Offshore Bypass Pipelines and Associated Infrastructure, Voorbaai, Mossel Bay

Environmental Management Programme

Report Prepared for

The Petroleum Oil and Gas Corporation of South Africa SOC Limited

PetroSA

Report Number 583957/02

DFFE Reference Number: To be provided

SAHRA Reference Number: To be provided

Report Prepared by

srk consulting

February 2023

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SRK Consulting (South Africa) (Pty) Ltd.

The Administrative Building
Albion Spring
183 Main Rd
Rondebosch 7700
Cape Town
South Africa

e-mail: lelston@srk.co.za
website: www.srk.co.za

Tel: +27 (0) 21 659 3060
Fax: +27 (0) 86 530 7003

SRK Project Number 583957

February 2023

Compiled by:

Lauren Elston
Senior Environmental Consultant

Email: lelston@srk.co.za

Authors:

Lauren Elston; Kelly Armstrong

Peer Reviewed by:

Chris Dalgliesh
Principal Environmental Scientist

Profile and Expertise of EAPs

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by The Petroleum Oil and Gas Corporation of South Africa SOC Limited (PetroSA) as the independent consultants to undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting was established in 1974 and comprises over 1 600 professional staff worldwide, offering wide-ranging expertise in the natural resources and environmental sectors. SRK's Cape Town Environmental, Social and Governance (ESG) department has a proven track record or managing large, complex environmental and engineering projects in the Western Cape, Africa and internationally. SRK has rigorous quality assurance standards and is ISO 9001 accredited.

As required by NEMA, the qualifications and experience of the key individual practitioners responsible for this project are detailed below.

Project Director and Reviewer: Christopher Dalgliesh, BBusSc (Hons); MPhil (EnvSci)
Registered EAP (no. 2019/413)
Chris Dalgliesh is an SRK Director and Principal Environmental Consultant with over 36 years' experience, primarily in Southern Africa, West Africa, South America, the Middle East and Asia. Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure and industrial sectors. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs), in accordance with international standards (e.g. IFC). He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies and monitors project on behalf of financial institutions, and also has a depth of experience in Strategic Environmental Assessment (SEA) and Resource Economics.

Project Manager: Lauren Elston, BSc (Env); BSc (Hons) (EnvMgmt)
Registered EAP (no. 2020/981)

Lauren Elston is a Senior Environmental Consultant with almost 15 years' experience. Lauren specialises in Environmental Impact Assessment, Air Quality Management, Water Use Management and Environmental Auditing. Her core expertise includes environmental impact assessment and management of projects in the renewable energy, waste, agricultural, infrastructure, industrial, mining, and mixed development sectors in South Africa. Lauren has experience in Water Use Licences, Atmospheric Emission Licences, Waste Management Licences, Mine Closure, and the development of Environmental Management Plans. In addition, her experience includes Greenhouse Gas Reporting and Emissions Inventory Reporting on the National Atmospheric Emissions Inventory System (NAEIS).

Statement of SRK Independence

Neither SRK nor any of the authors of this EMPr have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no prior association with PetroSA in regard to the development that is the subject of this Report. SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this EMPr have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by The Petroleum Oil and Gas Corporation of South Africa SOC Limited. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

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Acronyms and Abbreviations

amsl	Above mean sea level
AST	Aboveground Storage Tank
BA	Basic Assessment
CBM	Central Buoy Mooring
CR	Contractors Environmental Representative
DFFE	(National) Department of Environment, Forestry and Fisheries
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ERP	Emergency Response Plan
ESA	Ecological Support Area
GHG	Greenhouse Gases
GTL	Gas to Liquid
HWM	High Water Mark
LWM	Low Water Mark
MR	Medium Range
MUCH	Maritime and Underwater Cultural Heritage
NEMA	National Environmental Management Act 107 of 1998 as amended
PetroSA	The Petroleum Oil and Gas Corporation of South Africa SOC Limited
PLEM	Pipeline End Manifold
SANS	South African National Standards
SG	Surveyor General
SPM	Single-Point Mooring
SRK	SRK Consulting (South Africa) (Pty) Ltd
TNPA	Transnet National Ports Authority
TOP	Threatened or Protected Species

Glossary

Avifauna	The collective birds of a given region.
Basic Assessment Report	The report produced to relay the information gathered and assessments undertaken during the Environmental Impact Assessment.
Coastal Area	Coastal public property, littoral active zone and any area between the high water mark and up to 500 m landwards of the high water mark where dunes wetlands, mangroves, lagoons, salt marshes, salt pans, mud flats occur, but not exceeding the boundary of the coastal zone.
Coastal Zone	Means the area comprising coastal public property, the coastal protection zone, coastal access land, coastal protected areas, the seashore and coastal waters, and includes any aspect of the environment on, in, under and above such area.
Coastal Public Property	Coastal waters, land submerged by coastal waters, natural islands within coastal waters and the seashore.
Coastal Protection Zone	The coastal protection zone contemplated in section 16 of NEM: ICMA
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.
Contractor	Any company appointed by the Proponent to undertake construction or related activities on site, and will include the main Contractor, as well as any Sub-Contractors.
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Contaminated Water	Water contaminated by activities on site, e.g. concrete water and run-off from plant / personnel wash areas.
Design Phase	The stage during which detailed layout and development plans are prepared, including the drafting of contract documents for construction.
Dune	A mound or ridge of loose wind blown material, usually sand, whether covered by vegetation or not
Ecological Support Area	Areas which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development.
Environment	The external circumstances, conditions and influences that surround and affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	The authorisation by a competent authority of a listed activity or specified activity in terms of NEMA.

Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project
Environmental Management Actions	Requirements or specifications for environmental management to achieve impact management outcomes, as presented in the EMPr, some of which are based on the mitigation measures identified in the BA Report.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Hazardous substance	A substance (including materials and waste) that can have a deleterious (harmful) effect on the environment and those substances declared hazardous substances in terms of the Hazardous Substances Act 15 of 1973.
Heritage Resources	Refers to something tangible or intangible, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations and has cultural significance.
Housekeeping	Maintaining the working environment in a tidy manner.
Hydrology	(The study of) surface water flow.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Impact Management Outcome	The intended objective or end goal of impact management, effected through the implementation of mitigation measures / environmental management actions
Intelligently Pigged	An inspection technique whereby an inspection probe, often referred to as a "smart" pig, is propelled through a pipeline while gathering important data, such as the presence and location of corrosion or other irregularities on the inner walls of the pipe.
Method Statement	A mandatory written submission by the Contractor to the Resident Engineer or Environmental Control Officer setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity.
Mitigation Measures	Actions identified in the EIA to manage (avoid, minimise or optimise) potential environmental impacts which may result from the development.
Operational Phase	The stage of the works (including maintenance) following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Performance indicator	A measurable indicator of the outcome of environmental management, used to assess the success with which mitigation measures have been implemented. Often captures the results of several different monitoring activities.
Previously Disadvantaged Individual	A person who belongs to the previously disenfranchised population groups in South Africa, i.e. blacks, coloureds, and Indians.
Phase	A defined period during the life of the power plant project, e.g. the Construction and Operational Phases.

Proponent	The person or organisation implementing the project.
Resources	The personnel, financial, equipment and technical requirements necessary for the successful completion of mitigation measures and for monitoring activities.
Schedule	The schedule or deadline for completion of each mitigation measure, which are recorded to ensure that mitigation measures are implemented in good time and in the correct sequence.
Seashore	The area between the Low Water Mark and High Water Mark
Solid waste	All solid waste including construction debris, chemical waste, broken / redundant equipment, oil filters, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Stakeholders	All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.
Sub-Contractors	A Sub-Contractor is any individual or Contractor appointed by the main Contractor, to undertake a specific task on site.
Vessel	A waterborne craft of any kind, whether self-propelled or not, but does not include any moored floating structure that is not used as a means of transport by water.

1 Introduction

1.1 Background

The Petroleum Oil and Gas Corporation of South Africa SOC Limited (PetroSA) operates and owns a Gas to Liquid (GTL) refinery in Mossel Bay, that imports and exports hydrocarbon fuels using a Central Buoy Mooring (CBM) facility and a Single-Point Mooring (SPM) facility. The SPM facility is connected to the GTL refinery via three marine pipelines of varying diameters (8", 12" and 14") housed in a single enclosed ~3.4 km long, 36" carrier pipe subsea bundle from the tank farm to the SPM (see Figure 1-1). In order to bypass the corroded section of two of the existing pipelines (12" and 14"), PetroSA proposes to modify the existing SPM subsea bundle by installing two new ~1.4 km steel pipelines (12" and 14") (referred to as a dual pipeline) on the seabed, parallel to and ~15 m from the existing housing structure. The dual pipeline will terminate in a new Pipeline End Manifold (PLEM) seabed structure and be tied into the existing SPM buoy (to be repositioned to align with the new PLEM) and the existing operating bundle (the project).

The new pipelines will be welded together in string lengths (strings) of approximately 200 m at the fabrication (pipeline assembly) site located within PetroSA's Tank Farm and launched to sea by a tugboat across temporary elevated roller lines (an ~12 m wide launch way) to be installed between the Tank Farm and the Low Water Mark (LWM) of the sea.

SRK Consulting (South Africa) (Pty) Ltd (SRK) undertook the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended. The BA Report contains a detailed description of the project and its impacts.

NEMA requires that an Environmental Management Programme (EMPr) be submitted along with the BA Report to demonstrate how environmental management and mitigation measures will be implemented. The mitigation measures, which were identified during the BA process, apply to the following phases of the development process:

- **The Design Phase**: These measures relate to the detailed layout, planning and design of the pipeline and associated infrastructure, and will largely be implemented by the planning and development team, prior to the commencement of any physical on site activities. These mitigation measures are presented in Section 2.
- **The Construction Phase:** These mitigation measures are applicable during site preparation, pipeline assembly, and launching and installation of the pipeline, and must be implemented by the relevant Contractors and sub-contractors. These mitigation measures are presented in Section 3.
- **The Operational Phase[1]:** These mitigation measures are applicable during the long-term operation of the pipeline and must be implemented by PetroSA. These mitigation measures are presented in Section 4.
- **The Decommissioning Phase:** As it is expected that the pipeline will be maintained in the long-term and not be decommissioned in the foreseeable future, measures related to decommissioning are not included in the EMPr.

The management measures listed for the various phases are either:

[1] Maintenance activities are excluded from the scope of this project. PetroSA plans to request the adoption of a Maintenance Management Plan (MMP), for maintenance activities triggering LN1 Activity 19A for the entire SPM system, including the existing pipelines.

- Essential: measures which must be implemented and are non-negotiable; or
- Best Practice: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented. *These measures have been italicised in Table 2-1, Table 3-1 and Table 4-1 for ease of reference.*

***Note**: The EMPr will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for approval along with the BA Report. Once Environmental Authorisation (EA) has been issued by DFFE, this document may need to be updated to ensure that all relevant conditions of authorisation are adequately captured.*

1.2 Proponent Details

The details of the person who will be responsible for the implementation of the EMPr are presented in Table 1-1 below.

Table 1-1: Proponent details

Name of Company	The Petroleum Oil and Gas Corporation of South Africa SOC Limited
Contact Persons	Dian Naicker
Position	Operations Environmental Leader
Postal Address	Private Bag X1 Mossel Bay 6500
Telephone	(044) 601 2911
Email	Dian.naicker@petrosa.co.za

Data Source:	Esri Basemap
Scale	1:35 000
Projection:	Datum: WGS84
Central Meridian/Zone:	
Date:	Compiled by:
18/08/2022	LEKT
Project No.	Fig No.
583957	1.1

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PETRO SA SPM PIPELINE

LOCALITY MAP

Path: \\Ctn-svr0.ctn.za.srk.ad\vol1\Root\Proj\New Proj\583957_PetroSA SPM Pipeline BA\8GIS\GISPROJ\MXD\583957_PetroSA_SPM_Pipeline_Locality_Map1_20220818.mxd

Revision: C Date: 20 02 2023

1.3 Content of the EMPr

The EIA Regulations 2014, promulgated in terms of NEMA (GN R982, which came into effect on 8 December 2014, as amended by GN R326) prescribe the required content in an EMPr. These requirements and the sections of this EMPr in which they are addressed, are summarised in Table 1-2.

Table 1-2: Content of the EMPr as prescribed by the EIA Regulations, 2014

GN 982 Annexure 4 (1) Ref.:	Item	Section Ref.:
(a)	Details of:	
(a) (i)	The Environmental Assessment Practitioner (EAP) who prepared the EMPr	Page i
(a) (ii)	The expertise of that EAP to prepare an EMPr, including a curriculum vitae	Page i
(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.4 and Table 1-3
(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating areas that should be avoided, including buffers;	Figure 1-6
(d)	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Table 1-3 and Table 1-4
(d)(i)	Planning and design;	Table 2-1
(d)(ii)	Pre-construction activities;	
(d)(iii)	Construction activities	Table 3-2
(d)(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	
(d)(v)	Where relevant, operation activities;	Table 4-1
(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to-	Table 2-1, Table 3-2 and Table 4-1
(f)(i)	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	
f(ii)	Comply with any prescribed environmental management standards or practices;	
f(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	
f(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 3.2 and Section 4.2
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 2.1, Section 3.1 and Section 4.1
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Table 2-1, Table 3-2 and Table 4-1
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f)	

GN 982 Annexure 4 (1) Ref.:	Item	Section Ref.:
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 3.2 and Section 4.2
(m)	An environmental awareness plan describing the manner in which-	Table 2-1, Table 3-2 and Table 4-1
(m)(i)	The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	
(m)(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	Any specific information that may be required by the competent authority.	

1.4 Project Description and Area

1.4.1 Offshore Bypass Pipelines and Associated Infrastructure

The project area / corridor for the bypass pipelines and associated infrastructure extends from ~1.5 km to ~3 km offshore of Voorbaai in Mossel Bay. The corridor is ~720 m north east off the Mossel Bay Seal Island Nature Reserve, a protected area comprising Seal Island (Figure 1-1).

The bypass dual pipelines will be installed on the seabed, parallel to and ~15 m from the existing SPM pipeline housing structure, predominantly in an area that is already disturbed/transformed.

PetroSA import condensate, reformate, diesel and petrol and export diesel, kerosene and petrol via an existing SPM buoy (see Figure 1-2) which is aligned with a PLEM structure on the seabed, where the existing pipeline housing structure terminates. Medium Range (MR) vessels berth on the SPM, which PetroSA leases from the Transnet National Ports Authority (TNPA).

srk consulting	PETROSA SPM PIPELINE Existing SPM Bouy	Project No. 583957

Figure 1-2: Existing SPM buoy

1.4.2 Fabrication Yard and Launch Way Corridor

The dual pipelines will be welded together at a fabrication site (pipeline assembly site) at PetroSA's existing Tank Farm (Erf 1349 and Remainder of Erf 13) and placed on a pipe string roller line within the yard (see Figure 1-3). The pipe string roller line (temporary launch way) will extend in a straight line towards the sea (see Figure 1-3) within the launch way corridor (see Figure 1-4). Part of the launch way corridor (above the High Water Mark [HWM]) is located on a vegetated dune, ~15 m above mean sea level (amsl), on Erf 1358 owned by the Mossel Bay Municipality. The temporary launch way will

extend from the vegetated dune above the HWM of the sea to the sealine, also referred to as the Low Water Mark (LWM) (see Figure 1-3).

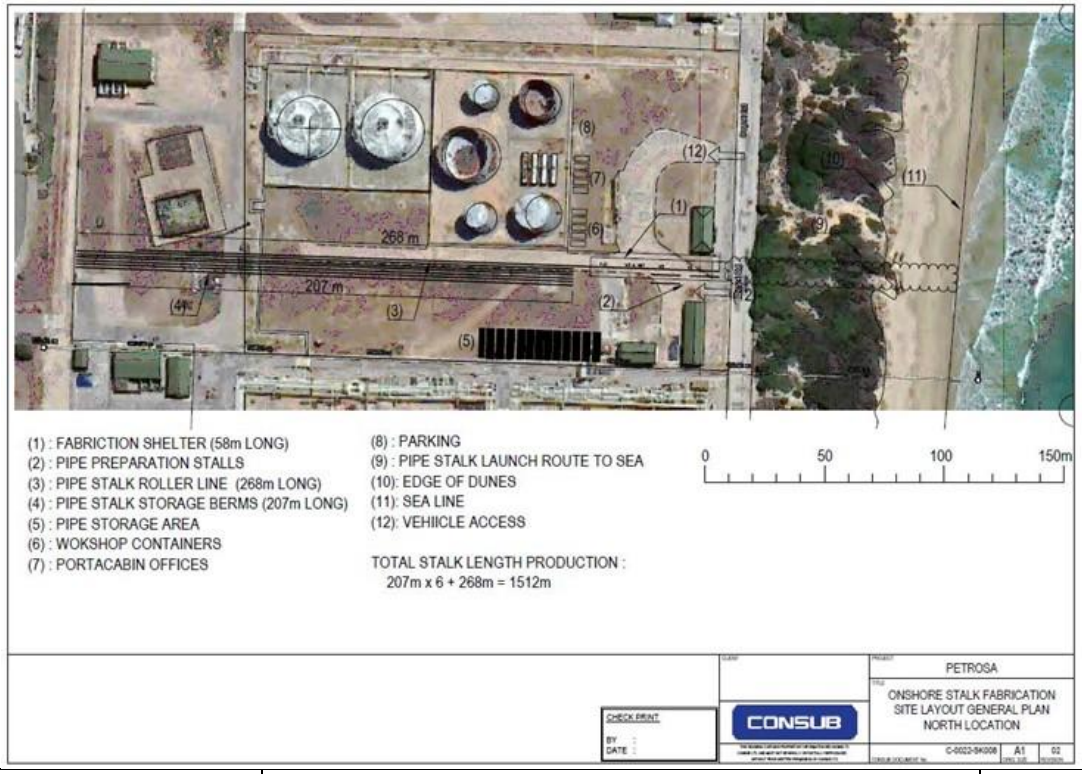


Figure 1-3: Fabrication site and launch way corridor

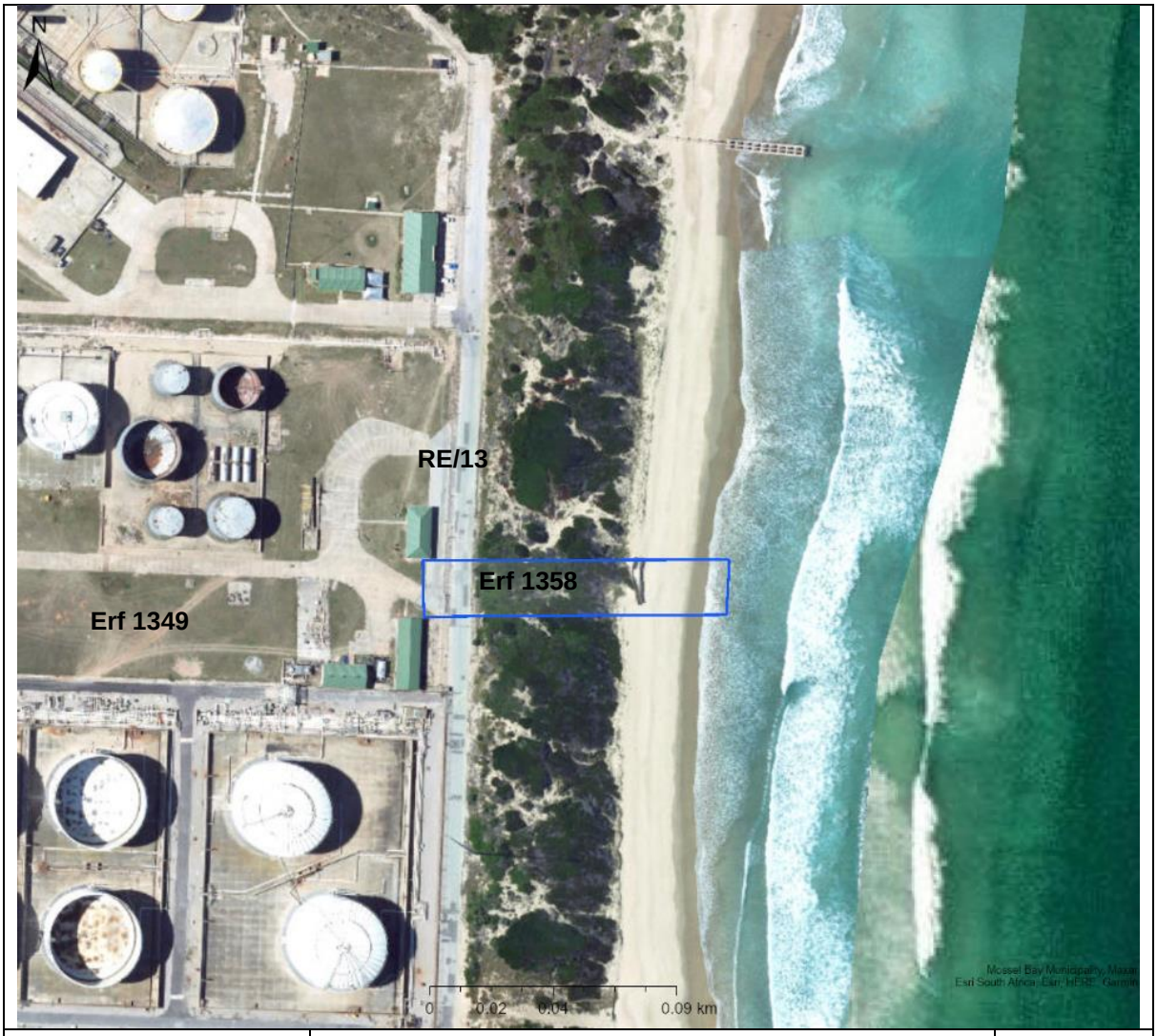
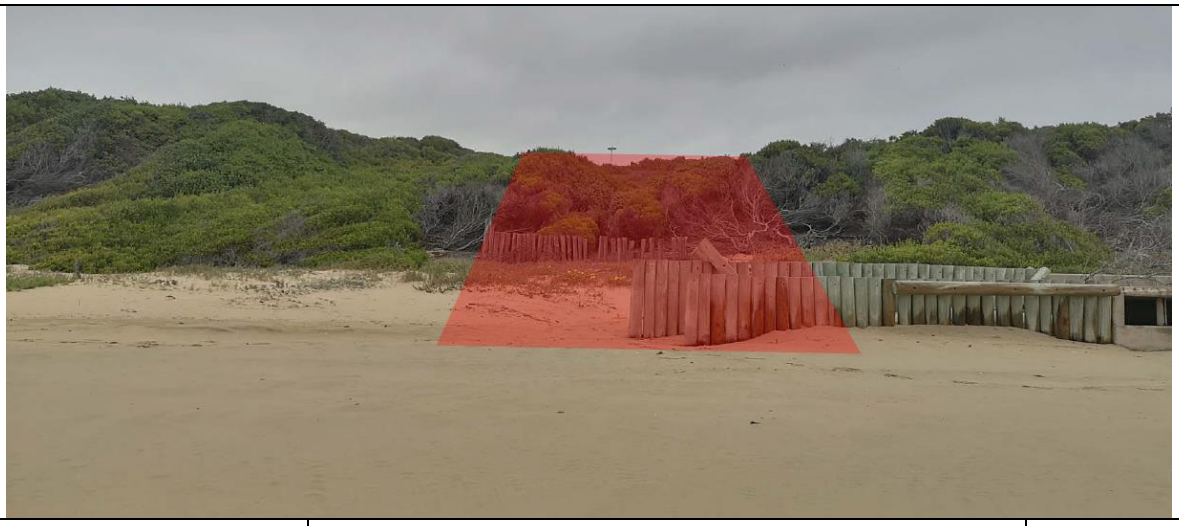


Figure 1-4: Launch way corridor

The launch way corridor, within which the ~12 m wide launch way will be constructed (including space for vehicles), is ~20 m wide and 100 m long. It is located in between the Gericke Estuary (~230 m north of the launch way site) and the Twee Kuilen Estuary (~550 m south of the launch way site) (see Figure 1-1). The launch way corridor is located within a coastal area, in the coastal protection zone and on coastal public property.

The launch way corridor is located within an Ecological Support Area (ESA). Although several milkwood trees (a protected tree species under the under the National Forests Act 84 of 1998) are located within the launch way corridor (and on the entire dune system) the launch way site is very degraded as evident from the alien vegetation that has colonised the site as a result of prior disturbance to construct underground stormwater infrastructure.

A stormwater manhole, underground stormwater pipe and drainage outfall (on the beach) are located within the launch way corridor. Despite the existing infrastructure within the launch way corridor, the ~12 m wide and ~100 m long launch way (including space for vehicles) will be accommodated within the corridor. Wood poles on the beach (see **Error! Reference source not found.**) next to the s tormwater outfall will be removed and later re-instated.



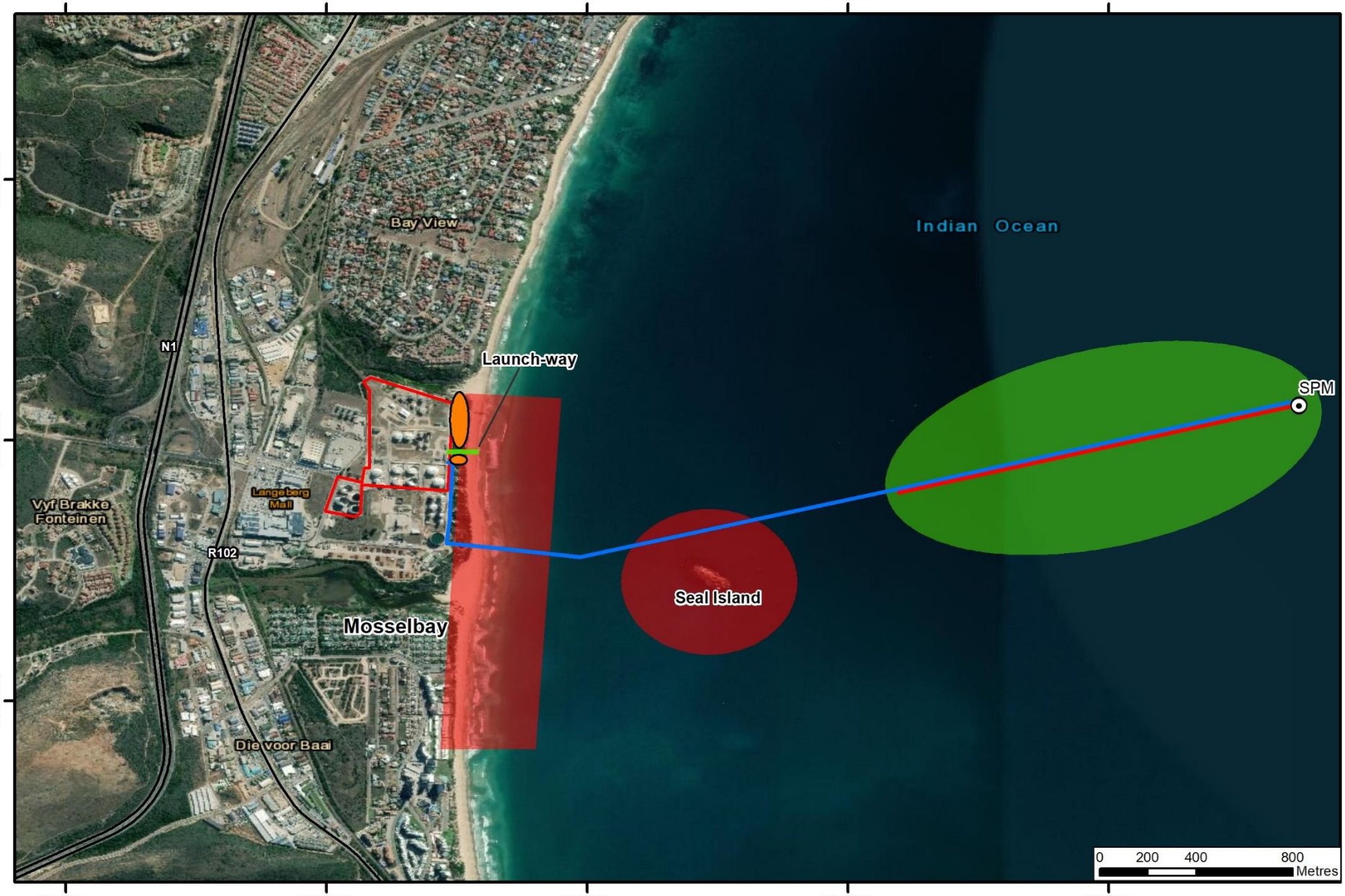
srk consulting	PETROSA SPM PIPELINE View of the Approximate Project Area for the Launch way	Project No. 583957

Figure 1-5: Schematic beach view of the launch way corridor

A more detailed project description is provided in Section 3 of the BA Report (SRK Report 583957/01:*Offshore Bypass Pipelines, PetroSA, Mossel Bay*).

1.5 Integrated Project and Sensitivity Map

The EIA Regulations, 2014 prescribe that an integrated map at an appropriate scale is presented in the EMPr. The map should, so far as it is applicable, superimpose the proposed activity and associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers – see Figure 1-6.



N

Legend

- SPM
- Roads
- Exisiting pipelines
- New bypass pipelines
- PetroSA Tank Farm
- NO-GO Zones

Environmental Sensitivity

- High Sensitivity
- Low Sensitivity

Data Source: Esri Basemap	
Scale 1:24 000	
Projection:	Datum: WGS84
Central Meridian/Zone:	
Date: 02/02/2023	Compiled by: LEKT
Project No.: 583957	Fig No. 1.6

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PETRO SA SPM PIPELINE

ENVIRONMENTAL SENSITIVITY MAP

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Revision: A Date: 20 02 2023

1.6 Potential Impacts and Impact Management Outcomes

A summary of the potential impacts of the proposed development identified and assessed in the BA Report is presented in Table 1-3. Additional details on the nature of these impacts are provided in the BA Report (SRK Consulting Report No: 583957/01, February 2023).

Table 1-3: Potential impacts of the proposed project

Impact	Description	Impact Status
Construction Phase		
Air Quality	Impaired air quality due to windblown sand	Negative
Noise	Increased noise levels due to project activities	Negative
Terrestrial Ecology	Degradation and / or loss of terrestrial habitat and endangered and protected species	Negative
	Displacement and / or loss of terrestrial fauna	Negative
	Spread of terrestrial alien and invasive plant species	Negative
Marine Ecology	Displacement and / or loss of marine fauna	Negative
Heritage	Loss or damage to land-based heritage resources	Negative
	Loss or damage to marine-based heritage resources	Negative
Socio- economic	Increased employment, income and skills development	Positive
Climate Change	Contribution to global warming from emissions of Greenhouse Gases (GHG)	Negative
Operational Phase		
Marine Ecology	Displacement and / or loss of marine fauna due to release of hydrocarbons into the marine environment from pipeline leaks	Negative
Socio- economic	Economic growth from increased fuel supply	Positive

The mitigation and enhancement measures stipulated in the BA and in this EMPr seek to meet the impact management outcomes[2] listed in Table 1-4. A management outcome describes the intended objective or end goal of impact management, effected through the implementation of mitigation measures / impact management actions.

Table 1-4: Impact management outcomes of the EMPr

Impact	Impact Management Outcome
Construction Phase	
Air Quality	No windblown sand related nuisance or complaints from local communities
Noise	No noise related nuisance or complaints from local communities
Terrestrial Ecology	No significant displacement and / or loss of terrestrial fauna
	No significant degradation and / or loss of terrestrial flora habitat and protected species
Marine Ecology	No significant displacement and / or loss of marine fauna
Socio- economic	Enhanced economic benefits to the local community and economy
Heritage	No significant loss and / or damage to heritage resources

[2] In terms of Regulation 36(1) of the EIA Regulations, 2014, where an amendment is required to the impact management ***actions*** of an EMPr, such **amendments may immediately be effected by the holder** and reflected in the next environmental audit report, however, in terms of Regulation 36(2) where an amendment to the impact management ***outcomes*** of an EMPr, the EMPr may be amended **on application by the holder only**.

Impact	Impact Management Outcome
Climate Change	Limited GHG emissions
Operational Phase	
Marine Ecology	No significant displacement and / or loss of marine fauna
Socio-economic	Enhanced economic growth

2 Measures Applicable to the Detailed Design Phase

2.1 Roles and Responsibilities

The key role players during the Design Phase of the project are:

- PetroSA (the proponent); and
- Engineering consultants responsible for the detailed design plans.

Their roles and responsibilities during the detailed Design Phase with respect to the implementation of the EMPr are outlined below.

PetroSA:

- Ensure that the Contractors are aware of and take into consideration all relevant measures in the EMPr; and
- Confirm that all relevant environmental management measures in the EMPr have been incorporated into the project design on completion of the Design Phase.

Engineering Consultants:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the detailed design; and
- Reference the environmental management measures applicable to the Construction (Section 3).

2.2 Environmental Management Measures

The environmental management and mitigation measures (also called “management actions”) that must be implemented during the Design Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 2-1 below.

Table 2-1: Environmental mitigation measures / management actions that must be implemented during the *Design* Phase

Design Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Authorisations	1.	Ensure that all required licences and permits have been obtained before the start of construction. These include, but may not be limited to: • EA; • Heritage approval from the SAHRA Maritime and Underwater Cultural Heritage unit; • Pollution Safety Certificate (Prevention and Combating of Pollution of the Sea by Oil Act 6 of 1981); • Permit for the use of a vehicles in a coastal area; and • Permit for the destruction and / or removal of threatened or protected species in terms of the Threatened or Protected Species (TOPS) Regulations.	• PetroSA	• Before construction commences	• Keep record of all permits, licences and authorisations	• Required licences/permits on file
Environmental Compliance	2.	Appoint an Environmental Control Officer (ECO) to oversee construction activities.	• PetroSA	• Before construction commences	• Review appointment documentation	• ECO appointment documents
	3.	Include the EMPr in all tender documents to ensure that sufficient resources are allocated to environmental management by the Contractors.	• PetroSA	• Prior to call for tenders	• PetroSA to check tender documents and contract	• Incorporated in tender documents
Safety Certificate and Emergency Contingency Plan	4.	Ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents	• PetroSA	• Before construction commences	• Review Safety Certificate and Emergency Contingency Plan	• Safety Certificate and Emergency Contingency Plan on file
	5.	Compile an Emergency Contingency Plan (or implement the existing one) to manage potential risks associated with oil discharge incidents during the Operational Phase.	• PetroSA	• Before Operation Phase commences	• Review Emergency Contingency Plan	• Emergency Contingency Plan on file
Lighting Plan or Procedure	6.	Ensure vessel operators have a Lighting Plan or Method Statement / Procedure in place to minimise or avoid impacts associated with night-time lighting on avian species, fish species and marine mammals.	• PetroSA	• Before construction commences	• Review Lighting Plan or Method Statement / Procedure	• Lighting Plan or Method Statement / Procedure on file
Employment	7.	Source labour from the local community, where possible.	• PetroSA	• Before construction commences	• Keep record of staff by origin	• Percentage of local staff
Traffic management	8.	Schedule the delivery of abnormal loads to the site outside peak traffic periods.	• PetroSA	• During Design Phase	• Keep record of delivery times of abnormal loads	• Compliance with measure

[3] Unless otherwise indicated, monitoring will be undertaken by PetroSA, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Design Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Heritage resource management / Hydrographic surveys	9.	Undertake hydrographic surveys (to confirm MUCH resources / foreign objects) of the proposed bypass pipeline route prior to commencement of construction.	• PetroSA	• Before construction commences	• Review Hydrographic Survey Map	• Hydrographic survey map on file
	10.	Appoint a maritime archaeologist to assess the find, if potential MUCH resources are identified during the hydrographic surveys, prior to commencement of construction.	• PetroSA	• Before construction commences	• Review appointment documentation	• Maritime archaeologist appointment documents
Seed propagation for rehabilitation	11.	Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas.	• PetroSA	• During Design Phase	• Review appointment documentation	• Rehabilitation specialist appointment documents
Waste management	12.	Ensure vessel operators have a waste management procedure in place to avoid waste discharges to sea.	• PetroSA	• Before construction commences	• Review waste management procedure	• Waste management procedure on file

3 Measures Applicable to the Construction Phase

3.1 Roles and Responsibilities

The key role players during the Construction Phase of the project are as follows:

- PetroSA (the proponent);
- Contractors[4] responsible for hydrographic surveys and installation of the pipeline;
- Vessel operators responsible for installation of the pipeline; and
- ECO responsible for overseeing construction activities and reporting compliance with EMPr.

The anticipated Construction Phase organogram is presented in Figure 3-1 below and shows the proposed lines of communication during this phase. PetroSA will retain responsibility for ensuring that the Contractors and Vessel Operators fully implement the provisions of the EMPr.

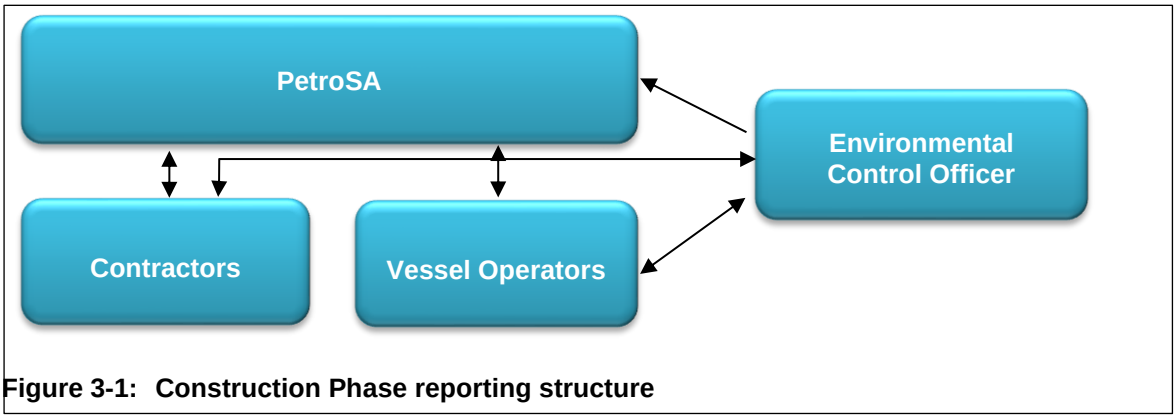

Figure 3-1: Construction Phase reporting structure

Key roles and responsibilities during the Construction Phase with respect to the implementation of the EMPr are outlined below.

[4] Includes Contractors and Sub-contractors.

PetroSA:

PetroSA has overall responsibility for management of the project. In terms of environmental management, the proponent will:

- Appoint suitably experienced Contractors who will be responsible for the overall management of activities on site during the Construction Phase;
- Appoint an and suitably qualified ECO to monitor compliance with the EMPr for the duration of the Construction Phase;
- Ensure that the Contractors are duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Monitor the Contractors activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Relay all instructions from the ECO to the Contractors and ensure that these are fully understood and implemented;
- Report any environmental emergencies/concerns to the ECO immediately;
- Act as a point of contact for local residents and community members;
- Ensure that non-compliance is remedied timeously and to the satisfaction of the relevant authorities;
- Ensure that Contractors are aware of and contractually bound to the provisions of this EMPr by including the relevant environmental management requirements in the tender and / or contract documents, as appropriate; and
- Notify the authorities should problems not be remedied timeously.

Contractors:

The Contractors will be required to appoint or designate a Contractor's Environmental Representative (CR) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor and the ECO. The CR shall:

- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Ensure that all employees comply with the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

The Contractors have a duty to demonstrate respect and care for the environment. The Contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

ECO:

The ECO shall be a suitably qualified/experienced environmental professional or professional firm, appointed by the proponent, for the duration of the Construction Phase of the project. The ECO shall:

- Request Method Statements from the Contractor prior to the start of relevant construction activities, where required, and accept these (as appropriate) without causing undue delay;
- Monitor, review and verify compliance with the EMPr by PetroSA and the Contractors;
- Undertake site inspections at least once a month to determine compliance with the EMPr;
- Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with PetroSA and the Contractors, as required;
- Compile a checklist highlighting areas of non-compliance following each ECO inspection;
- Ensure follow-up and resolution of all non-compliances;
- Provide feedback for continual improvement in environmental performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMPr, and which could potentially have environmental impacts, and advise PetroSA and the Contractors as required; and
- Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

3.2 Compliance and Monitoring

3.2.1 Method Statements

A Method Statement is a document setting out specific details regarding the plant, materials, labour and method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by a Contractor to the ECO for the ECO to confirm that these methods meet the requirements of the EMPr and acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to motivate amendments to specifications in the EMPr for consideration by the ECO. It also provides a reference point to detect deviations from the agreed approach to an activity.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;
- Material and equipment requirements;
- Transportation of equipment to and from site;
- Method for moving equipment/material while on site;

- How and where material will be stored;
- Emergency response approaches, particularly related to spill containment and clean-up;
- Response to compliance/non-conformance with the requirements of the EMPr; and
- Any other information deemed necessary by the ECO.

The following list provides examples of Method Statements that may be requested from the Contractor:

- Rehabilitation of launch way;
- Environmental awareness training;
- Waste management;
- Site demarcation and vegetation clearance;
- Any others requested by the ECO.

The Method Statements will be submitted by the Contractor to the ECO not less than **7 days** prior to the intended date of commencement of an activity. The ECO shall accept / reject the Method Statement within **2 days**. An activity for which a Method Statement has been requested shall not commence until the ECO has accepted such method and, once accepted, the Contractor shall implement the relevant Method Statement. A pro forma Method Statement is attached in Appendix A, although a suitable Method Statement format can be agreed between the ECO and Contractors.

3.2.2 Environmental Records and Reports

The estimated duration of the Construction Phase is approximately eight months. Environmental records and reports required during the Construction Phase are listed in Table 3-1. There are two categories of reports:

- Reports recommended by the Environmental Assessment Practitioner (EAP) to monitor implementation of the EMPr; and
- Statutory audits and reports prescribed by law and / or the Competent Authority and / or conditions of EA (see below).

Table 3-1: Reports required during the *Construction* Phase

Report	Frequency	From	To
Environmental Checklist	Weekly	CR(s)	ECO
Environmental Compliance Report	Monthly	ECO	PetroSA
Site Closure Report	End of Contract	ECO	PetroSA

3.2.2.1 Reports

Environmental Checklist

The CR(s) will undertake weekly site inspections to check on the implementation of the EMPr by the Contractors and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to the ECO very soon after each inspection. This checklist should be discussed between the CR(s) and the ECO during the initial site inspection, and agreement reached on the preferred format and content.

Environmental Compliance Reports

The ECO will undertake site inspections at least every fortnight during the first month and monthly thereafter. Following each site inspection the ECO will prepare Environmental Compliance Reports, detailing any environmental issues, non-compliance and actions to be implemented. These reports will be based on the ECO's observations from site inspections. Environmental Compliance Reports will be submitted to PetroSA and a full record will be kept by the ECO, for submission to the Local Authority and/or DFFE on request.

When more frequent site visits are undertaken by the ECO, the frequency of Environmental Compliance Reports will increase accordingly to allow for timeous reporting of environmental issues and actions required.

Photographic Records

If the ECO identifies any areas of concern, the ECO will request photographic records, which must be submitted by the Contractor for record purposes.

Construction Site Closure Report

The ECO will undertake a final site closure inspection on completion of the Construction Phase. The purpose of this is to confirm compliance with all site closure requirements identified by the ECO, and that the site has been left in an environmentally suitable condition. If outstanding environmental requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The Site Closure Report will be submitted to PetroSA for record purposes, and to DFFE if requested.

In the event of temporary site closure (e.g. over the December construction shut-down period, or during Care & Maintenance) a similar procedure will be followed and a Temporary Site Closure Report compiled an submitted by the ECO.

Statutory Environmental Audit Reports

In terms of Regulation 34 of the NEMA EIA regulations, 2014, PetroSA is required to appoint an independent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMPr and recommend improvements (if required). In terms of Regulation 34(2)(d) of the EIA Regulations, 2014, the Environmental Audit Reports must be conducted and submitted at intervals confirmed by DFFE in the EA.

Since the Construction Phase of the project is anticipated to be eight months, and the impacts of the project are predominantly associated with the Construction Phase, Statutory Environmental Audit Reports during the Operational Phase are not deemed to be required. However, DFFE will specify the Environmental Audit Reporting requirements in the EA.

3.2.2.2 Corrective Action

Corrective action is a critical component of the implementation–review–corrective action–implementation (or plan-do-check-act) cycle and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring by the CR and ECO indicates non-conformance with the EMPr, the ECO will formally notify the Contractor(s) through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and

- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the Contractor(s) will be required to produce a Corrective Action Plan (or similar plan), which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the ECO for acceptance prior to implementation. Once it has been accepted, the corrective action must be carried out within the time limits stipulated in the Corrective Action Request. Additional monitoring by the CR and ECO will then be required to confirm the success or failure of the corrective action.

3.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the Construction Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 3-2 below.

Table 3-2: Environmental mitigation measures / management actions that must be implemented during the *Construction* Phase

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Site camp	1.	Erect the site camp and material lay down area within PetroSA's Tank Farm.	• Contractors	• Start of construction	• Visual inspections	• Site boundaries demarcated
	2.	Demarcate construction site boundaries upon establishment. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour and materials remain within site boundaries.				
Safety and Security	3.	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractors	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of safety/emergency incidents.
	4.	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc., to all the relevant personnel. Clearly display emergency procedures at the relevant locations around the site.				
	5.	Secure the Site Camp, particularly to restrict unauthorised access to fuels and any other hazardous substances.				
	6.	Store all construction material and equipment in a secure area.				
	7.	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances, etc.).				
	8.	Advise the ECO of any emergencies on site, together with a record of action taken				
Employment	9.	Employ local contractors and sub-contractors, if possible.	• PetroSA	• Before construction commences	• Keep record of staff by origin	• Percentage of local staff

[5] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Environmental Awareness Training	10.	Provide environmental awareness training to all personnel on site (including the construction personnel and vessel operators) at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment. • Suitable disposal of construction waste and litter. • Heritage artefact identification and management. • Key measures in the EMPr relevant to worker's activities. • How incidents and suggestions for improvement can be reported. • Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	• Contractors	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMP
Complaints Register / Grievance Mechanism	11.	Maintain and disclose a complaints register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• PetroSA	• Duration of construction activities	• Keep record of all complaints	• Register on site • Complaints followed up and closed out
Hazardous materials	12.	Design and construct hazardous material storage facilities, especially fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractors	• Throughout construction	• Visual inspection of hazardous materials handling and storage areas	• Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials. • Number of spills of hazardous materials, including waste; • Cost of cleaning up spills. • Evidence of contamination and leaks.
	13.	Ensure that contaminants (including cement) are not placed directly on the ground (e.g. mix cement on plastic sheeting) to prevent runoff from contaminating the stormwater				
	14.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
Protection of terrestrial habitat	15.	Restrict the width of the launch way development footprint to 12 m within the launch way corridor.	• Contractors			

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
and vegetation clearing	16.	Clear vegetation by hand rather than with heavy machinery, as far as practically possible.		• Throughout construction	• Visual inspection of the launch way corridor	• Activities are contained to the launch way corridor
	17.	Demarcate with fencing all areas outside of the development footprint as no-go areas.				
	18.	Prohibit damage to adjacent vegetation outside the demarcated development footprint.				
	19.	Remove alien invasive species cleared from the development footprint from the site.				• Absence of alien vegetation
	20.	Chip cleared indigenous vegetation for use as mulch to stabilise the disturbed surfaces after construction.		• After removal of indigenous vegetation	• Visual inspections of chipped vegetation	• Chipped vegetation stockpiled for rehabilitation
	21.	Install temporary windbreaks (shade netting) to stabilise the dune during construction, if necessary.		• Throughout construction	• Visual inspections of windbreaks and dunes	• Installation of windbreaks
	22.	Strip topsoil and stockpile separately for use during rehabilitation, only in areas where the ground cover will be disturbed by vehicles during dune profiling. Do not strip topsoil if dune profiling is not required (i.e if the rollers are placed directly on the surface).		• Before dune profiling	• Inspection of the launch way corridor	• Stockpiled topsoill
	23.	Prohibit damage to adjacent vegetation outside the demarcated development footprint.		• Throughout construction	• Visual inspections of adjacent vegetation	• No damage to adjacent vegetation observed.
Cement management	24.	Ensure that cement is mixed on mortar boards and not directly on the ground (where unavoidable).	• Contractors	• Throughout construction	• Visual inspection and approval by ERP and ECO.	• Number of incidents of batching outside works footprint • Contamination of water and soil • Visible litter / waste on site.
	25.	Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste.				
	26.	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.				
	27.	Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.				
Waste management	28.	Implement a Waste Management Method Statement / Waste Management Plan for waste management (including hazardous waste)	• Contractors and Vessel Operators	• Before start of activities on site • Throughout construction	• Availability of Method Statement / Plan • Availability of waste manifests • Visual inspection of waste collection and disposal areas	• Waste Management Plan on file. • Absence of litter • Availability of rubbish bins and skips • Degree to which rubbish bins and skips are filled
	29.	Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.				
	30.	Aim to reuse or recycle decommissioned items.				
	31.	Aim to minimise waste through reducing and re-using (packaging) material.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
	32.	Arrange for all waste produced to be collected and disposed of by an accredited service provider.			• Visual inspection of construction areas (litter)	• Total volume of general and hazardous waste storage capacity • Total volume of general and hazardous waste stored on site • Degree to which different waste is separated • Frequency of waste collection
	33.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.				
	34.	Collect all waste in bins and/or skips at the construction site.				
	35.	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.				
	36.	Provide separate bins for hazardous / polluting materials and mark these clearly.				
	37.	Do not allow any burning or burying of waste on site.				
Stormwater management	38.	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated waste water and fuels into the stormwater system.	• Contractors	• Throughout construction	• Visual inspection of stormwater system	• Incidence of stormwater contamination
	39.	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.				
Windblown sand management	40.	Regularly evaluate the effectiveness of windblown sand management measures. Amend how or which measures are used if necessary.	• Contractors	• Throughout construction	• Visual assessment of dust plumes and windblown sand • Visual assessment of dust control measures	• Visibility of dust / sand coming off launch way • Dust mitigation measures in place • Number of registered complaints
	41.	Erect the launch way as soon as practically possible after vegetation clearing.				
	42.	Restrict vegetation clearance to the launch way corridor.				
	43.	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				
	44.	Reduce airborne dust by covering stockpiles of loose material with plastic sheeting or netting, especially during windy conditions.				
	45.	Stabilise exposed surfaces following construction as soon as is practically possible.				
	46.	Rehabilitate areas with indigenous vegetation as soon as practically possible.				
	47.	Investigate and respond to complaints about excessive dust and take appropriate corrective action.				
Noise management	48.	Limit construction activities to Mondays to Saturdays, 07h00 - 18h00, or in compliance with relevant municipal bylaws, if applicable.	• Contractors	• Throughout construction	• Site inspection	• Number of registered complaints

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
	49.	Maintain all vehicles and equipment in good working order to prevent unnecessary noise.				
	50.	Investigate potential noise reduction measures if complaints are received.				
Fauna management	51.	Prohibit direct light in water, except during safety inspections.	• Contractors • Vessel operators	• Throughout construction	• Site inspection • Method statement	• Compliance with method statement
	52.	Ensure vessel operators have a lighting plan or procedure in place to minimise or avoid impacts associated with night-time lighting on avian species, fish species and marine mammals.				
	53.	Restrict vehicles to clearly demarcated areas on the beach				
	54.	Reduce lighting in non-essential areas.				
Fire management	55.	Ensure that no fires are permitted on or adjacent to site.	• Contractors	• Throughout construction	• Inspect attendance register for training sessions • Inspect fire extinguishers and certificates.	• Number of fire incidents • Certified extinguishers in appropriate locations.
	56.	Ensure that sufficient fire-fighting equipment is available on site.				
	57.	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.				
	58.	Suitably maintain firefighting equipment.				
Protection of archaeological and paleontological resources	59.	Cease work and consult a suitably qualified heritage professional if potential shipwreck artefacts are encountered.	• Contractors • PetroSA	• Throughout construction	• Visual inspection • Review records of finds • Appointment of a maritime archaeologist	• Records of finds
	60.	Do not remove or destruct cultural, historical or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA.				
Traffic Management	61.	Schedule the delivery of abnormal loads to the site outside peak traffic periods.	• Contractors	• Throughout construction	• Keep record of vehicles entering the site and time they enter • Keep record of incidents and complaints	• Number of incidents and complaints • Number of vehicles travelling to site each day
	62.	Ensure that large construction vehicles are suitably marked to be visible to other road users and pedestrians.				
	63.	Restrict vehicles to clearly demarcated areas on the beach.				
	64.	Investigate and respond to complaints about traffic.				
Visual aspects	65.	Control litter and keep construction site as clean and neat as possible.	• Contractors	• Throughout construction	• Visual inspection	• Number of complaints
	66.	Reduce lighting in non-essential areas.				
Ablution facilities	67.	Provide ablution facilities (i.e. chemical toilets) for all site staff at a ratio of 1 toilet per 15 workers (absolute minimum 1:25).	• Contractors	• Throughout construction	• Visual inspections	• Compliance with measures

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
	68.	Secure all temporary / portable toilets to the ground to the satisfaction of the ECO to prevent them toppling due to wind or any other cause.			• Records of waste disposal	• Number of pollution incidents
	69.	Maintain toilets in a hygienic state (i.e. toilet dispensers to be provided, toilets to be cleaned and serviced regularly (at least "twice- monthly" by an appropriate waste contractor), and toilets to be emptied before long weekends and builders' holidays).				
Response to environmental pollution	70.	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	• Contractors • Vessel operators	• Throughout construction	• Maintain register of pollution events and response • Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning	• Number of incidents • Spill kit available • Safety certificates • Emergency Contingency Plan • Time activities stopped • Number of recurring incidents • Availability and completeness of incident register
	71.	Record environmental pollution events in an incident register.				
	72.	Ensure availability of a spill kit at the site camp in the event of a hydrocarbon spill during land-based activities.				
	73.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the stormwater system.				
	74.	Repair faulty equipment as soon as possible.				
	75.	Install additional bunding / containment structures around the equipment that was the source of the leak / spillage to prevent pollution from reaching the stormwater system.				
	76.	Treat hydrocarbon spills, e.g. during refuelling, with adequate absorbent material, which then needs to be disposed of at a suitable landfill.				
GHG emissions	77.	*Implement measures to increase energy efficiency / reduce energy wastage*	• Contractors • Vessel operators	• Throughout construction	• Check Maintenance register • Keep record of measures implemented to be energy efficient	• Register and records on file.
	78.	*Maintain vehicles, equipment and vessels to reduce emissions*				
Housekeeping	79.	Store all vehicles, machinery and equipment within the PetroSA Tank Farm.	• Contractor	• Throughout construction	• Visual inspection	• Condition of the vehicles, generators and other equipment • Number of contaminations noted on site
	80.	Maintain all generators, vehicles, and other equipment in good working order.				
	81.	*Implement good housekeeping practices.*				

Construction Phase Measures						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Construction Demobilisation and Rehabilitation	82.	Remove all materials, temporary structures, temporary fences, plant, equipment and waste upon completion of construction.	• Contractors	• Once construction is complete and • Throughout construction	• Visual inspection of site	• Compliance with measures • Records of waste disposal • State of areas on and surrounding the site • Absence of compacted areas on the beach • Reinstated vegetation
	83.	Clean up and remove any spills in the appropriate manner.				
	84.	Rip compacted areas on the beach compacted by heavy machinery and profile the sand to mimic the surrounding beach profile.				
	85.	Rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas.	• Rehabilitation specialist			

4 Measures Applicable to Operational Phase

4.1 Roles and Responsibilities

Since PetroSA plans to request the adoption of a Maintenance Management Plan (MMP) for maintenance activities for the entire SMP system (including the existing pipelines), environmental management measures associated with maintenance activities (undertaken by Contractors) are excluded from this EMPr (as they will be included in the MMP).

The key role players during the Operational Phase of the project (responsible for investigations and to respond to potential environmental pollution incidents associated with infrastructure leaks) are:

- PetroSA (proponent).

Key roles and responsibilities during the Operational Phase with respect to the implementation of the EMPr are outlined below.

PetroSA:

- Ensure that copies of the EA and EMPr are available at its offices and all managers are aware of the requirements of the EA and EMPr;
- Implement and manage a programme of environmental inspection, monitoring and reporting;
- Comply with the applicable environmental commitments, procedures, restrictions and guidance specified in the EA and EMPr;
- Ensure that all supervisors and workers are familiar with and understand the requirements of the EA and EMPr that are relevant to their activities;
- Ensure that all supervisors regularly discuss environmental topics with staff;
- Ensure that all environmental incidents or accidents are investigated and analysed, and that measures are implemented to prevent similar events from happening in the future;
- Implement a programme for follow-up and analysis of all environmental incidents or accidents; and
- Liaise with the authorities and other stakeholders regarding the pipeline environmental performance.

4.2 Compliance and Monitoring

4.2.1 Statutory Environmental Audit Report

In terms of Regulation 34 of the NEMA EIA regulations, 2014, PetroSA is required to appoint an independent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMPr and recommend improvements (if required). In terms of Regulation 34(2)(d) of the EIA Regulations, 2014, the Environmental Audit Reports must be conducted and submitted at intervals confirmed by DFFE in the EA.

Since the impacts of the project are predominantly associated with the Construction Phase, and maintenance activities are excluded from the scope of work of this project, Statutory Environmental Audit Reports during the Operational Phase are not deemed to be required.

4.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented by PetroSA during the Operational Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 4-1 below.

Table 4-1: Environmental mitigation measures / management actions that must be implemented during the *Operational* Phase

Operational Phase						
Aspect	**ID**	**Mitigation Measure / Management Action**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[6]**	**Performance Indicators**
Environmental compliance	1.	Apply to DFFE for the adoption of a Maintenance Management Plan (MMP), for maintenance activities triggering LN1 Activity 19A for the entire SPM system, including the existing pipelines	• PetroSA	• Prior to the start of operation	• Check record of application submitted to the DFFE	• Application on file.
Maintenance inspections	2.	Undertake regular infrastructure maintenance inspections	• PetroSA	• Throughout operations	• Record of maintenance inspections	• Review records of maintenance inspections
Fauna management	3.	Compile an Emergency Contingency Plan (or implement the existing one) to manage potential risks to marine fauna associated with hydrocarbon discharge incidents from the pipeline and / or SPM facility.	• PetroSA	• Prior to the start of operation	• Review Emergency Contingency Plan	• Records of pollution incidents
Response to environmental pollution	*4.*	Implement the Emergency Contingency Plan to manage potential risks associated with hydrocarbon discharge incidents.	• PetroSA	• Throughout operation	• Review Incident Report.	• Records of pollution incidents
	5.	Compile and implement a programme for follow-up and analysis of all environmental incidents or accidents.	• PetroSA	• Throughout operation	• Authorities to confirm adequacy of programme	• Response from authorities
	6.	In the event of a hydrocarbon leak, immediately stop the transfer of fuels in the SPM system	• PetroSA		• Visual inspection • Community complaint • Incident Report	• Incident Report on file.
	7.	Only resume activity once the problem has been stopped.				
	8.	Repair faulty equipment as soon as possible.	• PetroSA			
	9.	Notify the relevant authorities within one day of an environmental pollution event, at a minimum: • DFFE is the case of a hydrocarbon spill exceeding 200L.			• Maintain register of events and communication with authorities	• Time between incident and notification

[6] Unless otherwise indicated, monitoring will be undertaken by PetroSA supported by the authorities.

Prepared by

Lauren Elston
Senior Environmental Consultant

Project Manager

Reviewed by

Chris Dalgliesh
Principal Environmental Consultant

Project Partner

Appendix A:

Method Statement Pro Forma

METHOD STATEMENT		(Insert company logo)
TITLE:		**Ref No:**
DISTRIBUTION AND AUTHORISATION		
Requested by:	**Date requested:**	**Signature:**
Submitted by:	**Date submitted:**	**Signature:**
Approved by RE:	**Date approved:**	**Signature:**
Approved by ECO:	**Date approved:**	**Signature:**

PROJECT DETAILS (What, How, Where, When)

Brief Description of Work to be Undertaken

Insert description of the scope of work to be undertaken - append a layout diagram if necessary

Description of Process, Methods and Materials

Provide a description of how works will be undertaken, paying special attention to the way in which environmental and social risks that have been identified will be addressed.

Environmental and Social Risks Identified

Insert possible environmental and social risks of the activity (e.g. water contamination, nuisance from dust, etc.)

Duration of Works

Indicate the anticipated duration of works, including anticipated start and completion date.

SRK Report Distribution Record

Report No.	583957/02
Copy No.	1

Name/Title	Company	Copy	Date	Authorised by
PetroSA EMPr	This report is being distributed as an annexure to the BA Report, and as such to the same stakeholders as that report.	1	February 2023	Lauren Elston

Approval Signature: