The Kingdom of Lesotho

WATER COMMISSION

CONSULTANCY SERVICES FOR UPDATING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT AND DEVELOPMENT OF RESETTLEMENT ACTION PLAN FOR LESOTHO LOWLANDS WATER DEVELOPMENT PROJECT PHASE III (LLWDP III) BOTHA-BOTHE [ZONE 1]

Environmental & Social Impact Assessment (ESIA)

Executive Summary

July 2022

Submitted by:

***SM* CONSULTING ENGINEERS (PTY) LTD**

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Our Ref: SMCE/Env/8006-19

Your Ref: Contract No. AfDB/LRWSSP-B/C10

ESIA Executive Summary Submission Form

Date: 13th July 2022

To: LLRWSSP
Commission of Water
Sentinel Park Building
15 UN Road
Private Bag A440
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Lesotho

Attn: **Mr Mokake Mojakisane**

REF: ESIA EXECUTIVE SUMMARY SUBMISSION FORM: SM CONSULTING ENGINEERS UPDATING OF THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT AND DEVELOPMENT OF RESETTLEMENT ACTION PLAN FOR LESOTHO LOWLANDS WATER DEVELOPMENT PROJECT PHASE III (LLWDP III) BOTHA-BOTHE [ZONE 1]

Dear Sir

We, being **SM Consulting Engineers (SMCE)** [*the undersigned*], in regard to the Assignment **Contract No. AfDB/LRWSSP-B/C10** dated June 2022, for the provision of the consultancy services for **Updating the Environmental and Social Impact Assessment (ESIA) and Development of Resettlement Action Plan (RAP) for Lesotho Lowlands Water Development Project Phase III (LLWDP III) Botha-Bothe [Zone 1]** hereby submit the Environmental and Social Impact Assessment (ESIA) Executive Summary for your attention for Client feedback.

We remain,

Yours Sincerely,

Authorised Signature:

Name and Title of Signatory: MV. Williams – Managing Director
Name of Firm: SM Consulting Engineers

Document Control

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is bound into the front of all documents released by SM Consulting Engineers Pty (Ltd) The signatories hereof, being duly authorised thereto, by their signatures hereto confirm their acceptance of the contents hereof.

PROJECT NAME	UPDATING THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND DEVELOPMENT OF RESETTLEMENT ACTION PLAN (RAP) FOR LESOTHO LOWLANDS WATER DEVELOPMENT PROJECT PHASE III (LLWDP III) BOTHA-BOTHE [ZONE1]
DOCUMENT TITLE	ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) EXECUTIVE SUMMARY
VERSION DATE	13 JULY 2022
VERSION STATUS	REVISION 03
DOCUMENT STATUS	SUBMITTED

Signing Of The Original Report

We, the undersigned, accept this report as a stable work product to be placed under formal change control as described by the Change Control Procedure document.

NOTE: “Final Version to be applicable and submitted on Acceptance of Report by Client.”

	Prepared by	**Reviewed by**	**Approved by**
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	Signature:	**Signature:**	**Signature:**
	Date: 13 July 2022	**Date:** 13 July 2022	**Date:** 13 July 2022

Revision Record Sheet

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Important Notice

This summary is confidential and is provided solely for the purposes of undertaking a Review for the Lesotho Lowlands Water Supply Study. This report is provided pursuant to a Consultancy Agreement between SMCE Pty Ltd. and the Lesotho Water Commission, under which SMCE has been engaged to perform specific tasks. It is strictly limited to the matters stated and subject to the various assumptions, qualifications and limitations, and does not apply by implication to other matters.

This document is an update to the 2008 Environmental Social Assessment (ESIA) undertaken by SSI. This report is compiled in partial fulfilment of the consultancy agreement between SMCE and the client LLWSDP (Lesotho Lowlands Water Supply Development Project) Phase III in Botha Bothe Zone1.

This summary aligns itself with all previous draft or interim reports, whether written or presented orally, before the issue date. This report has not and will not be updated for events or transactions occurring after the issue date or any other matters which might have a material effect on its contents or which come to light after the issue date. Such revisions will be facilitated by the client. They will be beyond the scope of this assignment.

The summary report presents the social and environmental impacts and mitigation measures envisaged for adoption by construction activities. The report further highlights the Environment Social management measures to be adopted to ensure sustainable construction of the Water Infrastructure.

This executive summary must be read in conjunction with the main ESIA report.

Approval Of Document

CLIENT APPROVAL

Report Title:	ESIA Executive Summary – LLWSDP – Phase III Zone 1 (Botha Bothe)		
Final Revision #	**Prepared by**	**Submission Approved by Client**	**Submission on**
3			

REPORT COMPILED BY:

SM Consulting Engineers

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Acronym	Meaning
AP	Affected Persons
CCS	Community Council Secretary
CLO	Community Liaison Officer
CR	Community Representative
DA	District Administrator
DCS	District Council Secretary
DRWS	Department of Rural Water Supply
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EM	Environmental Management
EMS	Environmental Management System
ESMP	Environmental and Social Management Plan
ESS	Environment & Social Specialist
GBV	Gender Based Violence
GIR	Grievances Investigation Report
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
IFR	Instream Flow Requirements
LHDA	Lesotho Highlands Development Authority
LHWP	Lesotho Highland Water Project
LLBWSS	Lesotho Bulk Water Supply Scheme
MSDS	Material Safety Data Sheet
OH&S	Occupational Health & Safety
PIE	Project Implementation Entity
PIU	Project Implementing Unit
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
STD	Sexually Transmitted Diseases
TB	Tuberculosis
TIP	Trafficking in Persons
TSP	Total Suspended Particulates
VEC	Valued Environmental Compounds
WASCO	Water and Sewage Company
WC	Water Commission
WTW	Water Treatment Works

1. EXECUTIVE SUMMARY

1.1 Overview of the project

The Lesotho Bulk Water Supply Scheme (LLBWSS) project was initiated in 2004 with the objective to address water security challenges and to improve water supplies for domestic, institutional, and industrial use in the Lowlands' urban, peri-urban, and other demand centres (towns and clusters of villages with populations of 2,500 people and more). The Lowlands region has been divided into demand zones. Zone 1 in the north-west of Lesotho have been identified as a priority area due to the high-water demand, economic opportunities, and current shortages in supply. The project in Zone 1 comprises the construction of a bulk water supply scheme which will abstract water from the Hololo River and transfer it storage reservoirs near to the project towns.

The portable bulk water supply scheme for Zone 1 is supplied by an abstraction point on the Hololo River close to the road bridge that links Qalo with Monontša, a water treatment plant, 15 pump stations, 30 reservoirs and 108.2km pipelines with diameter ranging from 80mm to 700mm.The bulk of the supply is for Botha Bothe district including provision for the newly constructed Ha Belo industrial estates.

Zone 1			
1	Butha Buthe	9	Selomo
2	Makhunoane	10	Makong
3	Qholaqhoe	11	Phooko
4	Seboche	12	Rampais Nek
5	Phelantabe	13	Nqechane
6	Khukune	14	Jonathane
7	Qalo	15	Pitsi's Nek
8	Serutle	16	Khabo

The project will also realise a number of significant benefits, such as:

- Improved access to potable water;
- Public health benefits from treated water supply;
- Economic growth.

Project Components

The 2018 Updated Project designs for Zone 1 of the Lesotho Lowlands Water Supply Project. Includes the following key infrastructure components

- Direct surface water abstraction from the Hololo River, augmented by LHWP transfer in the short to medium term, for potable water supply.
- Raw water intake with a total capacity of 880 l/s (76,060m3/d)
- Hololo Water Treatment Works with total capacity of 72,800m3/d with 45,200m3/d built in Phase 1 and the remaining 27,600m3/d in Phase 2.
- A total of 59 Service Reservoirs, with 42 to be built in Phase 1 and 17 in Phase 2
- 25 Pumping Stations with all their civil infrastructure to be built in Phase 1 but the MEICA components to be constructed in Phases 1 and 2.
- 147km length of pipelines, with varying diameters from 80mm to 800mm to be built in a single phase (Phase 1).

Other relevant infrastructure requirements include access roads to the bulk water infrastructure sites and water distribution system downstream of the bulk water infrastructure.

1.1.1 Alternatives to the project

The Zone 1 project area will be served by a bulk water supply scheme using direct river abstraction, water treatment, pumping stations and conveyance through pipelines to storage tanks near target settlements. Abstraction will be from the Hololo River just below the road bridge crossing to Qholaqhoe, with the treatment works located near Qalo. When there is insufficient flow in the Hololo River water will be released from the Highlands Water Project via 'Muela Dam and the Nqoe River into the Hololo River.
The designed system provides for climate change resilience. The system has been designed to maximise the use of alternative sources of energy and gravity. While reducing the dependency on fossil fuels. To achieve this design the system the following alternatives were considered: water sources used to supply the water project and the energy sources used to power the abstraction, treatment and supply of water as part of this project.

The water sources alternatives assessment focused on vulnerability to climate change of the proposed water source. As well as yield capacity of the water sources. The alternatives considered for the water supply project included: Spring-fed system, Groundwater-fed systems, Abstraction of water from the Hololo River, Construction or augmentation using off-bank storage, Instream-storage dams. The preferred option was the abstraction form Hololo river with augmentation of supply during winter month through releases from Muela (LHWP).

The energy requirements for the project are mainly for the following key activities: river abstraction, water treatment, pumping stations and conveyance through pipelines to storage tanks near target settlements.
The alternative sources of energy considered were solar, gravity, diesel powered generator and connection to the electrical grid. The preferred option was the hybrid energy sources that incorporates gravity, solar and connection to the national power grid.

1.1.2 Main project activities

The project implementation shall be done in three distinct phases, namely: mobilization, construction and operation phase.

During the mobilisation phase, the contractor will undertake the following key activities:

- Survey of reservoirs and pipelines and associated infrastructure
- RAP assets verification and valuation
- RAP implementation
- Site establishment of contractor's camp –
- Clearing for material lay down areas
- Recruitment
- Training of staff and labourers
- Natural materials sourcing (borrow pits establishment, quarries, water, and sand)
- Constructing or rehabilitating temporary access routes to the reservoir sites and abstraction point

Construction Phase

This is an active undertaking of civil works and involves the following:

- Site clearance of the construction areas
- Diversion of water from the water abstraction infrastructure construction area
- Manual digging of the trenches
- Concrete batching
- Material haulage to the construction sites
- Concrete pouring and casting
- Blasting of hard rock material, excavations within hard rock areas
- bulk earthworks for all foundations
- Importing of bedding and backfill materials
- Pipe laying
- The excavations are backfilled with bedding and backfill material that has been imported
- The electromechanical works shall be undertaken during the construction phase
- Pressure testing for the reticulation network.

Once the water infrastructure construction is completed there will be sectional rehabilitation and handover of the completed sections. This shall be an on-going exercise that runs concurrently with the civil works. The following key activities shall be undertaken:

- Removal of alien invasive species
- Shaping of all construction sites
- Reinstatement of paved roads (resurfacing as prescribed by Roads directorate standards)
- Reinstatement of paved walkways

- Reinstatement of electrical, telecommunication, sewage and any other utility supply line that was damaged during construction of Zone 1 project infrastructure
- Soil reaping to remove and or rehabilitate temporary access routes
- Removal of material from temporary lay down areas (construction offices, bunded areas, material laydown areas, site fence and ablution facilities)
- Decommissioning of concrete batching plants or areas
- Clean up of all spillages
- Reaping and re-vegetation of soil to remove the footprint of the site camp
- Rehabilitation and shaping of the quarries and river sand abstraction points
- Re-vegetation and or relocation of all trees damaged during construction

Operations Phase

The operational phase shall involve, abstraction of water form the Hololo River, treatment of water within the Water treatment works and supply of portable water to the water supply and reticulation network to settlements Botha Bothe and Hlotse.

Decommission phase

The Water Utility provider (WASCO) indicated that their Policy provides for decommissioning of both pipelines and reservoirs. This happened at the end of the lifeline of the project infrastructure components or when the health safety and environmental impacts of the infrastructure operations increases.
It is currently not known when the Zone system or its components will be decommissioned. In future when the system is decommissioned. A detailed decommissioning plan shall be developed to guide the process.

1.2 Brief description of the project site

The project is located within the Lowlands Region of Lesotho which has an altitudinal range of 1,388 metres above mean sea level (mamsl) to 1,800 mamsl. The majority of the water reticulation infrastructure shall be located within sedimentary Karoo rock of the Beaufort and Stormberg Groups comprising sandstones, siltstones and mudstones. The soils derived from the Karoo sedimentary sequences and basalt overlay on the western Lowlands are the country's main cultivable areas and are typically inherently low in fertility, quite poorly structured, have low water holding capacities, and are easily eroded.

The project is located within the administrative districts of Leribe and Botha Bothe. In Leribe the summers are warm while the winters are short, cold and dry. It is mostly clear around the year with temperatures varying from 0^{o}C to 26^{o}C and rarely below -3^{o}C or above 30^{o}C. The climate of Botha Bothe is mild, and generally warm and temperate. In winter, there is much less rainfall than in summer. The temperature averages 13^{o}C; precipitation 902mm per annum.

Land use in the project area comprises a mixture of dryland subsistence crops (principally maize and beans), grazing (cattle, sheep and goats), woodlots and forestry plantations of Eucalyptus and pine species, urban areas and extended villages. **Figure 1-1** below provides an overview of the land uses along the reticulation network. The project area is a modified landscape with evidence all round of human habitation. The proposed project reticulation

network is to be located along and across the A1 North Road to Mokhotlong. Also passes through the built up commercial hub of Botha Bothe town.

The general appearance of the vegetation within the project site represents typical lowlands of Lesotho. It is predominantly grassland with small thickets and woodlands found in gullies and valleys of the foothills and on krantzes, steep cliffs and hillslopes of the Lowlands. Dominant flora species within the project area *Heteropogon contortus and Eragrostis curvula*. The vegetation along the shores of the Hololo river is composed of mainly sedges and rushes. Typical grass-like species and herbs found near water and damp places are *Scirpus sp., Juncus sp., Cyperus sp., Plantago sp., Schoenoplectus sp., Imperata cylindrica, Miscanthus sorghum, Persicaria, polygonum sp., Anagallis sp, Verbena sp, Bromus sp, Schisostylis coccinea, Poa sp., Homeria sp* and *Moraea sp*. The grass-like species are mainly used for handicrafts.

The are no recorded avifauna breeding areas within the project area. A colony of Bald Ibis was recorded foraging area within the proposed project locality. This red data species it is classified as threatened. Threats to the survival of this species are harvesting and habitat degradation a likely impact of this project.

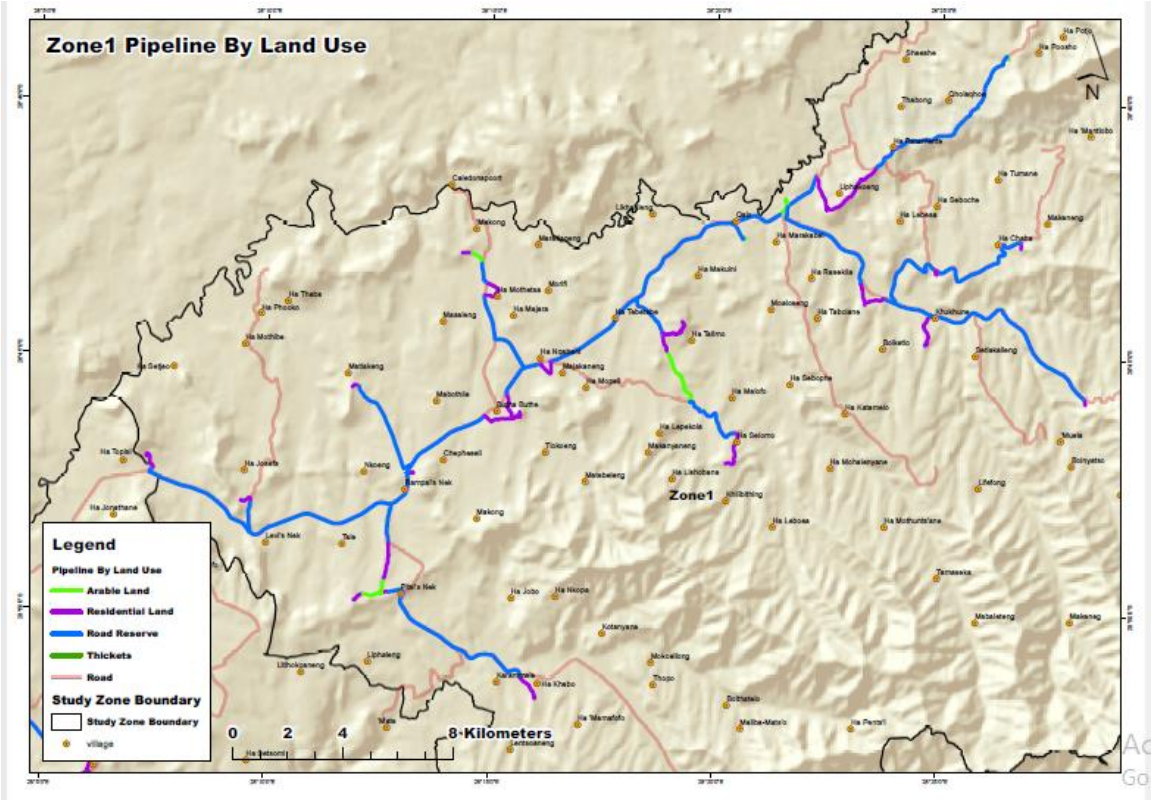

Figure 1-1 – Map showing general land uses along the project infrastructure

The proposed project area includes rural, peri urban and urban settlements within districts of Botha-Bothe and Leribe. From the Baseline winter monitoring the average ambient air quality is around 53 AQI. This implies the air quality is good. From the results the air quality

ranges from 99 which is moderate to 25 which is good air quality. The Particulate matter PM2,5 for the Botha Bothe district ranges between 11.1 and 6.1 µg/m^3. The average PM2.5 is 9.42 µg/m^3. The major sources of air emissions from observation include: homestead fires, open commercial fires (*chesa nyama*), car exhaust emissions.

The ambient noise within the project localities differs from rural to urban settlements. While also displaying 24 hour fluctuations. The highest ambient noise is recorded at 18:00 in both urban and rural settlements within the project villages. Thus implying the noise levels peak during the evening when commuters, livestock herders, farmers and scholars return home. Based on baseline data Botha Bothe urban settlements have highest noise levels at daily average of around 77dB, followed by rural Leribe at around 43dB and Botha Bothe rural at around 35dB.

1.3 Institutional and legal framework for implementation of the project

1.3.1 Institutional arrangements for the project

Ministry of Water: Provides Policy direction for the project. In line with the national objectives facilitates mainstreaming of gender and climate change in the design and implementation of the project.

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The Ministry of Water through the Department of Water Affairs, Water law section, allocates all water licensing requirements for the projects as guided by the Water Act 2008.

Water Commission: The Water Commission (WC), as the proponent of the project, is responsible for the effective implementation of the project in compliance with all approvals. As the proponent WC will appoint a construction contractor, who will be responsible for the implementing the proposed LLWDP III Project and hence implement the proposed mitigation measures documented in this ESMP.

Department of Environment: The Department of Environment through the Environment Impact Assessment Section, coordinates the approval and authorisation of the EIA Record of Decisions for all development projects in Lesotho. They achieve this in consultation with a multisectoral ad-hoc EIA review committee called Environmental Units. They also provide oversight and compliance monitoring of developments to the requirements of the project ESMPs', EIA regulations and the Environment Act of Lesotho.

Department of Rural Water Supply (DRWS): The DRWS facilitates free portable water supply for all communities within rural communities. They are beneficiaries and end users of the infrastructure that will be developed as part of this Project. They hold the responsibility of ensuring that environmental and social compliance is adhered to during Project design, and implementation.

Water and Sewerage Company (WASCO): WASCo is a state owned company that is responsible for urban portable water supply**.** They are the beneficiaries and end users of all urban bulk water storage, wastewater treatment works, urban water supply network

that will be developed as part of this Project. They have the obligation of ensuring that environmental and social compliance is adhered to during project planning, design and implementation.

Project Engineer: This is the independent Consulting Engineer that shall be appointed by the project proponent. It is anticipated that the Project Engineer will be responsible for the construction supervision of the project, therefore WC will appoint a Project Engineer. It will be the responsibility of the Engineer to oversee the overall implementation of the project as well as to ensure compliance with the ESMP. Therefore, the Project Engineer will appoint a qualified Environmental Manager.

Project Environmental Manager: The project Environmental Manager shall be engaged as part of the Consulting Engineer's team. The Environmental Manager (EM) will ensure that the provisions of ESMP are complied with by the contractor during the implementation of the project

Contractor: The contractor is responsible for construction of the distribution lines as well as the associated substation, within the conditions of the ESMP. The contractor is answerable to the Project Engineer for all environmental issues associated with the project. The contractor will, therefore, appoint an Environmental Control Officer (ECO).

Environmental Control Officer – The Environmental Control Officer (ECO) to be engaged by the Contractor. The ECO will be responsible for ESMP implementation throughout construction. The ECO must be available on a daily basis to supervise construction phase and ensure compliance with the ESMP and to prepare regular site inspection reports.

Community Liaison Officer (CLO): The Contractor will appoint a Community Liaison Officer (CLO) who is approved by the Engineer and will work in close collaboration with the ECO. The CLO will be responsible for daily liaison with local stakeholders affected by construction activities.

Project Affected Community Councils: The project affected community councils are Sephokong and Maisa Phoka (Leribe), and Likila, Tša-le-Moleka, Lipelaneng and Makhunoane community councils (Botha Bothe). These are the competent local authority that shall facilitate and authorise allocation and use of natural resources for use within this project. They are the competent authority that deals with land management at local level. They are key in Resettlement Action Plan implementation as guided by the Lesotho Laws.

Village Chiefs Marena – these are the traditional local authorities within the project affected communities. The roles of traditional chiefs as guided by law relevant to the ESMP include but are not limited to: grievance management, safety and security. They also play a vital role in asset verification during the RAP implementation.

1.3.2 Legal and Regulatory Framework of Implementing the project

This ESIA and the resultant ESMP have been developed in compliance to the following key national legal and policy requirements for the ESIA: Constitution of Lesotho (1993), Environment Act (2208), Water Act (2008), Mines and Mineral Act (2005) Local Government cat (2004), Local Administrative Act (1969), National Heritage Resources cat (2012), Roads Act (1969), Road Traffic Act (1981), Sexual Offences Act (2003), Anti Trafficking in Person Act (2011), Labour Code (1992), Workman's Compensation act (1977), Labour Code (Construction Safety) Regulations (2002), weeds Eradication 1969.

The project development and the ESIA are aligned to the national objectives as defined in the following national policies and strategies: Vision 2020 and the National Strategic Development Plan 2012/13-2016/17 as the implementation strategy of Vision 2020, The Environmental Policy, 1998, Gender and Development Policy (2003), Lesotho water and Sanitation Policy (2007), Long Term Water and Sanitation Strategy (2014), The Kingdom of Lesotho's Third National Communication on Climate Change (2021), Lesotho National Climate Change Policy 2017.

1.4 Major and moderate project impacts

This section highlights the negative and positive impacts associated with the construction of the following Water infrastructure components (Intake Towers/ points; Water treatment works (WTW); Water Pipelines; Pumping stations; Electrical supply, Storage Reservoirs; Off-Channel storage, Labourers/ operators camps).

The major impacts associated with construction include impacts on water courses, cultural heritage, roads traffic, noise and vibration, air quality, economic impacts, and public health. The summary of impacts is provided in **Table 1.1** below.

Table 1.1:: Summary of Moderate to High construction impacts

Class of impacts	Impact	Pre-mitigation assessment*	Post-mitigation assessment*
Impact on water courses	Increased sediment yield, sandbanks, islands	Moderate	Low
	Damage to water courses	Moderate	Low
	Soil erosion/loss	High	Low
Impact on cultural heritage	Disturbance of graves and ash heaps	Very high	Moderate
	Damage to initiation and spiritual sites along flood plain	Very high	Moderate
Impacts on roads and traffic	Increased traffic	High	High
	Road safety	Very high	Moderate
Noise and vibration	Noise and vibration	Moderate	Moderate
Air quality	Air pollution from dust	High	Low

Class of impacts	Impact	Pre-mitigation assessment*	Post-mitigation assessment*
	Air pollution from vehicle exhaust emissions	Moderate	Low
Social impacts	Skills development	Low positive	Moderate positive
	Loss of assets	High	Low
	Impact on livelihoods	Moderate	Low
	Increase in social ills	Moderate	Low
	Socio-political issues	Moderate	Moderate
Economic impacts	Employment opportunities	High positive	Very high positive
Public health	Occupational Health and Safety	Very high	Moderate
	Increase in HIV and other communicable diseases	Very high	High

* The impacts are negative except where stated.

The major impacts associated with operation of the infrastructure include impacts on surface water resources, aquatic ecology, water quality, health, economic impacts and aesthetics. Other positive and negative impacts will be caused by IFR releases, inter-basin transfers, supply of treated water to communities in the area, disposal of WTW sludge, and economic opportunities created by the availability of water.

Table 1.2: Summary of Moderate to high operational impacts

Class of impacts	Impact	Pre-mitigation assessment *	Post-mitigation assessment*
Impacts on surface water resources	Decrease in water flows	High	Moderate
	Increase in sediment deposition	High	Moderate
	Disposal of sludge from WTW	Moderate	Low
	Discharge of 'Muela water into Hololo River	Unknown	Unknown
Impacts on aquatic ecology	Impact of IFR releases on ecological status of river	High	Low
	Impact on instream biota (downstream)	High	Low
	Impact on riverine vegetation (downstream)	High	Low
	Impact of 'Muela water transfers on biota and riverine vegetation (upstream)	Unknown	Unknown
Impacts on water quality	Impact on water quality due to reduction in dilution	Unknown	Unknown
	Impact on water quality due to 'Muela transfers	Unknown	Unknown
Social impacts	Improved access to potable water	Very high positive	Very high positive
	Decreased water flow in Hololo River for downstream users	High	Moderate

Class of impacts	Impact	Pre-mitigation assessment *	Post-mitigation assessment*
Health	Public health benefits from treated water supply	High positive	High positive
Economic impacts	Economic growth	Moderate positive	Moderate positive
	Economic displacement	High	Very low
Aesthetics	Visual impact	Moderate	Very low

* The impacts are negative except where stated.

The residual operational impacts of the project include abstraction of water at the intake works and the impacts that this will have on downstream users, hydrology and sedimentation in the absence of any compensatory releases.

1.5 Consultations

The process employed multiple consultative phases. The first phase was conducted by the client between April and June 2018 to sensitise district authorities in Botha Bothe about the project. Key among those consulted were Members of Parliament of the affected constituencies, the District Administrators, District Council Secretaries, Principal chiefs, Area Chiefs, Community Councils and Government Departments. These consultations culminated in the development of a directory which the consultants later used to contact relevant parties for the meetings.

The second leg of consultations took place in June 2022 when the client introduced the consultants to the district authorities. During these consultations, consultants obtained additional details for other stakeholders in the districts. the table below shows the stakeholder log of all consultations undertaken as part of this ESIA updating exercise.

There are a total of around 612 P stakeholders consulted as part of this process. These include 357 men and 255women

Table 1.3 – Register of Key stakeholder consultations

Activity Performed	Date
DA Botha-Bothe courtesy call	20-06-2022
DCS Botha-Bothe courtesy call	20-06-2022
DA Leribe courtesy call	23-03-2022
DCS Leribe courtesy call	23-03-2022
Courtesy call Principal Chief Leribe	22-06-2022

Activity Performed	Date
Courtesy call Principal Chief Botha Bothe	23-06-2022
Pitso Ha Khabo (Khabo, Ha Lehloba)	29/06/2022
Pitso Ha Majara (Marallaneng, Morifi, Litlhalaneng)	28/06/2022
Pitso Ha Belo	5/07/2022
Pitso Nqechane	27/06/2022
Pitso Ha Motšoane (Ha Rampai, Literapeng, Ha Motšoane, Ha Mamatona, Naleli, Ha Loti, Libenyane, Thabana-Tšoana, Makhasane, 'Metsoaneng, Ha Rachane)	4/07/2022
Pitso Koeneng (Literapeng, Ha Mokotjo, Tale)	30/06/2022
Pitso Leribe (Bolofo, Maiseng, Ha Sera, Ha Mothetsi, Mamanyatsa)	30/06/2022

The major noted concerns from stakeholders and project affected communities were the following:

1. **Stakeholder fatigue and mistrust of consultations**
   Complained that the government has a tendency of making promises that it is not willing to fulfil and takes too long to implement.

2. **Recruitment**
   Majority of PAPs who attended the consultations expressed concern about the age restrictions as provided in local law. They indicated that they are aged above 60 and they are still active and should be considered for recruitment.
3. **Project benefits recommendations**
   The community highlighted that the project must aim to maximise benefits to the community (including jobs, skills development including provision of portable water for all villages along the water pipeline). The community also recommended that the when sitting project camp sites, priority should be given vulnerable groups these include elderly child headed households and disabled within the community.

4. **Alternatives recommendations**
   The community recommended use of existing water sources to supply water in system design.

5. **RAP Entitlements and criteria, compensation Rates**
   What happens if the pipeline goes through household compound?
   They stressed that compensation must be fair and adequate
   What are the current rates of the compensation
   There was also a concern on when the construction will start

1.6 Environmental and social management plan (ESMP):

The main objective of the ESMP is to provide a framework of actions to manage negative impacts and enhance beneficial impacts of the project through design, construction and operation phases of the project. Each management action is designed to be practical, measurable and auditable. Specifically, the ESMP aims to:

- Draw attention to all the key environmental management requirements applicable to the project.
- Provide an environmental management planning document for incorporation into the construction tender and contract documents.
- Define and outline the functions, roles and responsibilities of persons accountable for effective environmental management.
- Outline mitigation measures and environmental specifications to minimise the extent of and to manage environmental impacts associated with the project.
- Identify the requirements for detailed Method Statements (construction phase) for certain aspects or activities; and
- Define requirements and procedures for environmental and social monitoring.

The detailed mitigation measures that and the key role players that shall be responsible for their implementation, monitoring and facilitation. Are outlined in the of the ESMP implementation matrix provided in **Table 1.4** below.

The roles and responsibilities of the role players involved in implementation of this ESMP are as outlined in section 1.3.1 of this Executive summary.

Table 1.4 – ESMP Implementation Matrix

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
PLANNING AND DESIGN PHASE						
Obtain permits and permissions	Construction commencing without all legally required permits and permissions (i.e. borrow pits, water uses, tree removal licenses)	▪ Develop an environmental document control system/register where all permits and permissions will be filed, and updates stored.	All permits and permissions obtained prior to the specific work commencing on Site.	Consulting Engineer	Prior to construction commencement	EM Prior to construction
		Apply for all possible permits (refer to Table 3.2 for details of possible licenses.		Water Commission/ Consulting Engineer		
		RAP assets valuation and verification				
		RAP implementation/ Land Expropriation				
Opening of borrow pits ana material sourcing areas	Unstainable extraction and use of natural resources (borrow pits, quarries and sand mining)	▪ Prior to the use of any borrow pit or quarry, seek approval from relevant competent local and national authority				
		▪ Prior to the use of any borrow pit or quarry, the Contractor should prepare an EMS for approval by the Engineer.				
		▪ Where possible, the Contractor must use existing borrow pits and suppliers for borrow or quarry material wherever possible.				
		▪ Borrow pits Rehabilitation operations should ideally be conducted in parallel with extraction. Accordingly, progressive rehabilitation, in which depleted sections of a borrow pit are reclaimed while extraction is ongoing in other sections of the same borrow pit is encouraged (if practicable).				
Community liaison	Community discontent	▪ Develop stakeholder engagement strategy	Officially appointed CLO on site.		Prior to construction	EM

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Delays in construction programme	■ Liaison structures are to be established with local police to monitor social changes during the construction phase.	Liaison structures with relevant people established	Water Commission Contractor	commencement and direct engagement of communities	Once-off
		■ Liaison should be established with existing crime control organisations.				
		■ Liaison structures should be established with authorities (chiefs, councilors, town clerks and Ds/DCs)				
	Inadequate community consultation during surveying and site demarcation	■ A suitably qualified community liaison officer (CLO) to oversee the project Stakeholder engagements should be appointed	A grievance mechanism is established to deal with issues and complaints			
		■ A grievance mechanism should be developed to deal with any issues that might arise due to construction activities				
		■ A complaints register should be developed	Complaints are recorded and dealt with efficiently			
		■ Appoint a suitably qualified Community Liaison Officer (CLO) appointed for each each of the 8 key construction areas	Effective communication with individual land users.	Contractor	Prior to construction commencement of each site	Engineers' CLO
Contractor's Environmental Control Officer mobilised to site	Inadequate implementation and monitoring of environmental requirements on site if environmental officer is not on site.	■ Appoint a suitably qualified Contractor's Environmental Control Officer (ECO).	Officially appointed ECO on site. (4 ECO's for the different construction components appointed for 24 months	Contractor	Prior to construction commencement	EM
Develop environmental induction	Inadequate compliance to the	■ Develop an environmental induction training programme that addresses all the aspects listed in s. 8.3 of this ESMP.	Environmental induction training programme available	Contractor	Prior to construction commencement	EM

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
training programme for all staff and labour.	environmental requirements.	■ Environmental issues to be incorporated to toolbox talks (see s. 8.3 of this ESMP).	when staff and labour mobilised to site			Once off
Planning and design of camp sites – offices, staff and labour accommodation, stores, equipment maintenance workshops, etc.	Environmental degradation, unnecessary removal of vegetation, loss of land, social impacts, air quality, water quality and noise impacts	■ The planning and design for the construction camp and construction site must ensure that there is a minimum impact on the environment. These areas must be kept to a minimum footprint size.	Camp sites established as per proposed mitigation measures.	Contractor	Prior to construction of camp sites	Engineer
		■ A method statement is required from the Contractor at tender stage that includes the layout of the camp, management of the ablution facilities, access routes, power supply and wastewater management. The method statement must be approved by the Engineer.	Camp sites located on previously disturbed areas (where possible). . Limited number of camp sites.			Once-off
		■ As far as possible the construction camp must be located on already disturbed land with existing access roads if possible.				
		■ As far as possible the construction camp must be located more than 500 m from schools, hospitals, clinics, churches, spiritual sites and residential areas.				
		■ A site plan must be submitted to the Engineer for approval.				
		■ Develop a waste management plan.				
		■ Develop a storm water management plan.				
		■ Design water supply and sanitation infrastructure.				
		■ Make provision for a clinic or First Aid station at the camp.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
Security details during construction activities	Theft	■ All staff associated with the project, as well as visitors to site must be clearly distinguishable (company overalls with company logo), hard hat.	Appropriate clothing and PPE provided to all staff and visitors	Contractor	Prior to construction	Engineer Continuous
		■ The contractor shall take reasonable measures against trespassing on private property				
	Vandalism	■ The contractor will be responsible for his own security arrangements and shall comply with all site security instructions	Secure and adequate fencing and access control			
		■ Gates shall be installed where necessary.				
	Safety of site staff jeopardised	■ All gates shall be fitted with locks and be kept locked at all times during the construction phase. Gates shall only be left open on request of the Landowner	24-hour security evident onsite			
		■ Protect and maintain existing private property, fences and gates				
	Injury to trespassers resulting in lawsuits	■ Respect the open or closed status of gates for the duration of the construction period				
Survey and mark out construction servitude	Environmental degradation	■ The planning and design for the construction servitude must ensure minimum impact on the environment, community assets, graves, ash heaps and other aspects of cultural heritage, woodlots, fruit trees, croplands, houses and businesses	Construction servitude marked as per proposed mitigation measures and the RAP	Contractor ECO	Prior to construction commencement	EM Prior to demarcation of all sites
		■ The bulk of the construction servitude should overlap with the road servitude, there should be minimal impact on the landowners.				
	Unnecessary removal of vegetation,	■ Existing access points should be located to minimise modification of existing topography and removal of trees.	Vegetation removal only confined to the			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ The appointed ECO should have a good understanding of the local flora to make sound recommendations with regards to the final setting out and demarcation of work areas.	required working corridor			
Survey river cross-sections for post-construction river bank reinstatement	Increased erosion and sedimentation	■ Design of the crossing and flood protection structures to be in line with best engineering practice.	River crossings are designed as per engineering drawings	Contractor	Prior to construction commencement	EM
Air, water and noise monitoring	No baseline is available to determine air, water and noise impacts	■ Ambient air quality and water quality baseline must be determined and recorded before commencement of construction.	Baseline data available for at least 3 months before construction commences	Contractor	At least 3 months prior to site establishment	EM
		■ Silencers / approved and specified muffler systems must be included for heavy machinery / vehicles to reduce noise generated.				EM
		■ Monitoring to be conducted as per the Monitoring Protocols in Table 8.3.				Monthly
CONSTRUCTION ACTIVITIES						
Site clearing and site establishment at the WTW, pump stations, reservoirs and along the pipeline	Decrease in floral diversity	■ Protected or endangered species of plants shall not be removed unless they are interfering with construction. Where such species must be removed, the necessary permits shall be obtained from the respective authorities.	No trees and vegetation removed outside the construction footprint	Contractor ECO	Prior to construction, during construction and decommissioning	EM During all site clearance activities
		■ All protected species not to be removed must be clearly marked and such areas fenced off if required.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Increased potential for erosion and soil loss.	■ In sensitive environments such as pristine or valuable vegetation and sensitive social environments, the working servitude may be reduced.	No litigation due to unauthorized removal of vegetation.			
		■ Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise impacts.				
	Introduction of exotic or invasive plants	■ The removal of all economically valuable trees or vegetation shall be negotiated with the relevant landowner(s) and/or communities before such vegetation is removed.				
		■ Plants outside of the construction area are not to be disturbed, destroyed or removed.				
		■ Big trees with large root systems shall be cut manually and removed.				
		■ The Contractor will be held liable for the replacement of any plant or feature under the protection of local by-laws, provincial ordinances or national legislation that is removed or damaged by the Contractor's negligence or mismanagement. The ECO will indicate which plants or features to be avoided.				
		■ No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river and stream banks, unless authorized by the Engineer.				
		■ The appointed Environmental Control Officer (ECO) should have a good understanding of the local flora to make sound recommendations with regards to the management of disturbed areas.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Intentional or unintentional killing of fauna on site	■ Protect excavation and trenches and monitor for any trapped wildlife and livestock.	No evidence of domestic animals on site.	Contractor ECO	Prior to construction, during construction and de-commissioning	EM Continuous
		■ Ensure that all construction personnel are provided with appropriate training in ecological awareness, as appropriate to their work activities.	No litigation concerning stock losses and animal deaths			
	Loss of fauna due to habitat distance	■ The contractor must ensure that the site is kept clean and free of rubbish that could potentially attract animal pests, and that rubbish bins are scavenger proof.				
		■ The contractor must report problem animals or vermin to the Engineer.				
	Obstruction to faunal migratory patterns.	■ Ensure that domesticated and livestock animals belonging to the local community are kept away from the construction works.	No visible impediment of faunal corridors.			
		■ No hunting or trapping wild or domesticated animals may be permitted.				
	Potential decrease in faunal populations	■ The contractor may under no circumstances make use of pesticide or poison to control unwanted animals without permission from the ECO or considering alternative measures.	Trenches are not left open for long distances or for long periods at a time.			
		■ No wild animal may under any circumstance be handled, removed or interfered with.	No hunting or poaching of fauna			
		■ No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin and snakes.				
		■ The Contractor must regularly undertake checks of the surrounding natural vegetation, in fences and along game paths to ensure no traps have been				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		set. Remove and dispose of any snares or traps found on or adjacent to the site.				
		■ Where there is a potential problem area that may be contributing to pest infestation, it must be inspected by the ECO and a professional pest control to make recommendations that should be implemented				
	Loss of avifaunal species	■ The construction activities should be confined to the immediate footprint of the infrastructure. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of bird species.	No disruption to sensitive bird habitats	Contractor ECO	Prior to construction, during construction and decommissioning	EM Continuous
		■ Should any new sites or nests be found during the construction process, each site shall be assessed for merit and the necessary precautions be taken to ensure the least disturbance.				
	Disturbance to breeding patterns and displacement due to habitat transformation	■ Ensure that all construction personnel are provided with appropriate training in ecological awareness, as appropriate to their work activities				
		■ No hunting or trapping of avifauna may be permitted.				
		■ Measures to control noise should be applied according to the best practice.				
	Spread of alien vegetation to other environments.	■ Wash all mobile equipment and vehicles prior to mobilisation to site.	No evidence of Alien plants / seeds introduced on site and spreading to surrounding areas.	Contractor	Prior to construction, during	EM Monthly
		■ Alien vegetation growing on topsoil stockpiles must be removed.				
		■ All sites disturbed by construction activities must be monitored for exotic or invasive plant species and weeds.	Alien plants are eradicated and removed from site.			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Alien vegetation spread to other disturbed portions of the site must be controlled. ■ Invasive species and weeds must be destroyed before they reach seed formation stage. ■ Chemical removal shall be used in accordance with manufacturer's specification for weeds where mechanical eradication / control is no longer effective. ■ The type of chemical to be utilized must be determined in consultation with herbicide consultant and the ECO. ■ Those exotic / invasive plants or weeds which cannot be eradicated by means of herbicides, need to be manually removed from site. ■ Exotic plant material removed must be removed from the site and destroyed so that seeds and propagating material does not remain at the site. ■ Follow-up clearing for weeds and exotics should take place. ■ Herbicides must be applied by persons holding a Pest Control Operators license. ■ Control the type of material imported to site to minimise the spread of weeds and alien invasive plants.		ECO	construction and decommissioning	Weekly during the summer months
Earthworks and excavations at the WTW, pump station and reservoir sites and along	Topsoil, sub-soil and rock removal, stockpiling, replacement and disposal in croplands	■ Topsoil to be stripped to a maximum depth of 300 mm and stockpiled separately in piles no more than 1.5 m high. ■ Do not stockpile topsoil in drainage lines.	Topsoil is stripped and stored separately	Contractor	Prior to all earthworks	EM Throughout construction

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
the pipeline route		■ Topsoil stockpiles must be above the 1:50 year flood line.	Topsoil is replaced as required.			
		■ Stockpile topsoil in windrows parallel to the excavation.				
		■ All grass and other vegetation should be left on the topsoil stockpiles so that they colonise the area after construction.				
		■ Excavate the sub-soil and rock and stockpile separately from the topsoil.				
		■ If the sub-soil is suitable, replace in pipeline trench or other in other temporary excavations.				
		■ The replace the stockpiled topsoil to fill the trench, allowing for some future settlement.				
		■ Excess excavated material to be removed and disposed of at the designated spoil site.				
		■ The width and depth of the trench, as well as the working place (footprint) adjacent to the trench must be specified in the form of a method statement that will have been approved by the Engineer.				
	Topsoil, sub-soil and rock removal, stockpiling, replacement and disposal in all non-crop areas	■ Excavate all material from earthworks and stockpile in mounds no higher than 1.5 m high.	Excavated material is stockpiled and replaced as required.	Contractor		EM Throughout construction
		■ If the sub-soil is suitable, replace in pipeline trench or other in other temporary excavations.				
		■ If possible, spread the rest of the excavated material in a thin layer on the surface surround the pipeline trench in the road reserve, or remove it to the designated spoil site for disposal.	Excess material is disposed of at a designated spoil site			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Disposal of excess excavated material in non-designated areas or water courses	■ Identify a central spoil site for the disposal of all excess excavated material; or ■ Negotiate with the local municipality to determine if the excess material can be used as cover material at the local landfill site	A spoil site is designated and used for the disposal of all material, unless otherwise determined.	Contractor		EM Throughout construction
	Air pollution from vehicle movements, earthworks, excavations	■ All temporary stockpiles must not be higher than 1.5 m to reduce wind erosion. ■ In dry winter months all stockpiles must be protected from wind erosion. ■ All exposed areas and unpaved access roads must be adequately treated to lower dust emissions – either through regular watering or by spraying roads and disturbed areas with suitable dust binder chemicals. ■ Enforce speed limits to reduce generation of dust. ■ Monitor air quality against baseline.	Dust monitoring indicates that emissions are within the guideline limits. No complaints regarding air pollution received from community members and landowners.	Consulting Engineer Contractor ECO		EM Monthly
	Noise pollution and vibration from vehicle movements, earthworks, excavations	■ All machinery and equipment must be maintained in good working order. ■ Limit construction activities after working hours, on Sundays and public holidays. ■ A complaints register must be kept on Site to record any complaints received by the public. ■ Monitor noise levels against baseline. ■ Conduct a structure condition survey prior to blasting or the use of very heavy equipment to determine the pre and post-work structural condition	No complaints regarding noise pollution received from community members and landowners. Noise level monitoring results. Condition survey monitoring undertaken and compensation paid where required	Consulting Engineer Contractor ECO		EM Monthly

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Water contamination by sediment from uncontrolled runoff from earthworks areas and material stockpiles	■ Prevent uncontrolled runoff from all construction sites by creating temporary stormwater drainage systems and silt traps.	Water quality monitoring results.	Contractor		EM
		■ Particular care must be taken on steep slopes along the pipeline route and at reservoir sites and at the WTW which is located on the banks of the Hololo River.	No visual evidence of excessive erosion and sedimentation			
Non-hazardous waste management at the camp and all construction sites	Environmental pollution because of improper waste management and disposal	■ Develop and implement a Waste Management plan.	No litter or large amounts of construction waste seen on site.	Contractor	Requirements to be implemented prior to construction commencement and throughout construction period	EM Weekly
		■ Identify waste types which may be re-used or recycled.				
		■ Identify and implement ways in which to reduce, re-use and/or recycle waste.	Employees aware of importance of recycling waste.			
		■ Ensure sufficient number of waste bins and skips are strategically placed around the site to encourage workers not to litter and for temporary storage of construction waste.	Marked bins for recyclable materials.			
		■ Ensure waste bins and skips are emptied regularly.				
		■ Erect a bunded waste collection facility on site where waste can also be sorted for re-use or recycling.	Bunded waste collection facility erected on Site.			
		■ Identify designated approved waste disposal sites to dispose waste.	Waste Disposal manifest			
Hazardous waste management at the camp and all works areas	Soil and water pollution from the incorrect storage and disposal of hazardous waste	■ Create a bioremediation pad at the camp to dispose of all hydrocarbon contaminated soil.	Bioremediation site set up and operating	Contractor		EM Weekly
		■ Add BioZorb or other patented material to the bioremediation pad as per the manufacturer's instructions.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Water the site as required. The soil moisture should be adjusted at the beginning of the process and then controlled within the target range of 70-80% of field capacity (field capacity is the amount of water a soil can hold). The soil should not be allowed to dry out at any time.	Hazardous waste kept in a bunded controlled-access area			
		■ Monitor the bioremediation pad using a PAH detector or equivalent instrument.	Waste manifests show that all hazardous waste has been safely disposed.			
		■ Once the material is 'clean' (PAH = <40 mg/kg) dispose of it at the designated spoil site.				
		■ Dispose of all greasy rags, air filters, oil filters, brake linings, welding rods, fluorescent tubes, waste paint and chemicals, empty cement bags, etc in drums, hazardous waste containers for removal from site and disposal at the Holfontein hazardous waste disposal site in Gauteng, South Africa.				
		■ Store all hazardous waste in a bunded, access-controlled area.				
Ablution facilities in the field	Open defecation causes pollution and a health risk	■ Disposal certificates must be filed by the contractor.	Records show regular cleaning and waste disposal at a licensed site.	Contractor	Through out Construction period	EM Weekly
		■ Place temporary ablution facilities at least 100 m from any watercourse.				
		■ Once construction ceases in an area, remove portable toilets.	No evidence of toilets on site	ECO		
	Women working on site require privacy	■ Toilets are to be provided at a ratio of 1 toilet per 15 workers and must be situated in close proximity to all work areas.	Ablution facilities for men and women are provided as required			
		■ provide separate toilet for men and women				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
Disruption of utilities and services such as water, power, due to construction activities	Community discontent	■ All reasonable precautions must be taken to avoid damage to existing services, such as water, power.	No disruptions take place	Contractor Engineer	Requirements to be implemented during construction lifecycle	
		■ Prior to construction the location of existing services in the area must be confirmed and no-go areas demarcated if necessary.	In the event disruptions take place, they are planned			
	Delay in programme	■ Potentially affected service providers must be consulted regarding their requirements prior to construction.	No community discontents			
		■ Construction workers should avoid working or placing equipment in close proximity to areas which might cause disruptions, where possible.				
		■ Any damage to existing infrastructure shall be repaired immediately.	Service providers are made aware whenever construction activities might result in disruptions			
		■ Where pipe lines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such structures.				
		■ All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitized to this effect.				
		■ Upon completion of the project all roads directly damaged by construction activities shall be repaired				
Storage and handling of	Unsafe storage of hazardous materials.	■ Compile and maintain an updated inventory of all hazardous materials	Up to date inventory of hazardous	Contractor	Prior to construction	EM

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
hazardous materials		including fuel, oils and concrete admixtures stored within the Site.	materials stored on site.		commencement, and throughout construction period.	
		■ Keep Material safety Data Sheets on site at all times at all hazardous material storage areas.	MSDS sheets known to supervisory staff and present at the storage sites	ECO		Monthly
	Safety hazard.	■ All containers must be clearly labelled with the contents of the container.	Storage area contains bunds and signage as required.			
		■ Ensure that all those handling hazardous materials have been trained on the safe storage and handling.	No recorded accidents related to handling of hazardous chemical			
		■ Construct suitably bunded areas to contain 110% of the total capacity of the hazardous material stored to prevent any possible spillages of fuels and other hazardous substances and materials.	No recorded incidence of trespassing onto Hazardous store area			
		■ All storage areas must be locked at all times.				
		■ All storage areas shall have the standard warning signage attached.				
		■ The required First Aid provisions shall be provided e.g. eye wash, basin, etc				
Concrete mixing	Potential sterilization in the carrying capacity of the soil.	■ All spills (minor and major) must be cleaned and remediated within 24 hours of occurrence.	No release of contaminated water or concrete waste into the natural environment.	Contractor	During construction	
		■ Cement must be delivered in sound and properly secured bags or in approved bulk containers.	Waste concrete is disposed of at the designated spoil site.			
		■ Cement products in bags must be stored in storage containers to be provided at the construction camp and should only be opened when needed.		ECO		

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Where necessary, the ECO shall designate an area where concrete batching is to take place (on an impermeable surface).	Immediate removal and remediation of all spills.			
		■ Concrete batching areas should not be located in or near water courses				
		■ Internal drainage and sumps to be provided to contain stormwater runoff and spills.				
		■ Limit concrete mixing to single sites where possible.				
		■ No spillage of cement or cement-contaminated water into soil will be permitted. All cement contaminated water must be collected for evaporation prior to disposal, and any contaminated soil will be removed and disposed of at a registered waste disposal site.				
		■ Waste concrete to be disposed at the spoil site.				
		■ Cement mixers shall be placed on trays and no cement mixing will take place on the soil surface or permeable surfaces.				
		■ Dispose of all visible remains of excess cement and concrete after the completion of tasks.				
		■ Cement bags must be disposed of as waste at a licensed waste disposal facility.				
		■ Washing of concrete delivery trucks should only be undertaken in a designated and bunded wash bays.				
		■ Concrete drying procedure should be developed, and any accidental spills should be cleaned up immediately.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Locate the batch plant and/or concrete mixers far from sensitive receptors to reduce the impact of noise and dust.				
Casting of concrete	Noise pollution from casting of concrete and vehicle movements	■ Silencers / approved and specified muffler systems to vehicles and equipment to reduce noise generated. ■ All machinery and equipment must be maintained in good working order. ■ Limit construction activities after working hours, on Sundays and public holidays. ■ A complaints register must be kept on Site to record any complaints received by the public. ■ Monitor noise levels against baseline.	No complaints regarding noise pollution received from community members and adjacent landowners.	Contractor ECO	Throughout construction period	
Refuelling and maintenance of construction equipment	Environmental pollution as result of spillages of fuel and oils.	■ The contractor shall take all reasonable steps to prevent the pollution of soil and/or groundwater by fuels and oils as a result of his activities. ■ Hydraulic oil and temporary fuel supply (if required) shall be placed within a bunded area (to accommodate 110% of the storage capacity)	No soil contamination evident on Site.	Contractor ECO	Throughout construction period	
		■ All machinery to be inspected thoroughly for fuel, lubrication and hydraulic oil leakages before mobilisation to Site so as to ensure they are in proper working condition to minimise breakdowns etc.	No vegetation or water contamination on Site.			
		■ In the event of spillage, the contaminated soil shall be removed and disposed of at a registered hazardous waste landfill site or the bioremediation pad at the contractor's cost. Proof of disposal shall be kept for auditing purposes.	Spills cleaned up immediately.			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Where hazardous substances are used, drip trays must be used.				
		■ All fuel bowsers must be equipped with drip trays and these must be used during refuelling.				
		■ Drip trays shall be regularly cleaned of any spills and contaminated rainwater collecting in them (if required) and the spill material collected and disposed of as hazardous waste. Fuel bowsers must be parked on an impermeable surface to prevent spillage onto soil.				
		■ Drip trays shall be placed under stationery vehicles, fuel storage bowsers, generators and any other equipment that may leak oil or fuel, to prevent leaks				
		■ Any hazardous material spills must be cleaned immediately as per Environmental Emergency Plan.				
		■ All machinery using fuel must be checked for leaks on a daily basis. If found leaking fuel or any other hydrocarbon substance, the machine must be removed from Site or undergo repairs at a defined workshop area.				
		■ All vehicles and machinery not parked on an impermeable area for a period longer than 12 hours must have a drip tray placed beneath its fuel tank and or oil tanks.				
		■ Servicing of equipment shall be done in a workshop on an impermeable surface to prevent spillage onto soil.				
		■ No servicing shall be carried out in or on the banks of a water course.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
Construction worker employment	Inadequate / unequal work creation for local residents	■ Priority is to be given to the employment of local, Basotho people.	At least 90% of the workforce is locally sourced.	Contractor	Requirements to be implemented prior to construction commencement and throughout construction period	Engineer's OH&S Manager
		■ All employment to be done in accordance with the Labour Recruitment Strategy.				
		■ Ensure the implementation of the appropriate Lesotho Labour Laws.	No labour disputes			Continuous
		■ Ensure both men and women are equitably employed.	Gender balance within the workforce			
		■ Training of local people with construction skills must be encouraged and implemented on site.	Compliance with legislation.			
		■ Contractor must institute an approved training and skills development programme to meet targets and criteria.	Expenditure by Contractor on training equals 3% of wage bill.			
		■ The training shall be restricted to trade skills for the construction industry, such as equipment and machine operators, electricians, welders, safety representatives, supervisors, etc.	Adequately representative work force.			
		■ Additional training must be provided for workers for the duration of construction, directed towards: (i) satisfying the immediate requirements of the Works, and (ii) introducing unskilled employees to the constraints and requirements of an organized working environment, and (iii) to the use of construction tools and equipment.	Training of females, expenditure on learnerships and expenditure on internships each equals 0.5% of wage bill.			
Mobilizing staff and labour to the sites	Potential spread of HIV/AIDS and other communicable diseases.	■ Prepare and implement an HIV and TB awareness campaign for health education of workers (including posters, free condoms, etc.).	Records of HIV and TB awareness training.	Contractor		Engineer's EM Client

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Allow for regular HIV voluntary counselling and treatment for all staff.		ECO	Requirements to be implemented prior to construction commencement and throughout construction period	Independent SHE auditor Relevant National Authority
	Injuries and death from accidents	■ The camp site must be kept in a hygienic and safe state at all times.	Records of HIV and TB counselling and testing.			
		■ Enforce the use of PPE at all times.	OH&S audit results are positive			
		■ Appoint First Aiders, SHE reps for all job sites				
		■ All workers and supervisory staff to be trained on safe use, management storage and disposal pf relevant PPE				
		■ Hold daily job site specific toolbox talks				
		■ Hold driver education and safety training.				
		■ carry out accident and incident investigations for all OHS accidents on site				
		■ Only employ certified equipment operators to use equipment.				
		■ Apply a zero-tolerance policy for drugs and alcohol on site and for all transport drivers				
		■ Maintain all vehicles and equipment in good running order.				
		■ PPE signage to be put in place at all work sites.				
		■ Ensure all OHS measures outlined in Construction Safety Regulation and relevant OHS polies are implemented				
Fire management	Loss of arable land, grazing land, woodlots, trees,	■ No open fires shall be permitted on site.	No loss of land and other assets due to fire	Contractor	Throughout the construction period	Engineer

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	houses and other assets due to run-away fires	■ Smoking shall only be permitted in designated smoking areas in the site and cigarette but disposal bins provided.		ECO		
		■ A fire officer shall be appointed by the contractor who shall be responsible for co-ordinating rapid, appropriate responses in the event of a fire	No reported fires on Site or in the surrounding area.			Continuously
		■ Firefighting equipment must be kept at accessible places on site.				
		■ Firefighting equipment must be serviced regularly and kept in good working condition.	No complaints received from the public.			
Transportation of equipment, materials and concrete on access routes	Road accidents	■ Ensure proper road signage on site is erected prior to construction.	No vehicle collisions due to construction activities.	Contractor	Requirements to be implemented prior to construction commencement and throughout construction period	
		■ Where construction will affect existing roads (e.g. pipeline crossings) or where construction takes place in urban areas, traffic is to be diverted or otherwise managed to minimise disruption to the public.				
	Disruption of traffic	■ Ensure all drivers are licensed.	Adequate signage erected in and around Site.			
		■ Ensure all vehicles to be used on site are roadworthy.				
	Community discontent	■ Where required, personnel should be deployed to warn on-coming vehicles and pedestrians of construction works.	Roads in good condition.			
		■ Plant operators and particularly drivers of haul and concrete trucks are to be continuously made aware of other road users.				
	Deterioration of road surface	■ Project-related roads shall be kept in a good condition and damage repaired.				
		■ Enforce speed limits.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Warn border authorities at the Caledonspoort, Maputsoe Bridge and Pika border crossings of additional traffic.				
Restriction of access during pipeline construction	Pipeline construction may impact on people's access to fields, grazing land, schools, clinics, houses and businesses	■ All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties.	No disruption to access.	Contractor	Throughout the construction period	Engineer
		■ Safe alternative access must be provided to houses, schools, clinics, fields, grazing land and businesses at all times.				
		■ Speed limits shall be enforced in such areas and all drivers shall be sensitized to this effect.	Alternative access is provided.			Continuously
		■ Upon completion of the project all roads directly damaged by construction activities shall be repaired				
Storm water / wastewater management	Impact on the wellbeing and reproduction potential of the aquatic biota.	■ The Contractor must identify sources of process construction water and quantify quantities for approval and monitoring by the Engineer in consultation with DW.	Construction water permit	Contractor	Throughout the construction period	EM/ DWA
		■ The Contractor shall implement a stormwater management system for the area, especially along access roads and internal vehicle tracks.	Stormwater plan	ECO		EM Weekly
	Potential decrease in ground water quality.	■ Temporary stormwater diversion measures should be implemented during the construction of the pipeline.	No evidence of pollutants released into streams and rivers.	ECO		
		■ The Contractor shall supply a wastewater management system at the camp that will comply with legal requirements and be approved by the Engineer.	Wastewater management system/ plan			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Potential decline in the use of water for activities on site.	■ Wash bays, service areas and fuel storage areas may not be located within the 1:100-year flood line or horizontal distance of 100m (whichever is greater) of a watercourse or drainage line.	No erosion caused by construction activities. Site layout plan	Contractor		
		■ Bio-degradable detergents may be used.	Low concentration of pollutants within wastewater	ECO		
	Impact on health of the community relying on the water for domestic use.	■ Workshops, refuelling depots and washing areas shall be bunded to prevent leaching to the ground.	No evidence of pollutants being released into ground water.	ECO		EM/ Monthly
		■ Water from wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps. Oils collected in this manner should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites.	No evidence of PAHs within wastewater			
	Decrease in ground water and surface water quality.	■ No drainage from fuel storage areas shall be permitted.	No evidence of toxins in drinking water			
		■ Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural environment. Any contaminated stormwater and other run-off from the site shall be contained. Any spill which may contaminate water must be treated according to the approved spill management method statement the Contractor compiled.				
		■ Contain oil or fuel spills in water using an approved oil absorbent fibre.	The quality of the water from upstream			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
	Decrease in the populations of aquatic micro-organisms.	■ Grey water not deemed suitable for dust suppression by the Engineer must be stored in sealable marked containers and disposed of with other waste water. Wastewater as well as spilled fuel collected within bunded areas and refuelling areas shall be disposed of as hazardous waste.	of construction and downstream of construction will not differ with more than 10%.			
	Decrease in floral reproductively.	■ Drainage lines are not to be altered and these areas should be level with the surrounding land once subsidence has occurred diversion berms can be installed to direct all wastewater to a catchment area.	No evidence of erosion and sedimentation caused by construction activities.			
		■ Do not locate sand washing plants or associated settlement ponds within the 1:50 year flood line or within horizontal distance of 100m (whichever is greater) of a watercourse.				
	Potential decline in the use of water for activities on site.	■ Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.				
		■ Deflect any unpolluted water/runoff away from any dirty area.				
	Toxicity and threat to human health.	■ Where necessary, turbid water pumped from excavations within rivers must be passed through a sand filter or settling pond before being releases back into the river. Ensure that no storm water is allowed to enter any drainage installation for the reception, conveyance, storage and or treatment of sewage.				
		■ Ensure that water passing through vehicle wash bays and workshops pass				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		through oil separators before passing into the conservancy tank.				
		■ No roads shall cut through river- and stream banks as this may lead to erosion causing siltation of streams and downstream dams.				
		■ No residue or substance which causes or is likely to cause pollution of a water resource may be placed in any trench or excavation.				
		■ No material stockpiling should take place within a water course.				
		■ Erosion and sedimentation into channels must be minimized through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks.				
		■ During construction through a drainage line, the majority of the flow must be allowed to pass down the stream. In-stream diversions should be used rather than the construction of new channels.				
		■ Bank destabilisation, vegetation removal and erosion must be minimized. Erosion sensitive zones shall be clearly marked and avoided where possible.				
		■ Provide temporary surface water drainage or sediment traps where necessary.				
Local procurement of services	Boost to the local economy through supply of goods and services	■ Identify an area to cater for informal traders.	Area demarcated for informal traders.	Contractor	Requirements to be implemented prior to construction commencement	EM Monthly
		■ Prevent / discourage informal traders from establishing stalls in unsuitable locations.				

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Procure food, cleaning services, etc from local providers as far as possible.			and throughout construction period	
Cut and fill activities	Negative effect on sense of place of the surrounding area.	■ No vegetation shall be pushed into heaps or left lying all over the veld.	No disruption of the natural and existing landscape characteristics.	Contractor	Throughout construction period	EM Monthly
		■ Shape cut and fill slopes to emulate the natural surroundings.				
	Visual impact	■ Shape areas to correct contours to within a tolerance of 300mm.				
		■ Trim areas already shaped to within an acceptable tolerance, with all undulations following a smooth curve. Ensure that final trimmed levels make provision for the specified depth of the reapplied topsoil.				
Removal of graves, ash heaps	Emotional impact for families	■ Develop and implement the grave removal protocol. To be developed and described as part of the RAP	No complaints received.	Contractor	Prior to construction	EM Ongoing
Disturbance of cultural heritage sites and fossils	Loss of important cultural and physical heritage	■ Follow the Chance Finds Procedure set out in the World Bank Operational Policy OP 4.11.	Artefacts records and location maps	Contractor	Throughout the construction period	EM ongoing
		■ Provide training to site foremen, employees and ECO.	Training register .	ECO		
Demobilising of site camps, temporary construction sites, laydown areas	Long term land degradation, source of erosion.	■ All infrastructure, buildings, plinths, concrete foundations, rebar, construction waste, introduced material, scrap metal, cables, fencing, storage tanks, containers, etc must be removed from site on completion of the works.	All sites are decommissioned and rehabilitated as required.	Contractor	On completion of construction	EM At end of contract
	Aesthetics effects	■ Backfill any excavations and depressions using saved sub-soil material.	Filled Site handover forms	ECO		
	Weed invasion.	■ Apply topsoil from stockpile to a depth of 300 mm and contour to blend in with the surrounding landform.	No visual scars remain.			

Activity	Potential Impact	Mitigation Measures	Performance Indicator	Responsibility	When	Verification: responsibility and frequency
		■ Remove any excess excavated material to the spoil site.				
		■ Reinstate any drainage lines that may have been disturbed.	Visual inspection			
		■ Rip and scarify any temporary access roads which are to be no longer used and apply topsoil if available.	Filled and signed site handover forms			
		■ Develop a revegetation plan for areas where natural re-growth may not be possible.	Re-vegetation plan			
		■ In urban areas, re-instate any businesses that were moved temporarily during construction.	Signed and filled reinstatement forms			
		■ Re-instate and services and utilities that were moved.	Utilities reinstated			
		■ Identify redundant construction materials which may be re-used by the community and make available.	Handover letters and or forms			

1.7 Environmental Monitoring Plan

The purpose of the environmental monitoring programme is to ensure that mitigation measures, identified and described in the EMP, are implemented. Construction activities will be monitored by the environmental team on Site, with regular audits against the requirements of this EMP being carried out. The ultimate target is to achieve 100% compliance with the EMP.

Monitoring during construction will take the form of:

- Inspections (visual and document checking).
- Watching briefs.
- Actual measurements.

Key aspects to monitor during construction include:

- All effluent discharge points or runoff areas, which may include workshop and, fuel bund areas, chemical store and handling areas, waste storage areas, sedimentation ponds and toilets and wash areas in the temporary camp, waste water drains.
- Solid waste storage sites (general and hazardous).
- Chemical storage areas for general tidiness and good housekeeping.
- Ambient Noise and dust levels.
- General site cleanliness.
- Water Quality (including Environmental Flow Assessment)

Environmental monitoring requirements and key performance indicators are listed in table below. This provides a list construction activities aspect, that should be monitored. It must be noted that the monitoring aspects listed in these tables are not inclusive and it is expected that the EO will amend and update the tables to correspond to the actual construction activities.

Table 1.5: List of key aspects to be monitored and their frequency

Aspect to be inspected	Frequency	Responsible person
Litter and waste management (hazardous and non-hazardous)	Daily	ECO
Soil contamination from hydrocarbon spills	Daily	ECO
Disposal of waste concrete	Weekly	ECO
Hazardous materials storage, handling and disposal of containers	Weekly	ECO
Fuel management	Daily	ECO
Stormwater drainage and sumps	Weekly	ECO
Oily water separator(s)	Weekly	ECO
Erosion and siltation directly attributable to construction works	Weekly	ECO
Portable toilets and effluent disposal	Weekly	ECO
Workshops	Weekly	ECO

Aspect to be inspected	Frequency	Responsible person
Spoil dump	Weekly	ECO
Topsoil management	Weekly	ECO
Working within demarcated areas	Daily	ECO
Disturbance of identified plants and trees	Weekly	ECO
Rehabilitation and revegetation of disturbed areas	Weekly	ECO
Informal job seeker settlements developing near the contractor's camp	Daily	CLO, EM
HIV awareness training and voluntary counselling and testing	Monthly	ECO, CLO
Road safety awareness training	Monthly	CLO
Compensation payments	Monthly	WC, EM, CLO
Resettlement	Monthly	WC,EM, CLO
Grave/ash heap removals	Daily in affected areas	ECO, CLO
Application of gender policy	Monthly	ECO
Application of employment policy and practices	Monthly	CLO, EM
Local procurement	Monthly	CLO, EM
Notification of affected persons in advance of blasting, disruption of utilities, disruption of access, noisy activities, etc	As needed	ECO
Building condition surveys	Before and after heavy construction works and blasting close to buildings	CLO, EM Engineer
Maintenance of Complaints Register	Daily	CLO, EM

In addition to the site inspections listed above, the ECO will be required to keep a **watching brief** at the following sites:

- Excavations in areas of high palaeontological potential i.e. where excavations exceed 2 m in hard rock areas;
- Excavations in areas with a high archaeological potential e.g. near old ruins;
- Excavations close to where graves and ash heaps have been identified;
- All river and donga crossings;
- Construction of the intake works.

The watching brief will require the ECO to conduct an awareness training session with the site foreman and all construction workers who may be working in the sensitive areas listed above, including the production of visual material to alert people what to look for. The training sessions must also include:

- A detailed explanation of the Chance Find Procedures to be followed if any artefacts or fossils are found during pipeline excavation or reservoir construction.
- Procedures to be followed if graves are found during pipeline and reservoir construction.
- Emergency procedures in the event of major hydrocarbon spills into a water course (including dongas) during construction of the pipeline and intake works.
- Procedures to be followed for minor hydrocarbon leaks and spills in any water course.

During construction, the following data must be collected as per the **monitoring protocols** listed below:

- Air quality (PM10 and total suspended particulates (TSP).
- Noise.
- Water quality.
- Aquatic ecology (fish and invertebrates).
- Weather.
- HIV/AIDS and TB.

Table 1.6 – Environmental Monitoring Requirements during the Construction Phase

Environmental Issue	Location	Frequency	Performance Indicator
Areas Occupied and Demarcation of the site	Construction site	Daily	• Construction activities restricted to within the designated areas as indicated on the construction layout plan
Use of Plant and Machinery	Construction site	Daily	• Plant and Machinery remain within demarcated construction areas. • Minimal dust and noise impact on the surrounding environment. • EMS developed that describes environmental management measures in terms of heavy machinery and plant.
Waste Management	Construction site	Weekly	• Procedures in place to prevent, minimize, recycle and reuse domestic and construction waste material. • Dispose of residual wastes in an environmentally acceptable manner. • Ensure waste is disposed of at Engineer-approved site. • All construction workers have received training regarding waste minimisation, location and use of waste bins, and general waste management. • Metal dust bins provided are to BS 792 or equivalent plastic receptacles for the appropriate storage of garbage at all accommodation facilities and works areas. • Solid waste is removed to a designated disposal facility at least twice per week, or as necessary, throughout the duration of the contract. • Solid waste storage facilities are fenced and locked to prevent unauthorized access. • The storage area is clean. • Solid waste is stored inside bins and not lying around.
Contamination of soil and water due to fuel/lubricant spillages	Construction site	Monthly	• Visual inspections for spillage. • Fuel stores are in a bunded area on an impervious surface. • Ready supply of absorbent materials available on site in event of spillage. • Bunded areas to have a minimum containment capacity of 110% of the largest storage tank. • Hydrocarbon spills absorbed with absorbent material and collected and disposed of off-site in an approved landfill site.
Effluent Management	Effluent discharge points	Monthly	• No discharge of concrete, cement, chemicals and fuels into any water course. • Waste water is contained in ponds prior to disposal. • Site sanitation complies with Effluent Discharge Standard. • Water from batching is disposed via the waste water management system approved by the Engineer.

Environmental Issue	Location	Frequency	Performance Indicator
			• All effluent from wash bays, fuel stores or from pumps is collected and disposed of through an oil trap to remove oil residues prior to release to sedimentation ponds. • Water samples taken at each discharge point on a monthly basis. • Samples are analysed for suspended solids, faecal coli and oil and grease in an ISO 9000 accredited laboratory. • Test results are submitted to the Engineer within 7 days of the tests having been carried out.
Hazardous Waste Management	Construction Site and Workshops	Weekly	• Register is kept of all hazardous substances present on the site. • MSDSs are readily available. • Fuel, lubricants and other hazardous chemicals, *i.e.* paints and solvents shall be stored in a bunded area not closer than 80 m from any river or drainage line. • Designated area for washing of vehicles, machinery or equipment and is not closer than 80 m from any river or drainage line. • Routine maintenance of vehicles, machinery or equipment is undertaken at an off-site workshop. • Concrete batching/mixing shall only take place at agreed specific areas on site and runoff from the batching area will not be allowed to flow into natural streams and watercourses. • Used fuel, oils, hydraulic fluids, paints and solvents should be stored in drums or other suitable containers in a designated hazardous waste storage area. These should be labelled, sealed and removed from the site to an appropriate disposal site or recycling facility. • Hazardous waste is appropriately stored, transported, handled and disposed of. • No evidence of accidental, negligent, or deliberate spillage of hazardous substances. • No evidence of persistent or un-repaired oil leaks or hydrocarbon spills. • No evidence of actions that may cause pollution incidents.
Noise and Dust	All construction sites	Weekly	• Work hours are restricted to between 07h00 and 17h00 Monday to Friday • Local residents are informed of the nature and duration of construction activities. • Complaints Register in place and functional. • Noisy equipment is equipped with suitable silencers. • Dust control measures are in place, *e.g.* watering of access roads and exposed areas during windy conditions and water spraying of aggregate areas. • Exposed soil mounds are covered with netting or other shade cloth.

Environmental Issue	Location	Frequency	Performance Indicator
Blasting and Vibration	Blasting site	Prior to every blast	• Residents are informed of blasting activities at least 24 hours in advance. • Blasting activities will be pre-warned through the use of sirens in accordance with the blasting protocols. • Personnel stationed on roads with red flags to prevent persons, animals and traffic entering or remaining within the danger zone. • All possible approach routes to the danger zone are covered by these warning arrangements. • After blasting, no person to approach the area until it has been examined by the Blasting Supervisor or other responsible person and declared safe. • All persons including Contractor employees absent from the blast and fly rock area. • All workers involved in blasting provided with protection equipment and appropriately trained. • 100 % safety record and no blasting accidents recorded.
Dilapidation Survey	Area surrounding blast	Prior to and after every blast	• Dilapidation survey undertaken of any structures within a 500m radius of blasting areas. This is to be done in the form of colour photographs, video surveys, and shall provide a record of the following features: • Identification of the owners and tenants. • General type of construction, foundation type, age and use. • Photographs shall provide the location and date and shall show signs of settlement or stress cracks, signs of poor construction, areas of standing water adjacent to the site wet for extended periods and signs of settlement and tilting.
Soil Management	All construction sites	Weekly	• Land clearance has been kept to a minimum. • Highly erodible soils and steep slopes avoided wherever possible. • The topsoil is shallowly ripped before removal. • Topsoil is stockpiled at a suitable pre-selected site. • Stockpile is not contaminated with substances such as diesel, oil, petrol, rubbish. • The Contractor covers soils with tarpaulin during transportation. • An EMS developed to describe how soil and other stockpiles are managed. The EMS includes the location of all stockpiles, the interval before they are used, how they are to be stabilised, and what control measures are implemented while they are being stabilised. • EMS developed for slopes that have been cut during construction. • Keep vehicles to well-defined haul roads.
Fire Controls	Construction site	Weekly	• Fire Risk Assessment in place. • Designated person responsible for the fire safety management system and inspections.

Environmental Issue	Location	Frequency	Performance Indicator
			• Environmental awareness training for fire-fighting undertaken (procedures, precautionary measures and safety standards, etc explained to staff). • System for issuing of hot work permits is established and monitored. • Weekly inspections of escape routes, fire safety signage and temporary emergency lighting (where applicable) conducted. • Site fire detection and alarm devices installed on site tested. • Carry out weekly checks of fire-fighting equipment, fire brigade (or alternative arrangement) access and fire-fighting facilities. • Periodic fire drills conducted. • A sufficient number of fire marshals appointed and trained.
Borrow Pits and Quarries	Borrow Pit Site	Monthly	• EMS prepared and approved by the Engineer prior to use of borrow pit or quarry. • Protected, rare and endangered plant species remain. • Topsoil preserved for future use. • Progressive rehabilitation of borrow pits. • Where necessary, haul trucks are covered with tarpaulin to minimise dust. • Access roads must be rehabilitated after use. • Sites are cleaned up and returned to an acceptable state when an operation is closed down with all equipment removed and infrastructure demolished and removed.
Excavations and Trenches	Construction Sites	As excavations and trenches are dug	All excavations protected by: • sloping or benching the sides of the excavation • supporting the sides of the excavation • Placing a shield between the side of the excavation and the work area. • Materials or equipment that might fall or roll into an excavation are kept 1 m from the edge of excavations. • Warning systems are provided, *e.g.* stop logs to alert operators. • All excavations and trenches over 1.5 metres in depth, where entry is required, are either shored, battered back or benched unless a geo-technical engineer confirms in writing it is stable. • All excavations and trenches less than 1.5 metres in depth, are shored, battered back or benched in a manner deemed appropriate by a Competent Person. • Employees prohibited from standing or working under loads being handled by lifting or digging equipment.
Spoil	Construction sites	Weekly	• EMS that describes the systems and procedures to mitigate environmental impacts resulting from

Environmental Issue	Location	Frequency	Performance Indicator
			generation of spoil during construction phase in place. • Spoil generated during the construction works is managed in accordance with preferred waste management hierarchy of avoidance, minimisation, reuse, recycling and finally disposal. • Where possible, all clean and/or treated spoil is reused or recycled. • Off-site disposal of spoil is minimised.
Erosion Control and Stormwater Management	Construction sites	Monthly	• Stormwater drainage plan in place and approved by the Engineer. • Plan includes proposals for protection against stormwater damage, and containment of flows, and rehabilitation measures. • Plan shows the location of stormwater channels, silt traps, dispersive measures, sedimentation ponds, and any other special measures to control or collect water flow. • Sedimentation ponds are sized to contain a 1:10 year rainfall event. • Any runnels or erosion channels that develop during construction are backfilled and compacted. • Measures are taken to prevent further scouring. • Cleared areas likely to be subject to erosion from heavy rainfall events or stormwater flows are stabilised until they can be revegetated or are constructed on.
Cultural Heritage / Archaeological Sites	Construction site	Monthly	• During construction, if any archaeological or cultural remains, other than graves that are dealt with by the Employer, are unearthed, work should cease immediately. • All archaeological chance finds are reported to the Department of Culture. • Demarcate and carefully work around the site to avoid damage. • Do not remove any object from the site.
Fauna and Flora	Construction Site	Weekly	• Fires are strictly prohibited and illegal on site. • No unauthorised chopping down, or wilful damage to any shrub or any tree outside the demarcated construction area is observed. • No off-road driving or the creation of an unwanted track is observed. • Construction disturbances. • Indigenous flora and fauna is protected within and around the site. • No defacing, painting or otherwise marking of and/or damage natural features/vegetation on the site is observed. • Vehicles remain on existing roads and tracks and are not be permitted to drive off-road.

Environmental Issue	Location	Frequency	Performance Indicator
Sensitive Environments	Within construction area	As necessary	• Sensitive habitats located in close proximity to construction, earthmoving and soil striping activities, stockpiles, waste facilities, haul roads and other infrastructure are declared as 'no-go' areas.
Increased Employment	Priority should be given to people from local villages.	Throughout construction period	• Contractor employs unskilled and semi-skilled labourers in terms of LHDA Labour Recruitment Guideline.
HI/AIDS	Construction personnel	Throughout construction period	• Contractor's personnel attending the programme being able to: Communicate the existence of problems of HIV and be able to outline the consequences of transmission of HIV/AIDS to or from the local community. • Contractor's personnel attending the programme being able to: Recall and communicate the mode of HIV/AIDS transmission and preventative measures including the proper use of the condom. • Contractors rating against Employer's Public Health Action Plan. (This Plan is to be developed. It will assist in verifying whether the HIV/AIDS interventions implemented during construction have been successful in increasing awareness and reducing the rate of HIV/AIDS transmission in the Project area).
TIP (Trafficking In Persons)	In host communities	Throughout construction period	• Contractor should have a clear labour recruitment plan to avoid trafficking in persons. This plan must be shared and involve all relevant community members such as the community counsellor and area chiefs.

1.8 Grievance Redress mechanism

Scope of GRM

This Generic Grievance Redress mechanism presented in this ESIA is applicable for the undertaking of the ESIA, The RAP and implementation of the ESMP.

This GRM shall be applicable during the undertaking of the pre-construction and construction activities. That are associated with the Zone 1 project.

In terms of spatial scope this GRM is applicable within all land parcels, host villages, host community councils and district councils within Leribe and Botha Botha. Where Zone 1 project infrastructure shall be constructed.

GRM Roles and Responsibility

Role	Responsibility
Project Manager	Accountable for the implementation of the Grievance Redress Mechanism (GRM).
Environmental Manger (Environmental and Social Safeguards Specialist)	Responsible for the overall implementation of the grievance mechanism. Overall responsibility for tracking and following up on issues and complaints raised Ensure Feedback is provided to the AP by the Focal Points. Raise awareness in the communities (Project Area) on GRM. Train Focal Points on the implementation of the GRM. Support the resolution of Complaints; and liaison with Focal Points and the Complainant (AP).
PIU - Community Liaison Officer (CLO)	Responsible serving as the main point of contact with the Complainant (AP). This includes receiving and reporting Complaints, maintaining the Complaints Log. Dissemination of the Feedback to the AP.
Water Commission (WC) • **GRM Committee** • **PIU**	Responsible for investigating and resolving Complaints. This includes conducting investigations, proposing resolutions, implementing corrective actions and coordinating with the complainant.
Local Community Structures **District Councils (Leribe & Botha Bothe), Community Councils (Likila B02, Tsa-le-Moleka B04,** **Botha Bothe Urban Council** **Masia Phoka C06)**	Responsible for collating grievances from the project affected communities in line with project reporting protocols. The CLO's shall collect these complaints from the Community Council Secretary. While the community will lodge the compliant through their area chief and or Community Councilor.

Step 2: Registration of Grievances

A register of grievances which will be held by the PIU Community Liaison Officers (CLO), GRM Community Representative (CR), Community Council Secretary (CCS) and Chiefs Offices. The Aggrieved Party (AP) will register their grievances on this register and to register the grievance, the AP will provide information to be captured in the Grievances Registration Form .The PIU will also accept complaints from the APs submitted through verbal, email, phone, WhatsApp, meeting or letter to the offices of the PIU, in English and Sesotho. The PIU Manager or/and Environment & Social Specialist (ESS) will transcribe these submissions. Receipt of grievances shall be acknowledged as soon as possible, by letter or by verbal means.

When a complaint is made verbally to the PIU, the PIU will acknowledge its receipt in a communication that outlines the grievance process; provides contact details and, if possible, the name of the person who is responsible for handling the grievance; and note how long it is likely

to take to resolve the grievance. Complainants will receive periodic updates (every two weeks) on the status of their grievances. This GRM has established clearly defined schedules for acknowledgment and follow-up activities. And to enhance accountability, these schedules will be disclosed widely to various stakeholders, including communities, civil society, and the media.

Step 3: Assessment and Investigation

Assessment and investigation involves gathering information about the grievance to determine its validity and resolving the grievance. The merit of grievances should be judged objectively against clearly defined standards. Grievances that are straight forward (such as queries and suggestions) will be resolved quickly by contacting the complainant.

Having received and registered a complaint, the next step in the complaint-handling process is for the focal points to establish the eligibility of the complaint received. The CLO, GCR, CCS or/and Chiefs, once a complaint or grievance is registered, shall within 5 days assess the registered complaint or grievances to determine its validity.

Once the registered grievance or complaint has been determined as falling within the scope of this GRM, the PIU or/and CW (GRM Team) shall investigate the complaint.

The PIU and/or CW (GRM Team) will ensure that investigators are neutral and do not have any stake in the outcome of the investigation. At the end of the field investigation, PIU and/or CW (GRM Team) shall compile a Grievance Investigation Report (GIR) on the outcomes of the investigations and the specific recommendation to resolve the grievance or complaint.

Step 4: Recommendations and Implementation of Remedies

After the investigations, the focal point will inform the AP of the outcome of the investigations and the recommended remedies if any. The AP shall be provided with written response clearly outlining the course of action the PIU and/or CW (GRM Team) shall undertake to redress the grievances and the specific terminal date by which the recommended remedies shall be completed. Potential actions will include responding to a query or comment, providing users with a status update, or referring the grievance to another level of the system for further action.

The PIU or/and CW (GRM Team) will then ask the Complainant to sign the Registration Form. If the Complainant agrees to sign, the Complaint is closed out as resolved. If the Complainant refuses to sign, or has failed to sign within the timeframe allowed, the Complaint is referred to the Ombudsman.

Step 5: Referral to Ombudsman

The PIU or/and CW (GRM Team) will seek to reach a resolution with the Complainant that is satisfactory to both sides. In the likely event that the AP is not satisfied with the recommended remedy. The PIU or/and CW (GRM Team) shall forward the copy of Grievance Registration Form (GRF) and the Grievances Investigation Report (GIR) as well as the resolution to the Ombudsman.

1.9 ESMP budget

The Estimated overall budget (itemized matrix) for the implementation of all environmental and social measures (in local U.S. dollars, are provided in the table below.

Table 1.7 – Estimated cost of implementing the ESMP

Timing	Item Required for Implementation of the ESMP	Unit Cost (US Dollars $)	Quantity (Unit)	Frequency	Sub-Total Cost
Pre-construction	Environmental Flow assessment - Muela release and discharge (IFR/EFA studies)	20,000	1	1	20,000.00
	RAP asset verification and valuation	5,000	1	1	5,000.00
	RAP Implementation	15,000	1	1	15,000.00
	Drafting the Site Specific ESM File with tools, Environmental method statements	6,000	1	1	6,000.00
	Licenses application	750	1	1	750.00
	Appointment of the Engineers' EM	3,500	1	36	126,000.00
	Appointment of the Contractors' ECO (4)	1,500	4	24	144,000.00
	Appoint of contractors CLO (8)	1,000	8	24	192,000.00
	Basic PPE for all Contractors' staff and visitors	50	70	3	10,500.00
	Occupational Health entry and exit screening	15	70	2	2,100.00
	Pre-construction dilapidation survey	500	1	8	4,000.00
Construction	VCT - HIV/TIP Training and GBV training	200	1	8	1,600.00
	Daily Covid-19 Screening for staff and visitors	10	70	24	16,800.00
	Public Health (Covid-10) outbreak prevalence testing	100	70	1	7,000.00
	Update meetings with Host Community Councils/ Chiefs	50	8	36	14,400.00
	PPE for working at heights and for other high-risk operations	15	20	1	300.00
	Waste collection Bins procurement	100	8	1	800.00

Timing	Item Required for Implementation of the ESMP	Unit Cost (US Dollars $)	Quantity (Unit)	Frequency	Sub-Total Cost
Carbon emissions reduction measure	Transporting solid waste to designate landfill	100	8	36	28,800.00
	Transporting hazardous waste to designate landfill	100	8	36	28,800.00
	Dust emission suppression along material haulage and construction access routes s	188	1	24	4,512.00
	spoil haulage for use in land reclamation or landfill management initiatives	150	8	24	28,800.00
	Trees/ Flora removal and reinstatement	10	1	34	340.00
	Regular vehicle and plant maintenance and repair	400	20	24	192,000.00
	Local recruitment and local skills capacity building	350	40	1	14,000.00
Environmental compliance auditing and emissions monitoring	Air quality compliance monitoring	1,350	1	24	32,400.00
	Water quality monitoring	2,400	1	36	86,400.00
	Ambien noise monitoring	24	8	24	4,608.00
	Monitor the bioremediation pad using a PAH detector or equivalent instrument.	840	1	36	30,240.00
	Third party construction ESMP compliance audit	9,000	1	1	9,000.00
Rehabilitation	Ploughing crop fields	150	34	1	5,100.00
	Reinstatement of paved roads and pavements	280	15	1	4,200.00
	Reinstatement of non-paved earth road crossings	60	15	1	900.00
	Removal of Medical waste (Toilets) from site	80	1	8	640.00
	Vibrations - rehabilitation	700	20	1	14,000.00
	Post construction dilapidation survey	700	10	1	7,000.00
ESTIMATED COST OF COMPLYING WITH THE ESMP					**1,037,990.00**

1.10 Conclusion and Recommendations

The major residual impacts of the project are loss of assets and displacement of economic activities. As well as the Environmental flow impacts associated with the release from Muela Hydropower dam.

A Resettlement action Plan has been developed as part of this ESIA. However, it excluded the detailed assets registration and verification. The majority of the PAPs involved in commercial activities within Botha Bothe town. Are seasonal transient street venders. It is anticipated that there might be changes in the assets and nature of PAPs along the anticipated works area. As a result it recommended that a pre-construction RAP asset registration and verification shall be required. The compensation and reinstatement shall be undertaken as part f RAP implementation prior to construction.

The anticipated release of water from Muela dam during periods of low flow, proposed as part of this project. Can be implemented as guided by an Environmental Flow Assessment. It is therefore recommended that a 'baseline' study of the upper Hololo River is undertaken as a matter of urgency. It is also suggested that a new IFR calculation needs to be done, using the 2008 IFR report on the conditions in the Hololo River as a benchmark. The downstream communities for Hololo river include the project beneficiaries and infrastructure host communities. It is recommended that other additional downstream users of Hololo river are consulted as part of the IFR. Once the IFR has been finalised, it is recommended that a comprehensive monitoring programme should be put in place to monitor downstream impacts once the scheme is in operation in order to determine whether the IFR flows is sufficient or not to meet hydrological, ecological and user needs. This shall provide the required operational rules for the release as well as guide the flow regime systems maintenance. While ensuring down stream public and animal safety. The pre-construction annual Environmental Flow Assessment study should be undertaken prior to start of the project construction.

As the Environmental Assessment Practitioner on this ESIA. It is my professional opinion that once these two pre-construction studies are carried out. In addition, if the necessary action and monitoring plans are developed and implemented during construction and throughout the operation of the project. The residual impacts associated with the construction of Zone 1 shall be reduced.

It can therefore be concluded that of the *known* anticipated construction impacts, the project benefits outweigh the temporary and relatively small scale, temporary impacts of construction and the permanent impacts of the proposed scheme. The landscape and biophysical environment in the project area have been significantly altered and degraded, and the impact assessment has been conducted based on the relatively low sensitivity of the environment and the high vulnerability of the local communities to water shortages and poor quality of water. Any further delays in project implementation will pose a considerable risk and could result in social conflict and perpetuation of the poverty cycle.