station December 2019

[15] Stein Muller Dam Bathymetric Survey 2019

[16] The Survey of the following Dams, General Waste Landfill Site Ponds, Coal Stockyard Dam, North Clean Water Dam and South Clean Water Dam to determine the Volumes and Inflows (2020).

[17] Dirty Water Dam Survey (2020)

[18] DWD: Survey Report For: Tutuka Power Station Lidar Survey (2022)

[19] The Survey of the following Dams, General Waste Landfill Site Ponds, Coal Stockyard Dam, North Clean Water Dam and South Clean Water Dam to determine the Volumes and Inflows (2020)

2.3 Definitions

Abbreviation	Explanation
Dredging	The operation of removing ash and silt from water bodies
De-Watering	The process of temporarily storing ash and silt removed from the Dams to be dried and handled for disposal to the designated dumping site.
Professional Surveyor	Surveying specialist registered with SAGC for minimum 3 years and equipped with work experience to perform surveying works (i.e., bathymetric surveys) related to dam design and maintenance

2.4 Abbreviations

Abbreviation	Explanation
CIDB	Construction Industry Development Board
DSR	Dam Safety Regulation
ECSA	Engineering Council of South Africa
NWA	National Water Act
ISO	International Standards Organisation
N/A	Not Applicable
P&ID	Piping and Instrumentation Diagram
QCP	Quality Control Plan
QIP	Quality Inspection Plan
SANS	South African National Standards
WUL	Water Use License
SHEQ	Safety Health Environment Quality
SOW	Scope Of Work

2.5 Roles and Responsibilities

2.5.1 Civil Maintenance

- Responsible to coordinate the works, and for all contract management and liaising with the contractor

- Responsible for managing and supervising the works being executed at all times

2.5.2 Civil Engineering

- Compiles scope of work for the Dredging of the Dams at Tutuka Power Station
- Conducts technical evaluation, as per the issued technical evaluation strategy

2.5.3 Principal Contractor

- As per OHS Act (85/1993) executes scope of work issued by the Employer

2.5.4 Tutuka Environmental

- Ensures that environmental legislation and standards are adhered to, and environmental practices are implemented at all times during execution of the works.

2.5.5 Tutuka Quality Management Department

- Ensures that quality legislation and standards are adhered to, and quality practices are implemented at all times during execution of the works.

2.5.6 Tutuka Safety

- Ensures safety legislation and standards are adhered to, and that safety practices are always implemented during execution of the works.

2.6 Process for Monitoring

The tender committee will adjudicate the tender evaluation and contract appointment.

The Contractor will compile a QCP, which will ensure the works are executed within the relevant technical and SHEQ requirements.

Specified duration including a program/gantt chart as defined in works information per task order.

2.7 Related/Supporting Documents

As per section 2.2

3. Constraints

3.1 General Constraints

a) A compulsory site tender briefing session/scope clarification meeting to be conducted and if the Tenderer/Contractor does not attend or send a technical representative to the meeting, that Tenderer/ Contractor will be disqualified.

b) All technical queries to be directed to Civil Engineering.

c) Contractor to provide returnable schedules in accordance with the technical evaluation strategy issued by the Employer.

d) All works to be executed in accordance with standards referenced under section 2.2.

e) Deliverables/objectives of this works includes but not limited to:

i. Submit detailed method statement and material and/or equipment and machinery data sheet for Employer's Civil Engineers to approve before commencement of the works.

ii. Submit detailed programme/plan including breakdown of tasks to be executed, date of completion for each task and amount of time needed to complete task for Employer to approve before commencement of the works.

iii. Submit detailed QCP, which ties in with the submitted method statement, signatories to be Contractor, Eskom civil maintenance, Eskom civil engineer, and Eskom quality. QCP must be submitted to Civil Maintenance, Civil Engineering and Civil Quality to approve before commencement of works.

iv. Conduct all necessary site investigation and assessments to enable effective execution of the scope of work.

v. Execute scope of work of the Dredging of the Dams

vi. Submit detailed report detailing investigation and assessment findings, survey results reflecting actual dam capacity, volume of ash required to be removed, and restored dam capacity post completion of dredging works.

vii. Manage and mitigate the operational risks, including inflows into the Dams during execution of works

viii. Comply to all SHEQ requirements by ensuring safety of plant and personnel

3.2 Site Constraints

i. All works must be executed while the dams are in operation. Isolations will not be provided.

ii. Contractor to prevent and ensure that there is no discharge of water into the environment during execution of dredging the dams.

iii. Contractor to provide all machinery, equipment, plant, materials and skilled labour to execute the required works.

iv. Contractor to provide and install necessary mechanism/s and/or equipment to prevent and control the dredging works not to be disrupted by any inflows to the Dams

v. Dredging, dewatering, handling, transportation, and disposing of sludge/ash must be conducted without inducing any spillages to the current infrastructure. All machine, equipment, infrastructure and systems must be regularly inspected and maintained to be in good working condition

vi. Contractor to consult with the Employer's Environmental Officer to obtain approval of the items vi) a-b stated below. Once approval is issued by the Employer's Environmental officer, Employer's Representative to instruct the Contractor to proceed with the dredging works

   a. Suitable site location identified and methodology of executing the dewatering process,
   b. Methodology of conducting ash removal, handling and disposal

vii. All environmental laws and regulations are to be adhered to during the execution of works.

viii. The Contractor's tools, machinery, equipment and execution of work must not impair the operation or access to the station.

ix. During execution of the scope of work, Contractor to share the site with other contractor/s conducting operation and maintenance tasks.

x. Contractor to take note of the stilling wells, penstock, recovery systems and other structures located within the vicinity of the dams and prevent machinery and plant from inflicting damage to these infrastructures.

xi. Contractor to comply to all legislation and regulations when working around transmission and distributions lines, this includes approved permits for working near and under any transmission lines and servitudes.

4. Site Description

4.1 DB Thermal Dam

The DB Thermal Dam is one of several terrace dams at Tutuka Power Station and forms part of the dirty water recovery system at the station. It is located within the perimeter of the power station at the southwest of the station as shown in Figure 1.

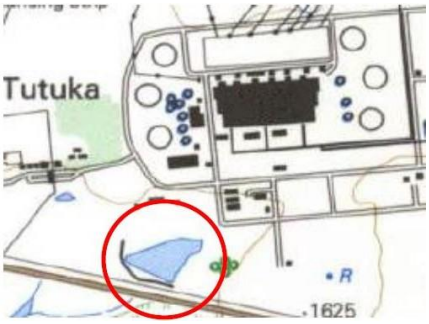

Figure 1: DB Thermal Dam

Large amounts of silt and ash deposition at the dam have ultimately decreased the capacity of the dam and is currently posing a major risk of the dam overflowing. The inadequate capacity of the dam was evident when the dam overflowed during the rainy season from 2019-2021 and during March 2022 due to high inflows from the station. On the respective dam overflow investigations, the incident has been identified and classified as an environmental contravention and a deviation to Tutuka's Water Use License (Licence No: 08/C11K/ABCFGI/1016).

The DB Thermal dam receives inflows via concrete and earth channels from various sources namely but not limited to:-, overflowing water from cooling tower 1 & 2, storm water runoff, ash & coal settling ponds overflow, air heater washing tanks overflow and ash ingress due to floor ashing onto the station drains because of SCC breakdowns. Under normal operational conditions, water from floor ashing would flow to the Dirty Water Dam however it has been channelled in the past to the DB Thermal Dam under abnormal conditions due to blocked station drains

Furthermore, the water recovery system is composed of two electric pumps. The diesel pump is used when required under emergency circumstances to lower the dam level to prevent overflowing. Measuring/Stilling wells have been constructed which will aid in monitoring the dam level ultimately promoting healthy dam management.

The Tutuka Rain Readiness report, which was compiled in 2014 by Jeffares and Green, stated that the DB Dam Capacity was 99141.7m^3 after a bathymetric survey was conducted. Figure 2 illustrates the DB Thermal dam survey showing the contours, which formed part of the Tutuka Rain Readiness Report.

Figure 2: DB Thermal Dam Survey

Furthermore, in 2019 there was a comprehensive bathymetric survey conducted by 20 Twenty Projects at the DB Thermal Dam. It was found that the volume below waterline was 41263m^3. Therefore, it can be seen that the dam lost approximately 60 000m^3 of dam capacity and a minimum of 60 000m^3 will be required to be dredged to restore the capacity of the dam. Figure 3 displays the results of the bathymetric survey. The report further stated that there was a large degree of siltation and sedimentation build up which was affecting the capacity of the dam and hence the functionality. DB Thermal dam capacity has been severely limited due to the large build-up of sediment over the years. The report went on to state that it is highly recommended that the DB Thermal Dam be dredged as soon as possible.

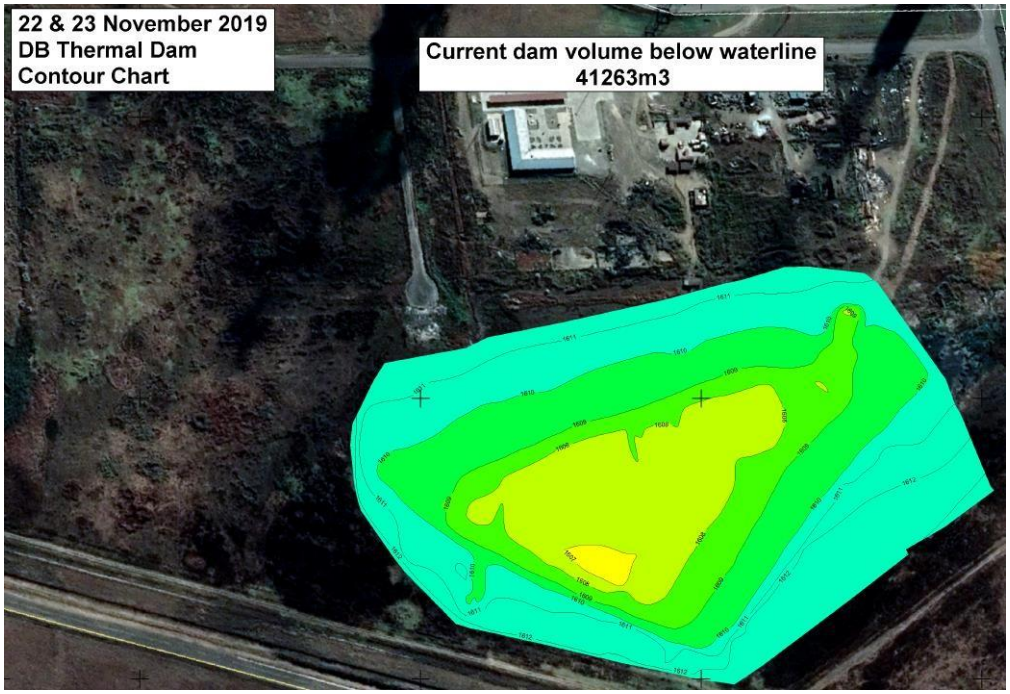

Figure 3: DB Thermal Bathymetric Survey

It is fundamental that DB Thermal dam is prioritised and dredged first to maximise the storage capacity and to promote healthy dam management in accordance with environmental standards. Based on the surveys conducted in 2014 and 2019 respectively, it is estimated that the dam has lost approximately 60% of its storage capacity due to silt and ash inflow into that dam over the years. This entails that a minimum of 60000m^3 of silt and ash is required to be removed from DB Thermal dam to bring the dam back to the required minimum capacity of 100000m^3. Furthermore, it can be seen from the bathymetric surveys that the deepest point in the dam is approximately five meters. Contractor to conduct site investigations to determine the actual volume of ash that needs to be dredged from DB Thermal Dam and submit to the Employer's Civil Engineer to approve before commencing with the dredging works

4.2 Steinmuller Water Dam

The Steinmuller Water dam is located within the perimeter of the power station at the southeast of the station [Figure 4]. Furthermore, the water recovery system is composed of two electric pumps. Diesel pumps are used when required under emergency circumstances to lower the dam level to prevent overflowing. Measuring/Stilling wells have been constructed which will aid in monitoring the dam level ultimately promoting healthy dam management. An assessment of Steinmuller Dam integrity and water quality as well as a bathymetric survey were conducted in October 2019.The original capacity of the dam was 204 857 m³ and according to the bathymetric survey conducted in 2019 the dam capacity was 182 835 m³ [Figure 5]. This proves that there is siltation occurring at the dam and dredging will be required. Furthermore, over 55% of the dam has been covered in dam weed and reeds which has limited the capacity of the dam. The dam bed has been silted up over the years which has contributed to the overall decrease in capacity of the dam. It would be in the interest of the Power station to increase the capacity of the dam by dredging the dam and removing the current dam weed and reed beds. The dam is also a catchment of any overflowing water from cooling tower 4 & 5, rainwater, mine transfer house (wet coal and washing effluent), coal settling ponds overflow and water leaks from the dust suppression pipe to ash disposal to name few.

Figure 4: Steinmuller Water Dam

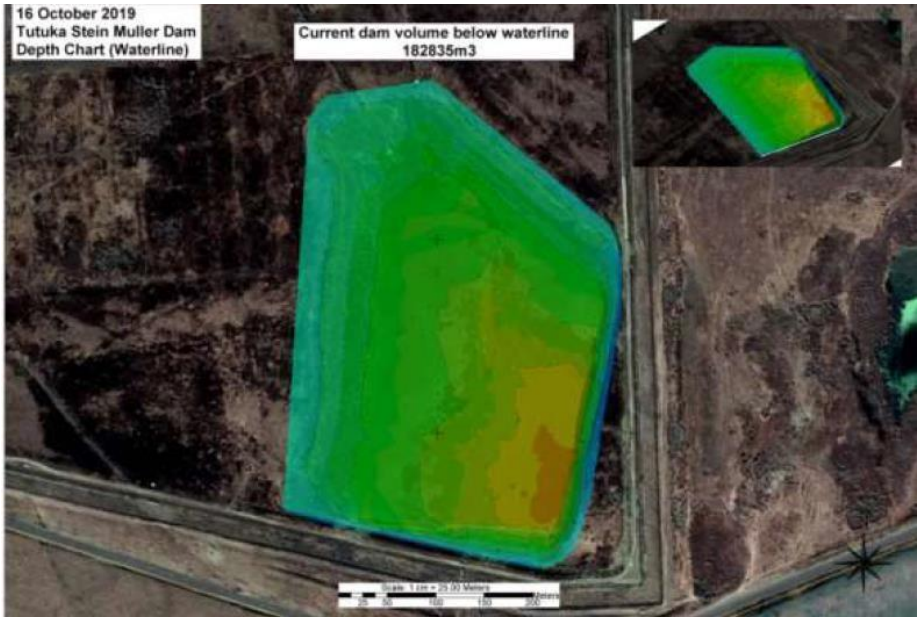

Figure 5: Steinmuller Water Dam Bathymetric Survey

4.3 North Clean Dam

The North Clean Dam is located to the north side of the station [Figure 6]. The dam receives storm water runoff from areas adjacent to the Power Station. The original capacity of the dam was 191 400 m³. The dam is also a catchment of any overflowing water from cooling tower 3 & 6 and rainwater. There is currently no permanent recovery infrastructure at the Dam. Furthermore, the water recovery system is composed of two electric pumps. Diesel pumps are used when required under emergency circumstances to lower the dam level to prevent overflowing. Measuring/Stilling well has been constructed which will aid in monitoring the dam level ultimately promoting healthy dam management. A bathymetric survey of the dam was conducted in November 2019 and the dam volume below the dam waterline was 38767 m³.

Figure 6: North Clean Dam

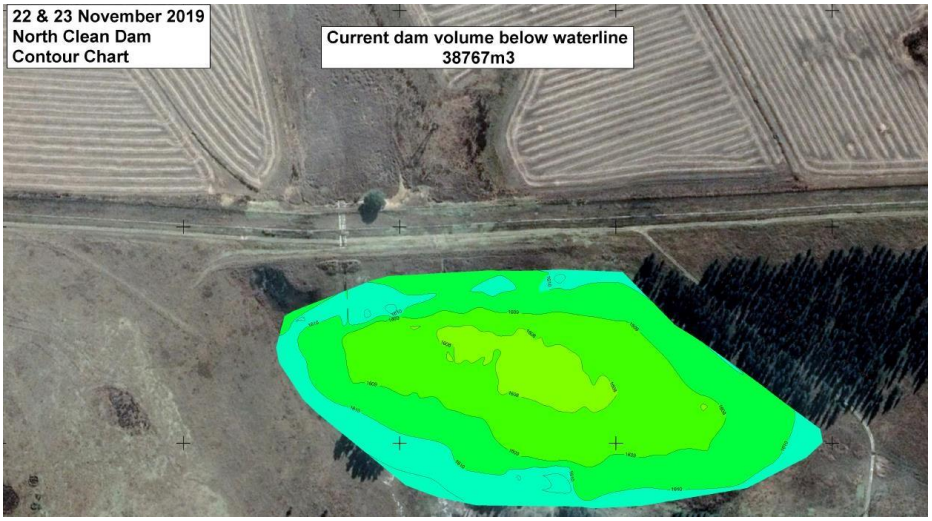

Figure 7: North Clean Water Dam Volume Below Waterline

4.4 Dirty Water Dam

The Dirty Water Dam (DWD) is located towards the west of the station not far from the East Gate at Tutuka Power Station [Figure 8]. The DWD has overflowed quite a number of times with the identified failure mechanisms being the lack of DWD storage capacity which was compromised by historic ash inflow to the DWD. The Dirty water dam was dredged in 2021 due large amounts of ash ingress into the dam which led to minimum storage capacity. The situation led to an environmental contravention as dirty water was then diverted to flow into the environment. It is fundamental that the DWD is regularly dredged to prevent a reoccurrence of the above contravention.

The main source of water inflow into the DWD is from the station drains with rainwater also flowing into the DWD. It's an integral component at the station which needs to be running at optimum levels in keeping up with production and environmental targets and regulations. The DWD was recently dredged and rehabilitated between the years 2021 and 2022. A survey of the DWD was conducted in December 2014 ,2019 and 2022.According to the latest June 2022 DWD Survey, the capacity up to the overflow was 95 741 m³. The DWD was brought back in service(commissioned) in June 2022. It must be noted that since then siltation has occurred due ash inflow into the dam hence the dam capacity has already decreased which poses a threat to healthy dam management during the rainy season.

Figure 8: Dirty Water Dam

Figure 9: DWD Post Dredging (2021)

4.5 Ash Sedimentation Ponds

The sedimentation ponds are located adjacent to the DWD and form part of the water recovery system at the station[Figure10]. The sedimentation ponds are composed of the primary, secondary and tertiary sedimentation ponds.

Figure 10: Ash Sedimentation Ponds

The ultimate purpose of the sedimentation ponds is for ash and other sediments to settle and for siltation to occur before water is cascaded to the oil skimming plant and finally to the DWD [Figure 11]. Each of the sedimentation ponds contain penstocks which will require repairs and these repairs fall within this scope. Penstock Repairs are inclusive but not limited to joint repairs and concrete works. Due to plant operations which include emergency floor ashing, the rate of siltation at the sedimentation ponds is excessively high which has resulted in the abrupt loss of capacity. Furthermore, the north sedimentation pond is already showing signs of large amounts of siltation even though its been in commission for less than a year which further emphasizes the need to frequently dredge the sedimentation ponds [Figure 12].

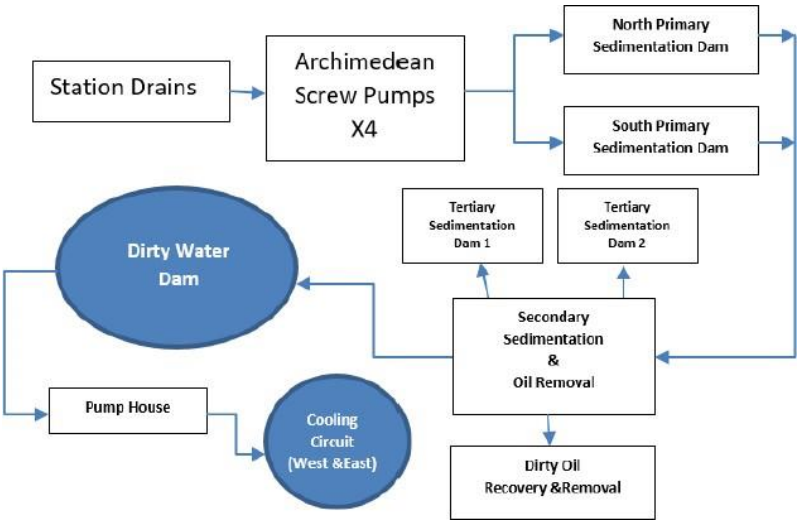

Figure 11: Water Recovery System

Figure 12: North Primary Sedimentation Pond

4.6 Ash Dump North Clean Water Dam

The Ash Dump North Clean Water Dam is located north of the ash dump and its capacity is 362368m³. A bathymetric and lidar survey of the dam was conducted in August 2020 and its capacity at that time was found to be 331237.1m³. Inflow into the dam is from the Ash Dump Clean Water Diversion channel and from surface run from the adjacent catchment areas. Figure 14 displays the Ash Dump North Clean Water Dam.

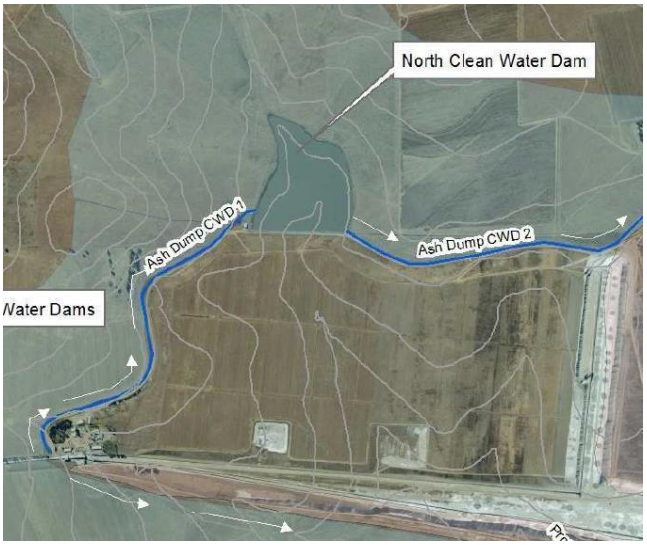

Figure 13: Ash Dump North Clean Water Dam

4.7 Ash Dump Settling/South Dam

The Ash Dump Settling/South Dam is located to the south of the ash dump and its capacity is 80812m³. A bathymetric and lidar survey of the dam was conducted in August 2020 and its capacity at that time was found to be 37875.5m³. Inflow into the dam is from the Ash Dump Dirty Water channel(DWC) and from surface run from the adjacent catchment areas. Figure 15 displays the Ash Dump Settling/South Dam and the DWC.

Figure 14: Ash Dump Settling/South Dam

4.8 Ash Dump Dirty Water /South Ash Retention Dam

The Ash Dump Dirty Water/South Ash Retention Dam is located adjacent to the Ash Dump Settling/South Dam and its capacity is 157259m³. A lidar survey of the dam was conducted in August 2020 and its capacity at that time was found to be 141747.1m³. Figure 16 displays the Ash Dump Dirty Water/South Ash Retention Dam.

Figure 15: Ash Dump Dirty Water/South Ash Retention Dam

4.9 Mooi Messie/South Clean Water Dam

The Mooi Messie/South Clean Water dam is located adjacent to the Ash Dump Dirty Water/South Ash Retention Dam and its capacity is 167689m³. A bathymetric and lidar survey of the dam was conducted in August 2020 and its capacity at that time was found to be 156645.6m³. Inflow into the dam is from the Ash Dump Dirty Water channel and from surface run from the adjacent catchment areas. Figure 17 displays the Mooi Messie/South Clean Water dam.

Figure 16: Mooi Messie/South Clean Water Dam

5. Scope of Work

i. Contractor to note dams will be dredged as and when required basis. Furthermore, the employer will instruct the contractor when each of the respective dams will be dredged.

ii. Contractor to conduct initial site investigations, which is inclusive but not limited to bathymetric surveys and laboratory testing. The site investigations are to determine the following:

a) Applicable characteristics of the ash/silt to be removed from the dams and used as input to determining the most efficient dredging method/s and dredging production rate to be maintained during execution of the works.
b) Volume of ash to be removed from the dams and where possible the rate of sludge/ash inflows during normal and abnormal conditions that might change the initial volumes. This can be applicable during the dredging scope per dam.
c) Sludge characterisation/classification including disposal requirements

iii. Contractor to provide all drawings, survey results and site investigations/assessments in the form of detailed reports.

i. Contractor to bring in all machine, equipment, systems/infrastructures and operational requirements to dredge the dams as per suitable and efficient methodology investigated, analysed and defined by the Contractor and execute the de-watering process, handling, transporting and disposal of ash in the shortest duration possible. Transportation to be done taking Health and Safety of plant and personnel into consideration. No sludge/ash spillages will be allowed on site during works execution. If there are spillages, the Contractor will be required to clean the spillages with immediate effect.

ii. Contractor to conduct detailed site preparations to support removal of ash & silt and establish the de-watering area. This includes but not limited to:

a) Assessing and determining the pumping discharge and other de-watering sites
b) Assembling and connecting fixed HDPE pipe work from the dredging machine/s to the de-watering site
c) Facilitating the dewatering process, handling, and transportation of ash from the de-watering site to the designated disposal site. Quantity of ash removed from de-watering site to be measured by the dry ash disposed to the designated dumping site by truck.

iii. The Contractor must record the following when dredging is being executed, at which the Contractor should readily produce upon Employer's request during execution of the dredging works:

a) Date and time of dredging inspection.
b) Quantity of sediments and/or ash removed in cubes
c) Comparison of planned vs actual quantity of ash and/or silt removed
d) Daily production rate of dredging

e) Problems identified and challenges encountered

f) Maintenance action required if any

g) Action taken/recommended action.

iv. The Contractor must ensure that the dredging personnel are well trained and informed of the dredging operating and work requirements. Only trained, competent maintenance technicians or personnel must be authorised to conduct dredging operations and work. The Contractor must appoint a competent Site Manager with minimum of 5 years work experience in dredging of dams or dam rehabilitation and/or bulk earthworks, and/or similar works. The Contractor's Site Manager must monitor dredging and supervise the execution of the dredging works. The Contractor's Site Manager must always supervise the works and if not available, the delegate/stand-in must be appointed in writing to ensure continuity of the works.

v. Contractor to note that all dredging information must be recorded on a daily report. The Contractor upon Employer's request must readily submit a dredging report during execution of the dredging works and at the completion of the dredging works. The Contractor's site manager must sign the report issued to the Employer.

vi. Contractor to provide and install all the necessary materials, mechanisms, systems, and equipment to prevent and control the dredging works not to be disturbed and/or stopped by the inflow into the dams.

vii. Contractor to provide details and reasoning as to why their selected dredging methodology, machinery, equipment and skills is chosen to execute the dredging works which best suits the site conditions and operations. Contractor to submit this before commencing with the dredging works for each dam for Employer to approve.

viii. Provide all necessary machine, equipment, labour, systems/infrastructures to dredge silt and ash from the dams, execute the de-watering process and dispose it to the ash disposal facility. Any rock encountered during the dredging operations shall be brought to the attention of the Employer immediately.

ix. Contractor to note that specific areas within the station will be used for de-watering. The areas will be identified prior to dredging

x. Contractor to conduct post dredging site investigations, which is inclusive but not limited to bathymetric and lidar surveys. All these results are to be submitted in the form of detailed reports. The site investigations are to determine the following:

a) Verify that the correct quantity of silt and ash have been removed from the dam
b) Verify that dredging works are completed, and that the respective dam's storage capacity has been restored as per the employer's requirements.
c) To find the actual dam storage capacity after dredging is completed.

xi. Contractor is required to remove all reeds and vegetation along the perimeter of the dam such that it is easily accessible for inspections to be executed.

xii. Contractor is required to rehabilitate the dam which is safe in accordance with dam safety regulations and which is inclusive of but not limited to the following:

- Contractor to close all ramps created for access during dredging works.
- Contractor to rip existing dam surface bed to a maximum 300mm depth in layers of 150mm. Dolerite material to be imported and applied on the surface bed of the dam in 150mm layers.
- Contractor to compact dam surface bed, in layers of 150mm, to minimum 93% MOD ASHTO
- The dam wall/embankment slope must be and kept at a 1:3 ratio to ensure slope stability. To achieve this, Contractor to rip existing material to a maximum 300mm depth in layers of 150mm. Dolerite material to be imported.
- Contractor to compact dam wall/embankment in layers of 150mm to a minimum 93% MOD ASHTO.

xiii. Contractor to carry out a Lidar Survey to determine final dam capacity after the dam has been rehabilitated.

xiv. The Contractor will rectify all identified damages/deterioration identified during and post completion of the dredging works.

xv. The Contractor must mitigate any unforeseen conditions and all measures taken to mitigate the risk, i.e., unfavourable weather conditions, for example rain, storms, etc. The mitigations must take health and safety of personnel and plant into consideration at all costs.

xvi. The Contractor to conduct a detailed Risk Assessment prior to the commencement of any dredging works, taking into consideration the transmission lines, servitudes, working near or under high voltage lines etc, and put all the mitigations while working under these conditions. This may include getting authorisation and required permits from transmission and appoint an approved Authorised/Appointed person to supervise the works.

6. Labour, Materials and Machine/Equipment

The Contractor shall be responsible for the supply and delivery of all materials, tools, equipment, tools, machinery, labour, approved machinery operators and specialist skills necessary to execute the required dredging works. All equipment and machinery must be in working order. Contractor to conduct calibration tests on all tool's machinery, and equipment. Contractor to submit valid calibration certificates for Employer's approval before commencing with works. Contractor to submit method statement together with material/product data sheet for Employer's Civil Engineer to approve before commencement of works.

Contractor to provide their own resources to secure security of tools, materials, and machinery/equipment that will be stored on site. Employer will not be liable to account for any costs related to damages or thief of Contractor's tools, materials, and machinery and equipment.

Contractor to ensure that all machinery and equipment used on site will be replaced with immediate effect when damaged or scheduled for maintenance/service and at no time will works stop due to unavailability of machinery. Works delayed due to unavailability of machinery, skilled operators etc will result in a penalty, NCR, early warning etc.

7. Quality Control and Assurance

The Contractor shall develop and implement a system for quality verification records, including site investigation Plans, Record Books (Data Books) as specified in the Tutuka Quality Specifications.

Routine checks and inspections to be conducted as per Contractor's Quality Control Plan (QCP), illustrating defined intervention assessment points. Before commencement of the works, the Contractor:

a) Submits QCP for the Employer to review and approve before commencement of any works. The QCP include witness, hold, test, inspection points and signatories to be included are the Contractors Supervisor, Eskom Civil Maintenance, Eskom Civil Engineer and Eskom Quality.

b) Compiles and present detailed technical proposal of executing the required works to the Employer, for Employer (i.e., Civil Engineering, Civil Maintenance, Civil Quality, etc.) to approve upon receiving for each task order and before commencing to execute dredging works. Detailed proposal to specify methodology, machinery, equipment, labour, etc applicable for the dredging works

8. Configuration Management

All documents supplied by the Contractor shall be subject to Employer's approval. The language of all documentation shall be in English.

All project documents must be submitted to the Employer's Representative with transmittal note. In order to portray a consistent image, it is important that all documents used within the project follow the same standards of layout, style and formatting as described in the Work Instruction. The Contractor is required to submit documents as electronic and hard copies and both copies must be delivered to the Eskom Representative with a transmittal note.

9. DOCUMENT RETURNABLES

The contractor shall produce and submit a project plan, project quality plan, organogram, detailed method statement, QCP, safety file for approval prior to the commencement of work. The Contractor to conduct induction and medicals prior to commencement of work.

These documents should contain the following information, which is not limited to -

- Project Programme: Indication of the different activities applicable for the execution of the required works from site establishment to handover as well as the time period allocated for each activity
- Project Quality Plan: Highlight the activity or standard which shall be used to ensure quality materials and workmanship
- Organogram: Indication of the core staff (i.e. Site Manager/Project Manager, Safety Officer, etc.) who will be involved in the execution of the required works. Names and qualifications to be specified.
- Method Statement: Detailed method statement specifying sequence of activities, skills, labour, materials, tools, equipment, machinery and testing procedures applicable for the execution of the required work.
- QCP: Must indicate relevant hold, surveillance and witness points for the Contractor and Employer

- Drawing format for all drawings to comply with Microstation. The creation, issuing and control of all Engineering Drawings will be in accordance with the latest engineering drawing requirements. Drawings issued to Eskom will be a minimum of one hardcopy and an electronic copy. All Contractor is required to submit are electronic drawings in Micro Station (DGN) format and scanned drawings in PDF format. No drawings in TIFF, AUTOCAD or any other electronic format will be accepted. Drawings issued to Eskom may not be "Right Protected" or encrypted. All drawings are to be done on the Eskom drawing template and must be signed by the Contractor.

10. Programme

The Contractor is to submit a detailed program of the works 1 week after being awarded the contract. The programme must clearly demonstrate to complete the works in the shortest time possible, effective from the order/contract appointment. The program submission must be in soft copy pdf.

The project programme to specify the different activities applicable for the execution of the required works from site establishment to handover as well as the time period allocated for each activity.

11. Acceptance

This document has been seen and accepted by:

Name	Designation
	Civil Engineering Manager
	Senior Civil Engineer
	Auxiliary Engineering Manager
	Senior Engineer-Auxiliary Engineering
	Chemical Services Manager (Acting)
	Engineering Manager
	Civil Maintenance Supervisor
	Civil Maintenance Supervisor
	Outside Plant Maintenance Manager
	Maintenance Manager
	Quality Officer-Civil Plant
	Environmental Officer
	Environmental Manager
	Safety Manager
	Senior Advisor Quality Engineering
	Dirty Water Dam Recovery Manager
	GMR2 Compliance Manager
	Risk & Assurance Manager

12. Revisions

Date	Rev.	Compiler	Remarks
24 March 2022	0		Submitted for Review
31 March 2022			
25 August 2022			
17 October 2022	1		Final Document

13. Development Team

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

14. Acknowledgements

N/A

Appendix A

N/A