TotalEnergies EP South Africa B.V.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED OFFSHORE PRODUCTION RIGHT AND ENVIRONMENTAL AUTHORISATION APPLICATIONS FOR BLOCK 11B/12B - REF NO: 12/4/13 PR

Draft Scoping Report

41105306-355162-1
DECEMBER 2022

PUBLIC

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PROJECT NO. 41105306

OUR REF. NO. 41105306-355162-1

DATE: DECEMBER 2022

QUALITY CONTROL

Issue/revision	First issue	Final Draft	Final Draft 1	Final
Date	14 November 2022	26 November 2022	28 November 2022	28 November 2022
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Project number	41105306	41105306	41105306	41105306
Report number	41105306-355162-1	41105306-355162-1	41105306-355162-1	41105306-355162-1

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Acronyms and Abbreviations

Abbreviation	Explanation
AEL	Atmospheric Emission Licence
ALARP	As low as Reasonably Practicable
BA	Basic Assessment
BAT	Best Available Techniques
BHA	Bottom Hole Assembly
CA	Competent Authority
CBOs	Community Based Organisations
CHIA	Cultural Heritage Impact Assessment
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CR	Critically Endangered
CGR	Condensate Gas Ratio
CWC	Concrete Weight Coated
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries, and the Environment
DHI	Danish Hydraulic Institute
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EBSAs	Ecologically or Biologically Significant Areas
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EN	Endangered
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FIT	Formation integrity test
FLET	Flow Line End Termination
GHG	Greenhouse Gas
GN	Government Notice
GRDM	Garden Route District Municipality
GTL	Gas To Liquids

Abbreviation	Explanation
HAB	Harmful algal blooms
HDI	Human Development Index
HF	High Frequency
HS	High Speeds
IBA	Important Bird Areas
IEM	Integrated Environmental Management
I&AP	Interested and Affected Parties
IFC	International Finance Corporation
IMMA	Important Marine Mammal Areas
IPF	Impact-producing factors
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
LC	Least Concern
LPG	Liquefied Petroleum Gas
LWD	Logging While Drilling
MBLM	Mossel Bay Local Municipality
MEG	Methyl Ethylene Glycol
MMPATF	Marine Mammal Protected Areas Task Force
MPA	Marine Protected Areas
MPRDA	Mineral and Petroleum Resources Development Act
NADF	Non-Aqueous Drilling Fluids
NDC	Nationally Determined Contribution
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NGO	Non-Governmental Organisation
NT	Near Threatened
PACs	Project Affected Communities
PAD	Pump and Dump
PAPs	Project Affected Peoples
PASA	Petroleum Agency South Africa
POB	Persons on Board
POPI	Protection of Personal Information Act, 2013
PR	Production Right

Abbreviation	Explanation
PTS	Permanent Threshold Shift
PWP	Production Work Programme
ROV	Remotely Operated Vehicle
RSA	Republic of South Africa
S&EIA	Scoping & Environmental Impact Assessment
SAGERS	South African Greenhouse Gas Emissions Reporting System
SASAR	South African Search and Rescue
SCG	South Coast Gas
SDU	Subsea Distribution Units
SELs	Sound Exposure levels
SLP	Social Labour Plan
SPL	Sound Pressure Levels
SR	Sensitive Receptor
SSDI	Sub Surface Dispersant Injection
TBC	To Be Confirmed
TL	Transmission Loss
TSS	Temporary Threshold Shift
UTA	Umbilical Termination Assembly
TEEPSA	TotalEnergies Exploration and Production South Africa B.V.
VSP	Vertical Seismic Profiling
VU	Vulnerable
WD	water depth
WBM	Water Based Muds
WML	Waste Management Licence

Units of Measure

Unit	Explanation
°C	Degree centigrade
dB	Decibel
dB(A)	Decibel average weighted
ha	Hectare
Hz	Hertz
“	Inch = 2.54 cm
km	Kilometre
km^2	Square Kilometre
m	Metre
mamsl	Metres above mean sea level
mg	Milligrams
$mg/m^2/day$	Milligrams per square metre per day
MMstb	Millions of standard tank barrels
m/s	Meters per second
ppm	Parts per million
Tcf	Trillion Cubic Feet
%	Percentage
µg	Microgram
$µg/m^3$	Micrograms per cubic metre

1 PROJECT BACKGROUND AND SCOPE OF REPORT

TotalEnergies EP South Africa B.V. (TEEPSA), together with its joint venture partners, QatarEnergy, Canadian Natural Resources International South Africa Limited, and a South African consortium, MainStreet 1549 held an Exploration Right (Exploration Right Ref. No.: 12/3/067) over Block 11B/12B, located offshore from the Southern Cape coast, South Africa. To date the exploration programme for Block 11B/12B has been focused on the south-western part of the block and has resulted in d gas and associated condensates discoveries in the Paddavissie fairway including the Brulpadda and Luiperd discoveries (hereafter referred to as project development area).

In 2019 and 2020, TEEPSA and its joint venture partners discovered gas and associated condensates in Block 11B/12B through the drilling of two successful wells, namely Brulpadda-1AX and Luiperd-1X respectively. After conducting technical and feasibility studies TEEPSA confirmed the commercial viability of the Brulpadda and Luiperd discoveries in the Paddavissie fairway.

T E E P S A Exploration Right for Block 11B/12B expired in September 2022. TEEPSA now seeks to convert the Exploration Right into a Production Right (PR). The PR application was submitted in terms of Sections 83 to 86 of the of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) (as amended) through the Petroleum Agency South Africa (PASA)[1] on 05 September 2022 and was subsequently accepted by PASA on 19 September 2022.

TEEPSA is planning to develop the Paddavissie fairway if a PR is granted and if commercial agreements for the sale of the gas onto the domestic market can be achieved.

Within Block 11B/12B, the following development and production related activities are proposed:

- Drilling of up to six (6) development and appraisal wells on the project development area;
- Laying of deep-water subsea manifolds and flowlines connecting wells within the project development area; and
- Connection of these manifolds and flowlines to the existing PetroSA F-A Platform at Block 9 Offshore Field, via a subsea production pipeline of approximately 109 km in length.

The gas and associated condensates produced by the subsea wells would be exported to the PetroSA existing F-A platform via a subsea production pipeline of approximately 109 km. The gas will be processed using the existing processing facilities on F-A Platform and the gas and associated condensates will be exported via two existing pipelines connecting the platform to the shore. Production is expected to last approximately 20 years.

Furthermore, TEEPSA proposes to conduct further investigations, which include exploration and appraisal drilling and related activities within Block 11B/12B, to enable further refinement of the

[1] PASA is the authority delegated by the Department of Mineral Resources and Energy to regulate petroleum exploration and production related activities.

geological and reservoir understanding, as is typical of developments of this nature. The following activities are proposed:

- Additional drilling of up to four (4) exploration wells in the application area, including vertical seismic profiling (VSP) in areas where drilling may take place, and well testing, to improve the understanding of the potential oil and gas bearing geology within the licence block;
- Bathymetry and sonar surveys (helpful for exploring and mapping the ocean);
- Seafloor sampling surveys of the sea floor; and
- Metocean surveys.

The outcome of the on-going commercial negotiations (including agreements for the sale of the gas) should determine the use of the gas. Some possible use scenarios include Gas to Liquids (GTL) or Gas to Power (GTP). Any construction, modification or upgrades at the F-A Platform or at any onshore facility, if required by the off-taker of gas or condensates, will be subjected to a separate Environmental EA Application (“EA”).

Offshore support to the exploration and production activities will be by support vessels, departing from the ports of Mossel Bay, Gqeberha and/or Cape Town, through port and associated offshore infrastructure facilities. Helicopters will operate from George airport to support offshore activities. Logistics, laydown areas and support will be undertaken from Mossel Bay port using port infrastructure and facilities for all offshore activities. Beneficiation of the product and handling of waste streams will occur on the existing F-A Platform and permits.

The proposed project triggers listed activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), which require environmental authorisation (EA) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended). In accordance with the regulatory requirements, TEEPSA must undertake a Scoping and Environmental Impact Report (S&EIR) process in support of its EA application for undertaking the proposed development and production related activities in Block 11B/12B.

WSP Group Africa (Pty) Ltd (WSP) has been appointed by TEEPSA to undertake the S&EIR process in support of the EA application.

1.1 CONTENT OF THIS REPORT

The main purpose of this scoping report is to identify the potential environmental and social impacts associated with the proposed project and provide a description of the current baseline environmental conditions within the application area, a description of alternatives currently under investigation, and to present the proposed public participation process and plan of study for the impact assessment phase.

This document has been structured as follows to meet the requirements of the 2014 EIA Regulations, as amended:

- Introduction and overview – Introduces the project and the project proponent, provides an overview of the project, provides the details of the environmental assessment practitioner (EAP), and explains the ESIA process;
- Project Motivation – Motivates the need for and desirability of the project;
- ESIA Process – Summarises the process being undertaken with respect to the ESIA for the project, inclusive of the methodology utilised for scoping;

Description of the Proposed Project - Provides a summary of the key project components, the project location, scale, nature and design, production process, main inputs and outputs, schedule, and activities during different phases of the project, inclusive of a description of the project location;
Project Alternatives –Summarises alternatives being considered by the project proponent;
Policy, Legal and Administrative Framework –Discusses the environmental policy, legal, and administrative framework applicable to the project. This framework includes a summary of relevant South African regulations, the applicable administrative framework, the environmental permitting process, applicable international laws, and conventions and TotalEnergies standards, HSE policy and sustainable commitments;
Description of the Environment that may be affected –Describes the current pre-project biophysical, socio-economic, and cultural status of the area, key characteristics (sensitive or vulnerable areas), important heritage resources, current land use and livelihoods;
Environmental Issues and Potential Impacts of the Project, including its Alternatives – Summarises the identified potential impacts, issues and potential mitigation measures that will be assessed further in the ESIA at a high level. This section also includes the plan of study for the impact assessment, including the impact assessment methodology;
Public Consultation –This section provides a summary of the public consultation activities proposed and carried out as part of the ESIA process;
Next Steps in the Process –Indicates what the next steps in the process are;
References –References to literature consulted; and
Appendices –Technical material supporting the scoping report, public participation supporting information, etc. A list of key terminology used in this report is provided in Appendix F.

1.2 STRUCTURE OF THIS REPORT

Where applicable, this scoping report has been written in compliance with Appendix 2 of the Environmental Impact Assessment (EIA) Regulations (GN R.326).

Section	Requirements	Section addressed in report
2.(1)	A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include -	
(a)	Details of	
	(i) the EAP who prepared the report; and	Section 2
	(ii) the expertise of that EAP to compile a specialist report including a curriculum vitae	Section 2
(b)	The location of the activity, including -	Section 3
	(i) the 21-digit Surveyor General code of each cadastral land parcel;	
	(ii) where available, the physical address and farm name;	

Section	Requirements	Section addressed in report
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 3
(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is -	Section 3
	(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d)	A description of the scope of the proposed activity, including -	Section 4
	(i) all listed and specified activities triggered;	Section 6
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Sections 4 and 6
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 6
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 4
(g)	A full description of the process followed to reach the proposed preferred activity, site, and location of the development footprint within the site, including -	Section 6
	(i) details of all the alternatives considered;	Section 6
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	

Section	Requirements	Section addressed in report
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
	(v) the impacts and risks for which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 8
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 12
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 8
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 11.10
	(ix) the outcome of the site selection matrix;	Section 6
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	N/A
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 6
(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including—	Section 11
	(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Section 6
	(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;	Section 11.7

Section	Requirements	Section addressed in report
	(iii) aspects to be assessed by specialists;	
	(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	Section 11
	(v) a description of the proposed method of assessing duration and significance;	Section 12
	(vi) an indication of the stages at which the competent authority will be consulted;	Section 11.6
	(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and	Section 11
	(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;	Section 11
	(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Section 11.10
(i)	An undertaking under oath or affirmation by the EAP in relation to -	Section 13.5
	(i) the correctness of the information provided in the report;	Section 14
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Not yet
(k)	Where applicable, any specific information required by the competent authority; and	NA
(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Section 13.5

2 PROPONENT AND PRACTITIONER DETAILS

2.1 DETAILS OF THE PROPONENT AND ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1.1 DETAILS OF THE PROPONENT

Table 2-1 - Proponents details

Proponent Contact Details	
Proponent	TotalEnergies EP South Africa B.V. (TEEPSA)
Address	Tygervalley Chambers Two, 3rd Floor, 27 Willie Van Schoor Ave, Bellville 7530
Telephone number	+27 21 003 4077

2.1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Group Africa (Pty) Ltd has been appointed as the Environmental Assessment Practitioner (EAP), to undertake the ESIA for the Offshore Production Right / EA application for Block 11B/12B.

WSP Group Africa (Pty), is a leading environmental consultancy with a broad range of expertise and over 23 years' experience in the regional market marketplace with a dynamic blend of local knowledge and global expertise.

Our team's combined experience in the environmer complete this project. The details of the EAP team or provided in Table 2-2**.** The CVs of the Project Team are available in Appendix A**.**

Table 2-2 - Details of the environmental assessment practitioner

Team Member	Qualifications	Professional Registrations	Years of experience
Dr. Brent Baxter	Ph.D. (Botany), University of Natal, South Africa	PriSciNat (Reg. No.: 400065/07)	28
Olivia Allen	M.Sc. Water Resource Management - University of Pretoria.	Registered EAP (Ref. No. 2019/1725)	17
Kavilan Naidoo	BSc (Hons) Environmental Management	Registered EAP (Ref No: 2019/608)	9

2.1.3 STATEMENT OF INDEPENDENCE

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

3 PROJECT OVERVIEW

3.1 PROJECT SUMMARY

TEEPSA seeks to convert the expired Exploration Right into a Production Right (PR). The PR application was submitted in terms of Sections 83 to 86 of the MPRDA to PASA on 05 September 2022 and was subsequently accepted by PASA on 19 September 2022. The PR application information is summarised in Table 3-1.

The PR application area is located offshore and stretches between Mossel Bay and Cape St. Francis (Figure 3-1). The closest north-eastern point of the PR application area is about 75 km offshore from Cape St Francis, whereas the closest north-western point is about 120 km offshore from Mossel Bay. The PR application area covers approximately 12 000 square kilometres (km^2) with water depths ranging from 500 to 2 300 meters.

TEEPSA, together with its joint venture partners (Table 3-2), confirmed the commercial viability of the Brulpadda and Luiperd discoveries in the Paddavissie fairway, after conducting technical and feasibility studies in 2019 and 2020. The Greater Paddavissie, which includes the western area of the Paddavissie fairway, consists of a post rift interval, calibrated by Brulpadda –1AX and Luiperd-1X exploration wells.

The layout plan of the Paddavissie fairway is presented in Figure 3-2. Two (2) 3D seismic acquisitions were performed over Paddavissie in 2019 and 2020 and two (2) wells were drilled in 2018 and 2020 which discovered both gas and associated condensates in both prospects. The eastern and central area of Block 11B/12B does not include any previous wells for calibration; however, extensive 2D seismic surveys were acquired in 2020, whereby various potential additional prospects were identified. It is also understood from these assessments that oil or gas and condensates are considered as the potential fluid type in these areas.

Table 3-1 –PR Application Information

Licence Block No.	11B/12B
Exploration Right No.	12/3/067 (expired 6 September 2022)
Number of wells	Up to 6 development and appraisal wells Up to 4 exploration wells
Size of Area of Interest / application area	12 000 km^2
Water depth range	Water depth range of area of interest: 500 to 2 300m
Distance offshore	75 km to 120 km

Table 3-2 –Structure of Licence Holding and Shareholding of Block 11B/12B

Organisation	Shareholding
TEEPSA	45%
Canadian Natural Resources International (South Africa) Limited	20%
QatarEnergy	25%
Main Street 1549	10%

3.2 PROJECT LOCATION

The Block 11B/12B application area is located offshore within the South African Exclusive Economic Zone in the Outeniqua Basin (Figure 3-1).

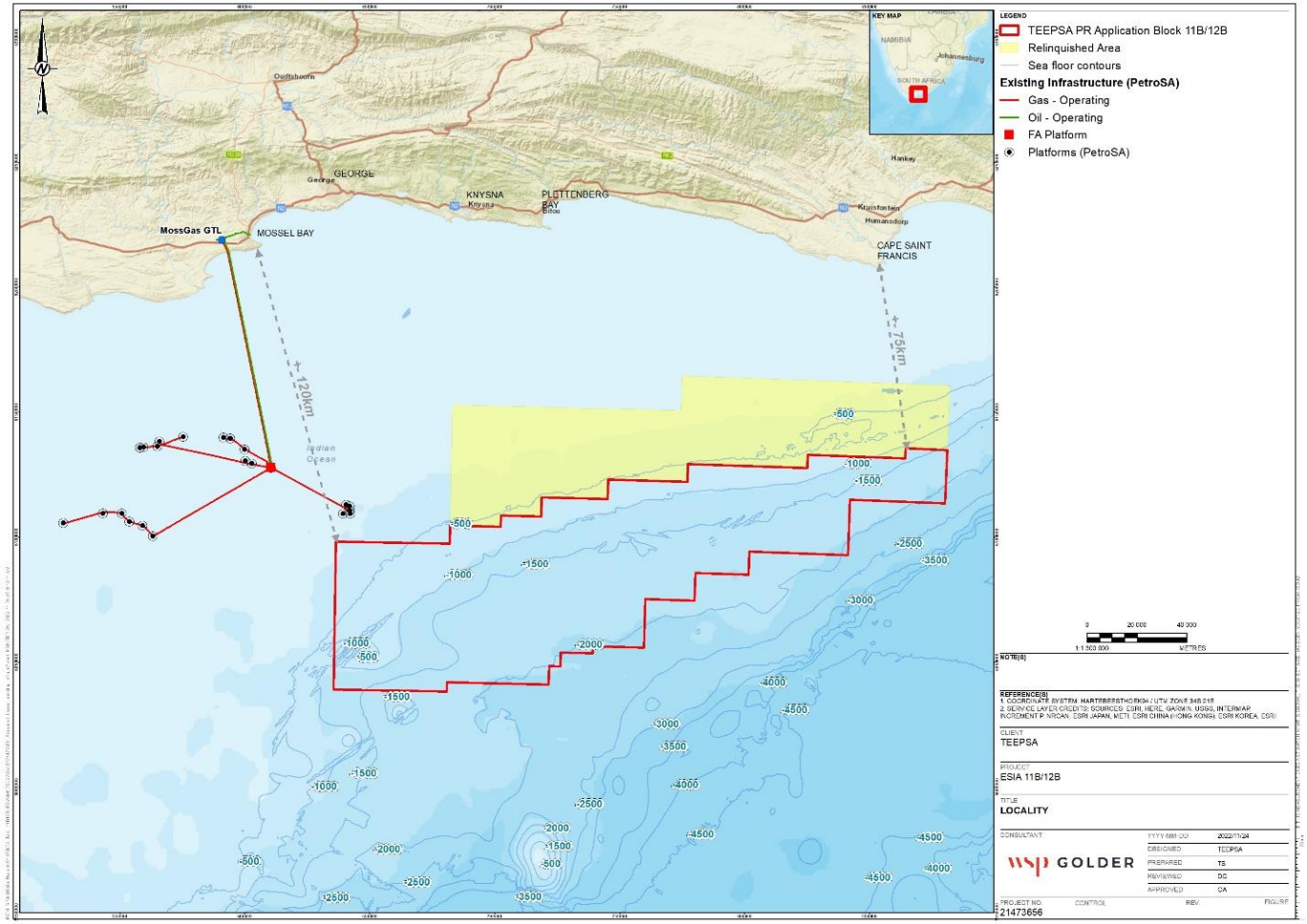


Figure 3-1 - Locality Map

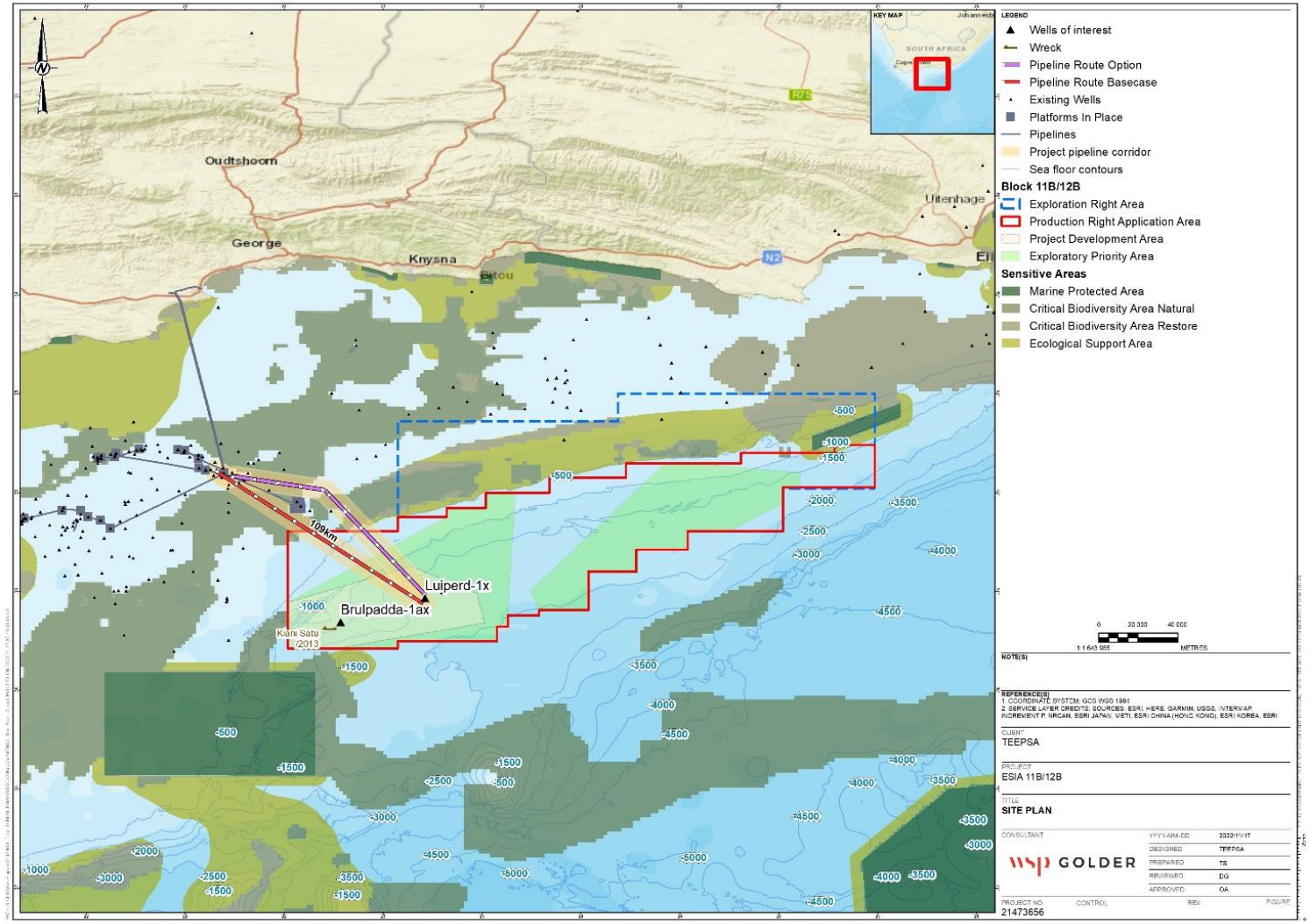


Figure 3-2 - Layout plan

4 NEED AND DESIRABILITY

This chapter describes the 'need and desirability' of the proposed project and its contribution to the country's strategic objectives.

4.1 STRATEGIC CONTEXT

The strategic context of South Africa's energy transition is outlined in a number of documents, most importantly:

- South Africa Low-Emission Development Strategy (SA-LEDS) 2050 (February 2020) - sets out a low-carbon growth trajectory that makes a contribution to the global emissions reduction efforts while ensuring a just transition and building resilience to climate change[2]
- First Nationally Determined Contribution (NDC) (2021) - the Paris Agreement requires countries to commit to greenhouse gas emission reductions as a contribution to the global response to climate change. Structural changes that have been, and continue to be, made include efficiency measures, a shift to renewable energy sources and adaptations to climate change threats. These efforts have reduced greenhouse gas emissions and South Africa intends continuing with initiatives that decarbonise the economy in a just and fair transition[3]
- Gas Masterplan Base Case Report (DMRE, 2021) - describes the natural gas sector as it currently stands and the roadmap for planning and investment in developing natural gas resources in South Africa[4]
- Just Transition and Climate Pathways Study for South Africa (NBI) - concluded that gas is needed for South Africa's decarbonisation strategy to support transitions in the power, synfuels, industry and transport sectors. South Africa also needs to develop its local resources as infrastructure to import Liquefied Petroleum Gas (LPG) is limited[5]
- Climate Change Bill (2022) - transposes the commitments made by South Africa in terms of the Paris Agreement into law and is closely aligned with the National Environmental Management Act (Act 17 of 1998, as amended) and aims to align policy and institutional arrangements at a local, provincial and national level to embed climate change issues into every aspect of decision-making. It also provides for the determination of a national greenhouse gas emissions trajectory for the South Africa with sectoral emissions targets[6]
- South Africa Integrated Resource Plan (IRP) 2019 - 2019 places energy at the centre of a decent standard of living for all citizens while considering the commitments made by South Africa to reduce the total greenhouse gas emissions in terms of the Paris Agreement on Climate Change

2 Government of South Africa. South Africa Low-Emission Development Strategy (SA-LEDS) 2050 (2020)

3 Government of South Africa. First Nationally Determined Contribution Under the Paris Agreement. (Updated September 2021)

4 Department of Mineral Resources and Energy NEDLAC Consultation/Gas Master Plan 2022 Basecase Report. September 2021

5 National Business Initiative. Just Transition and Climate Pathways Study for South Africa. The Role of Gas In South Africa's Pa Net-Zero. (Undated)

6 Republic of South Africa. Minster of Forestry, Fisheries and the Environment. Climate Change Bill [B9-2022]

and the need to support the country's energy transition process towards achieving net-zero carbon by 2050, with the plan informed by the above documents. This plan acknowledges electricity as the preferred energy supply and, in support of this outlines how a diversified energy mix will support this. The document also discusses further research and development on innovative solutions, financial considerations and demand forecasts to support implementation[7].

The South African Economic Reconstruction and Recovery Plan (2020) - outlines the structural interventions required to achieve the National Development Plan goals of reducing unemployment, poverty and inequality. While acknowledging the challenges faced by the economy have, over time, worsened due to sustained low levels of investment and growth and exacerbated by the recent Covid-19 pandemic, the Plan calls for investment in securing additional energy supplies, including gas, drafting legislation to facilitate upstream sector investment to unlock investment and creating additional generating capacity[8].

4.2 ENERGY SECURITY AND DIVERSIFICATION BENEFITS

All the above strategies recognise the place of natural gas production as one element in the mix of technologies that will secure energy generation capacity going forward. Natural gas in the energy mix will serve as a bridge on the path from reliance on fossil fuel to carbon-neutrality from 2050 (as per the Paris Agreement) and to complement renewable energy sources (as per the IRP (2019) that are under development as part of the strategic approach described above.

The generation mix of power supplied in South Africa comprises 38 GW installed capacity from coal, 1.8 GW from nuclear, 2.7 GW from pumped storage, 1.7 GW from hydro, 3.8 GW from diesel and 3.7 GW from renewable energy. The proposed decommissioning of 20 GW of coal-fired generation capacity by 2030 will leave 33.5 GW of coal-fired generation capacity. While a 2 GW shortfall is anticipated in the short-term, the take up of renewable generation capacity by 2030 including 6.2 GW of gas and diesel-fired generation, will result in a percentage annual contribution of 58.8% for coal-fired capacity and 40% from renewable generation capacity, with the balance attributable to 'other' generation sources, co-generation and landfill (IRP, 2019).

Natural gas currently contributes 2.6% of South consumption of 0.15 tcf and an annual average growth rate of 1.6% over the last decade due to the limited supply (SA Gas Master Plan: Basecase Report (2012)).

Currently natural gas demand is met through importation of natural gas from the Pande and Temane gas field located in Moçambique by Sasol, PetroSA operates the gas-to-liquid (GTL) plant located near Mossel Bay and Tetra4 supplies compressed gas to a dedicated purchaser.

The Organisation for Economic Co-operation and Development (OECD)[9] in their November 2022 Economic Outlook Note for South Africa forecasts economic growth of 1.7% in 2022, 1.1% in 2023

7 Republic of South Africa. Department of Energy. Integrated Resource Plan (IRP) (2019)

8 Government of South Africa. The South African Economic Reconstruction and Recovery Plan (Undated)

9 https://www.oecd.org/economy/south-africa-economic-smapshot/ (accessed 24/22/2022)

and 1.6% in 2024. While this is lower than the NDP Vision 2030 forecast of 3% on average over the next 10 years, the challenge of energy security remains, especially where it is seen as a driver of economic development and social upliftment.

TEEPSA's offshore discovery of natural gas is the result of a multi-year exploration process and the move to a production process has the potential for substantial benefits to result from such a capital-intensive development. The overriding benefit of the TEEPSA development is the replacement of a dwindling reserve and the use of existing offshore and onshore infrastructure associated with the PetroSA facility in Mossel Bay.

Once the TEEPSA project has commenced production, the scaling up of regional gas infrastructure to shift gas to other areas of South Africa will become commercially viable, with the intention that gas imports from Mozambique are replaced with domestically sourced supplies.

4.3 SOCIO-ECONOMIC BENEFITS

The TEEPSA project has potential to supply the F-A Platform, contributing replacement feed from the newly identified reserves. This could extend the life of the FA Platform and associated infrastructure by up to 20 years based on current resource estimates.

The contribution of the TEEPSA project to the extension of the life of the existing facilities will effectively safeguard the contributions that the facility makes to the local economy through direct employment and support of local business.

Should the GTL gas off-take scenario be realised, then the gas and condensates would be sold to, the PetroSA GTL refinery. It was commissioned in 1992 and is the third largest operating refinery of this type in the world, producing approximately 45,000 barrels per day of fuel and high-value petrochemicals. The refinery employs people, mostly from the surrounding area and recruits graduates from the Centre of Excellence located close to the refinery (PetroSA website)[10].

The refinery is an integral part of the economy of Mossel Bay and surround areas and, as an organisation, invests in the local communities with education, health, community development and environmental and sustainable development programs (PetroSA website).

The current PetroSA facility in Mossel Bay is the only purpose-built GTL facility in the country. Due to dwindling supply reserves from the existing offshore field, it is facing closure when the gas reserve is estimated to be depleted by 2029 (SA Gas Master Plan: Basecase Report (2012).

The TEEPSA project is required to contribute to local development through integration of community-based initiatives with Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDP) and Environmental Management Frameworks (EMS). This will be facilitated through the municipal structures and the public participation process.

10 https://www.petrosa.co.za/driving_change/Pages/Community-Affairs.aspx

4.4 CONSISTENCY WITH NEMA PRINCIPLES

The DFFE Need and Desirability Guidelines (2017)[11] states: "In order to pro
Regulations' requirement to consider "needs and d
contained in NEMA, which serve as a guide for the interpretation, administration and implementation
of NEMA and the EIA Regulations." The NEMA prin
management must:

- "place people and their needs at the concern" and
- "be integrated, acknowledging that all element
  and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option;
- pursue environmental justice "so that adverse
  such a manner as to unfairly discriminate against any person";
- ensure that decisions take "into account the i
  affected parties"; and
- ensure that the environment is "held in public
  environmental resources must serve the public interest and the environment must be protected as the people's common heritage".

These principles will guide the ESIA process throughout, including the environmental and social studies, the assessments of risks and impacts, the identification of mitigation measures and the stakeholder engagement process that will be undertaken to comply with the relevant statutory requirements.

5 PROJECT COMPONENTS AND ACTIVITIES

TEEPSA is planning to develop the Paddavissie fairway if a PR is granted and if commercial agreements for the sale of the gas onto the domestic market can be achieved. . This section first provides a preliminary description of the proposed development and production related components and activities that will be undertaken should the PR be granted. It is followed by a preliminary description of the proposed additional exploratory activities planned to enable refinement of the geological and reservoir understanding, as is typical of developments of this nature. The section then provides a high-level description of planned support activities to assist offshore operations. Finally, an overview of the project phases is provided.

5.1 DEVELOPMENT AND PRODUCTION RELATED COMPONENTS AND ACTIVITIES

5.1.1 PROJECT DEVELOPMENT CONCEPT

PetroSA operates the existing F-A Platform in offshore Licence Block 9 within the Bredasdorp Basin, approximately 85 km off the south coast of South Africa. Existing gas and condensate export

11 DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa

pipelines link the F-A platform to the PetroSA operated Gas-To-Liquids (GTL) Refinery onshore in Mossel Bay. Tied back to the platform are several existing subsea developments - E-M, F-A Satellites, South Coast Gas (SCG) wells and the F-O field (Figure 5-1).

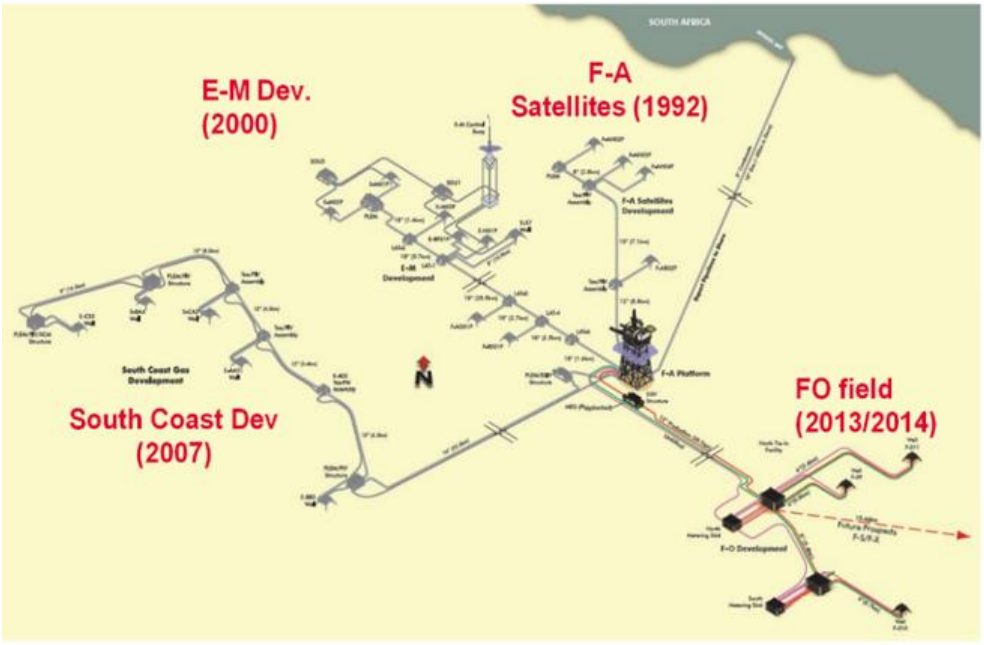


Figure 5-1 –F-A Platform existing subsea layout

As shown on Figure 3-2, the proposed development and production project in Block 11B/12B is adjacent to the existing F-A Platform in offshore Licence Block 9 and the F-O field. The proposed project assumes no further production from this field, enabling the Paddavissie development to exclusively use the offshore installation for the treatment and export of gas and condensate.

The Paddavissie field is located approximately 110 km southeast of the existing F-A Platform. The development concept of the current project comprises wells and a subsea production system (SPS) to collect gas and associated condensates in the Paddavissie field. The development concept also includes a subsea pipeline to carry the gas and condensate to existing treatment and export facilities on the F-A platform where it will go to shore via the existing pipelines.

The proposed development assumes no further production from the existing PetroSA fields, enabling the Paddavissie development to exclusively use the Offshore installation for the treatment and export of gas and condensate.

The proposed development will connect up to 6 wells in the project development area via a multiphase pipeline carrying both gas and associated condensates from the wells up to the F-A Platform. From there, it will be carried for further treatment and exporting via the existing PetroSA-operated gas and condensate pipelines onshore. Any construction, modification or upgrades at the F-A Platform or of any onshore facility, if required by the off-taker of gas or condensates, will be subjected to a separate EA application.

5.1.2 DEVELOPMENT WELLS

It is proposed that up to 6 development wells are drilled in the project development area. These wells will ultimately be connected to F-A gas platform for further treatment and export.

5.1.2.1 Well architecture

With regard to well development, it is currently planned to have a combination of vertical wells (Figure 5-2) and deviated wells connected with a manifold at a mid-location (Figure 5-3).

The preliminary well design is presented in Table 5-1. In this table, the term individual portions of a single wellbore.

Table 5-1 –Preliminary Well Design

Section	Description
Conductor pipe	Drill 26" x 42" hole section a meters below the mud line (BML)] and cement.
26" Hole section /	Shallow hazard (SHAZ) assessment is performed to a depth of 1000m below mud line to avoid any gas bearing formations, however the possibility of shallow water flow must be managed. Drill 26-600m below the mud line. The objective is to obtain aims good formation integrity test (FIT) at the 22" shoe, circulated the kick without o fracturing the shoe to be able section if necessary. Run and cement 22" c
14 ¾" hole section	TD criteria: Geological (based on marker) Drill 14 ¾" up to 50m above top of Paddavissie reservoir (or as close as safely possible). Ensuring not entering the reservoir in this phase. Run 10 ¾" casing and cement 5 A contingency casing (13 5/8" deploy in order to avoid any kind of uncertainties due to poor pressure and fracture gradient or potential open hole issues.
8 ½" open hole	Drill 8 ½" hole up to Max TD.

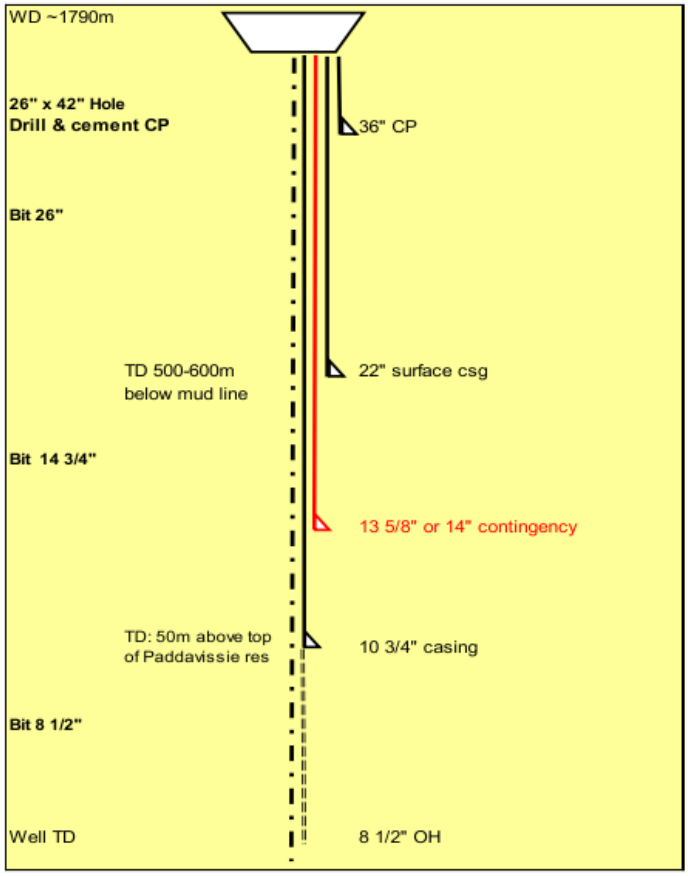


Figure 5-2 - Vertical Well

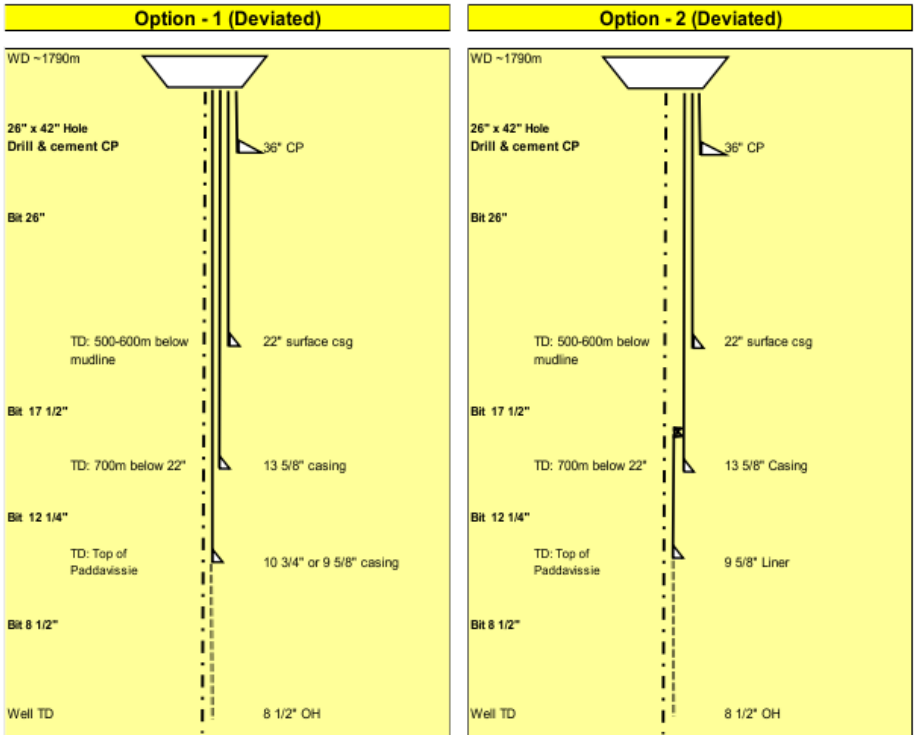


Figure 5-3 –Options for Deviated Wells

5.1.2.2 Typical drilling fluids or muds

Drilling fluid is a mixture of fluids, chemicals and solids that are tailored to provide the correct chemical and physical characteristics that are required for safe drilling of a well. The key functions of the drilling fluid are to:

Maintain a stable wellbore and preventing the open hole from collapsing;
Provide sufficient hydrostatic pressure to control subsurface pressures and prevent kicks or blow-outs;
Transport the cuttings to the surface;
Cool and lubricate the drill bit and drill string (reduce friction);
Power the mud motors / downhole tools during the drilling process;
Regulate the chemical and physical characteristics of returned mud slurry on the drilling unit; and
Displace cements during the cementing process.

5.1.2.3 Composition of drilling fluids

There are two types of drilling fluid: Water-Based Muds (WBM) and Non-Aqueous Drilling Fluids (NADF). They differ in terms of their chemical composition.

Water-Based Muds

Their main ingredient is freshwater or seawater. This ingredient makes up to 85 to 90% of the total volume of the WBM. The remaining 10 to 15 % of the volume typically comprise of barite, potato or corn starch, cellulose-based polymers, xanthan gum, bentonite clay, soda ash, caustic soda and salts (these are usually either potassium chloride [KCl] or sodium chloride [NaCl]). Other minor additives may be used in special circumstances such as citric acid for pH control, or polyethylene glycol butyl ether for clay inhibition, amongst others (SLR, 2020).

Non-Aqueous Drilling Fluids

Non-Aqueous Drilling Fluids (NADF) use base fluids with significantly reduced aromatics and extremely low polynuclear aromatic compounds. The main chemicals used in NADF consists of a base oil, brine, gelling products, lime and emulsifiers.

NADFs base fluid and other chemicals have a higher toxicity than WBMs which may cause an increase in toxicity in the marine environment. The industry trend is moving towards the use of low toxicity NADF which is biodegradable (SLR, 2020).

It is expected that the boreholes will be drilled using WBM in the upper sections (i.e., shallow portions) of the wells and that NADF might be used in the lower (deeper) sections of the wells.

Preliminary well drilling fluid and cement details are provided in Table 5-2 and will be confirmed as detailed engineering progresses.

Table 5-2 –Preliminary Drilling Fluid and Cement Detail

Hole section	Casing type	Casing size	Type of drilling fluid	Cementing summary
26" x 42"	Conductor pipe	36"	Sea water/Hi-vis pills/ Pump and Dump (PAD) mud	Up to seabed
26"	Surface casing	22"	Sea water/Hi-vis pills/PAD mud	Up to seabed
14 3/4"	Production casing	10 3/4"	High performance Water	500m above the casing shoe
8 1/2"	Lower Completion casing (	7" liner	High performance Water based mud	To Be Confirmed (TBC)
-	Upper Completion casing	5 1/2" Tbg	Completion Brine (TBC)	NA

5.1.2.4 Well completion

Based on preliminary assessment, all wells will be provided with a sand control mechanism to avoid any threat to the integrity of tubular, surface facilities and production operations. Lower completion for both vertical or deviated wells will be Open hole gravel Pack. Additional studies will be performed to confirm this option.

5.1.3 SUBSEA SYSTEM

A subsea system will connect the Paddavissie development wells to the F-A Platform. The current plan is to have a direct subsea tie-back to the F-A Platform via a new 18" subsea structures including Flow Line End Termination (FLET) and a production manifold at the end of the pipeline will allow the connection of the Paddavissie wells.

Feasibility of installing pigging facilities for the Luiperd pipeline is under study. Provision for temporary pigging facilities may be included. The structure foundations for both the new manifolds and subsea structure are gravity based, however this is to be confirmed by the planned Geophysical/Geotechnical survey and the structures are to be optimised in future design work.

Pigging is a process in which highly viscous fluids are conveyed of out of pipelines. The pig is a cleaning device that is pumped through the pipeline under pressure. Thus, contaminations are conveyed out of the piping

The structures also house a subsea distribution unit, flowmeters, isolation valves and pressure and temperature monitoring instruments. Hydrate inhibitor methyl ethylene glycol (MEG) will be distributed to the wells via an umbilical. Preliminary flow assurance studies place the MEG injection rates between 2 and 15 m^3/h (for ramp-up operations). MEG lines will be

Umbilical links sea floor and oil and gas equipment for controls, power and heat. They provide electric and fibre optic signals, electrical power and hydraulic and chemical injection fluids to the subsea unit.

included in the umbilical, together with other chemicals as corrosion inhibitor.

5.1.4 PRODUCTION PIPELINE

Pipeline routing from Paddavissie to the F-A Platform and the subsea locations are preliminary and will be modified as the project progresses, and as environmental baseline and subsea/ bathymetry surveys are completed. These studies will enable optimisation of the pipeline routing by avoiding critical areas related to environmental sensitivities and soil stability.

A rigid 18" subsea pipeline from the project development area to the F-A Platform will form part of the project activities. Given the locations of the Brulpadda and Luiperd fields and the F-A Platform, there are limited options in terms of the production pipeline route. However, two pipeline routes have been considered:

- The pipeline route base case: an approximately 109 km long direct route pipeline; and
- The pipeline route option: an approximately 115 km long pipeline, following a path slightly northeast from the base case.

The base case is retained as the most suitable route as it follows an area already greatly disturbed by existing O&G activities, avoids getting to close to the environmental sensitive feature, the Secret Reef, and reduces footprint impact on the marine Critical Biodiveristy Area (CBA) (Figure 3-2).

As mentioned above, the exact pipeline route still needs to be confirmed pending the outcome of further subsea/bathymetry surveys. Due to the uncertainties, a corridor with a 10 km width for the proposed production pipeline has been indicated in Figure 3-2.

5.1.5 F-A PLATFORM MODIFICATIONS

Although this component of the project is outside the scope of this ESIA, indicative information regarding the required modifications to the PetroSA F-A platform has been described in this section for completeness sake.

The F-A Platform will require some modifications to connect the new 18" line arrd w Technical evaluations were done by TEEPSA to confirm the capability of the existing platform to handle the production profile associated with the proposed production wells. As part of the assessment, preliminary flow assurance studies were performed to determine the volume of slug in the line especially during the transient periods. Based on these studies a new separator may be required to handle the cumulated liquid in the pipeline. A slug catcher then capable of handling around 300 m^3 of slug is to be installed in F-A Platform. Sizing and configuration of the slug catcher will be defined during conceptual studies. Considering the production profile and Condensate Gas Ratio (CGR) of the Paddavissie production wells, an increase in the condensate treatment could also be envisaged. Additional pumps and coalescer vessel are foreseen to increase condensate capacity in the platform for treatment and export to Mossel Bay.

> A slug is an uneven distribution of liquid and gas in a pipeline. Pipelines transport both gas and liquids in two-phase flow. Liquids tend to settle in the bottom of pipelines, while the gases occupy the top section. Under certain conditions, the liquids and gases may group together to form slugs.

Permitting requirements associated with the proposed F-A Platform modifications will be addressed by PetroSA as part of their production right and associated activities.

5.1.6 RESOURCE ESTIMATES AND PRODUCTION TIMEFRAME

Resources associated with the Luiperd gas discovery for the initial phase of development would be between 1.0 Tcf (Trillion Cubic Feet) and 2.0 Tcf of gas with a mid-case of 1.4 Tcf, and between 46 MMstb (Millions of standard tank barrels) and 97 MMstb of condensates, with a mid-case of 63MMstb.

The following phase of development will include additional producing wells on the Luiperd gas discovery combined with the Brulpadda gas resource. Resources associated with the next phase of Luiperd development are assessed between 0.5 Tcf and 1.0 Tcf of gas and between 14 MMstb and 38 MMstb of condensate. Brulpadda resources would be between 0.5 Tcf and 1.5 Tcf of gas and between 28 MMstb and 77 MMstb of condensate.

Based on current yield estimates, the plateau is expected to last up to 20 years.

5.2 EXPLORATION RELATED COMPONENTS AND ACTIVITIES

In addition to the field development programme (i.e., production phase), TEEPSA are studying the interest for additional exploration and appraisal work in other areas of the 11B/12B Block, especially towards the East-Northeast (ENE) of the Luiperd discovery where similar potential for hydrocarbons could exist.

The objective of the additional exploration work would be to increase the knowledge of the potential presence of further hydrocarbons in the block that might enhance the future development scheme, by providing complementary data to the one obtained from previous work. It will also enable a better understanding of previously identified reservoirs and other prospects.

It is expected that the exploration programme may include exploration and appraisal drilling and associated activities such as vertical seismic profiling, well logging and (flow) testing, sonar surveys, seafloor sampling and metocean buoy mooring.

5.2.1 EXPLORATION AND APPRAISAL WELLS

Up to 4 exploration and appraisal wells are proposed to be drilled in the eastern area of the PR application area (referred to Figure 3-2). The objective of drilling these exploration and appraisal wells is to determine the commercial viability of oil and gas that may be present. Well drilling activities associated with the proposed exploration and appraisal wells include vertical seismic profiling (VSP), well logging and testing, and well plugging.

Final site selection of the wells will be based on further detailed analysis of the pre-drilling survey data and the geological target. A Remote Operating Vehicle (ROV) will be used to finalise the well position including the presence of seafloor obstacles or any sensitive features.

Each well will be created by drilling a hole into the seafloor with a drill bit attached to a rotating drill string, which crushes the rock into small particles. Sections of steel pipe (which provide structural integrity to the newly drilled wellbore), are placed in the hole and permanently cemented into place. The diameter of the well decreases with increasing depth.

Once the target depth is reached the well will be logged and tested. Well logging involves the evaluation of the physical and chemical properties of the rocks in the sub-surface, and their component minerals, including water, oil and gas to confirm the presence of hydrocarbons and the petrophysical characteristics of rocks. Vertical Seismic Profiling (VSP) is an evaluation tool that is

used when the well reaches target depth to generate a high-resolution seismic image of the geology in the well's immediate vicinity. The seismic images and for forward planning of the drill bit during drilling. VSP uses a small airgun array, which is operated from the drilling unit. During VSP operations, receivers are positioned in a section of the borehole and the airgun array is discharged at intervals. This process is repeated for different stations in the well and may take up to 8 - 12 hours to complete.

Well (flow) testing is undertaken to determine the economic potential of any discovery before the well is abandoned or suspended. One test would be undertaken per exploration well if a resource is discovered. Testing may take 3 to 4 days to complete and involves burning hydrocarbons at the well site. A high-efficiency flare is used to maximise combustion of the hydrocarbons. If produced water arises during well flow testing (typically in small quantities), these would be treated on-board to separate the hydrocarbons from seawater. The treated water would be discharged to sea.

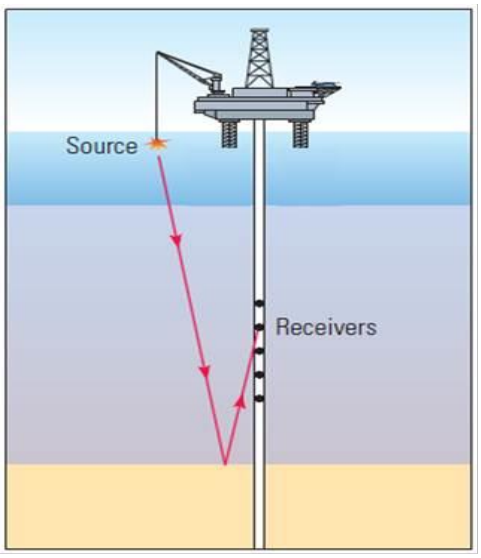
Once drilling and logging have been completed, the exploration well(s) will be sealed with cement plugs, tested for integrity and abandoned according to international best practices. Wells will be left on the seafloor with an abandonment cap which measures approximately 5 x 5 m and has a height of 4 m, designed to allow for overtrawling. For wells where a hydrocarbon resource is confirmed, a monitoring gauge may be installed on the wellhead (under the cap) to monitor pressure and temperature.

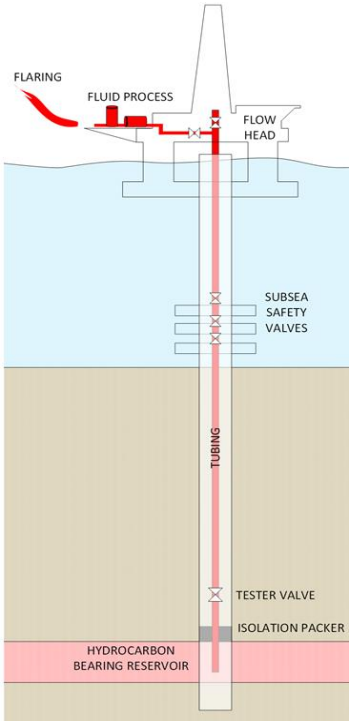
A final clearance survey of the seabed will be undertaken using an ROV. The drilling unit and supply vessels will demobilise from the offshore licence area and either mobilise to the next drilling location or relocate into port or a regional base for maintenance, repair or resupply.

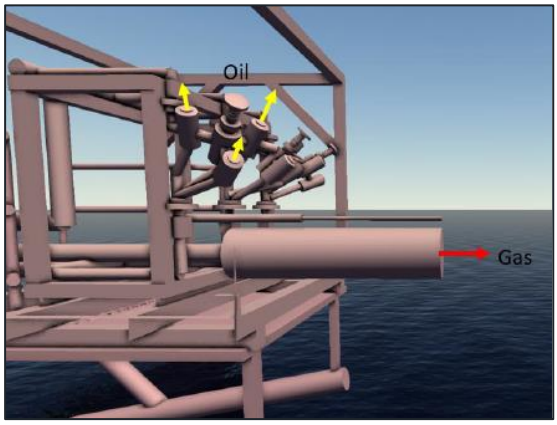
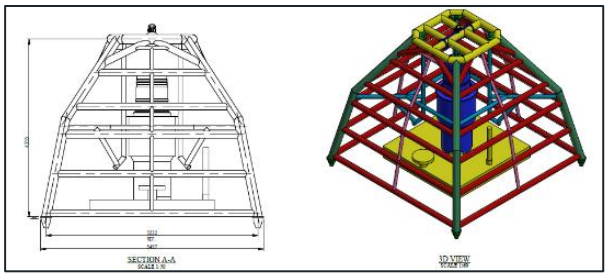
The various well drilling activities are summarised in Table 5-3.

Table 5-3 –Summary of Exploration Well Drilling Activities, including VSP and Well Testing

Well Drilling Activities	Description
Drilling Unit and Support Vessels	
Vessel type –ship or drilling platform	 Based on sea conditions experienced during previous drilling campaigns in Block 11B/12B, TEEPSA is proposing to again utilise a semi-submersible drilling unit (rig) with dynamic positioning system suitable for the deepwater harsh marine environment. The drilling unit may be supported by one or two tugboats depending on metocean conditions to keep it on location.

Well Drilling Activities	Description
	The final rig selection will be made depending upon availability and final design specifications. A semi-submersible drilling vessel is essentially a drilling rig located on a floating structure of pontoons. When at the well location, the pontoons are partially flooded (or ballasted), with seawater, to submerge the pontoons to a pre-determined depth below the sea level where wave motion is minimised. This gives stability to the drilling vessel thereby facilitating drilling operations.
Well Name and Location	
Likely number of wells	Maximum of 4 wells
Water depths or range of water depths	800-2 000 m
Location(s) of the most probable prospect(s)	Eastern area of PR application area (see Figure 3-2)
Range of water depths for most probable(s) prospect)	1 000-1 500m
Well Design and Operation	
Hole depth (meters below sea floor)	Up to 4 000-4500 m (to be confirmed)
Destination of all cuttings	Discharge overboard through cutting chute after treatment and cleaning
Depth of cutting release below seawater	10 m –To Be Confirmed
Type of subsea wellhead system that will be used	Dril-Quip SS-15ES to be confirmed
Type and position of the Blowout Preventor (BOP)	15K Subsea BOP
Drilling fluid (aqueous or non-aqueous)	WBM or NADF
Explosives to be used	Yes (for drilling, if required)
Vertical Seismic Profiling	
VSP source	Dual Delta Sodera G-Guns 

Well Drilling Activities	Description
Survey operation schedule and firing shot schedule	One VSP per well, occurring toward the end of the drilling operations
Well Testing	
How many planned for each well	1 test per well for wells being tested
Duration	3-4 days of flowing
Technology	Tubing conveyed perforating. Premium packer. Gas tight premium tubing. Downhole sampling and Surface read out + memory gauges combined. Electro-hydraulic flow back safety system. Flow head with hydraulic controlled valves. Surface safety systems on each individual pressurized process equipment. Common surface safety system for emergency shut down and venting. 
Estimated volume / release rate	Gas rate: 900.000 m^3/day
Partition Liquid / gas	BSW average: 98% condensate / 2% brine H_2S around 0.6/0.7 ppm CO_2 around 0.9/1.0%.

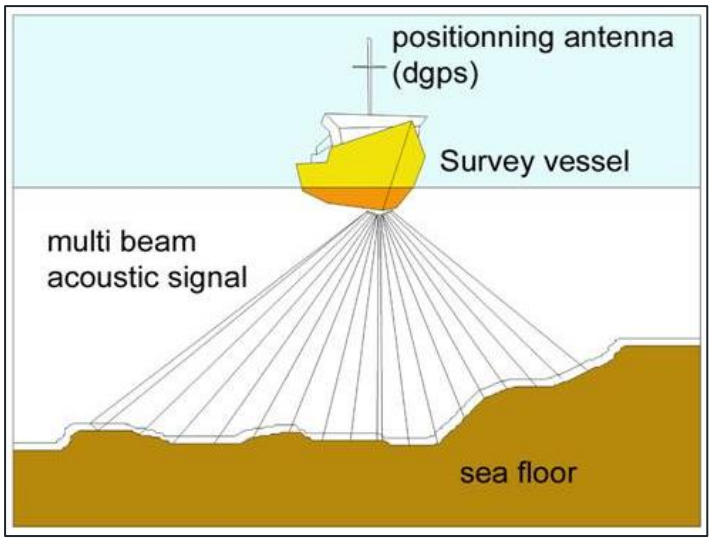
Well Drilling Activities	Description
Burner efficiency	 Sea Emerald burner heads: 99.993% efficiency under a wide range of conditions
Drilling Post Operation	
Specifications of plug	2-3 cement plugs
Would guidebases be removed	Plug#1: Isolation of Main Reservoir
Size of protrusion after casing has been cut	Plug#2: Second Barrier for Main Reservoir
Wellhead completion status	Left in place with Trawl over installed
Over trawlable equipment fitted on abandoned wellheads.	 Base: 5.2m x 5.2m Height: 4.4m

5.2.2 SONAR SURVEYS

Sonar surveys are used to investigate the structure of the seabed (bathymetry). Sonar surveys will be conducted from a vessel and might use multi-beam echo-sounding, single beam echo-sounding and sub-bottom profiling. Such surveys entail transmitting frequency pulses down to the seafloor to produce a digital terrain model and identify any seafloor obstructions or hazards.

Sonar survey activities associated with the proposed project are summarised in Table 5-4. A typical sonar survey diagram is depicted in the table below.

Table 5-4 –Summary of Sonar Surveys

Survey Activities	Description
Sonar Survey	
Schedule, duration	Duration: 15-30 days Between 1st of December to 31st of May (out of Marine Mammals presence)
Location, extend	Estimated 50 km^2 for the development area and along the pipe routing
Equipment / source specifications	Multi-beams Echo Sounder Side Scan Sonar Sub-bottom Profiler Ultra-High Resolution Seismic 

5.2.3 SEAFLOOR SAMPLING

Seafloor sampling will be undertaken to collect sea floor sediment samples for environmental baseline data collection and studies which is also used for monitoring of the environment during / post operations, and for use in geotechnical and geophysical studies. Seafloor sampling activities associated with the proposed project are summarised in Table 5-5.

Table 5-5 –Seafloor sampling activities

Coring Activities	Description
Extent of the zone	Covering the entire PA application
Duration	15-30 days
Technology used	Core box, drop cores, and dredge pipe for hard substrates
How many cores	Dependant on area to be surveyed
Diameter + depth of the samples	Not defined

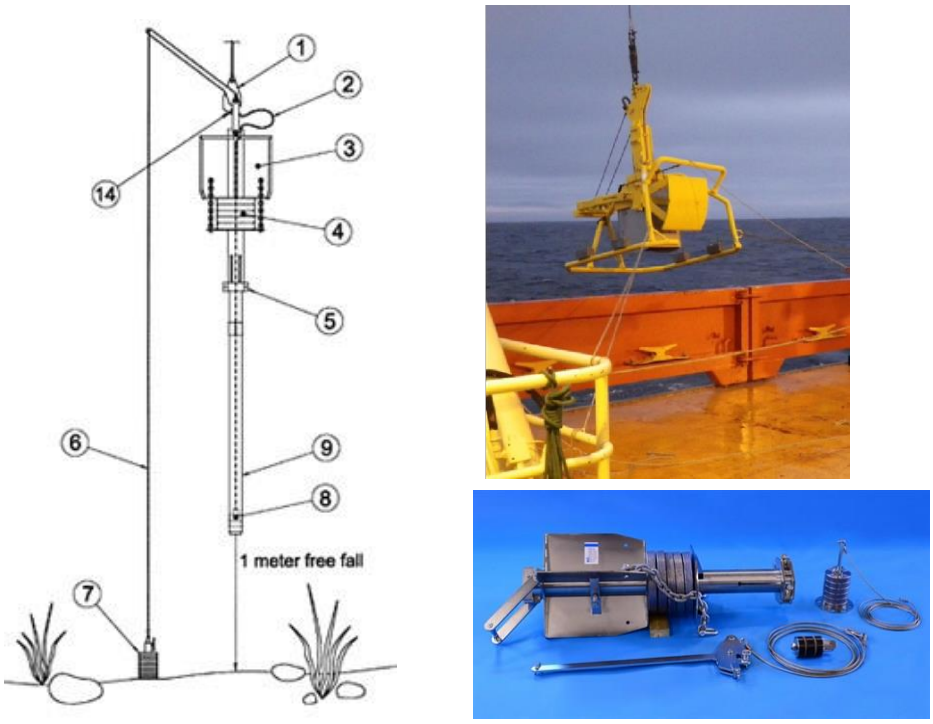


Figure 5-4 –Examples of sea floor sediment sampling tools

5.2.4 METOCEAN BUOY MOORING

TEEPSA is proposing to mobilise metocean buoys within the PR application area in order to measure oceanographical, meteorological and possibly acoustic data, i.e., currents, waves, water temperature, ambient water noise levels, wind and air parameters. At least one current mooring and wave buoy will measure complementary parameters at each drill site, and these will be located at least 5 km from each other due to the harsh weather conditions. A typical metocean buoy current mooring setup and surface wave buoy is shown in Figure 5-5. The wave buoy would require a temporary safety zone of between 500 m and 2 km radius on the sea surface (depending on the water depth). All vessels would be excluded from entering this safety zone.

(SLR, 2020)

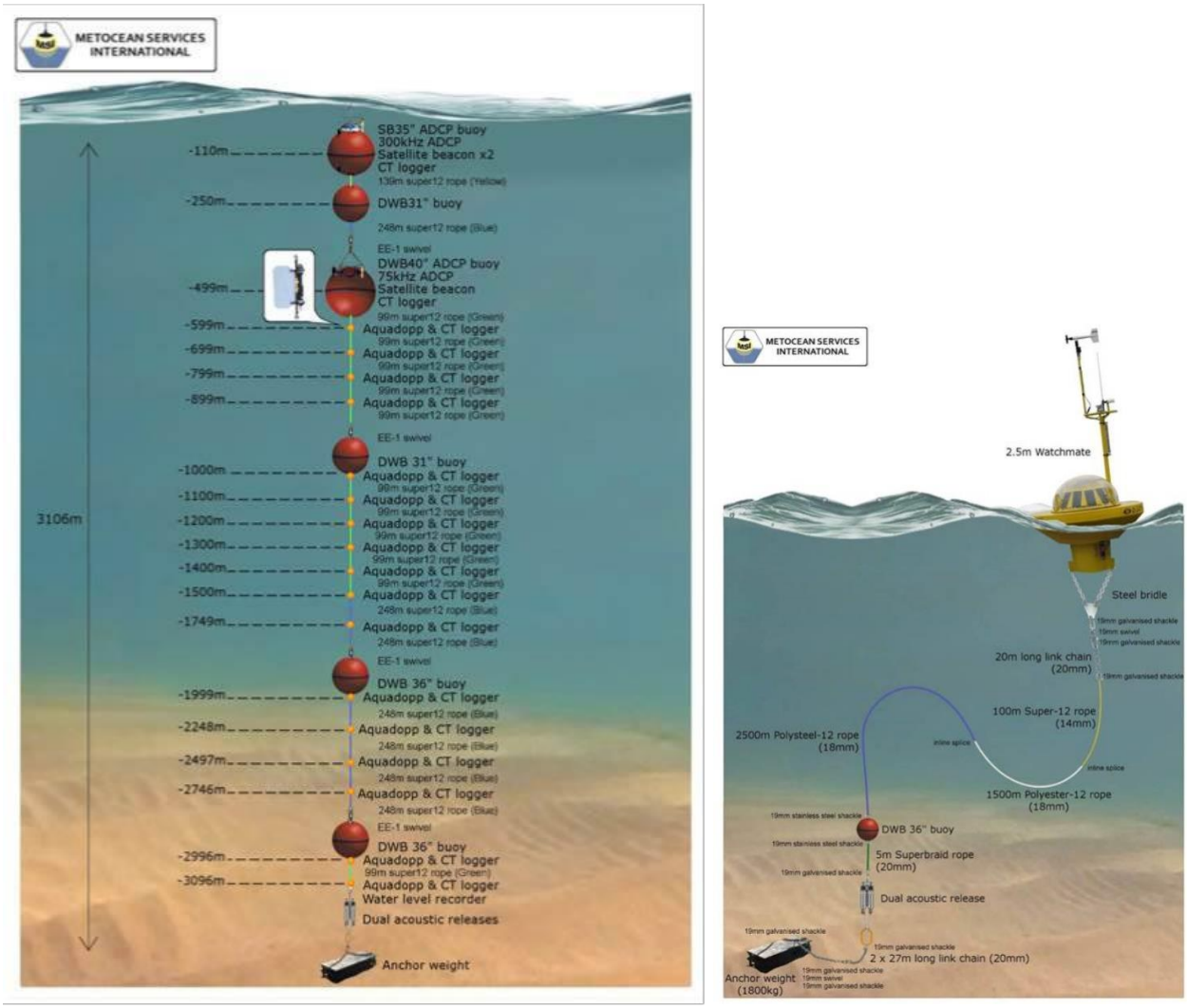


Figure 5-5 –Typical metocean buoy mooring system and wave buoy with weather station (Source: Metocean Services, in SLR, 2020)

5.3 SUPPORTING ACTIVITIES

The project will include a shorebase to support operations. It will also include a series of support and specialised vessels for the operations.

Supporting activities will also include helicopter transportation from existing airport facilities to move personnel to and from the offshore facilities if needed.

5.3.1 OPERATIONAL SHOREBASE

During all project phases, support operations will include transportation of equipment, supplies and personnel by vessel. The support operations will be conducted from a supply bases located at the ports of Mossel Bay, Gqeberha and/or Cape Town.

It is anticipated that the supply bases will be located in existing areas inside the ports facilities.

The supply bases will likely include:

Equipment and material storage;
Operations and maintenance centres;
Arrival and departure of support vessels; and
Loading/offloading supplies and equipment being transported to and from the drill ships and the F-A Platform.

5.3.2 SUPPORT AND SPECIALISED VESSELS

Supporting activities will include the use of supply and support vessels as well as tugboats to support preparation, construction and installation activities, operations, and decommissioning. Vessels will also be used to support drilling operations. Such vessels will very likely operate from the Mossel Bay area.

During the preparation, construction and installation activities, several vessels will be required for the installation of the production pipeline and the other equipment of the subsea production system. During that period, typical vessels required include:

S-Lay vessel
J-Lay vessel
Heavy lift vessel
ROV survey vessel
Pipe carrier vessel
Dive support vessel
Multi service vessel
Supply vessel
Umbilical installation vessel
Project patrol vessel

During the Production/Operations phase, the typical vessels expected are:

Tugboat
Supply vessel
Crew boat
Patrol boat

The vessels likely utilised during decommissioning will include tugs, supply vessels, and heavy lift vessels. All vessels will need to comply with applicable International Maritime Organization (IMO) standards relevant to their proposed use (e.g., double-hulled vessels for tankers, etc.).

5.4 PROJECT PHASES

The proposed development and production related activities will include three main phases: 1) Preparation, Construction, and Installation; 2) Production; and 3) Decommissioning.

Exploration and appraisal drilling phases include: Final site selection, drilling, plug and abandonment. The activities related to the exploration and appraisal drilling phases will be conducted in parallel to the development and production related activities. The exploratory drilling phases, along with the development and production phases, will be detailed in the ESIA report.

Major activities of the development and production, and exploration related activities project steps are described below.

5.4.1 PRODUCTION

5.4.1.1 Preparation, construction, and installation

This first phase will include:

- The drilling and completion of up to 6 development and appraisal wells;
- The installation of infrastructure for the subsea structures including FLET and a production manifold at the end of the pipeline to allow the connection of the wells;
- The laying of the production 18" pipeline to be connected from the subsea manifold to the F-A Platform;
- Modifications to the F-A Platform to connect the new 18" pipeline (these modifications however do not form part of the ESIA scope; they will be handled by PetroSA as part of the production right and associated activities);
- Commissioning activities; and
- The use of supply and support vessels, specialised vessels and helicopters to support preparation, construction, and installation activities.

5.4.1.2 Production phase

The second phase will include:

- The flowing of gas and condensate from the wells up to the F-A Platform through the 18" production pipeline for further treatment;
- The export of gas and condensate via the existing PetroSA-operated gas and condensate pipelines to the shore (this does not form part of this ESIA scope);
- The operation and maintenance of the Subsea Production System and the F-A Platform;
- The use of supply and support vessels as well as tugboats to support Operations at the F-A Platform;
- Well maintenance; and
- Flowlines pigging and inspection.

5.4.1.3 Decommissioning activities

Production wells will be decommissioned, capped and sealed at the end of the life of the field, and similarly pipelines and other infrastructure will be retrieved where feasible, or otherwise decommissioned in-situ and left on the seabed. Furthermore, the project infrastructure may also be utilised during further production phases of the project and may therefore only be decommissioned at the end of the production lifecycle of the entire project.

In principle, the decommissioning, rehabilitation and closure of the respective project components will be developed based on the relevant requirements as set out in the TEEPSA Offshore Structures Decommissioning Procedure as well as the outcomes of the closure plan that will be compiled as part of this ESIA. The decommissioning, rehabilitation and closure of the respective project components will occur as follows:

- The production wells (deep water) will be decommissioned and plugged in-situ.
- Production manifolds in-line tees (deep water) will be left on the seabed following visual inspection.

Flowline end termination units (shallow water) will be retrieved.
Production flowline including subsea tie-ins will be pigged to remove potential contaminants which will be collected and safely disposed of, after which the open-ended pipeline will be left on the seabed to naturally corrode from the inside (as the outer surface is corrosion-protected).
Subsea trenching to bury pipe components in shallow water will be profiled where required, deep-sea concrete pipe supports/anchors will remain in-situ.
Production risers (shallow water) will be retrieved.
Subsea distribution unit (connector with the subsea umbilical through the Umbilical Termination Assembly (UTA), distributing hydraulic supplies, electrical power supplies, signals, and injection chemicals to the subsea facilities) (deep water) will be left on seabed.
Limited new connection infrastructure and equipment to be installed on the F-A Platform will be decommissioned as part of PetroSA's decommissioning plan of the platform at the end of the overall project lifespan.
The use of supply and support vessels and specialised vessels to support decommissioning activities.

The above aspects will be further expanded upon during the development of the detailed closure plan for the project.

5.4.2 EXPLORATION

Exploration activites will include:

Undertaking marine surveys (metocean surveys, sonar surveys, seafloor sampling); and
Well drilling:

- The drilling of up to 4 exploration and appraisal wells, including well logging, VSP and well (flow) testing;
- Plugging and abandonment of wells; and
- Well monitoring.

The use of supply and support vessels, specialised vessels and helicopters to support marine surveys and well drilling activities.

5.5 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The period for which the EA is required is for a minimum of 30 years.

6 ALTERNATIVES

Alternatives are defined in in terms of the NEMA as *"different means of meeting the general purpose and requirements of the activity, which may include alternatives to –*

(a) the property on which or location where it is proposed to undertake the activity;

(b) the type of activity to be undertaken;

(c) the design or layout of the activity;

(d) the technology to be used in the activity; and

(e) the operational aspects of the activity."

Inclusive of the types of alternatives listed above, a range of alternatives exist, not all of which are necessarily appropriate for each ESIA.

The following sections describe the various alternatives that are appropriate to the proposed offshore project and have been assessed as part of the project. Further to the types of alternatives, are alternatives that maximise resource use efficiency (e.g., energy and water use efficiency) and minimise waste production.

The initial design of the project, as presented in Section 4, is based on the understanding of the project area and target hydrocarbon reservoirs. As additional surveys, studies, and tests are completed, TEEPSA will develop a better understanding of both the availability of design options and the environmental and social sensitivities within Block 11B/12B. During this process, various alternatives to the initial project design will be identified and considered. This section describes some of the project alternatives. However, the ESIA report will include a chapter dedicated to project alternatives describing the major project alternatives that were considered and describing the chosen option for each alternative.

Feasible alternatives to the proposed project location sites, technology, design and operation shall be evaluated and assessed in terms of their potential environmental and social impacts. For the time being, a number of alternatives have been pre-identified for the proposed project. They are presented below.

6.1 PROPERTY ALTERNATIVES

The location of the proposed project is constrained to the location of the gas, condensate and oil rim resource and confirmed reserves. Notwithstanding this, the production rights application area is smaller than the original exploration right area, with specific relinquishment of areas in the north-east of the exploration rights block which correlated with high biodiversity zones. These high biodiversity areas have specifically been excluded from the production right application area. (See Figure 3-2).

6.2 TYPE OF ACTIVITY TO BE UNDERTAKEN

The location of the proposed project is constrained to the location of the gas, condensate and oil rim resource and confirmed reserves. As such, no activity alternatives were viable to be considered for this project.

6.3 DESIGN ALTERNATIVES OF THE SUBSEA FACILITIES

Three options have been investigated with regards to the design of the subsea system in the Paddavissie production area. These options consider different combinations of deviated wells, vertical wells, manifolds and T-FLETs.

One of the options is likely to be excluded. In terms of installation, this option is not feasible due to the harsh local metocean conditions inducing fatigue in the line during the installation. Therefore, the two remaining options will be further considered.

6.4 WELL LOCATIONS

Six production wells will be located in the project development area in the vicinity of the existing wells namely, Brulpadda 1AX and Luiperd-1X exploration wells. Exploration wells will be drilled

within the eastern area of the block. The exact localities of the wells will be determined by further investigative work which will include geotechnical studies, sonar/bathymetry and sea floor sampling.

It is expected that further investigative work will also include a seabed survey using a remotely operated vehicle (ROV) to document the condition of the seabed around each planned well center. If the seabed survey results indicate special environmental special features, for instance corals, at the planned location, alternative locations would be considered before proceeding with drilling.

6.5 TYPE OF DRILLING UNIT

Different types of drilling units can be used for drilling, including a drillship, a drilling platform and a semi-submersible vessel:

A drillship is a large vessel specially designed and equipped for drilling in deep water. It is not fixed to the sea bottom. The most recent ones are equipped with dynamic positioning systems to ensure the stability of their location over the planned boreholes.
A drilling platform consists of a large deck supported by legs reaching to the seabed floor. There are several different types of drilling platforms.
A semi-submersible consists of a large deck supported by columns connected to underwater ballasted pontoons located under the seabed, which provides the buoyancy to the deck.

The selection of the drilling units appropriate for a project depends on several factors, including water depth and metocean conditions in the drilling area. For instance, in ultra-deep waters, a drilling platform or a semi-submersible cannot be used; drillships need to be used.

For the purposes of the proposed project a semi-submersible vessel is proposed. Given the high energy oceanographic conditions the semi- submersible vessel is the most feasible option for well drilling for technical safety reasons.

6.6 ONSHORE SUPPORT LOCATION(S)

While the onshore logistics base is most likely to be located within existing infrastructure in Mossel Bay there is a possibility that onshore support for the proposed project could come from, either may be operated out of Cape Town or Gqeberha.

The Mossel Bay port is located about 120 km from the north-west outer limit of Block 11B/12B.

As shown on Figure 3-1, the Mossel Bay port is the closest port to the Brulpadda and Luiperd reservoirs which are targeted by the development and production activities. The Mossel Bay port is also the closest port from the existing F-A Platform and Mossel Bay GTL facilities that will be used for the project purposes.

For the time being, the Mossel Bay port seems like the most probable location for the onshore However, feasible alternatives to the Mossel Bay port for the onshore support location will be assessed.

6.7 LOCATION OF THE PIPELINE CORRIDORS

A subsea pipeline/production line is required from Luiperd to the F-A Platform. Given the locations of the Brulpadda and Luiperd fields and the F-A Platform, there are limited options in terms of the production pipeline route. However, two pipeline routes have been considered:

The pipeline route base case: an approximately 109 km long pipeline; and

The pipeline route option: an approximately 115 km long pipeline, slightly northeast from the base case.

The two potential pipeline routes are indicated on Figure 3-2.

The base case is retained as the most suitable route as it follows an area already disturbed by existing O&G activities, avoids getting close to an environmental sensitive feature, the Secret Reef, and reduces footprint impact on the marine Critical Biodiveristy Area (CBA).

6.8 OPERATIONAL ASPECTS OF THE ACTIVITY

The operational aspects of the activity involve the transportation of product through the production pipeline which connects the wells to the F-A Platform. Beneficiation of the product and handling of waste streams will occur on the existing F-A Platform. Similarly, the beneficial product will be pumped to shore via existing infrastructure from the platform. PetroSA will be responsible for the operation of the field once commissioned, thus the impact assessment focuses on activities required to bring the field into production whereafter ongoing reduction will take place through the existing infrastructure and staff complement at the F-A Platform.

6.9 OPTION OF NOT IMPLEMENTING THE ACTIVITY

The No-Go alternative represents the option not to proceed with the production and development related activities associated with the proposed project and represents maintaining the status quo, except for variations from natural causes or other human activities. This leaves the project areas of influence (i.e., offshore licence block, southern coastline and near shore of South Africa) in their current state and precludes the opportunity of supplementing the current dwindling supply sources at the PetroSA facility and attendant economic and social benefits that may be derived, as detailed in Section 4.

7 DESCRIPTION OF THE ENVIRONMENT

The following section present a preliminary description of the host environment of the proposed project. This general overview will be detailed, as needed, in the ESIA.

7.1 PHYSICAL ENVIRONMENT

7.1.1 METEOCEAN DATA

The strong Agulhas Ocean current, coupled with the high wind and waves, make the harsh metocean conditions a challenge for especially the installation / construction phase of the project.

7.1.1.1 Sea current and waves

The Agulhas oceanic current that flows from Mozambique parallel to the continental slope of South Africa crosses the 11B/12B Block in the project development area. It is considered as the second strongest surface current in the world with velocities higher than 3 m/s and crosses the project development area from east to west (Figure 7-1**).**

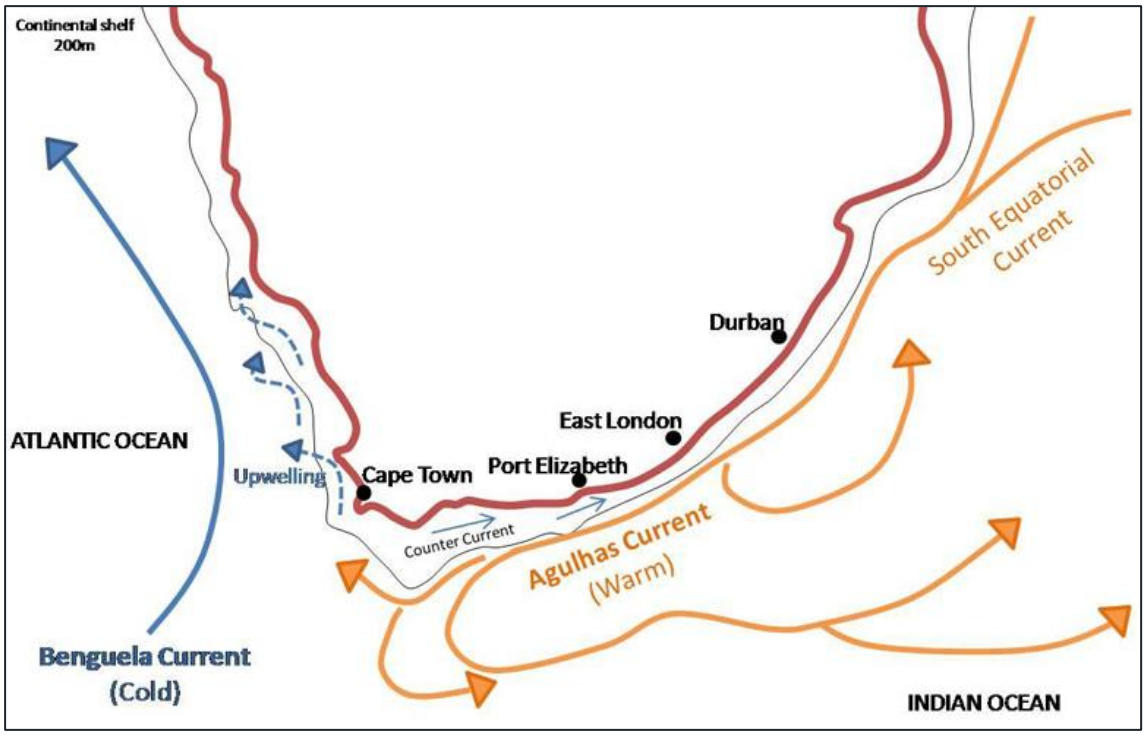


Figure 7-1 - Major current streams around South Africa (Source: Anchor, 2015)

This current presents high velocity (especially close to sea surface) but is quite narrow (~100 km) and does not affect the shallow areas on the continental shelf to the north of the project development area. From a development subsea standpoint, only the deepwater project development location is exposed to this high-speed current.

Regarding wave height conditions in deep water, a clear seasonality can be found. High Speeds (Hs) can reach Hs of 15 meters high with rogue waves that can reach up to 28 meters high.

The Agulhas current generates the formation of cyclonic eddies which propagate through the field area. Eddies can be 50-200 km in diameter. Those events induce rapid changes in current speed and directions. They can however be monitored by High Frequency (HF) radars located at shore (3 radar are currently in operation and 3 additional units will complete the set-up) up to 10-12 days in advance, based on the monitoring and model predictions.

7.1.1.2 Water temperature

The water temperature in the deep-water project development area and in Mossel Bay are presented in Table 7-1.

Table 7-1 –Minimum and maximum sea temperatures at different locations near the project development area

Area	Min and Max Temperature (c)
Project development area	
Seabed (1 684 m water depth)	1.7 - 4
Surface	16-28
Mossel Bay	
Seabed (47.4 m water depth)	10-19
Surface	13-24

7.1.1.3 Air temperature

The maximum estimated air temperature in the project development area is considered to be 29°C, the minimum 8°C and the annual average is 19°C. The monthly statistics of humidity show large variations from 31 % (minimum) to 100 % (maximum), with a mean humidity of about 77%.

7.1.1.4 Winds

Along the South Coast, the majority of waves arrive from the south-west, dominating wave patterns during winter and spring. During summer, easterly wind-generated 'seas' occur. semi-diurnal along the South Coast with an average tidal range of between 0.6 m during neap tides and 1.5 to 2.0 m during spring tides. Wind-driven upwelling occurs in the nearshore, especially when easterly winds blow during summer. Such upwelling usually begins at the capes and progresses westwards. Tidal influence will be minimal in Block 11B/12B.

7.1.2 GEOLOGY SETTING AND CHARACTERISATION

Block 11B/12B is located in the Outeniqua Basin. The Outeniqua Basin is structured by a set of four half-grabens with an E-W to NNW-SSE orientation (Figure 7-2) with associated depocenters that are called, from east to west, the Algoa, Gamtoos, Pletmos and Bredasdorp Basins (collectively known as the Outeniqua Basin).

They are bounded by normal faults (i.e., the St. Croix, Port-Elisabeth, Gamtoos and Plettenberg Faults) and are separated by prominent basement arches (respectively Recife, St. Francis and Infanta). Their southern extension is called the South Outeniqua Basin delimited to the south by the Diaz Marginal Ridge.

The rifting of the margin started at least during Oxfordian times up to Late Valanginian. The rift infilling results from two main sequences mainly composed of continental clastic deposits passing laterally to lacustrine and/or shallow marine environments

From the Late Valanginian, the structural and sedimentary evolution of the margin was controlled by the drift of the Falkland/Malvinas Plateau along the AFTZ which induced thermal subsidence, uplift and erosion. During these times the series became more marine as the basin was flooded and turbidites were deposited within the basin. After the Falkland/Malvinas Plateau cleared the tip of Africa during the Late Cenomanian, the tectonic activity decreased, and a passive margin was formed.

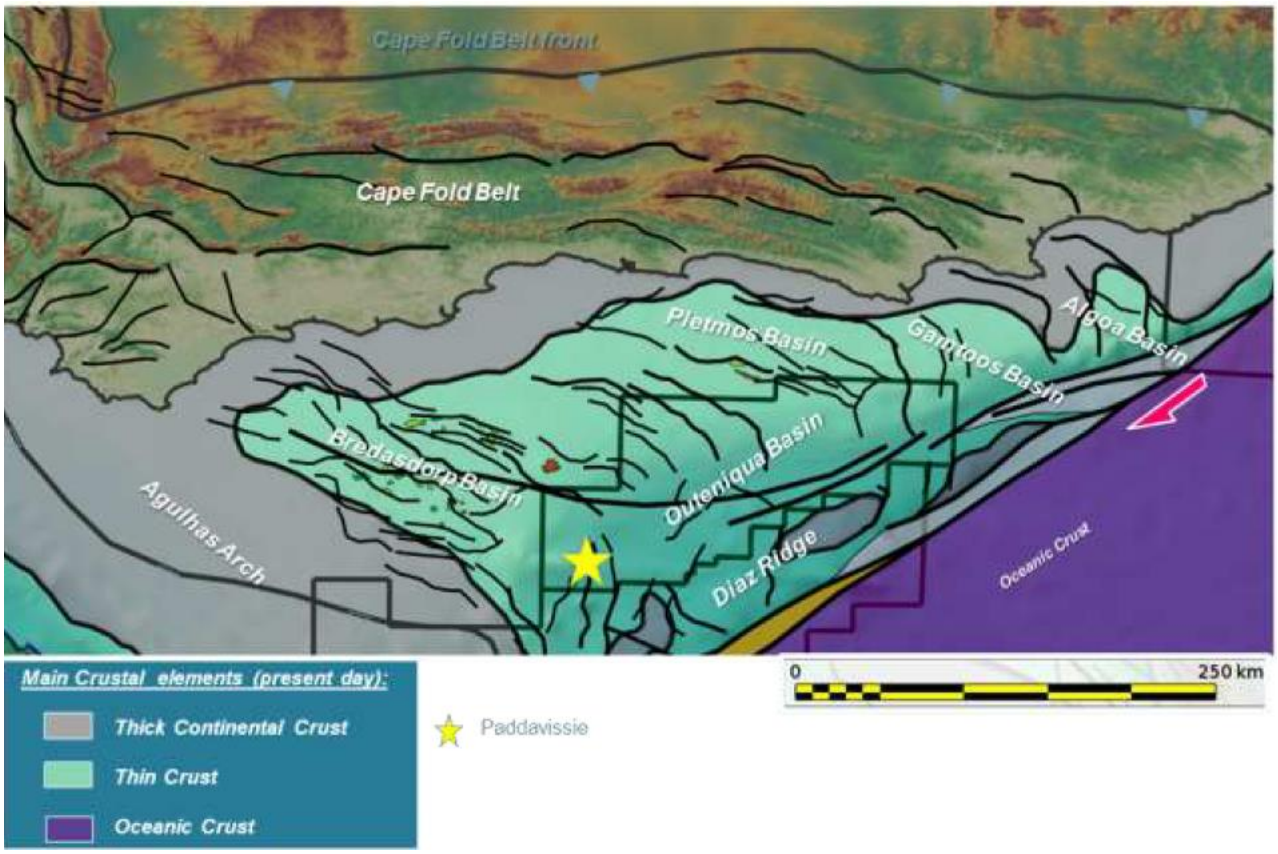


Figure 7-2 - Outeniqua Basin Location and Structural Setting (Source: Anchor, 2015)

7.1.3 BATHYMETRY AND SEDIMENTS

Along the East coast, the bathymetry is characterised by a very narrow shelf, which widens in the region of Nelson Mandela Bay at Gqeberha to the east of the project area (see Figure 7-3). Moving westwards, depth increases more gradually to the shelf break, which is located at a depth of 140 m off Gqeberha, 130 m off Cape St Francis, and 300 m south of Cape Agulhas (Birch & Rogers 1973, in SLR, 2020). Between 22° and 23°E, the shelf break indents towards the coast forming the Agulhas 'bight', in SLR, 2020). At the apex of the Agulhas Bank the shelf widens to 250 km.

Major bathymetric features on the Agulhas Bank include various banks (Alphard, 6-Mile, 12-Mile, 45-Mile and 72-Mile Banks, and the "Blues" and "Browns" B off Cape Agulhas, the Agulhas Arch and Alphard Rise (Birch & Rogers, 1973, in SLR, 2020). Dalgleish Bank and Grue Bank lie due south of Knysna, with Grue Bank situated within Block11B/12B. Grue Bank extends eastwards as a deep reef complex -referred to as Kingklip Koppies and the Agulhas- and Kingklip Ridges. The Kingklip Ridge (situated on the slope between Gqeberha and Cape St. Francis) is a unique 40 km long, 500 m wide feature that rises from a depth of more than 700 m to as shallow as 350 m with very strong currents on the outer ridge (Sink et al. 2019, in SLR, 2020).

The Agulhas Ridge is a positive relief feature rising more than 3 km above the surrounding seafloor and forms part of the Agulhas-Falkland Fracture Zone (Ben-Avraham et al. 1997; Uenzelmann-Neben & Gohl 2004, in SLR, 2020). This approximately 2 500 km long linear feature, located

between the southern margin of South Africa and the northern edge of the Falkland Plateau separates the Cape Basin and the Agulhas Basin (Ben-Avraham et al. 1997; Schut et al. 2002; Uenzelmann-Neben & Gohl, 2004, in SLR, 2020). To the east of the Agulhas Bank lies the deep and expansive Agulhas Basin, which is generally deemed featureless except for the Southwest Indian Seamount chain. This seamount chain occurs at a depth of more than 3 000 m and is referred to as the Mallory Seamount cluster which includes the Mallory-, Davie-, Shackleton- and Natal Seamounts (Sink et al. 2019, in SLR, 2020).

Outside the shelf break, depth increases rapidly to more than 1 000 m (Hutchings 1994, in SLR, 2020). Submarine canyons occur in the shelf break (>200 m) off Gqeberha, with the Southwest Indian Seamounts situated to the east of the Agulhas Bank beyond 3 000 m depth (Sink et al. 2012a, in SLR, 2020). Three submarine canyons are known off Nelson Mandela Bay with the Sundays and Addo Canyons breaching the shelf and spanning a depth range of approximately 150 m to 2 000 m. The deeper Cannon Rocks Canyon, off the Boesmans Estuary east of Gqeberha, is confined to the slope. Two potential canyons off Tsitsikamma that were included in the 2004 National Biodiversity Assessment (NBA) (Lombard et al. 2004, in SLR, 2020), could not be located during the Deep Secrets cruise (Sink, 2016, in SLR, 2020).

The coastline of the South Coast is characterised by a number of capes separated by sheltered sandy embayments. A large expanse of the mid-shelf region (40-100 m depth) of the Agulhas Bank comprises either rock or areas with sparse sediment cover. Inshore on the South Coast the seafloor is rocky. Offshore of this, an inner shelf sediment wedge extends up to 30 km offshore comprising soft liquid muds to the west of Mossel Bay and firm terrigenous sediment to the east (Birch & Rogers 1973; Schumann 1998, in SLR, 2020). Although mud patches occur inshore east of Cape Infanta and south of Cape Agulhas, the majority of unconsolidated sediment is sand to muddy sand (Birch & Rogers 1973, in SLR, 2020).

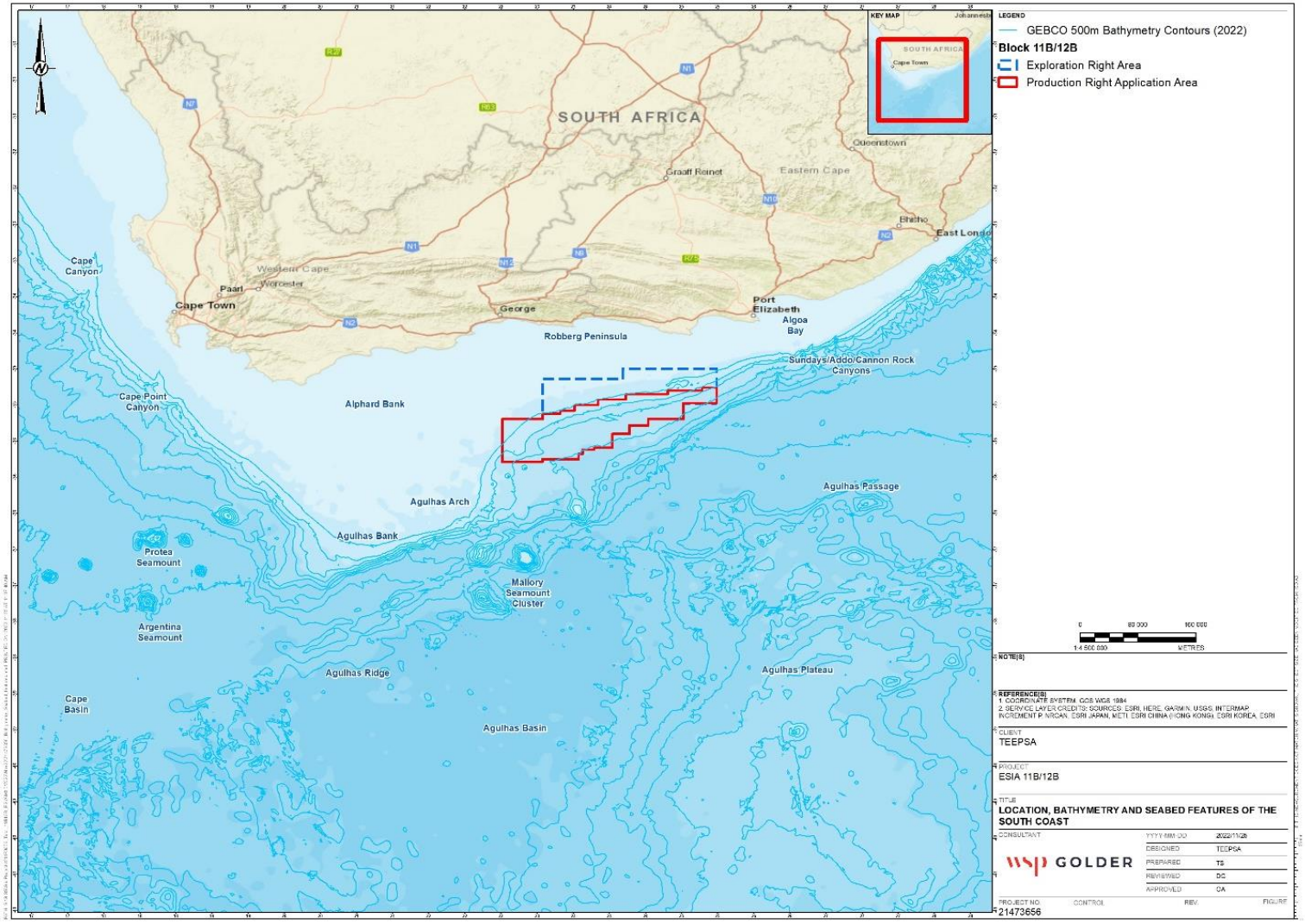


Figure 7-3 –Location, bathymetry and seabed features of the South Coast

7.1.4 NOISE

Existing underwater noise levels are influenced by both natural and anthropogenic sources. Each source of noise has different levels of noise at a range of frequencies. Low frequencies are generally impacted by human contributions (i.e., marine shipping) while higher frequencies may be impacted by natural physical or bioacoustics sources (i.e., surface waves, rain, marine fauna). Figure 7-4 demonstrates the frequency components of typical natural and anthropogenic noise sources.

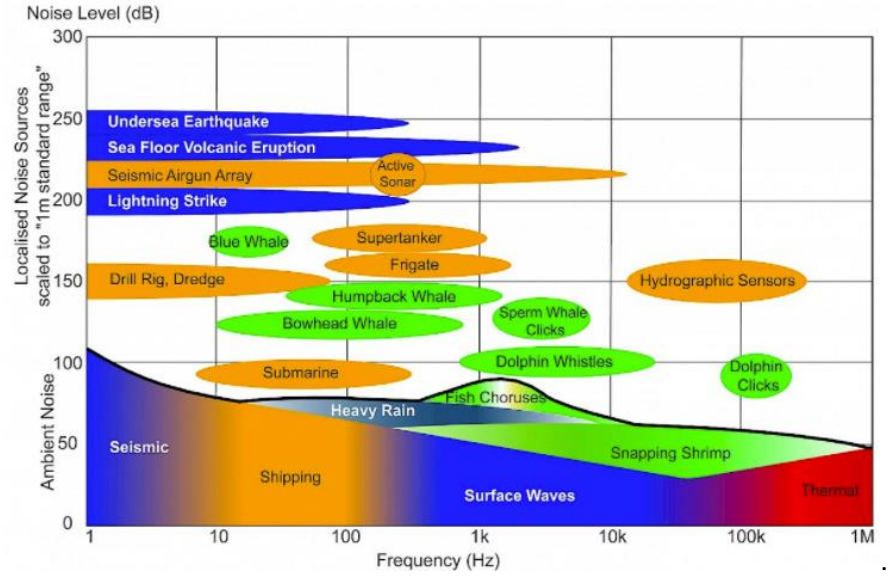


Figure 7-4 - Noise levels and frequencies of anthropogenic and natural noise sources in the marine environment. Source: https://www.ospar.org/work-areas/eiha/noise

In the vicinity of the project development area, noise levels are primarily influenced by vessel traffic, as well as existing industry and natural sources such as wind and waves and marine mammal vocalizations. There are several major ports on the coast of South Africa, including Cape Town, Mossel Bay, Gqeberha, East London, and Durban. Figure 7-5 shows the high number of existing vessel trips in 2020 in the vicinity of the Project. Therefore, it is expected that existing underwater noise levels in the vicinity of the Project are significantly impacted by existing vessel traffic.

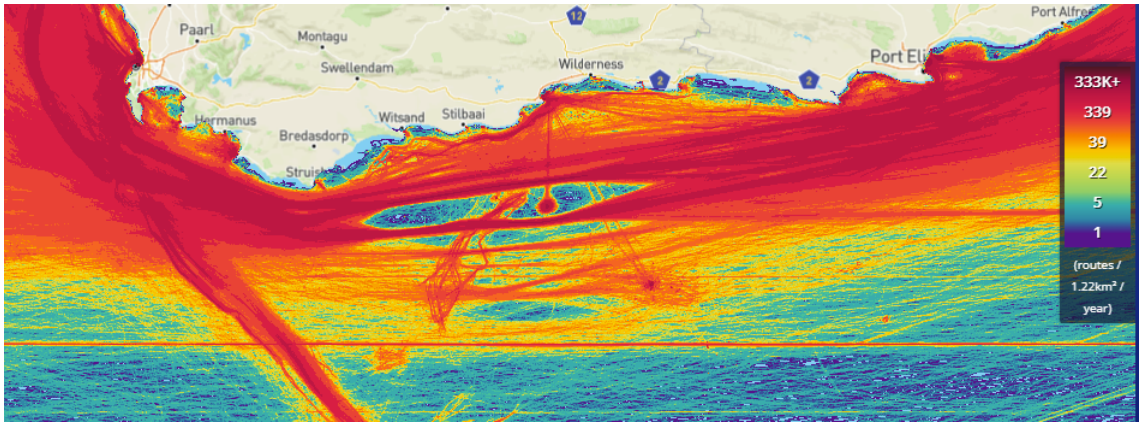


Figure 7-5 - Existing vessel traffic in 2020 in the vicinity of the Project. Source: https://www.marinetraffic.com

7.2 BIOLOGICAL ENVIRONMENT

7.2.1 OCEAN CURRENT AND CIRCULATION

Given that the physical oceanography of an area, particularly water temperature, nutrient and oxygen levels, are the principal driving forces that shape the marine communities, it is worth considering the broader oceanography of the region, building on from the description provided in Section 7.1. The oceanography of the PR application area is influenced by both the strong-flowing Agulhas current that moves down the east coast of South Africa as well as by localised oceanographic processes (Figure 7-1).

It is the interaction of the warm Agulhas current with cooler temperate waters is the principal reason for the diverse range of coastal and marine flora and fauna for which South Africa is famous. The Agulhas current forms part of the Indian Ocean Gyre, which brings warm water from the tropics to the east coast of South Africa and moves at a speed of approximately 2.6 m/s (Branch & Branch, 1981). The Agulhas current hugs the continental shelf, moving close to the shore edge when the shelf is narrow but is deflected away from the coast as the shelf widens (i.e., from Gqeberha westwards). The continental shelf becomes progr Cape down to the Agulhas bank in the southern Cape (Heydorn & Tinley 1980) (Figure 7-1).

The current produces large, complex meanders of approximately 130 km across the shelf, and eddies, which advect onto the Agulhas Bank (Swart & Largier 1987, Penven et al. 2001, Lutjeharms 2006, Pisces 2019) (Figure 7-6). After detaching from the shelf edge at 15°E, the Agulhas Current retroflects and lows eastwards (Schumann et al. 1998).

The thermal structure of Agulhas Bank is complex and is influenced by Agulhas current water intrusions at the surface and subsurface, upwelling and solar heating of surface waters (Pisces 2014). The warm, tropical water carried by the Agulhas current cools as it moves southwards and supports a changing array of species. At the inner boundary of the Agulhas current, cold bottom water is advected onto the Agulhas Bank via shelf-edge upwelling (Schumann et al. 1982, 1998, 2005). This process is linked to bottom topography and is most intense at the eastern boundary of the South Coast (Hutchings 1994). Such shelf-edge upwelling largely defines the strong thermocline and halocline topography that typically develops between the cold bottom water and the sun warmed surface layer during spring, summer and autumn. Cool counter-currents also flow inshore of the Agulhas current in an easterly direction, providing important opportunities for northward and eastward migration of certain species such as the sardine *Sardinops sagax*. South of the continental shelf, the current turns back on itself (retroflects) and begins flowing eastwards and once again joins the Indian Ocean Gyre as the Agulhas Return Current (Figure 7-6).

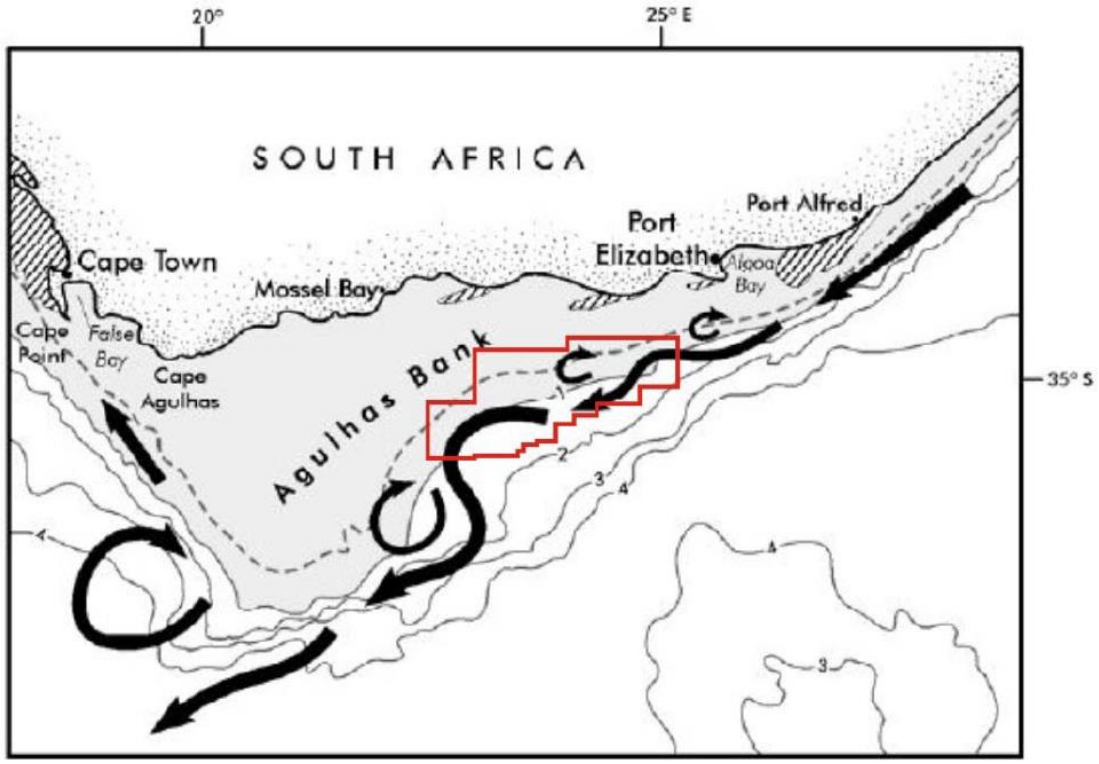


Figure 7-6 - The major circulatory elements along the South Coast in relation to the Production Right area (red polygon). The broken line denotes the edge of the continental shelf (200 m isobath) and upwelling is shown by hatching (adapted from Lutjeharms 2006 and Pisces 2014).

7.2.2 REGIONAL BIOGEOGRAPHY

Numerous attempts have been made to understand and map marine biogeographic patterns around the coast of South Africa, the most recent being Sink et al. (2012). Most of the studies recognised three coastal regions: a cool temperate west coast, a warm temperate south coast and a subtropical east coast region. The Block 11B/12B area falls within the warm temperate south coast, a region characterised by high diversity, with components of both the cool temperate and subtropical marine faunas, as well as high levels of endemism (species with distributions restricted to the bioregion). According to the most recent biogeographic divisions, the Block 11B/12B falls into within the Southwestern Indian Ecoregion and the Southwestern Indian upper and lower bathyal ecozones (Figure 7-7) (Sink et al. 2012). The more recent National Biodiversity Assessment (NBA) that was released in 2019 does not reclassify these biogeographic regions. Communities within this marine habitat are largely ubiquitous throughout the southern African South Coast region, being particular only to substrate type or depth zone. The biological communities occurring in the Block 11B/12B area consist of many hundreds of species, often displaying considerable temporal and spatial variability (Pisces 2019).

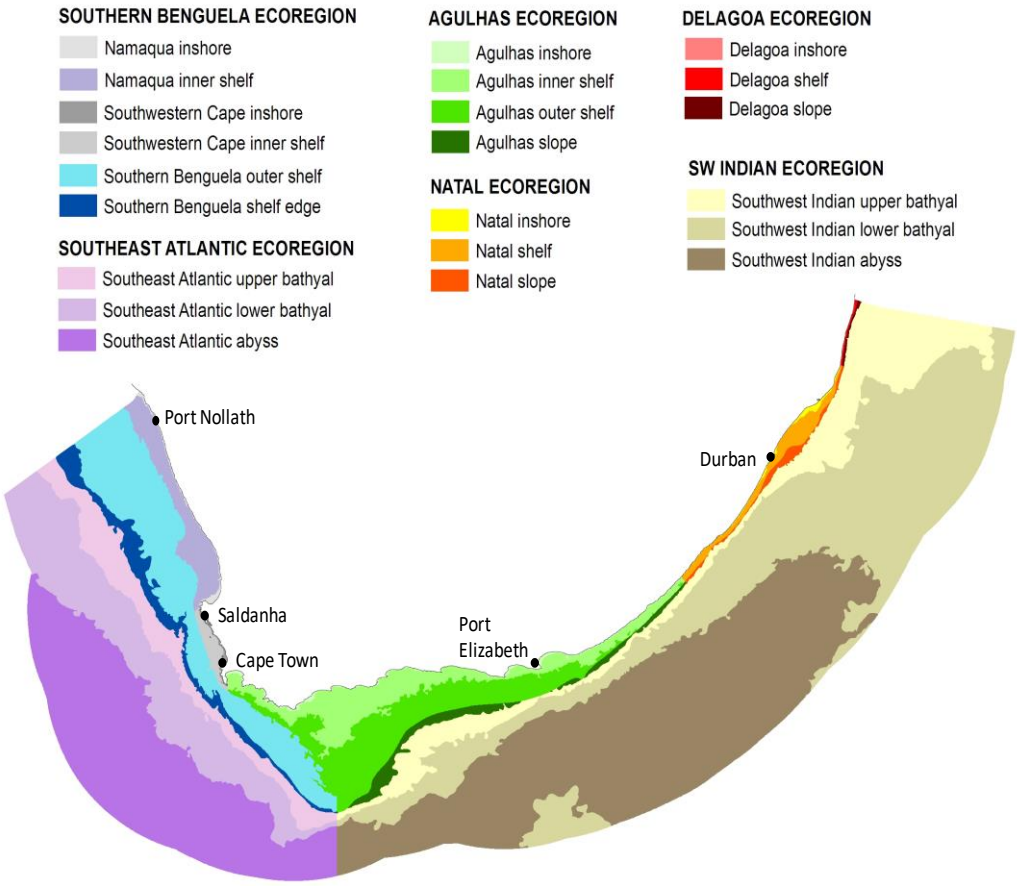


Figure 7-7 - Inshore and offshore Ecoregions in South Africa as defined by Sink et al. (2012).

7.2.3 BENTHIC INVERTEBRATE COMMUNITIES

The benthic biota of offshore substrates constitutes invertebrates that live on (epifauna), or burrow within (infauna), the sediments, and are generally divided into megafauna (animals >10 mm), macrofauna (>1 mm) and meiofauna (<1 mm). The structure and composition of benthic invertebrate communities is primarily a function of abiotic factors such as water depth and substratum (e.g., sediment grain size in unconsolidated sediments and reef structure/topography in areas of hard ground), current velocity and organic content of the sediment (Snelgrove & Butman 1994, Flach & Thomsen 1998, Ellingsen 2002). Biotic factors that influence benthic community structure include predation, food availability, larval recruitment and reproductive success (Pisces 2019). The seabed in the Block 11B/12B area is diverse, comprising areas of sand, mud and coral (Pisces 2019). Benthic communities expected to occur on the Agulhas Bank are divided into four main groups, based on the distribution of the main seabed types (Quick & Sink 2005, Sink et al. 2010, Shipton & Atkinson 2010):

Terrigenous muds. The biota of this habitat type in South Africa are typically comprised of a high biodiversity of benthic macrofauna (polychaetes, nematodes, amphipods, isopods, molluscs, echinoderms etc.).

Relict shelly sands. These relatively stable sandy habitats of varying grain size support highly diverse benthic communities, including seapens, molluscs, echinoderms (brittle stars and heart urchins), cerianthids (tube anemones), sponges, the deep-water rock lobster *Palinurus gilchristi* and a wide diversity of infauna (polychaetes, amphipods, isopods, molluscs).
Pre-Mesozoic basement rock. This low-profile rocky habitat is often sand inundated, with communities of sponges, black corals, gorgonians and ascidians (Sink et al. 2006).
Pre-Mesozoic rock outcrops. This highly structured reef habitat is generally characterised by highly diverse benthic and motile biota including sponges, azooxanthellate corals, octocorals, gorgonians, black corals, cerianthids and stylasterine lace corals, bryozoans, ascidians, basket stars and the South Coast rock lobster *P. gilchristi*. Fauna occurring in the deeper reef areas and canyons have community assemblages distinctly different to those from shallower reefs (Sink et al. 2006).

The benthic habitats of the Agulhas Bank in general are considered sensitive and particularly vulnerable to anthropogenic disturbance because these communities are frequently slow-growing, slow to mature and long-lived (Pisces 2019). The Agulhas Bank hosts a diversity of deep-water corals and sponges that have established themselves below the thermocline where there is a continuous and regular supply of concentrated particulate organic matter, caused by the flow of a relatively strong current (Pisces 2019). Reef-building cold water corals have also been documented within the Southwest Indian Upper Bathyal, Agulhas Sandy Shelf Edge and in association with deep reefs and submarine canyons on the Agulhas Inner Shelf and Shelf Edge respectively (Sink & Samaai 2009, Sink et al. 2011, Pisces 2019).

The 2018 National Biodiversity Assessment (NBA) classified offshore substrate types for the delineated marine habitats (Figure 7-8). This delineation shows that much of the habitat within the Production Right Area are (moving south to north) Southwest Indian Lower Slopes, Southwest Indian Mid Slope, Southwest Indian Upper Slope, with intersection with Agulhas Rocky Shelf Edge, Eastern Agulhas Outer Shelf Mosaic and potentially Agulhas Blues in the vicinity of the pipeline routing (Figure 7-8) (SANBI 2018). The habitat threat status of all the ecosystem types within the Production Right Area and proposed pipeline routing is considered "Near Threatened" (Sink et al. 2019).

Substrate types are presented in Figure 7-9. Given the substrate of most of the Production Right Area is classified as "Southwest Indian Unclassified Slope" — it is impossible to presence or absence of reefs, corals or hard grounds — it is imperative that the Production Right Area surveyed to confirm the substrate type, which will allow a better assessment of habitat sensitivity and significance. However, there is almost certainly rocky area in the north-western side of the Production Right Area ("Agulhas Rocky Shelf Edge") and ("Agulhas Mosaic Shelves") (Figure 7-9).

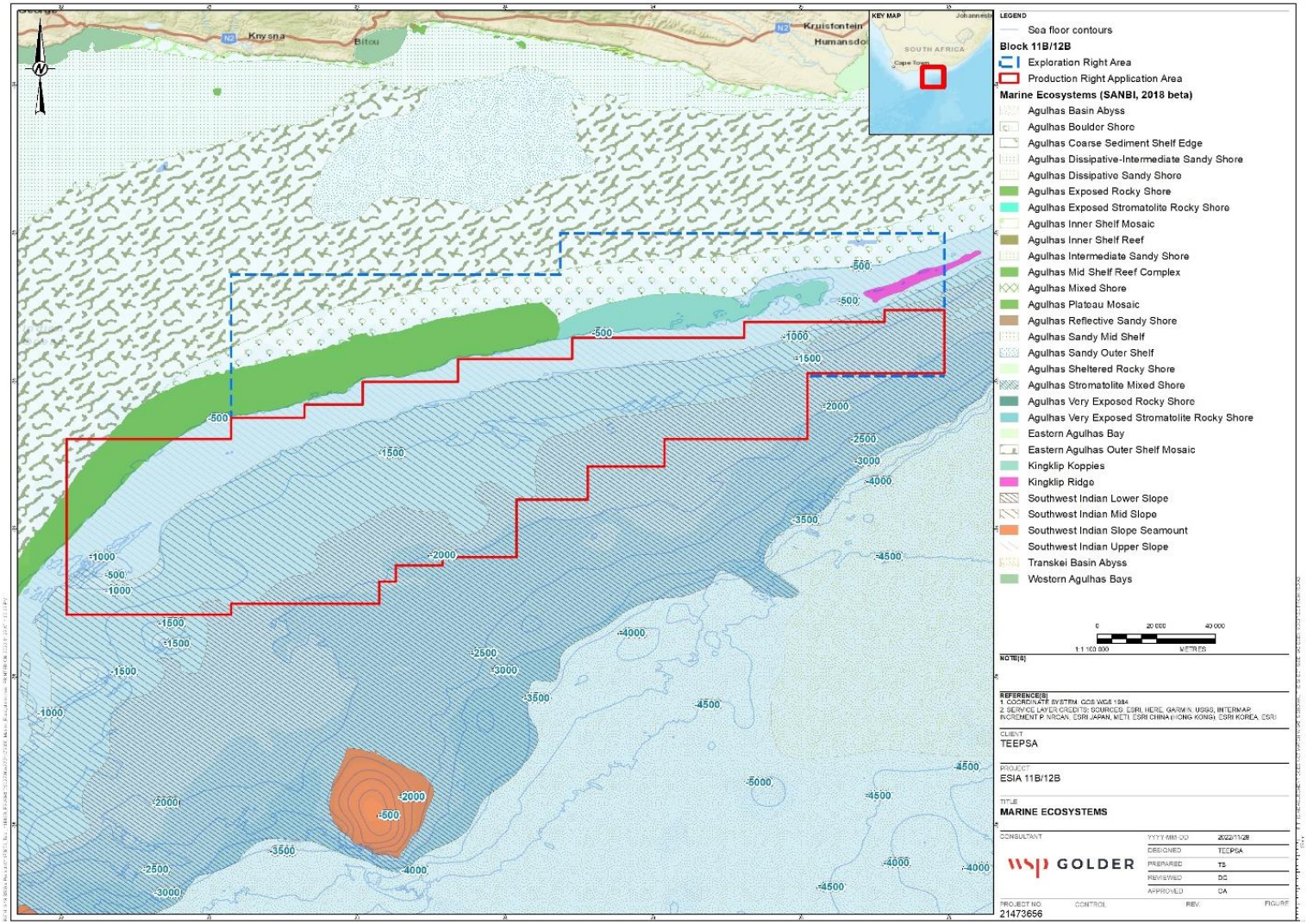


Figure 7-8 - The ecosystem classification of benthos in the vicinity of the Production Right Area (indicated by the red polygon) (SANBI 2018).

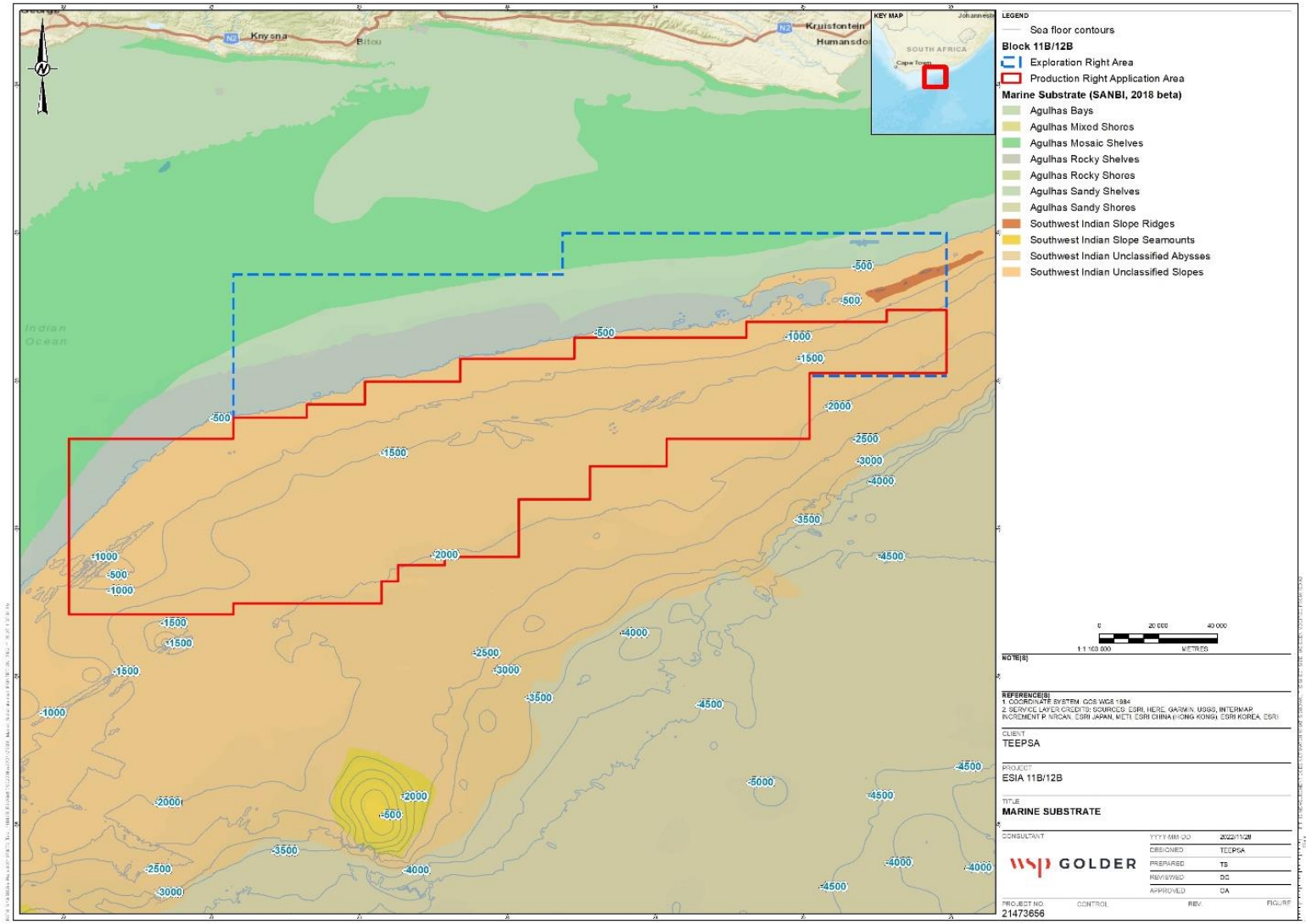


Figure 7-9 - The substrate type in the vicinity of the Production Right Area (indicated by the red polygon) (SANBI 2018).

7.2.4 PHTOPLANKTON AND ZOOPLANKTON

Phytoplankton biomass over the Agulhas Bank is strongly linked to environmental conditions: chlorophyll concentrations vary seasonally, being lowest in winter and summer (<1-2 mg/m^3) and peaking in spring and autumn (2-4 mg/m^3) (Brown 1992). Mean chlorophyll a concentrations also vary with distance from shore, with higher concentrations inshore (<200 m depth) areas (1.46 mg/m^3 in the top 30 m of the water column) compared to areas further offshore (1.00 mg/m^3) (Brown et al. 1991, Brown 1992).

Low phytoplankton biomass in the surface waters of the Agulhas Bank is generally associated with periods of deep winter mixing, or when strong thermoclines are present, which in true results in low nutrient availability (Probyn et al. 1994, Pisces 2019). Under these conditions, surface water phytoplankton communities are generally dominated by large-celled diatoms and dinoflagellates, with an overall phytoplankton productivity of 200-800 mgC/m^2/hr, declining with depth to near zero in bottom waters (Pisces 2019).

While phytoplankton biomass tends to be restricted to a narrow range of surface water (the "chlorophyll maximum"), production can increase chlorophyll maximum, resulting in chlorophyll concentration of >10 mg/m^3 (Carter et al. 1987, Hutchings 1994). Increases in phytoplankton productivity are also linked to coastal upwelling (Probyn et al. 1994). Although seasonal diatom blooms do occur along the South Coast and on the Agulhas Bank, the red tide harmful algal blooms (HABs) characteristic of the Benguela upwelling system are seldom reported east of Cape Agulhas (Pitcher & Calder 2000).

South Coast zooplankton communities have comparatively high species diversity, ranging from 3-6 gC/m^2 (De Decker 1984). The South Coast mesozooplankton calanoid copepod *Calanus aghulensis*, an important food source for pelagic fish stocks (Peterson et al. 1992). As with phytoplankton, mesozooplankton biomass increases from west (~0.51.0 g C/m2) to east (~1.0-2.0 g C/m^2) and peaks on the central and eastern Agulhas Bank during summer in association with the subsurface ridge of cool upwelled water (Pisces 2019). Standing stocks are estimated to be 0.079 gC/m^2 between Cape Agulhas and Cape Recife (Verheye, unpublished data). Macrozooplankton (>1 600 µm) of the area include important food source for pelagic fishes (Cornew et al. 1992, Verheye et al. 1994, Pisces 2019).

7.2.5 SEA TURTLES

The loggerhead turtle *Caretta caretta*, the leatherback turtle *Dermochelys coriacea* and the green turtle *Chelonia mydas* are the three species of turtle found along the South Coast of South Africa (Figure 7-10).

Figure 7-10 - Turtle species of the South Coast of South Africa: the loggerhead turtle *Caretta caretta* (top row), the leatherback turtle *Dermochelys coriacea* (bottom left) and the green turtle *Chelonia mydas* (bottom right). Image source: Wiki Commons (clockwise from top left) Hisgett 2015, Kanda 2006, Coalición Pro CEN 2005, Schulenburg 2012.

Green turtles are non-breeding residents often found feeding on inshore reefs. Leatherback turtles inhabit the deeper waters of the Atlantic Ocean and are considered a pelagic species that travel the ocean currents in search of their prey (primarily jellyfish) and may dive to over 600 m and remain submerged for up to 54 minutes (Hays et al. 2004, Lambardi et al. 2008). They come into coastal bays and estuaries to mate and lay their eggs on the adjacent beaches. Loggerheads tend to keep more inshore, hunting around reefs, bays and rocky estuaries along the African East Coast, where they feed on a variety of benthic fauna including crabs, shrimp, sponges, and fish. In the open sea their diet includes jellyfish, flying fish, and squid.

Green turtles nest mainly along the coast of Mozambique and on both Europa and Tromelin Islands (Lauret-Stepler et al. 2007). Loggerheads and leatherbacks nest along the sandy beaches of the northeast coast of KwaZulu-Natal, South Africa, as well as southern Mozambique during summer months. These loggerhead and leatherback nesting populations are the southern-most in the world (Nel et al. 2013). Even though these populations are smaller (in nesting numbers) than most other populations, they are genetically unique and thus globally important populations in terms of conservation of these species (Dutton et al. 1999, Shamblin et al. 2014).

The mean hatching success for loggerheads (73%) and leatherbacks (76%) on the South African nesting beaches is higher than reported at other nesting sites globally (de Wet 2013). Loggerheads reach sexual maturity at about 36 years of age whereas leatherbacks reach maturity sooner, at ~15 years (Pisces 2019). It has been estimated that only 1-5 hatchlings survive to adulthood (de Wet

2013). These hatchlings are poor swimmers for their first years of life: should they survive predation on their route from their beach nests to the sea, they are swept offshore by coastal rip currents to the Agulhas Current, and drift southwards (Hughes 1974a, b, c). After about ten years, the juvenile loggerheads return to coastal areas to feed on crustaceans, fish and molluscs and subsequently remain in these neritic habitats, while leatherbacks remain in pelagic waters until they become sexually mature and return to coastal regions to breed (Hughes 1974 a, b, c).

Between breeding events (which occur every 2-3 years), loggerhead and leatherback turtles migrate to foraging grounds throughout the South Western Indian Ocean as well as in the eastern Atlantic Ocean. Loggerheads tend to stay inshore and travel north to foraging grounds along the southern Mozambican coastline or cross the Mozambique Channel to forage in the waters off Madagascar **(**Figure 7-11). Leatherbacks tend to move south with the Agulhas Current to forage in deeper waters offshore, with some individuals following the Benguela Current along the west coast of South Africa, as far north as central Angola (de Wet 2013). Both loggerhead and leatherback turtles are likely to be encountered in Block 11B/12B.

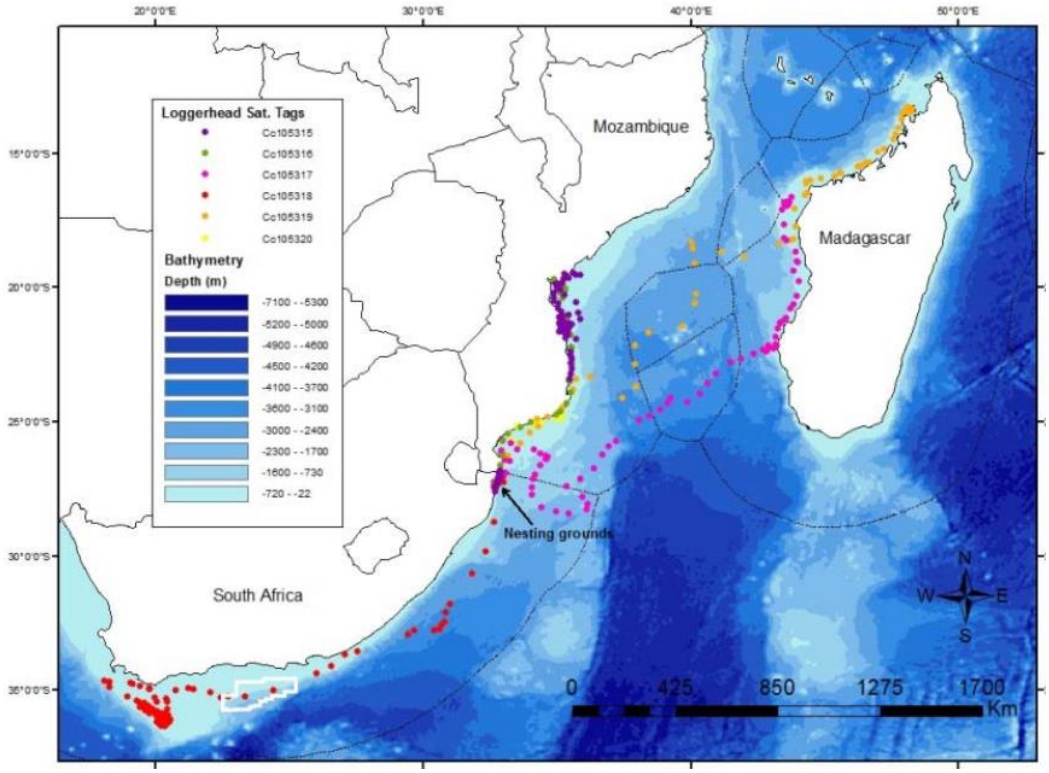


Figure 7-11 - Spatial distribution of satellite tagged loggerhead females (2011/2012; Oceans and Coast, unpublished data) in relation to Block 11B/12B (white polygon) (Pisces 2014).

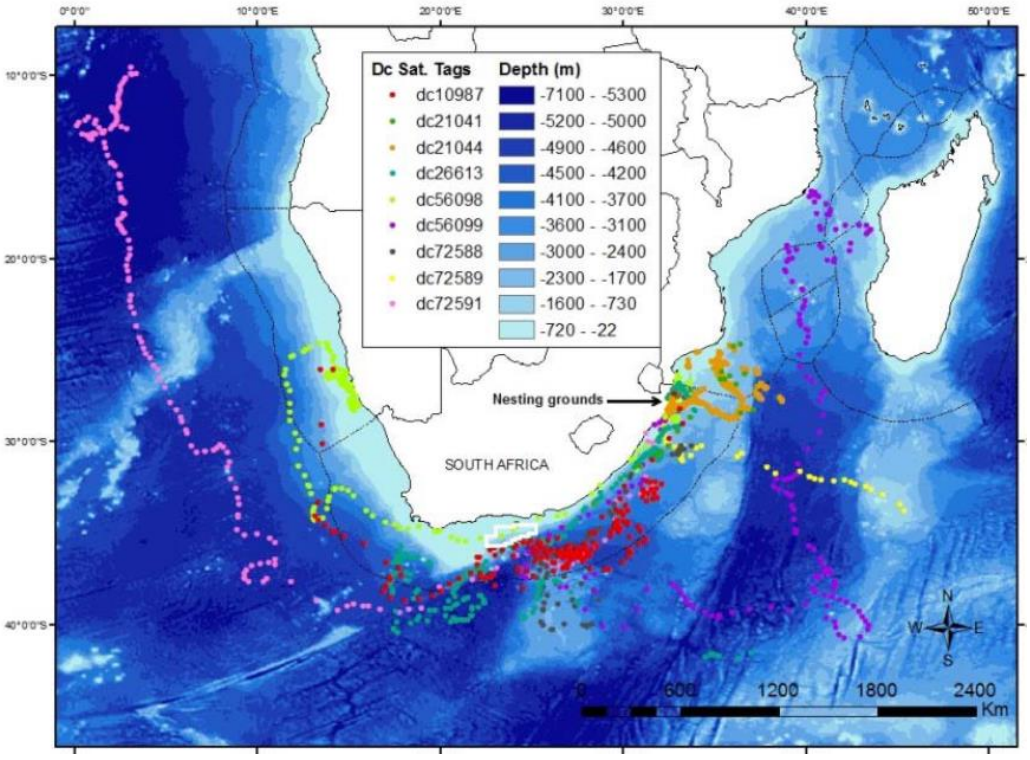


Figure 7-12 - The post-nesting distribution of nine satellite tagged leatherback females (1996 – 2006; Oceans and Coast, unpublished data) in relation to Block 11B/12B (white polygon) (Pisces 2014).

7.2.6 FISH AND SQUID

The South Coast ichthyofauna community is comprised of both temperate and tropical species because the region forms the transition zone between the warm south flowing Agulhas current and the cool upwelling Benguela Current System on the West Coast. This results in a productive system and diverse fish community which is supported by the species rich benthic habitat present in the area.

Small pelagic species of the Agulhas Bank include anchovy *Engraulis encrasicolus*, sardine *Sardinops sagax*, round herring (or redeye) *Etrumeus whiteheadi,* chub mackerel *Scomber* japonicas and horse mackerel *Trachurus capensis* (Pisces 2019). Since 1996, there has been a population shift of the commercially important anchovy and sardine eastward from the west coast to the Eastern Agulhas Bank. Since 1996, 37% of the observed average adult anchovy biomass was in the area to the west of Cape Agulhas since 1996, compared to 64% of average prior to this date (DFFE 2020). While highly variable, the sardine biomass in the area to the west of Cape Agulhas has declined from 71% of the sardine biomass in 2016, to 32% in 2017 and 23% in 2019 (DFFE 2020). Anchovies are most abundant between the cool upwelling ridge and the Agulhas Current i.e., mostly on the inshore edge of Block 11B/12B (Hutching 1994, Pisces 2019).

Horse mackerel are semi-pelagic shoaling fish that occur on the continental shelf off southern Africa and are currently more abundant off the South Coast than the West Coast (DFFE 2020). Round herring juveniles similarly occur inshore along the South Coast but move offshore with age (Roel et al. 1994, Hutchings 1994). Most trawling on the South Coast is undertaken on the wide Agulhas

Bank continental shelf, targeting species such as the demersal cape hakes *Merluccius capensis* and *M. paradoxus* and kingklip *Genypterus capensis* (DFFE 2020).

The area of the Agulhas Bank east of Cape Agulhas between the shelf-edge upwelling and the cold-water ridge (where copepod availability is highest) is a spawning ground for many of the country's commercial important fish stocks (Figure 7-13) (Crawford 1980, Hutchings 1994, Roel & Armstrong 1991, Hutchings et al. 2002, Pisces 2019). While most of the spawned eggs and larvae remain on the Bank, some are carried to the West Coast or out to sea via the Agulhas retroflection (Hutchings 1994, Duncombe Rae et al. 1992, Hutchings et al. 2002, Pisces 2019).

Anchovy spawn between October-January around the 200 m depth contour on the Agulhas Bank between Mossel Bay and Plettenberg Bay, after which the adults move inshore and eastwards. Sardine also spawn on the Agulhas Bank during spring and summer with adults moving eastwards and northwards after spawning (Crawford 1980, Pisces 2019). Sardine recruits are found inshore along the South Coast (Hutchings 1994). Winter (June-July) spawning of sardines on the central Agulhas Bank has also been reported in small areas characterised by high concentrations of phytoplankton (van der Lingen et al. 2006).

Round herring are also reported to spawn along the South Coast, as do the demersal cape hakes and kingklip (Roel & Armstrong 1991, Pisces 2019). Spawning of the shallow-water hake M. capensis occurs primarily over the shelf (<200 m) whereas that by the deep-water hake M. paradoxus occurs off the shelf (Pisces 2019). Kingklip spawn off the shelf edge to the south of St Francis and Nelson Mandela Bay, on the eastern edge of Block 11B/12B (Hutchings 1994, Pisces 2019). Squid (*Loligo* spp.) spawn principally in the inshore waters (<50 m) between Knysna and Gqeberha, with larvae and juveniles spreading westwards.

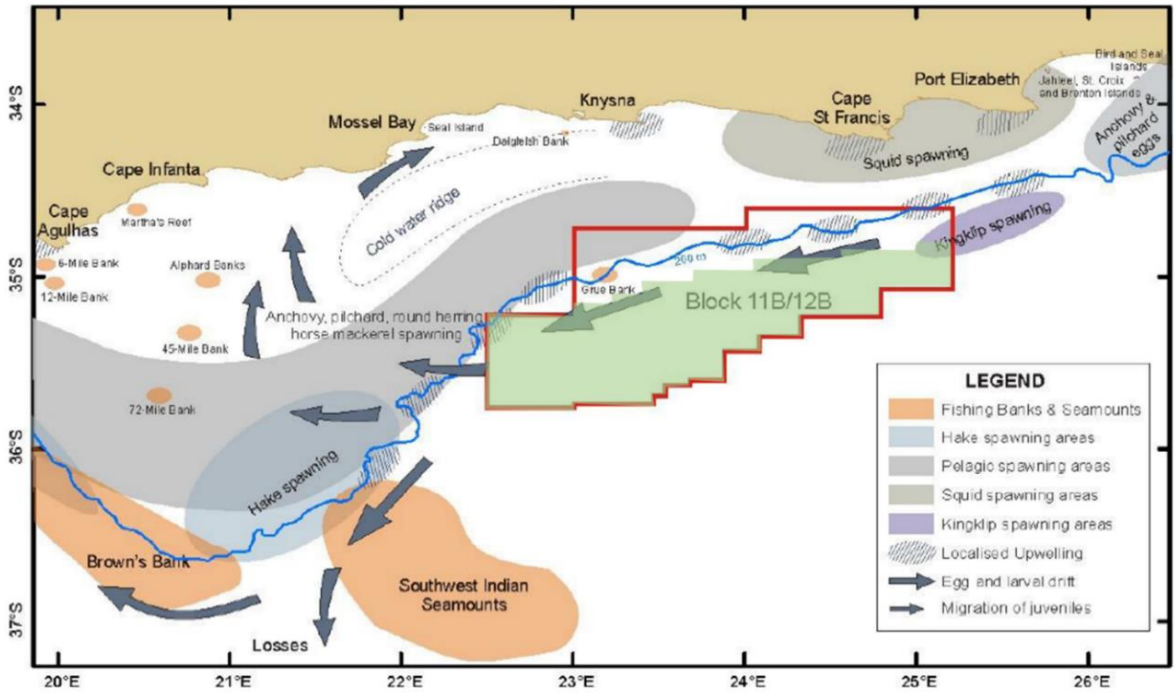


Figure 7-13 - Block 11B/12B (red outline) in relation to important fishing banks, seamounts, pelagic and demersal fish and squid spawning areas. Image sources: Pisces (2019) (after Anders 1975, Crawford et al. 1987, Hutchings 1994).

Table 7-2 - Important large migratory pelagic fish likely to occur in the offshore regions of the South Coast (IUCN 2021, adapted from Pisces 2019).

Common name	Species name	IUCN (2021) Global Conservation Status
Tunas		
Southern Bluefin tuna	*Thunnus maccoyii*	Endangered
Bigeye tuna	*Thunnus obesus*	Vulnerable
Longfin tuna/albacore	*Thunnus alalunga*	Least concern
Yellowfin tuna	*Thunnus albacares*	Least concern
Frigate tuna	*Auxis thazard*	Least concern
Eastern little tuna/Kawakawa	*Euthynnus affinis*	Least concern
Skipjack tuna	*Katsuwonus pelamis*	Least concern
Atlantic bonito/Katonkel	*Sarda sarda*	Least concern
Billfish		
Black marlin	*Istiompax indica*	Data deficient
Blue marlin	*Makaira nigricans*	Vulnerable
Striped marlin	*Kajikia audax*	Near Threatened
Sailfish	*Istiophorus platypterus*	Least concern
Swordfish	*Xiphias gladius*	Least concern
Pelagic Sharks		
Great Hammerhead shark	*Sphyrna mokarran*	Critically Endangered
Smooth Hammerhead shark	*Sphyrna zygaena*	Vulnerable
Pelagic Thresher shark	*Alopias pelagicus*	Endangered
Bigeye Thresher shark	*Alopias superciliosus*	Vulnerable
Common Thresher shark	*Alopias vulpinus*	Vulnerable
Dusky shark	*Carcharhinus obscurus*	Endangered
Great White shark	*Carcharodon carcharias*	Vulnerable
Shortfin Mako shark	*Isurus oxyrinchus*	Endangered
Longfin Mako shark	*Isurus paucus*	Endangered
Whale shark	*Rhincodon typus*	Endangered
Blue shark	*Prionace glauca*	Near Threatened
Oceanic whitetip shark	*Carcharhinus longimanus*	Critically Endangered
Bronze whaler shark	*Carcharhinus brachyurus*	Vulnerable

Large migratory pelagic species are the ichthyofauna most likely to occur offshore in Block 11B/12B, and include various tunas, billfish and sharks (Table 7-2).

The inshore region of the Agulhas Bank is an important nursery area for linefish species such as elf Pomatomus saltatrix, leervis or garrick *Lichia amia*, geelbek *Atractoscion aequidens* and carpenter *Argyrozona argyrozona* (Wallace et al. 1984, Smale et al. 1994, Pisces 2019). Adults undertake spawning migrations northwards along the South Coast between the cool water ridge and the shore, with eggs and larvae from the Kwa-Zulu Natal waters to the north dispersed southwards by the Agulhas Current, and juveniles occurring on the inshore Agulhas Bank (Garratt 1988, Beckley & van Ballegooyen 1992, Pisces 2019). Carpenter, for example, appear to have high reproductive output between central Agulhas Bank and the Tsitsikamma Marine Protected Area (MPA) (Pisces 2019). There are two separate nursery grounds for the species, one off the deep reefs off Cape Agulhas and another near Gqeberha, from where older fish disperse to the west and east (van der Lingen et al. 2006, Pisces 2019).

The coastal spawning grounds for Chokka squid *Loligo reynaudii* are mostly found between Plettenberg Bay and Algoa Bay in waters shallower than 60 m (Jacobs *et al*. 2022a). This cephalopod species is the basis for an important commercial fishery that mostly targets the species on the spawning ground during the spawning season (spring-summer). The egg capsules of this species are deposited directly onto the seafloor and develop optimally at temperatures of 12-20ºC and dissolved oxygen concentrations of >3 ml/l, which makes the Agulhas Bank an optimal area for spawning (Roberts 2005). The extent of the known inshore spawning grounds between Plettenberg Bay and Algoa Bay was estimated at approximately 90 km2 (Sauer et al 1992).

Once they have spawned, surface currents transport some of the paralarvae towards the central Agulhas Bank, which offers rich feeding grounds (Huggett and Richardson, 2000, Roberts, 2005, Jacobs *et al*. 2022b). Both juvenile and adult chokka make use of the wider Agulhas Bank and the Benguela upwelling area (west coast of South Africa) to feed before returning east to spawn (Jacobs *et al*. 2022a). Squid catches are focused primarily close to shore, but some fishing effort does occur in waters at and below the 200 m isobath.

7.2.7 MARINE MAMMALS

Based on historic sightings or strandings records, as well as habitat projections of known species parameters, an estimated 35 species of cetaceans (whales and dolphins) are known to occur (or are likely to occur) in the waters of the South Coast (Findlay et al. 1992, Best 2007, Weir 2011, unpublished records held by Sea Search, Pisces 2014, Pisces 2019) (Table 7-4). One resident species of coastal pinniped is present (the Cape fur seal *Arctocephalus pusillus pusillus*), while vagrant records include southern elephant seal *Mirounga leoninas*, subantarctic fur seal *A. tropicalis*, crabeater *Lobodon carcinophagus* and leopard seals *Hydrurga leptonyx* (David 1989).

While current data is available on species distribution and abundance of cetaceans in Block 11B/12B for two baleen whale species, the humpback whale *Megaptera novaeangliae* and southern right whale *Eubalaena australis*, almost all data is limited to the nearshore continental shelf (Pisces 2019). Indeed, the majority of information available on the seasonality and distribution of large whales offshore (>200 m deep) is based on commercial whaling data from the 1960s (Pisces 2014). Even historical data from commercial whaling activities, or government run cruises between

1975 and 1986, mostly occurred inshore of Block 11B/12B (Findlay et al. 1992, Pisces 2019). Information on abundance, distribution or seasonality of smaller cetaceans (including the beaked whales and dolphins) known to occur in oceanic waters off the shelf south of the Agulhas Bank is particularly poor (Pisces 2019).

Marine mammals can be grouped by their hearing range, with the whales spilt along taxonomic lines (Table 7-3). Mysticetes, or the baleen whales, fall within the so-called "low frequency cetacean" group, with a 7 Hz to 35 kHz, while toothed whales (Odontocetes) are "high frequency cetaceans", with a generalised 150 Hz to 160 kHz (Table 7-3).

Table 7-3 – Marine mammal hearing groups (from Southall et al. 2019) with some South African species examples

Hearing group	Generalised hearing range	Example species
Low-frequency cetaceans	7 Hz to 35 kHz	Baleen whales e.g., southern right whale (*Eubalaena australis*), humpback whale (*Megaptera novaeangliae*), Bryde's whale (*Balaenoptera edeni*)
High-frequency cetaceans	150 Hz to 160 kHz	Dolphins, toothed whales, beaked whales, bottlenose whales e.g., common dolphin (*Delphinus delphis*); dusky dolphin (*Lagenorhynchus obscurus*), killer whale (*Orcinus orca*), Atlantic bottlenose dolphin (*Tursiops truncatus*), short-finned pilot whale (*Globicephala macrorhynchus*)
Very high-frequency cetaceans	275 Hz to 160 kHz	True porpoises (None in South Africa)
Phocid carnivores in water	50 Hz to 86 kHz	True seals e.g., southern elephant seal (*Mirounga leonina*), leopard seal (*Hydrurga leptonyx*)
Otariid and other carnivores in water	60 Hz to 39 kHz	Cape fur seals (*Arctocephalus pusillus*), Cape clawless otter (*Aonyx capensis*)

Table 7-4 - Cetacean occurrence off the South Coast of South Africa, their distribution, seasonality, and IUCN Red List conservation status (adapted from Pisces 2019).

Common name	Species name	Distribution		Seasonality (presence in the area)	Global IUCN (2021) Conservation Status
		Shelf (<200 m)	Offshore (>200 m)		
Delphinids					
Dusky dolphin	*Lagenorhynchus obscurus*	Yes (0-800 m)	No	Year round	Least Concern
Heaviside'	*Cephalorhynchus heavisidii*	Yes (0-200 m)	No	Year round	Near Threatened
Common bottlenose dolphin	*Tursiops truncatus*	Yes	Yes	Year round	Least Concern
Common dolphin	*Delphinus delphis*	Yes	Yes	Year round	Least Concern
Indo-Pacific bottlenose dolphin	*Tursiops aduncus*	Yes	No	Year round	Near Threatened
Southern right whale dolphin	*Lissodelphis peronii*	Yes	Yes	Year round	Least Concern
Striped dolphin	*Stenella coeruleoalba*	No	Data deficient		Least Concern
Indian Ocean humpback dolphin	*Sousa plumbea*	Yes	No	Year round	Endangered
Pantropical spotted dolphin	*Stenella attenuata*	Yes (edge)	Yes	Year round	Least Concern
Risso's d	*Grampus griseus*	Yes (edge)	Yes	Data deficient	Least Concern

Common name	Species name	Distribution		Seasonality (presence in the area)	Global IUCN (2021) Conservation Status
		Shelf (<200 m)	Offshore (>200 m)		
Long-finned pilot whale	*Globicephala melas*	Yes (edge)	Yes	Year round	Least Concern
Short-finned pilot whale	*Globicephala macrorhynchus*	Data deficient			Least Concern
Rough-toothed dolphin	*Steno bredanensis*	Data deficient			Least Concern
Killer whale	*Orcinus orca*	Yes (occasional)	Yes	Year round	Data deficient
False killer whale	*Pseudorca crassidens*	Yes (occasional)	Yes	Year round	Near Threatened
Pygmy killer whale	*Feresa attenuata*	Data deficient			Least concern
Sperm whales					
Pygmy sperm whale	*Kogia breviceps*	Yes (edge)	Yes	Year round	Least Concern
Dwarf sperm whale	*Kogia sima*	Yes (edge)	Data deficient		Least Concern
Sperm whale	*Physeter macrocephalus*	Yes (edge)	Yes	Year round	Vulnerable
Beaked whales					
Cuvier's beaked whale	*Ziphius cavirostris*	No	Yes	Year round	Least Concern
Baird's Beaked Whale	*Berardius bairdii*	No	Yes	Year round	Least Concern
Southern bottlenose beaked whale	*Hyperoodon planifrons*	No	Yes	Year round	Least Concern

Common name	Species name	Distribution		Seasonality (presence in the area)	Global IUCN (2021) Conservation Status
		Shelf (<200 m)	Offshore (>200 m)		
Hector's beaked whale	*Mesoplodon hectori*	No	Yes	Year round	Data Deficient
Strap-toothed Whale	*Mesoplodon layardii*	No	Yes	Year round	Least Concern
True's beaked whale	*Mesoplodon mirus*	No	Yes	Year round	Least Concern
Gray's beaked whale	*Mesoplodon grayi*	No	Yes	Year round	Least Concern
Blainville's beaked whale	*Mesoplodon densirostris*	No	Yes	Year round	Least Concern
Baleen whales					
Antarctic Minke	*Balaenoptera bonaerensis*	Yes	Yes	>Winter	Near Threatened
Common minke	*Balaenoptera acutorostrata*	Yes	Yes	Year round	Least Concern
Fin whale	*Balaenoptera physalus*	Yes	Yes	MJJ & ON	Vulnerable
Blue whale (Antarctic)	*Balaenoptera musculus sp. intermedia*	No	Yes	Winter peak	Critically Endangered
Sei whale	*Balaenoptera borealis*	Yes	Yes	MJ & ASO	Endangered
Bryde's (	*Balaenoptera brydei* (subspp)	Yes	Yes	Year round	Vulnerable
Pygmy right	*Caperea marginata*	Yes	Data deficient	Year round	Least Concern
Humpback sp.	*Megaptera novaeangliae*	Yes	Yes	Year round, SONDJF	Least Concern

Common name	Species name	Distribution		Seasonality (presence in the area)	Global IUCN (2021) Conservation Status
		Shelf (<200 m)	Offshore (>200 m)		
Humpback B2 population		Yes	Yes	Summer peak ONDJF	Vulnerable
Southern Right	*Eubalaena australis*	Yes	No	Year round, SONDJF	Least Concern

Information that is available, however, suggests that the species most likely to be encountered in Block 11B/12B are humpback whales and southern right whales (as the most abundant baleen whales off the coast of South Africa), common bottlenose dolphins, common dolphins, long-finned pilot whales and sperm whales (Pisces 2019).

Southern right whales migrate to the southern Africa to breed and calve and arrive between June and November each year. They exhibit an extremely coastal distribution mainly in sheltered bays (90% <2 km from shore, see Best 1990, Elwen & Best 2004). The most significant concentration of these whales currently occurs on the South Coast between Cape Town and Gqeberha (Pisces 2019). However, the southern African population historically extended from southern Mozambique (Maputo Bay) to southern Angola (Baie dos Tigres) (Roux et al. 2011). As the southern right population recovers from commercial whaling activities, their range is expanding from its contacted distribution on the south coast of South Africa back to these historic grounds (Banks et al. 2011, Roux et al. 2001).

The majority of humpback whales on the south and east coasts of South Africa are migrating past southern African to the waters off Mozambique, Madagascar, Kenya and Tanzania (Pisces 2019). Most humpbacks reach southern African waters around April, continuing through to September/October when the southern migration begins and continues through to December. The calving season for humpbacks extends from July to October, peaking in early August (Best 2007). Off Cape Vidal, whale abundances peak around June/July on their northward migration (although some have been observed still moving north as late as October). Southward moving animals on their return migration are generally first seen in July, peaking in August and continuing to late October (Findlay & Best 1996a,b).

Two species of bottlenose dolphins occur around southern Africa. the smaller Indo-Pacific Bottlenose dolphin occurs exclusively to the east of Cape Point in water usually less than 50 m deep and generally within 1 km of the shore, while the larger common bottlenose dolphin generally further offshore around the shelf edge and pelagic waters on the south coast (Pisces 2019). Their distribution is essentially continuous from Cape Agulhas eastwards to southern Mozambique. There are also seasonal movements Indo-Pacific bottlenose dolphins along the South run' (Natoli et al. 2008).

Long-finned pilot whales display a preference for temperate waters and are usually associated with the continental shelf or adjacent deep water (Mate et al. 2005, Weir 2011). The distinction between long-finned and short finned pilot whales is difficult to make at sea. As the latter are regarded as more tropical species, it is likely that the vast majority of pilot whales encountered in Block 11B/12B will be long-finned (Best 2007). However, due to the influence of the Agulhas Current in the area, the occurrence of short-finned pilot whales cannot be excluded.

Sperm whales are the largest of the toothed whales and have a complex, well-structured social system. They live in deep ocean waters usually >1 000 m, but occasionally come inshore on the shelf into depths of 500-200 m (Best 2007). Seasonality of catches off the East Coast suggest that medium- and large-sized males are more abundant during winter (June to August), while female groups are more abundant in summer (December-February), although animals occur year-round (Best 2007). Although considered relatively abundant worldwide, no current data are available on density or abundance of sperm whales in African waters (Whitehead 2002).

The Cape fur seal Arctocephalus *pusillus pusillus* is the only species of seal resident along the South Coast, occurring at numerous breeding and non-breeding sites on the mainland, namely at Seal Island in Mossel Bay (population of about 4 000 individuals), on the northern shore of the Robberg Peninsula in Plettenberg Bay (5 000) and at Black Rocks (Bird Island group) in Nelson Mandela Bay (Pisces 2019). These colonies all fall well inshore of the Block 11B/12B. Seals are highly mobile animals with a general foraging area covering the continental shelf up to 120 nautical miles offshore (Shaughnessy 1979). While the movement of seals from the three South Coast colonies are poorly known, limited tracking of the Nelson Mandela Bay colony has suggested these seals generally feed in the inshore region south of Cape Recife (Pisces 2019). The Cape fur seal population in South Africa is regularly monitored by the Department of Environment, Forestry and Fisheries (DFFE), and the overall population is considered healthy and stable in size, although there has been a westward and northward shift in the distribution of the breeding population (Kirkman et al. 2013).

7.2.8 BIRDS

Some 60 seabird species have been recorded or are considered likely to occur on the South Coast of South Africa. These include resident species that breed along the coast (including the African Penguin *Spheniscus demersus* and Cape Gannet *Morus capensis*, both of which are listed as Endangered by thew IUCN), migratory species that visit the coast to overwinter, breed and feed (like Damara Tern *Sternula balaenarum*), as well as rare vagrants, which are species that stray outside their expected breeding, wintering or migrating range (Liversidge & Le Gras 1981, Ryan & Rose 1989).

Fifteen species breed within the South Coast region. These include the African Penguin *S. demersus* and Cape Gannet *M. capensis*, a number of cormorant species including the Endangered Cape Cormorant *Phalacrocorax capensis* and White-breasted Cormorant *P. lucidus*, and a number of tern species (the Roseate Tern *Sterna dougallii*, Damara Tern *S. balaenarum*, Swift Tern *Thalasseus bergii*) as well as the Kelp gull *Larus dominicanus vetula*. These species all breed on the coast or islands — Damara Terns breed inshore between Cape Agulhas and Cape Infanta, a breeding colony of Cape Cormorant is established on Robberg Peninsula, while Kelp gulls breed in high numbers on the Keurbooms River estuary spit (Marnewick *et al*. 2015, Witteveen 2015). There are African Penguin colonies along the South Coast at Dyer Island, east of Cape Agulhas, Cape Recife, and on the Algoa Bay islands (St Croix Island, Jaheel Island, Bird Island, Seal Island, Stag Island and Brenton Rocks), with a new colony established in the De Hoop Reserve east of Cape Agulhas (van der Lingen *et al*. 2006, Pieces 2019). Several species breed on the beaches between Plettenberg Bay and the eastern boundary of the Tsitsikamma Section of the Garden Route National Park, such as the Caspian Tern *Hydroprogne caspia*, African Black Oystercatcher *Haematopus moquini* and White-fronted Plover *Charadrius marginatus* (Pisces 2019).

The seabird colonies, as well as the migratory and vagrant seabird visitors, are mostly supported by an abundance of small pelagic fish species (see Section 7.2.4) within the productive waters of the Agulhas Bank. Most of the breeding resident seabird species feed on fish (with the exception of the gulls, which scavenge, and feed on molluscs and crustaceans). Feeding strategies include surface plunging (gannets and terns), pursuit diving (cormorants and penguins), and scavenging and surface seizing (gulls) (Pisces 2019). All these species feed relatively close inshore, although

gannets and kelp gulls may feed further offshore (Pieces 2019). For example, the majority of Algoa Bay penguins forage to the south of Cape Recife mostly within 20 km of the coast (although they have been recorded as far as 60 km offshore), following pelagic shoaling fish species such as anchovy, round herring, horse mackerel and pilchard which occur within the 200 m isobath (i.e., <200 m depth) (Pichegru et al. 2017, Pisces 2019). This distribution pattern is similar for most of the other foraging seabirds, which prey on the same small pelagics resource (up to 40 km from the coast), although Cape Gannets regularly feeds as far offshore as 100 km and Cape Cormorants have been reported up to 80 km from their colonies (Pisces 2019).

7.2.9 RED LIST SPECIES

As per the International Union for the Conservation of Nature (IUCN) Red listing, leatherback and loggerhead **turtles** are both described as "Vulnerable", and global scale (IUCN 2021). As a signatory of Convention on Migratory Species (CMS), South Africa has endorsed and signed two sister agreements specific to the conservation and management of sea turtles (these are the Africa-Atlantic and Indian Ocean South East Asia Memoranda of Understanding). South Africa, as a nation, is therefore committed to the protection of all species of sea turtles occupying its national waters, whether they are non-resident nesters (loggerhead and leatherback turtles) or resident foragers (green turtles) (Pisces 2014).

Numerous seabird species have shown a steady deterioration in status around the world and South Africa (Butchart et al. 2004, Crawford et al. 2018, Sherley et al. 2019). This is reflected in the upgrading of some species to the IUCN Endangered list, including the African penguin (upgraded from Vulnerable to Endangered in 2010), the Cape Gannet (upgraded from Vulnerable to Endangered in 2010), and the Cape Cormorant (upgraded from Near Threatened to Endangered in 2013). These declines have not been equal across space in South Africa, with the bulk of declines occurring at West Coast colonies. For example, the Eastern Cape African penguin population (specifically Algoa Bay) has declined at a slower rate than elsewhere in South Africa, the area has become increasingly important in terms of its relative contribution to the global population (Sherley et al. 2020). In a similar way, the Cape Gannet colony at Bird Island/Algoa Bay grew from ~22 000 pairs in 1956/57 to ~95 000 pairs in 2004/05 and subsequently plateaued, with >70% of all Cape Gannets (i.e., the global population) now nesting at Bird Island/Algoa Bay, at the eastern extremity of their breeding distribution (Sherley et al. 2019).

Of the 35 **cetacean** species listed as present/likely to occur in South Coast waters, the blue whale is listed as 'Critically Endangered', th are considered whale "Endangered", while fin, B population) and sperm whales are), Hump considered 'Vulnerable' (IUCN 2021). Although l book, the Indo-Pacific bottlenose dolphin is listed as 'Vulnerable' in the Sou Book, while the migratory subpopulation is consi 2004).

Many of the large **pelagic fish** species likely to be encountered are considered threatened by the IUCN, primarily due to overfishing. Tuna and swordfish are targeted by high seas fishing fleets and illegal overfishing has severely damaged the stocks of many of these species. Globally, the Southern Bluefin tuna is considered marin Endangered' 'Vulnerable' and Striped marlin is 'Near Threate

Of the eleven **shark** species likely to occur in Block 11B/12 IUCN Red List (the Pelagic Thresher shark, Dusky shark and Whale shark as well as the Shortfin and Longfin Mako shark), while the Great Hammerh (IUCN 2021). The great white shark Carcharodon carcharias is a significant apex predator in the Nelson Mandela Bay area, and while listed as 'Vulnerable' by the IUCN (2 the Convention on International Trade in Endangered Species (CITES) Appendix II as a species in which trade must be controlled in order to avoid utilization incompatible with their survival and has been a protected species in South Africa since 1991 (Pisces 2019). The bronze whaler shark is also listed as 'Vulnerable' by the IUCN.

7.2.10 PROTECTED AREAS/CRITICAL BIODIVERSITY AREAS

A Marine Protected Area (MPA) is an area of ocean and/or coastline specifically protected for the benefit of people and the environment. It is stated in the Protected Areas Act (Act No. 57 of 2003) that "no person may conduct mining, exploration, production or related activities in a protected environment without the written permission of the Minister and the Cabinet member responsible for minerals and energy affai from human induced impacts for marine species and ecosystems. Prior to 2019, South Africa had 25 formally declared MPAs which covered a total ocean territory (not including the Prince Edward Island in the Southern Ocean). In May 2019, the government formally gazetted the addition of 20 new or expanded MPAs (identified through Operation Phakisa), thereby increasing the total number of MPAs to 41 and the protected area of South Africa's Exclusive Economic Zone (EEZ) to These areas provide some protection to 87% of the different marine ecosystem types found in South African waters, ensuring that the MPA network is (SANBI 2019). Included in this was the addition of a number of new offshore MPAs, the purpose of which is to help ensure the sustainability of food and job security provided by fisheries, by securing the spawning grounds of numerous marine species as well as protecting vulnerable and unique habitats.

The seabed communities in Block 11B/12B are known to exhibit high levels of endemism, and as such, the coastal area in the vicinity of Mossel Bay has been recognised as one of seven areas in the biozone in need of additional protection which has been granted in the form of these offshore MPA designations. Offshore MPAs in close proximity to Block 11B/12B include the Southwest Indian Seamounts Marine Protected Area MPA (Notice No. 42478) to the southwest of the block, and the Port Elizabeth Corals MPA (Notice No. 42478) to the northeast

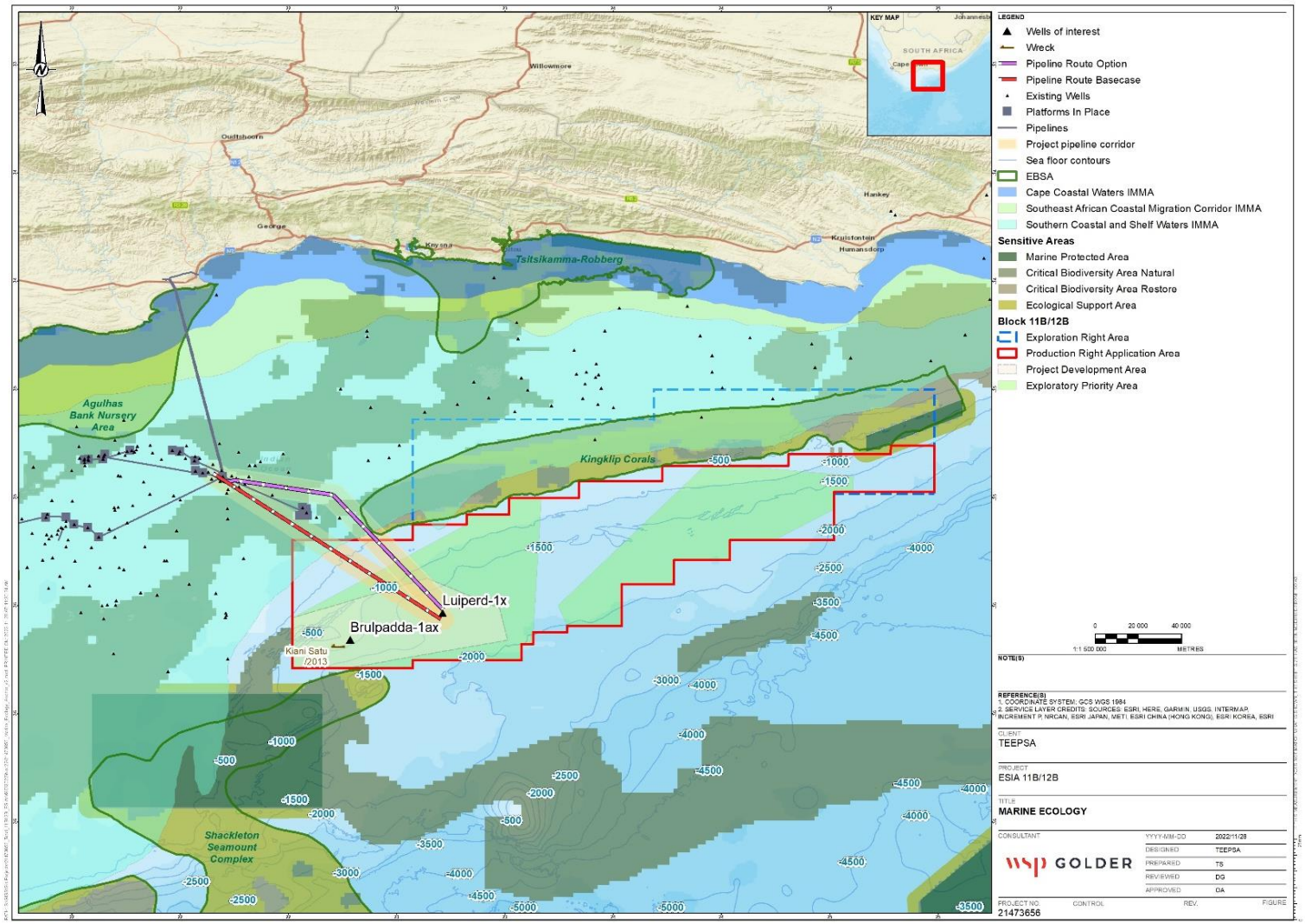


Figure 7-14 - Designated Marine Protected Areas (MPAs) EBSAs and CBAs in the area surrounding Block 11B/12B.

As part of a regional Marine Spatial Management and Governance Programme (MARISMA 2014-2020) the Benguela Current Commission and its member states have identified a number of Ecologically or Biologically Significant Areas (EBSAs) both spanning the border between Namibia and South Africa and along the South African coast, with the intention of implementing improved conservation and protection measures within these sites (Pisces, 2019). South Africa currently has 11 EBSAs solely within its national jurisdiction with a further four having recently been proposed. It also shares five trans-boundary EBSAs with Namibia (3) and Mozambique (2). The principal objective of these EBSAs is identification of features of higher ecological value that may require enhanced conservation and management measures. No specific management actions have been formulated for the various areas at this stage. The northern border of Block 11B/12B falls alongside the full extent of Area 1 and lies just to the north east of the Shackleton EBSA Seamount Complex EBSA. The proposed pipeline routing passes through the southwestern corner of the Kingklip Corals EBSA.

The proposed pipeline routing passes through a Critical Biodiversity Area (CBA) (Figure 7-14). CBA assessment presents a spatial plan for the natural environment, designed to inform planning and decision-making in support of sustainable development, and CBA maps are developed using the principles of systematic biodiversity planning. These maps comprise three categories of biodiversity priority areas, namely Protected Areas, CBAs and Ecological Support Areas (ESAs), which are jointly important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning and connectivity of the landscape or seascape as a whole. There are two categories of CBAs: 'CBA Natural' and 'CBA Restore' areas. CBA Natural areas are in a natural ecological condition, with the management objective of maintaining the sites in that natural/near-natural state; and CBA Restore sites have moderately modified or poorer ecological condition, with the management objective to improve ecological condition and, in the long term, restore these sites to a natural/near-natural state, or as close to that state as possible. As a minimum in CBA Restore sites, further deterioration in ecological condition must be avoided, and options for future restoration must be maintained. The ESAs include all portions of EBSAs that are not already within MPAs or CBAs, and a 5 km buffer area around all MPAs (where these areas are not already CBAs or ESAs). Within ESAs, negative impacts of human activities on key biodiversity features are managed and minimised to maintain the features in at least a functional, semi-natural state and/or to allow the area to improve in ecological condition.

The proposed pipeline routing passes through a CBA Natural area (Figure 7-14). The Impact Management zones of EBSAs and the CBAs and ESA areas are encouraged to be managed by place-based regulations, informed by the reasons for their classification. A range of sea-use activities and recommendations as to their permissibility subject to compatibility with different Critical Biodiversity Areas is presented in Figure 7-14 (from Harris *et al*. 2022). Activities that were assessed as being compatible with the management objectives of CBAs and EBSAs are recommended to be permitted in those areas according to the existing rules and regulations for that activity; activities that are not compatible are recommended to be prohibited.

In this case, as of April 2022, according to Harris *et al*. (2022), the development of the subsea pipelines associated with oil and gas processes are considered non-compatible within the CBA Natural area (as per Figure 7-15). The environmentally preferable option is to reroute the pipeline to avoid CBA areas. However, given that avoidance may not be feasible, it is recommended that the

substrate of these CBA Natural areas within the proposed pipeline routing be assessed, and sensitive and/or significant areas, communities or species identified. While the likely direct impacts on the substrate as a result of pipeline construction are expected to be short-term, and of low impact (due to the sufficient adjacent habitat to allow for rapid recolonisation), operational impacts related to oil spills are considered of critical concern. As such, it is considered essential that a comprehensive oil spill risk assessment be undertaken and that a proactive and adaptive management plan be implemented to manage and mitigate the potential risks.

Broad sea use	Associated MSP Zones	Associated sea-use activities	MPA	CBA-N	CBA-R	ESA
Conservation	Biodiversity Zones	Expansion of place-based conservation measures (e.g., MPA expansion)	Sea-use activities as per gazetted MPA regulations	Y	Y	Y
Recreation and tourism	Marine Tourism Zone	Beach recreation, non-motorised water sports		Y	Y	Y
		Ecotourism (e.g., shark cage diving, whale watching)		Y	Y	Y
		SCUBA diving		Y	Y	Y
		Motorised water sports (e.g., jet skis)		R	R	Y
		Recreational fishing (e.g., shore-based, boat-based and spearfishing)		N	R	Y
		Shark control: exclusion nets		Y	Y	Y
		Shark control: drumlines and gillnets		N	R	Y
Heritage	Heritage Conservation Zone	Protection of sites of heritage importance, including historical shipwrecks		Y	Y	Y
		Protection of sites of seascape value		Y	Y	Y
Fisheries	Commercial and Small-Scale Fishing Zones	Abalone harvesting		R	R	Y
		Linefishing		N	R	R
		Demersal shark longlining		N	R	Y
		Demersal hake longlining		N	R	R
		Midwater trawling		N	R	Y
		Pelagic longlining		R	R	Y
		Small pelagics fishing		N	R	Y
		South coast rock lobster harvesting		R	R	Y
		Squid harvesting		R	R	Y
		Tuna pole fishing		R	R	Y
		West coast rock lobster harvesting		R	R	Y
		Crustacean trawling		N	N	R
		Demersal hake trawling (inshore and offshore)		N	R	R
		Hake handlining		R	R	Y
		Seaweed harvesting		R	R	Y
		Commercial white mussel harvesting		R	R	Y
		Beach seining		R	R	Y
		Gillnetting		R	R	Y
		Kelp harvesting		R	R	Y
		Oyster harvesting		R	R	Y
		Small-scale fishing		R	R	Y
	Fisheries Resource Protection Zone	Resource protection		Y	Y	Y
Aquaculture	Aquaculture Zone	Sea-based aquaculture		N	R	R
Mining	Mining Zone	Mining: prospecting (non-destructive)		R	R	R
		Mining: prospecting (destructive, e.g., bulk sampling)		N	N	R
		Mining: mining construction and operations[1]		N	N	R
Petroleum	Petroleum Zone	Petroleum: exploration (non-invasive)		R	R	R
		Petroleum: exploration (invasive, e.g., exploration wells)		R	R	R
		Petroleum: production[1,2]		N	N	R
		Petroleum: oil and gas pipelines		N	N	R
Renewable Energy	Renewable Energy Zone	Renewable energy installations		N	R	R
Defence	Military Zone	Military training and practice areas		R	R	Y
		Missile testing grounds		R	R	Y
Transport	Maritime Transport Zone	Designated shipping lanes (including port approach zones)		R	R	Y
		Anchorage areas		R	R	Y
		Bunkering		N	N	R
		Ports and harbours (new)		N	N	R
		Dumping of dredged material		N	N	R
Infrastructure	Underwater Infrastructure Zone	Pipelines (excluding oil and gas)		N	R	Y
		Undersea cables (new installations)		N	R	Y
	Land-based Infrastructure Zone	Coastal development (new installations, including piers, breakwaters, and seawalls)[3]		N	N	R
Abstraction and Disposal	Disposal Zone	Waste-water (new installations)		N	R	Y
	Sea-water abstraction and disposal	Sea-water abstraction and disposal (e.g., desalination)		R	R	Y
		Sea-water abstraction and disposal (e.g., aquaculture disposal)		N	R	Y

[1] The activity should not be permitted to occur in CBAs because it is not compatible with the respective management objectives. However, if significant mineral or petroleum resources are identified during prospecting/exploration, then the selection of the site as a CBA could be re-evaluated as part of compromises negotiations in current or future MSP processes. This would require alternative CBAs and/or biodiversity offsets to be identified. However, if it is not possible to identify alternative CBAs to meet targets for the same biodiversity features that are found at the site, it is recommended that the activity remains prohibited.

[2] The recommended prohibition of the activity in CBAs (because it is not compatible with the management objective) refers to the location of the biodiversity disturbance rather than the location of the petroleum resource. If petroleum production is possible using lateral drilling or other techniques that do not result in any impacts on biodiversity within the CBAs, then production may be treated as an activity with restricted compatibility (i.e., recommended to be a consent activity).

[3] New coastal development should not be permitted in CBA Restore sites unless it is part of rehabilitation and restoration activities to improve ecological condition.

Figure 7-15 –List of all sea use activities grouped by their broad sea use and Marine Spatial Planning (MSP) Zones, and assessed according to their compatibility with the management objective of Critical Biodiversity Areas (CBA-N = CBA Natural; CBA-R = CBA Restore) and Ecological Support Areas (ESA). Activity compatibility is given as Y = yes, compatible, R = restricted compatibility, or N = not compatible. (Source: Harris et al. 2022).

Important Marine Mammal Areas (IMMA) are a marine spatial planning tool formulated by the joint International Union for Conservation of Nature (IUCN) Species Survival Commission/World Commission on Protected Areas, Marine Mammal Protected Areas Task Force (MMPATF). The areas considered as IMMAs include sites that host vulnerable species or a significant percentage of the members of a species, sites that are important for reproduction or feeding, and sites that are home to a wide variety of species. In South Africa, three IMMAs have been identified: the Cape Coastal Waters IMMA, Southern Coastal and Shelf Waters IMMA and the Southeast African Coastal Migration Corridor IMMA (Figure 35) (Purdon et al. 2020). The north western corner of Block 11B/12B intersects the Southern Coastal and Shelf Waters IMMA.

All whales and dolphins are given protection under the South African Law. The Marine Living Resources Act, 1998 (No. 18 of 1998) states that no whales or dolphins may be harassed, killed or fished (in the Regulations for the management of boat-based whale watching and protection of turtles as part of the Marine Living Resources A "behaviour or conduct that threatens, dvironmental b c Management: Biodiversity Act (NEM: BA, Act 10 of 2004) and regulations promulgated hereunder (Threatened or Protected Marine Species Regulations, Government Notice No. 40876 published 30 May 2017) provide for control of activities involving listed threatened or protected marine species, which includes numerous whale species that are potentially present in the Block 11B/12B. In term of these regulations, no person may carry out a defined as behaviour or conduct that "threatens, disturb threatened or protected marine species, and includes— … (b) in the case of a whale with a vessel or aircraft closer than 300 has exempted him/her from carrying out of such restricted activity in terms of section 57(4) of the Act.

Whilst they do not directly intersect with the Production Right Area, sensitive and significant coastal areas of biodiversity importance will be discussed here, given that potential far-field impacts and unplanned events (such as oil spills) may affect these areas. For example, there are a number of Ramsar sites along the South Coast adjacent to the 11b/12b Production Right Area. A Ramsar site is a wetland site designated to be of international importance under the under the Ramsar Convention on Wetlands of International Importance, to which South Africa is a signatory. These Ramsar sites include De Hoop (~160 km from the Production Right Area, ~130 km from the proposed pipe routing), De Mond (~220 km from the Production Right Area, ~200 km from the proposed pipe routing), and Wilderness Lankes (~130 km from the Production Right Area, ~106 km from the proposed pipe routing). Both these Ramsar sites are important wintering, staging and feeding areas for several species of breeding birds and locally migrant waterbirds.

7.3 SOCIO-ECONOMIC ENVIRONMENT

Exploration and production activities will mainly be offshore (Block 11B/12B) between the landmarks of Mossel Bay in the Western Cape Province and Cape St Francis in the Eastern Cape Province. Therefore, the description of the Socio-Economic Environment in the ESIA will focus on the sea and coastal users.

In the project area, potential sea and coastal uses and anthropic presence include:

- Small scale/artisanal fisheries;
- Industrial fisheries;

Maritime navigation;
Tourism and recreational activities;
Submarine cables;
Shipwrecks; and
Cultural, religious, spiritual and heritage reliance on the sea.

At this time, information on the socio-economic environment focuses primarily on the Mossel Bay Local Municipality, where onshore activities will be conducted during the production phase and where the port is located. This port will be a base for loading and unloading vessels, storing equipment, and providing supplies for drilling rig operations and crew changes.

Mossel Bay Local Municipality is also the closest coastal community to the offshore project area.

This section provides a brief synopsis of the socio-economic baseline for the Mossel Bay Local Municipality (MBLM) including socio economic data on its community. Considering that the MBLM falls within the Garden Route District Municipality (GRDM), this section will provide a synopsis of the socio-economic baseline of the MBLM.

The study focuses primarily on the Mossel Bay Local Municipality, where onshore activities will be conducted during the production phase and where the port is located. This port will be a base for loading and unloading vessels, storing equipment, and providing supplies for drilling rig operations and crew changes. The study area extends along the coastline to both east and west of Mossel Bay town within the municipal area. Exploration and production activities will mainly be offshore (Block 11B/12B) between the landmarks of Mossel Bay in the Western Cape Province and Cape St Francis in the Eastern Cape Province.

This section provides a brief synopsis of the socio-economic baseline for the Mossel Bay Local Municipality (MBLM).

7.3.1 MOSSEL BAY LOCAL MUNICIPALITY SOCIO-ECONOMIC BASELINE

The local context will focus on Mossel Bay, where the port is located. The port and main tourist attractions can be found in Ward 8.

Location

The MBLM is situated within the Garden Route District in the Western Cape Province. Oudtshoorn borders the municipality to the north, George to the east, and Langeberg to the west. Mossel Bay town is located approximately halfway between Cape Town and Gqeberha, some 50 km east of Albertina and 56 km west of George. Mossel Bay is close to the N2 (MapQuest, 2021; Mossel Bay Local Municipality, 2020, 2021; Mossel Bay Municipality GIS Viewer, 2021). Please refer to Figure 7-16 for the location of Mossel Bay and Figure 7-17 for the context of the MBLM. Mossel Bay has a geographical area of 2,001 km².

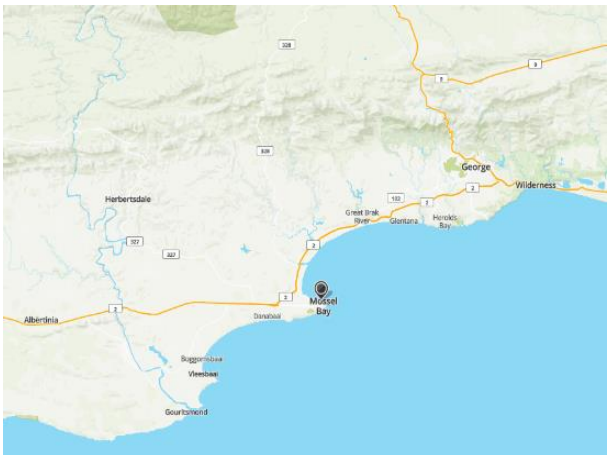


Figure 7-16 - Location of Mossel Bay

Figure 7-17 - Contextual map of the MBLM

Mossel Bay institutional context

The MBLM is a Category B municipality. The MBLM forms part of the GRDM in the Western Cape. The executive functions are delegated to the Executive Mayor and the Mayoral Committee, which assists the Executive Mayor in fulfilling the day-to-day decision-making and operational oversight role.

The financial state of Mossel Bay Local Municipality

The MBLM has been rated as low risk. The MBLM received an unqualified audit for 2018 and an unqualified audit opinion, with one finding for 2019. The MBLM is well-placed to meet its short-term commitments. The MBLM was liquid in 2020 with a liquidity ratio of 2.30. The municipality had a liquidity surplus of R4,133,514. The MBLM had assets of R703,439,502 as of 30 June 2020, compared to liabilities of R276,242,945.

Household income

The average 2018 monthly household income in the MBLM was R18,107, compared to the R17,613 of the GRDM. In 2016, low-income households earned less than R42,000 per year. The same is true of 24.6 % of households in the municipality. Of the low-income households, 17.4 % had no income. Necessities are expensive or unaffordable to these households. Housing is likely rented or even free (at times informal). Middle-income households earned earning between R42,001 and R360,000 per year. The middle-income households amounted to 59.22 % of households). These households will essentially be able to afford most necessities, products, and services. However, low-end middle-income households would experience many products and services as expensive or unaffordable. High-income households earned more than R360,001 yearly. The same applies to 16.22 % of local households. (Mossel Bay Local Municipality, 2017, 2021; Western Cape Government Provincial Treasury, 2020).

Poverty and inequality

The 2016 poverty rate showed that people living in poverty in the Mossel Bay municipal area fell from 3.2 % cent of the population in 2011 to 2.1 %. The poor below the poverty line decreased from 43,5 % (2011) to 43 % (2016). However, the demonstrated poverty intensity is still too high (Mossel Bay Local Municipality, 2021; Western Cape Government, 2020; Western Cape Government Provincial Treasury, 2020).

Basic service delivery

In the MBLM, 95.5 % of households have piped water available (inside or within 200m), 93.5 % of the households has access to electricity[12], and 92.6 % has at least weekly access to refuse removal services. In 2021, 34,310 people received free water, 33,947 basic electricity, 11,677 basic refuse removal, and 10 935 received basic sanitation (Mossel Bay Local Municipality, 2021; Western Cape Government, 2020).

Human development index

The Human Development Index (HDI) is a standard measure determining whether an area is developed or developing.[13] During the 2013 –2019 period, the HDI of Mossel Bay increased from 0.717 to 0.77. The MBLM has one of the highest municipal HDIs. However, this improvement in HDI must be understood within the context of increasing levels of inequality in the region, which indicates that everyone in the municipality does not necessarily experience the benefits of socio-economic development (Western Cape Government, 2020).

Equality in the provision of essential services

South Africa's history of inequality in access to essential services. Typically, the poor and vulnerable people are most directly affected. Hence the MBLM function in a complex service-delivery environment, particularly in ensuring access to land and resources. In this regard, the rights and socio-economic needs of indigenous groups such as the Gourikwas and the Koi-San groups (who claim coastal areas) and the small-scale fishers, including informal and subsistence fishers, are of relevance.

Vulnerable groups

The MBLM refer to "vulnerable groups" in their I defined. The MBLM IDPs state alignment with the Wes small-scale fishers are regarded as a vulnerable group. Coastal communities remain on the fringes of developmental prospects, bearing many costs without receiving many benefits (Andrews et al., 2021, p. 1).

[12] As primary source of lighting

[13] HDI is represented as a value between 0 and 1, with 1 indicating a high level of human development and 0 meaning no human development. The lower the HDI score range, the more it indicates that improvements are required in literacy, life expectancy and per capita income

Demography

Mossel Bay had a population of 95,255 in 2020[14]. The population is predicted to reach 97,514 people by 2025 (Urban Econ, 2022). Mossel Bay has an average population density of 47 persons/ km², which is higher than the district average of 27 persons per km². The high population density may cause pressure on the municipality to deliver adequate services to its 29,517 households. (Mossel Bay Local Municipality, 2020b, 2021; Urban Econ, 2021; Western Cape Government, 2020b, 2021b).

The Mossel Bay population consists of 53 % females and 47 % males. The average household size in the MBLM was 3.2 people per household in 2021. The average household size is estimated to decrease to 3.1 by 2023. On an elementary level, seen from a developing economy perspective, decreasing household sizes may reflect positively on the ability of household heads to provide for household needs. However, from an energy supply perspective, declining household sizes, hence more households for population size, may indicate increased energy consumption (Okogu, 2011, p. 129).

Housing

In 2020, of more than 30,000 households in the MBLM, only 84.8 % had access to formal housing. It follows that access to formal housing is a challenge in the MBLM.

Education

Mossel Bay has 24 public schools, which is a low number of schools in relation to the high learner enrolment. Seventeen of these schools are no-fee schools.[15] Two pre-primary schools provide daycare services to approximately 500 children. The low number of public schools accentuates the need for additional schools in the Mossel Bay area (Mossel Bay Local Municipality, 2021, p. 27; Western Cape Government, 2020). Schools with libraries and media centres have gradually increased from 15 in 2017 to 16 in 2019. Although small, this is a contribution to the overall quality of education.

The learner enrolment in Mossel Bay grew by 1.4 % annually from 2017 to 2019, the second highest in the district. Learner retention improved in Mossel Bay from 66.2 % in 2018 to 73.7 % in 2019). The Mossel Bay learner-teacher ratio was 30,9 learners per teacher in 2019. The education outcomes (Matric Pass Rates) improved from 80 % in 2017 to 84.7 % in 2019. Progress in education outcomes is a key indicator of socio-economic development in a region. A matric pass is a foundational step and an important starting point for future engagement in economic activities.

[14] URBAN-ECON shows the population as 96,114

[15] No-Fee Schools means parents do not pay school fees and the school governing body cannot deny learner admission.

Employment

In 2018, there were 37,055 people employed in the MBLM. This figure dropped to 36,701 in 2019, a loss of 354 employment opportunities. The COVID-19 impact primarily drives these losses and job losses from PetroSA. The national union of metalworkers of South Africa claimed that 500 of about 1 200 PetroSA workers received company notices to (Engineering News, 2022). The tertiary sector is the biggest employer, three times more than the primary and secondary sectors combined. Within the tertiary sector, almost 46 % are employed within the wholesale, retail, catering and accommodation and the finance, insurance, realistic, and business services sectors. The wholesale and retail catering accommodation sector accommodated some 42 % of the informal employment, followed by the construction sector with some 39 %. Between 38 % and 36 % of the employees in social and personal services, transport, storage, and communication sectors were informal employees (Western Cape Government Provincial Treasury, 2020). From an oil and gas perspective, the secondary sector (manufacturing, electricity, gas, water, and construction) only employs 15 % of the available workforce. In contrast, PetroSA indicated that approximately 1,000 of their employees resided in Mossel Bay.

Unemployment

The 2020 unemployment rate[16] in Mossel Bay was 15.6 %. This rate is lower than the national unemployment rate of 34 %. Job losses from PetroSA placed pressure on society. Escalating unemployment, particularly among women, youth, and vulnerable people, is challenging (Mossel Bay Local Municipality, 2021; Urban Econ, 2021; Western Cape Government, 2020).

Skills levels

The skills levels are categorised as skilled, semi-skilled, low-skilled, and informal. During 2018, 33 % of the formally employed cadre was skilled, 41.8 % semi-skilled, and 25.2 % low-skilled.

The skilled people were active in the general government (49 %), the finance, insurance, real estate, and business services (46.9 %) and the mining and quarrying sector in the third position, with 44.6 %.

Semi-skilled people showed a different trend. Most semi-skilled people were active in the construction sector (57.6 %), closely followed by the electricity, gas, and water sector with 55.6 %. The manufacturing sector was third with 53 %.

Most low-skilled people were employed in the community, social, and personal services sectors (50.8 %), followed by the agriculture, forestry, and fishing sectors at 46 %. The construction sector was a distant third at 25 %.

Health Facilities

Mossel Bay has access to the Mossel Bay District Hospital. There are five community health care centres, three operational primary health care facilities, and two community day centres in Mossel

[16] Unemployment defined in a narrow sense as people able to work, but not able to find employment.

Bay. PetroSA built one of the care facilities and renovated two of the others. (Golder Associates Africa (Pty) Ltd, 2021e, p. 2). In addition, Mossel Bay has 11 mobile primary health care units. There are three provincial ambulances per 1000 people.

Safety and security

Criminality remains a significant problem in South Africa at a high socio-economic cost. Regarding the safety and security in the MBLM, the following (Mossel Bay Local Municipality, 2021, pp. 29, 30; Western Cape Government, 2020, p. 14,15). The murder rate slightly increased between 2017 and 2020. The murder rate remains an alarming concer rate declined from 980 in 2018/19 to 836 in 2019/20. Sexual offences include rape (male and female), sex work, pornography, public indecency, and human trafficking. There were 111 cases of sexual offences in the Mossel Bay area during 2019/2020, down from 121 during the previous reporting cycle. Drug-related crimes refer to the situation in the port area where the perpetrator is found to be in possession of, under the influence of, or selling illegal drugs. Although drug-related crimes within the Mossel Bay area have decreased since 2017, it is still the highest form of crime in Mossel Bay. In 2019/020, Mossel Bay saw a decrease of 581 reported drug-related cases compared to 2017/18. The number of cases of driving under the influence of alcohol or drugs in the Mossel Bay area shows an increase from 465 in 2017 to 593 in 2020.

Mossel Bay rail network

The Mossel Bay railway station was used to transport fuel from PetroSA's tank yard to Bay station, situated at the Mossel Bay Port. This service was terminated in 2018, and since then, the railway station was not operational. The old station buildings are used as restaurants at present. The station can, however, be revived.

Mossel Bay road network

Mossel Bay has a total road network of 450 km and is halfway between Cape Town and Gqeberha, connected by the N2 highway. The CBD and the harbour are some distance away from the N2. The Louis Fourie corridor (R102) is the primary access to Mossel Bay. The Louis Fourie corridor connects the Mossel Bay CBD and harbour with the N2 to the west (7 km) and the north via a short section of Aalwyndal road (5.5 km). Another intersection is planned off the N2 to link Mayixhale Street in Kwanonqaba. This intersection will also be 7 km from the CBD.

The roads in the vicinity of the port are in reasonably good condition. Heavy vehicles would typically travel from the port to Church Street, turn right into George Road, and then onto Louis Fourie Road towards Voorbaai, where the tank yard is situated. Heavy vehicles are not allowed to travel on Marsh Street as the weight limit is 10 tonnes. An alternative route is to turn left from Louis Fourie Road onto the N2 highway that leads to Cape Town or Gqeberha. (Golder Associates Africa (Pty) Ltd, 2021c).

Port of Mossel Bay

Port of Mossel Bay is located about 400 km East of Cape Town. The port is situated almost halfway between Cape Town and Gqeberha. The Port of Mossel Bay is a medium-sized port, the smallest commercial harbour along the South African coast. The Port of Mossel Bay is situated directly adjacent to the CBD of Mossel Bay. The port can accommodate vessels up to 189 metres in length,

with a draught not exceeding 6.5 metres. The allowable deadweight is 52,318 tonnes. The catenary buoy caters to vessels up to 32,000DWT, with a length of 2,904m and a draught of 12m.

See Figure 7-18 for a view of Mossel Bay Port. The port mainly caters for the import and export of petroleum products. Mossel Bay Port also serves the fishing industry. Mossel Bay is the only port in South Africa with two offshore berths within the limits of the port. The port is capable of accommodating passengers and project ships.

Figure 7-18 - Birds eye view of Mossel Bay

Mossel Bay Port has five quays and the mentioned two offshore berths. Docking for exploration vessels is provided at the po Diesel fuel bunkering is available at quays 2, 3, 5 and the jetty. No heavy fuel oil bunkering is available. Ship chandelling and stevedoring services are available

With its slipway and associated infrastructure, Mossel Bay Port provides the only repair facilities in the region. The port serves fishing vessels and NPA vessels assigned to the port. Because of the port limitations, tankers use offshore mooring buoys. A full diving service is available for underwater inspection, hull cleaning, salvage etc. (Africa - Ports & Ships, 2021; MarineTraffic, 2021; National Ports Authority, 2018).

Energy

Electricity is purchased from Eskom's coal fired six intake substations. The notified maximum demand is 77,5MVA. At this stage, the maximum peak demand is 65,6MVA, with a spare capacity of 11,9MVA for future growth. The municipal electricity supply is at voltages ranging from 230V to 66,000V. The electricity is distributed under a NERSA licence to various industrial, commercial, and domestic customers. The municipality saw an increase in the number of indigents receiving basic services free of charge. Free basic electricity was supplied to 33,947 households in 2020.

Tourism

Tourism in Mossel Bay is typically highly seasonal and includes local and international tourists, with noted spikes in domestic visitors during the school holidays (Mossel Bay Local Municipality, 2021). Mossel Bay offers a unique and diverse tourism experience. Over and above the "Post O

Tré[17]e "70 historical beacons, heritage buildings, zipline are found in Mossel Bay.

Mossel Bay and the surrounding areas offer recreational fishing opportunities. Popular fishing spots include Banke, Dias Strand, Beneke se Klip, Dana Bay, De Bakke, Die Punt, Haaibankies, Hartenbos, and Santos beach. Several fishing charters operate from Mossel Bay (Mossel Bay Advertiser, 2021). Fishing is prohibited in marine protected areas or marine conservation areas.

Mossel Bay Ward

Ward 8 is the tourist mecca of Mossel Bay and comprises an area of 3.8 km². Figure 7-19 indicates the location of Ward 8. The Mossel Bay Port is situated just north of the Mossel Bay CBD. The port is where the harbour development is envisaged. Ward 8 is essentially a heritage precinct with historical buildings in the CBD, the Diaz Museum, the Post Office Tree and many more. Paved walkways along the beach with scenic rock formations and hiking trails attract many tourists.

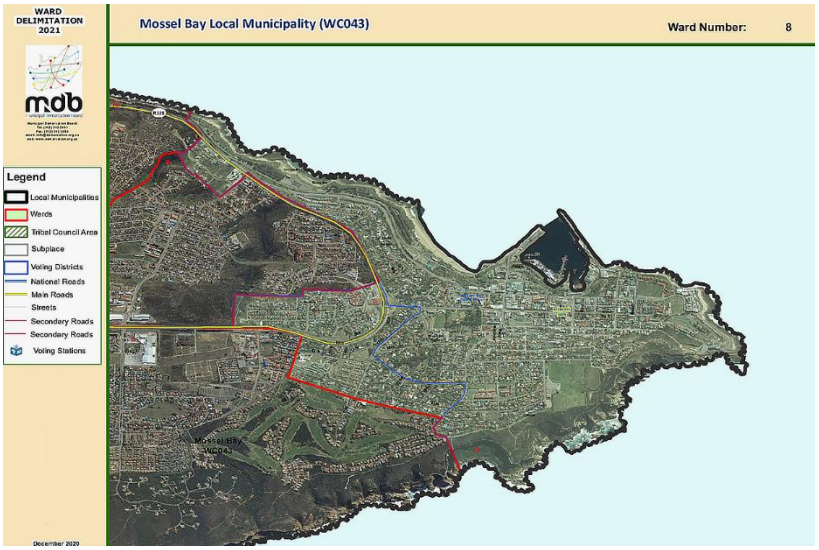


Figure 7-19 - Ward 8 –MBLM

Source: (Municipal Demarcation Board, 2021)

The main ethnic group living in Ward 8 is whites (80 %), followed by Black/African (9 %) and Coloured (8 %) groups. The most spoken language is Afrikaans, with English as the second preferred language. Ward 8 has a population of 2 906 with a median age of 44. Interestingly only 86.3 % of Ward 8 residents were born in South Africa.

In Ward 8, there are 1,149 households, of which women head 31.2%. This ward is unlikely to have many households headed by children. Approximately 52 % of households are entirely owned or are in the process of being refinanced, while 34 % are rented. The employment rate in this area is 61.4%, and internet access is available in 71.1 % of households.

[17] In 1500, Pêro de Ataíde, a Portuguese sea captain, lost most of his fleet in a severe storm of Mossel Bay. He placed a message of his losses in an old boot dangling from an milkwood tree near a spring where sailors often drew water. His message was picked up and delivered over time. The tree became a de facto post office box, where sailors would exchange letters protected in boots, iron pots, or beneath rocks. The tree post-box is still used to send and receive mail.

Infrastructure projects in Ward 8 are prioritised to attract investment and increase tourism. Maintenance projects were undertaken at the Point, the Marsh Street and Matfield substations were completed, and stormwater and sewerage lines were upgraded in Ward 8. Security cameras were installed in Marsh Street in the CBD. The ward's taxi rank a upgraded (Mossel Bay Local Municipality, 2021; Municipal Demarcation Board, 2021; Western Cape Government, 2020).

7.3.2 MARINE ARCHAEOLOGY

Mossel Bay's rich history navigator, Bartholomew Dias, landed in Portu Mossel Bay in 1487. Along the South African coastline, there are many 19th-century shipwrecks, with several that have foundered in Mossel Bay. The undersea environment is considered to be archaeologically sensitive. Pinnacle Point and the Cape St. Blaize Cave characterised cultural importance when the cave excavations revealed Middle Stone Age people occupation between 170,000 and 40,000 years ago.

Kiani Satu was a bulk carrier vessel which was pushed aground in Buffels Bay in 2013. The vessel was carrying cargo of rice and was heading to Ghana from Vietnam. Due to heavy seas the vessel suffered a power failure and became stuck in the sand and breakers in the Goukamma river-mount which is a marine protected area. Crew members were air lifted to safety and the vessel was towed out to deeper waters once the seas had calmed (Von Meck, 2017).

The locality of where the Kiani Satu sank is in close proximity to the production development area, in the southwestern corner of Block 11B12B (Figure 3-2).

7.3.3 CULTURE AND SPIRITUAL HERITAGE

Coastal cultural heritage is both a tangible and intangible asset for South Africa. The intangible cultural heritage related to the coast and sea in the Eastern Cape and Western Cape is vibrant and detailed. For example, as descendants of the Strandlopers, the representatives of the KhoiSan people practised ancient fishing techniques, such as in the " traces of the fish traps are still visible. This heritage indicates a diverse and coherent set of beliefs and human relations with the sea and coast (Boswell, 2022; Golder Associates Africa (Pty) Ltd, 2021b; Mosselbay.info, 2022; NSOVO Environmental Consulting, 2020, p. 70). The different beliefs and cultural and spiritual heritage related to the ocean will be assessed in relation to the proposed project activities.

8 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This section provides an overview of key environmental legislation and regulations applicable to the project. Other applicable legislation and international conventions related to exploration and production activities have also been included.

8.1 KEY RELEVANT LEGISLATION

8.1.1 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002

The Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002), as amended forms part of the key legislation governing exploration and production activities (including prospecting and mining) within South Africa. The MPRDA promotes the objective of equitable access to mineral and petroleum resources, within the broader context of environmental legislation. The application and issuance of Technical Cooperation Permits, Reconnaissance Permits, Prospecting Rights, Exploration Rights, Mining Rights and Production Rights falls within the ambit of Act. TEEPSA presently holds an Exploration Right for Block 11B/12B. The current application for PR falls broadly under Sections 83 and 84 of the MPRDA, which will include a Production Work Programme (PWP) and Social and Labour Plan (SLP).

From 2nd September 2014, the environmental regulation of prospecting, mining, exploration and production activities ('mineral activities') has been transferred from the MPRDA to the NEMA. The NEMA gives effect to Section 24 of the Constitution of South Africa South Africa, 1996 (Act 108 of 1996) by ensuring that the nation's mineral and petroleum resources are developed in an ecologically sustainable manner while promoting justifiable social and economic development. The Department of Mineral Resources and Energy (DMRE) is the Competent Authority (CA) responsible for the granting of an EA (for the production and exploration activities) whilst DFFE is the responsible appeals authority. However, the authority delegated by the DMRE to regulate petroleum exploration and production related activities is the Petroleum Agency South Africa (PASA).

The objectives of a SLP as stipulated in the MPRDA are: To promote economic growth and the development of mineral and petroleum resources in the Republic; to promote employment and advance the social and economic welfare of all South Africans; to contribute to the transformation of the industry; to ensure that right holders contribute towards the socio-economic development of the areas where they are operating.

A SLP typically consists of three components:

Human Resource Development: This component outlines how the proposed development will ensur employment legislation and how it proposes to give effect to the MPRDA objective of promoting employment and transformation in the mining and production industries.

Local Economic Development: This is a critical component of the SLP and requires extensive consultation with local municipalities, the Competent Authority, communities and other key stakeholders in the region. It outlines how the development aims to support local economic development (LED), aligned with the integrated development plans (IDPs) of local and district municipalities in the region. Social and economic baseline information; strategies to assess and address housing and living conditions; key economic activities; details of other operations in the area; as well as negative impacts of the operations on directly affected communities are included in this component.

Management of Downscaling and Retrenchment: This component demonstrates how provision will be made for managing and mitigating planned and unplanned closure or cessation of operations and how a Future / Transformation Forum will be established.

In accordance with the requirements of the MPRDA, a separate stakeholder consultation process will be undertaken for the SLP as part of the PR application process.

8.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The NEMA provides a framework for cooperative environmental governance between the various spheres of government by establishing principles for decision-making on matters relating to the environment. The NEMA also promotes integrated environmental management to ensure sustainable resource utilisation and development.

The NEMA principles (under Section 2 of the Act) guide the interpretation, administration and implementation of the Act and any other law concerned with the protection of the environment. Its overarching emphasis is that development must be environmentally, socially and economically sustainable. The Act also states that sustainable development requires the consideration of, inter alia, the following:

- That pollution and degradation of the environment are avoided, or where it cannot be altogether avoided, minimised and remedied;
- That waste is avoided, or where it cannot be altogether avoided, is minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
- That the development, use and exploitation of renewable resources and the eco-system of which they are part do not exceed the level beyond which their integrity is jeopardised; and
- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where it cannot be altogether prevented are minimised and remedied.

Chapter 5 of NEMA outlines the general objectives and implementation of Integrated Environmental Management (IEM), which provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of an EA. In order to give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

8.1.2.1 EIA Regulations, 2014

The EIA Regulations GN R324, 325, 326 and 327 published under the NEMA, provide lists of activities that require environmental authorisation (EA) prior to development, operation, or decommissioning. Activities triggered in GN R.324 (Listing Notice 3) and GN R.327 (Listing Notice 1) require a basic assessment (BA) process (200-day process) to support the application for EA, whereas activities triggered in GN R.325 (Listing Notice 2) trigger a full scoping and EIA process (300-day process). GN R. 326 outlines the requirements for the EA application process. A list of potential activities that could be triggered by the proposed project is provided in Section 8.2.

Where applicable, this scoping report has been written in compliance with Appendix 2 of the EIA Regulations (GN R.326).

8.1.2.2 Financial Provisioning Regulations, 2015

The Financial Provisioning Regulations (GNR 1147) were published in terms of NEMA, on November 2015, in line with the "One Environmental System" wherein mining and all matters pertaining to mining are be regulated in terms of the environmental legislation, and implemented by the Minster responsible for mineral resources.

As part of the "One Environmental System", the responsibility for financial provisioning for rehabilitation in the mining sector were transferred from the Mineral and Petroleum Resources Development Act 2002 (Act No. 28 of 2002) to NEMA through the Financial Provisioning Regulations, as of November 2015.

The purpose of these Regulations is to regulate the determine and making of financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. A detailed closure plan in accordance with these regulations will be developed for the project and will be appended to the ESIA/ESMP.

8.1.3 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004

The main objectives of the National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM: AQA) are to protect the environment by providing reasonable legislative and other measures to:

Prevent air pollution and ecological degradation;
Promote conservation; and
Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development in alignment with Sections 24a and 24b of the Constitution of the Republic of South Africa.

The NEMA: AQA has devolved the responsibility for air quality management from the national sphere of government to local spheres of government (district and local municipal authorities), who are tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and development of emissions reduction strategies. An Atmospheric Emissions Licence (AEL) is required if listed activities (under GN327) are triggered which result in atmospheric emissions and have a significance detrimental effect. In terms of Section 22 of NEM: AQA, no person may conduct a listed activity without an AEL.

Regarding offshore production and exploration activities, the PASA will take on the responsibility as the licensing authority for listed activities triggered in NEM: AQA. An AEL application would need to be submitted if any listed activities are triggered in relation to the project activities. At this stage it is possible that the storage of petroleum products on vessels in excess of 1000m^3 as well as offshore waste incineration may be required for the project and hence an AEL could be required. This aspect will be confirmed with the relevant regulatory authority as the ESIA process progresses.

NEM: AQA also provides for the monitoring and reporting of greenhouse gas emissions in accordance with the National Greenhouse Gas Emission Reporting Regulations (GN No. 275) which was published in terms of Section 53 (a), (o) and (p) of NEM: AQA on 3 April 2017. The purpose of these regulations is to implement a single national reporting system for the transparent reporting of greenhouse gas emissions.

No specific thresholds have been regulated for exploration and production activities; therefore, the regulations require that carbon dioxide (CO_2) and methane (CH_4) levels be reported on annually via the South African Greenhouse Gas Emissions Reporting System (SAGERS). TEEPSA would need to meet this requirement for all associated activities related to both exploration and production.

8.1.4 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) was implemented on 01 July 2009. One of the main objectives of the NEM:WA is to reform the law regulating waste management to protect health and the environment by providing reasonable

measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development and to provide for:

National norms and standards for regulating the management of waste by all spheres of government;
Specific waste management measures;
The licensing and control of waste management activities;
The remediation of contaminated land; to provide for the national waste information system; and
Compliance and enforcement.

In terms of the NEM:WA, certain waste management activities must be licensed and in terms of Section 44 of the Act, the licensing procedure must be integrated with an environmental impact assessment process in accordance with the EIA Regulations, 2014 (as amended) promulgated in terms of the NEMA.

It is understood that waste generated offshore, associated with exploration and production activities, are not applicable to the NEM:WA, since waste generated offshore will either be incinerated at sea or will be transported back onshore to facilities with a valid Waste Management Licence (WML). In the event waste generated offshore undergoes onboard incineration, compliance to the International Convention for the Prevention of Pollution from Ships, 1973/1978 (MARPOL) in relation to specifications for waste incineration at sea would be required.

8.1.5 NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS, 2003

The National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM:PA), as amended, provides for the declaration and management of protected areas, and the promotion of sustainable utilisation of protected areas for the benefit of people in a manner that would preserve the ecological character of such areas.

Various Marine Protected Areas (MPA) were proclaimed in terms of NEM: PAA for the South African offshore marine environment. MPA's are located Block 11B/12B (see details in section 7.2.10). For oil and gas related activities, all regulations and restrictions pertaining to any MPA in or around the proposed production area must be adhered to. Refer to section 7.2.10 for detail on MPA areas.

8.1.6 NATIONAL ENVIRONMENTAL MANAGEMENT: INTEGRATED COASTAL MANAGEMENT ACT, 2008

The National Environmental Management: Integrated Coastal Management Act 24 of 2008 aims:

To establish a system of integrated coastal and estuarine management in the Republic, including norms, standards, and policies, to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable;
To define rights and duties in relation to coastal areas;
To determine the responsibilities of organs of state in relation to coastal areas;
To prohibit incineration at sea;

To control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment;
To give effect to South Africa's international obligations in relation to coastal matters; and
To provide for matters connected therewith.

8.1.7 NATIONAL HERITAGE RESOURCES ACT, 1999

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the protection and management of South Africa's natural heritage, i that may be found or disturbed on the seabed. SAHRA is the enforcing authority for the NHRA. Shipwrecks within the territorial waters and the maritime cultural zone fall under the jurisdiction of SAHRA. According to Section 35 of the NHRA, any person who discovers archaeological objects or material (including wrecks) in the course of a development must immediately report the find to SAHRA. No person may, without a permit issued by SAHRA, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological site. In the event that a shipwreck is discovered during a pre-drilling site survey, TEEPSA would need to notify SAHRA and apply for the relevant permit.

In addition, Section 38 lists certain activities that would require authorisation by SAHRA. Under Section 38(1)(c)(i), SAHRA would need to be notified regarding any development or activity that will change the character of a site (including land covered by water) exceeding 5 000 m^2 in extent. Having considered such a notification, SAHRA will confirm whether a Heritage Impact Assessment would be required in order for an authorisation to be considered.

8.1.8 MARINE LIVING RESOURCES ACT, 1998

The Marine Living Resources Act, 1998 (Act 18 of 1998) intends to provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources; and for these purposes to provide for the exercise of control over marine living resources in a fair and equitable manner to the benefit of all the citizens of South Africa. The Marine Living Resources Act, states that no whales or dolphins may be harassed9, killed or fished. No vessel or aircraft may approach closer than 300 m to any whale and a vessel should move to a minimum distance of 300 m from any whales if a whale surfaces closer than 300 m from a vessel or aircraft.

8.1.9 OTHER APPLICABLE LEGISLATION

A screening of relevant legislation and national requirements was undertaken to identify the key legal issues related to the Project. Additional legislation to be considered during the implementation of the Project has been summarised and can be found in Appendix B of this report.

8.1.9.1 International Laws and Conventions

Relevant international conventions and treaties which have been ratified by the South African Government and which have become law through promulgation of national legislation are listed in Appendix C of this report.

8.1.9.2 Corporate TEEPSA Standards, HSE Policy and Sustainable Commitments

TEEPSA associated standards for production and development, and exploration activities, HSE Policy and sustainable commitments are presented in Appendix D of this report.

8.2 LISTED AND SPECIFIC ACTIVITIES

Based upon the currently available information, the proposed project will trigger the following listed activities tabulated in Table 8-1 and Table 8-2.

Table 8-1 - Listed activity requiring environmental authorisation in terms of GN R. 327 (Listing Notice 1)

Activity No	Activity No. Description	Applicability to Project
17	Development (i) in the sea... in respect of (e) infrastructure or structures with a development footprint of 50 m^2 or more.	The nature of the proposed project activities would require drilling units, in the form of well heads, to be placed onto the seafloor. Up to six (6) wells will be drilled during the production phase and a further four (4) wells during exploration. Subsea infrastructure including distribution units, manifolds, T-FLETS, and pipelines will also be placed on the seafloor. Each wellhead (including abandonment cap) has a footprint of approximately 25m^2 (5m x 5m). Therefore, the cumulative footprint of the project will exceed 50 m^2.
19A	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (iii) the sea.	The proposed project will require ploughing, drilling and associated activities on the seafloor. Trenching for pipelines will also be required. As a result, the excavation and removal of sediment (including underlying rock) will occur. In addition, as part of the exploration programme, coring and sampling of the sea floor may be undertaken. An estimation of the quantity of material removed could not be confirmed however, the activities would result in more than 5m^3.

Table 8-2 –Listed activity requiring environmental authorisation in terms of GNR. 325 (Listing Notice 2)

Activity No	Activity No. Description	Applicability to Project
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 m^3.	The proposed project activities would require equipment and infrastructure (including vessels) that store oil, gas and/or fuel (diesel). Specific storage volumes are not available at this stage however, the activity has been included for instances where storage capacity exceeds 500 m^3.
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.	Drilling units and support vessels could incinerate waste or transport back onshore for disposal. An Atmospheric Emission Licence (AEL) will be required in terms of the National Environmental Management: Air Quality Act, 2004, in the event that petroleum/hazardous waste is incinerated offshore and exceeds the threshold of 10kgs of waste a day.
7	The construction of facilities or infrastructure for the bulk transportation of dangerous goods: (i) in gas form, outside an industrial complex, using pipelines, exceeding 1 000 m in length, with a throughput capacity of more than 700 tons per day; (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1 000 m in length, with a throughput capacity more than 50 m^3 per day.	The proposed project will entail the construction of various pipelines on the seafloor for the transportation of gas and condensates to offshore and onshore facilities. Some of these pipelines will exceed 1000 m in length as well as the throughput capacities specified in this listed activity.
14	The development and related operation of – (ii) an anchored platform; or (iii) any other structure or infrastructure on or along the seabed, ...	Exploration, appraisal and production well related infrastructure as well as production pipelines will be placed on the seafloor as part of the project.
20	Any activity including the operation of that activity which requires a production right in terms of Section 83 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), as well as any other activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the production right.	The activities listed as part of this application are also being applied for as part of a Production Right application in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

9 PUBLIC PARTICIPATION PROCESS

9.1 OBJECTIVES OF THE PUBLIC PARTICIPATION PROCESS

The objectives of public participation for the various phases of the environmental authorisation process are presented in Table 9-1.

Table 9-1 –Objectives of the public participation process, per phase of the project

Approach	Objectives of Public Participation
ESIA: Scoping and Impact Assessment (Regulatory process)	
Scoping Phase.	Identify and map potential Interested and Affected Parties (I&APs). Inform I&APs of the project and EA process and the availability of project-related information, like background information documents, non-technical summary (in print and audio) of the draft scoping report and the draft scoping report. Invite stakeholders to register as I&APs (this is required in terms of the 2014 EIA Regulations, as amended in terms of NEMA). Request I&APs' consent to the purpose of sending information about the proposed project, and whether their names and surnames may be reflected in the CRR. Provide information about the proposed project, the ESIA and public participation process, opportunities for comment and the terms of reference for specialist studies to be undertaken during the impact assessment phase. For a period of at least 30 days, I&APs to contribute comments, concerns, raise questions, identify potential positive and negative impacts of the proposed project and comment on the Plans of Studies of the specialist studies to be undertaken. Identify potential issues of concern for consideration by environmental specialists during the impact assessment phase. Update the draft scoping report and specialist Plans of Studies based on I&APs' comm
Impact Assessment Phase.	Ongoing identification of I&APs and further opportunity for stakeholders to register as I&APs. Inform registered I&APs of the availability of the draft ESIA and ESMP, and opportunities for comment for a period of at least 30 days. Share information about the findings of the specialist studies undertaken, as well as proposed measures to avoid, mitigate and manage potential negative impacts. For registered I&APs to comment on the findings of the specialist studies undertaken, verify that the issues raised

Approach	Objectives of Public Participation
	during the scoping phase have been considered by the specialists, comment on the proposed measures to avoid, manage or mitigate potential negative impacts, the recommendations of the ESIA and to comment on the ESMP. Update the draft ESIA and ESMP based on I&APs' comments.
Decision-making Phase.	Inform registered I&APs of the PR and EA application and the appeals procedure.

9.2 PUBLIC PARTICIPATION PLAN

Figure 9-1 presents a flow-diagram of the ESIA and public participation process. The flow-diagram shows the steps in the ESIA process from preparation of the PR and EA application to final submission of the EIA for a decision.

The NEMA 2014 EIA Regulations, as amended, in Chapter 6 provide clear guidelines regarding the minimum requirements for public participation during an ESIA as part of an EA. Although these regulations do not prescribe in detail the methods of public participation, several guidelines in this regard, namely, the 2017 Public Participation Guidelines in terms of the NEMA and EIA Regulations, as amended, the 2016 Petroleum Agency South Africa Guidelines for Consultation with I&APs, and the Department of Mineral Resources Guidelines for Consultation with Communities and I&APs give direction and emphasise the importance of meaningful consultation.

The proposed methods of public participation take due consideration of the following:

- Relevant regulations, policies, guidelines, and international best practice.
- The EAP's experience with ESIA and public participation processes nationally and internationally.
- Local knowledge attained in the project area during the planning phase of the proposed project.
- The environmental and social impact assessment for additional exploration drilling and associated activities in Block 11B/12B off the south coast of South Africa conducted for TotalEnergies EP South Africa B.V. (TEEPSA) by SLR Consulting (Pty) Ltd in 2020(note: This application was withdrawn after the scoping phase).
- Information obtained from TotalEnergies regarding studies conducted in 2021 as part of the Social Baseline Study in the Mossel Bay area.
- The Environmental Impact Assessment for Well Drilling in Block 5/6/7 off the South-West Coast that is being conducted for TEEPSA by SLR Consulting (Pty) Ltd, 2022.
- Information gleaned from the field baseline data collection undertaken as part of the Cultural Heritage Impact Assessment conducted by TEEPSA for Block 11B/12B.

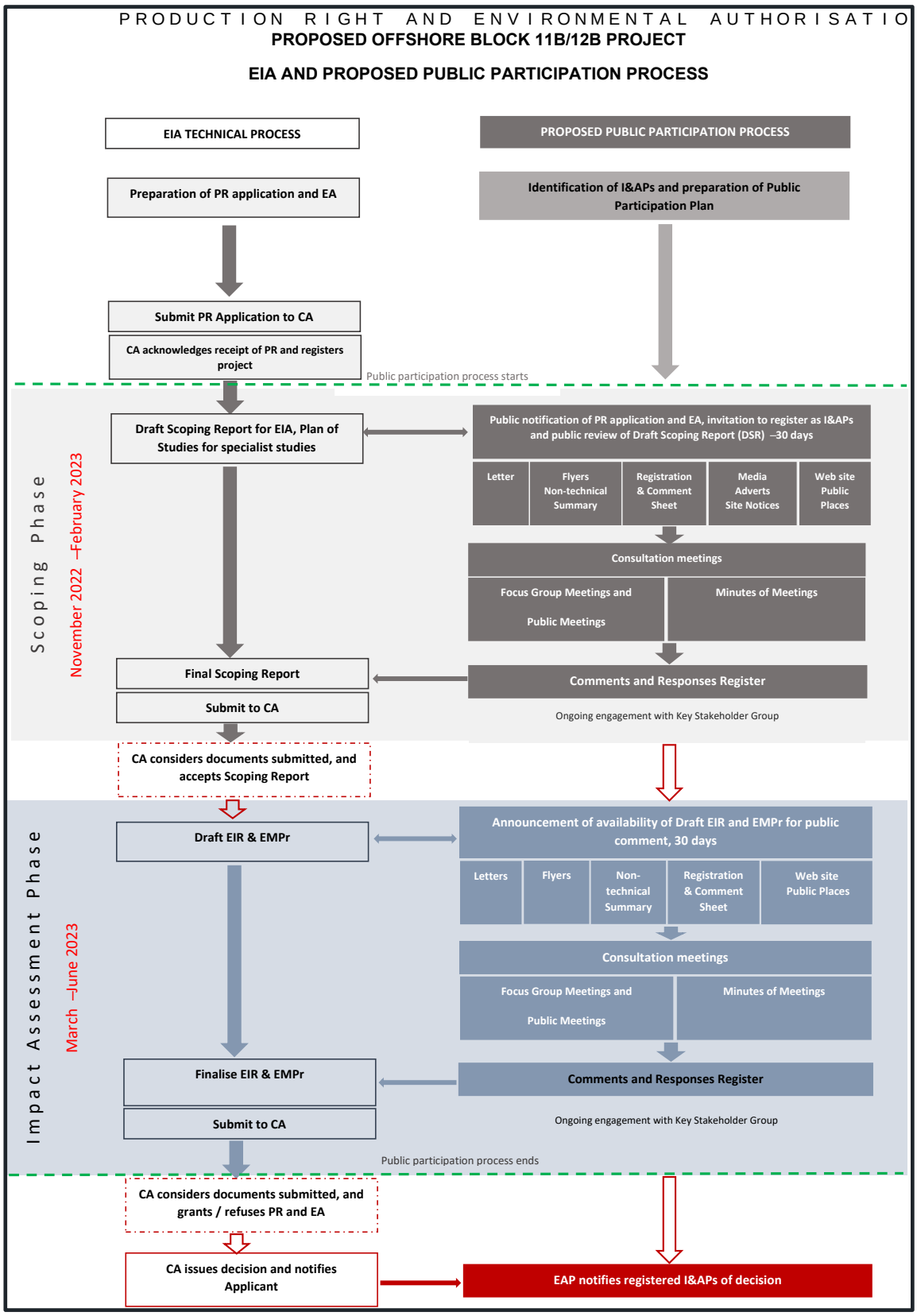


Figure 9-1: ESIA and public participation process as part of the proposed Block 11B/12B project

9.3 PRE-APPLICATION MEETING WITH COMPETENT AUTHORITY

Before the start of the ESIA, it is necessary for the EAP to convene a pre-application consultation meeting with the CA. The key objectives of the pre-application consultation meeting are to notify the CA of the applicant's intent to submit aePR and technical scope of the proposed project, and confirm the approach to the ESIA and public participation process.

The pre-application meeting with PASA took place on 03 November 2021. An update meeting with PASA is scheduled to take place in November/December 2022.

9.4 IDENTIFICATION OF POTENTIAL I&APS

Several existing I&AP databases, which were developed as part of previous permitting processes and social and cultural heritage baseline studies for Block 11B/12B, as well as concurrent engagements in adjacent blocks (e.g., Block 5/6/7), have been used to create a preliminary I&AP database for the 11B/12B project.

The 2014 EIA Regulations, as amended, in Chapter 6 (40) (2) (a -d) and (41)(2)(b) require "consult-ation with

The competent authority
Every State department that administers a law relating to a matter affecting the environment relevant to an application for an EA.
All organs of state which have jurisdiction in respect of the activity to which the application refers.
All potential or, where relevant, registered I&APs.

In addition to the above, the following I&APs must receive notification of the proposed application:

The occupiers of the site and, if the applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken.
Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken.
The municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area.
The municipalities which have jurisdiction in the related areas.
Any other party required by the CA."

Furthermore, the Amendment Regulations to the Mineral and Petroleum Resources Development Regulations, 2020, in Chapter 1 consideres "interes

The Department responsible for Co-operative Governance and Traditional Affairs.
The Department responsible for Human Settlements, Water and Sanitation.
Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed or existing prospecting or mining operation.
The Local Municipality.
Civil society; and
The relevant Government Departments, agencies, and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project."

The Department of Mineral Resources' Guideline f
which is relevant to mining, state that "I&APs include, but are not limited to[18]:

Host communities.
Landowners (traditional and title deed owners).
Traditional authority.
Land claimants.
Lawful land occupier.
The Department of Land Affairs.
Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting or mining operation.
The local municipality.
The relevant Government Departments, agencies, and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the propo

The Petroleum Agency South Africa's Guidelines f
addition to the abovementioned I&APs, the following stakeholders be included[19]:

Cape Nature.
Fishing Industry.
South African Maritime Safety Authority.
Relevant offshore regulatory authorities, i.e., Department of Environmental Affairs (fisheries branch, oceans, and coasts branch), South African Hydrographic Office, Port Authorities; and Marine Research Institutions.

In accordance with the minimum regulatory requirements mentioned above the following additional factors were also considered in the process to identify I&APs:

Description of the proposed Block 11B/12B project and its geographical location.
People who may be directly and indirectly affected by the proposed project.
People whose culture and heritage may be affected by the project.
Who are the most vulnerable among the potentially impacted?
Which stakeholders can assist with the early scoping of issues and impacts?
Who strongly supports or opposes the changes the project would bring and why?
Available information on the internet about past public participation processes in the project area.
Information in the public domain about the project area, environment, socio-economic situation, community values and interests.

[18] Indigenous groups form an important part of I&APs to be consulted, therefore, they have been added to the list of I&APs to be consulted as part of this process

[19] Small-scale fishers form an important part of I&APs to be consulted, therefore, they have been added to the list of I&APs to be consulted as part of this process

Information considered included but was not limited to documents such as the integrated development plans of relevant coastal municipalities, the Scoping Report and Comments and Responses Report of the ESIA for additional exploration drilling and associated activities in Block 11B/12B off the south coast of South Africa conducted for TEEPSA by SLR Consulting (Pty) Ltd in 2020.

Understanding who the legitimate representatives of stakeholder groups are with proof of appointment to represent the group, e.g., elected representatives of provincial, district and local councils, traditional and indigenous groups, leaders of local cooperatives, Community Based Organisations (CBOs), fishers, non-governmental organisations (NGOs) and vulnerable groups (women, the youth, elderly and so forth), different spheres of government, faith-based organisations and so forth.

The preliminary identification of potential I&APs covers the coastal area from Saldanha Bay in the Western Cape to East London in the Eastern Cape.

Importantly, the preliminary list does not yet constitute a complete list of registered I&APs. A list of registered I&APs will be available at the start of the impact assessment phase of the ESIA process after people had an opportunity to register as I&APs during the scoping phase.

EIA Regulation 42: Register of interested and affected parties

A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details, and addresses of-

(a) all persons who, because of the public participation process conducted in respect of that application, have submitted written comments, or attended meetings with the proponent, applicant, or EAP;

(b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and

(c) all organs of state which have jurisdiction in respect of the activity to which the application relates.

In terms of the 2014 EIA Regulations, as amended, people must formally register as I&APs by responding to the notifications published in accordance with the requirements of these EIA Regulations. The EIA Regulations define a registered interested and affected party (I&AP) in relation to an application as an interested and affected party *"whose name is recorded in the register opened for that application in terms of Regulation 42."*

The preliminary list of I&APs covers the following sectors of society, shown in alphabetical order:

Academia and research.
Business, commerce, and property developers.
Civil society organisations (CSOs):
Community Based Organisations (CBOs);
Cultural and heritage bodies.
Faith-based organisations.
Human rights organisations.
NGOs.
Traditional, indigenous groups and First Nations (e.g., Khoi and San nations).
Vulnerable groups (women, youth, elderly, organisations for the disabled, marginalised, etc.).
Conservation.
Fishers:

- Artisanal fishers.
- Commercial fishers.
- Inland fishers of coastal estuaries and lakes.
- Recreational fishers.
- Small-scale fishers and interim rights holders.

Government (national, provincial, local and metropolitan, including e.g., Ward Councillors).
Infrastructure.
Ward counsellors
Municipal owned entities.
Provincial owned entities.
State owned entities.
Tourism and recreation.

The list of registered I&APs will continually be updated during the ESIA process. People may register as I&APs in response to public notifications, e.g., media advertisements, site notices, letters and so forth, based on attendance of focus group and public meetings, and comments submitted.

9.5 NOTIFICATION LETTER AND REGISTRATION AS I&AP

A notification letter and registration and comment sheet will be distributed to the preliminary list of I&APs. The objectives of the notification documents are as follows:

Notify potential I&APs of TEEPSA's intention t
Share information about the proposed project, PR, and EA application, ESIA and proposed public participation process, and opportunities for comment.
Invite stakeholders to register as I&APs and to participate in the ESIA by contributing comments as milestones are achieved.
Invite I&APs to attend focus group and public meetings.
In terms of the POPI Act, to obtain I&APs' con
purpose of the proposed project for the provision of information and invitation to contribute comments, as well as reflect their names in the CRR.

The notification letter and registration and comment sheet will be distributed via email. In addition, the notification letter, registration, and comment sheet and copy of the media advertisement will be published to WSP's website at https://www.wsp.com/en-za/services/public-documents , as well as to the data free website at https://wsp-engage.com/Total-11B12bB, to provide all stakeholders with access to the information. The registration and comment sheet will also be available for completion via WSP's websites.

The notification documents will be available in English, Afrikaans, and isiXhosa.

Other mechanisms to reach I&APs will also be considered, such as radio announcements and distribution of flyers. Focus mobilisation of stakeholders will also be done to encourage stakeholders to register as an I&AP for the project and to attend the meetings.

9.6 MANDATORY MEDIA ADVERTISEMENTS

Given the geographic reach of the project, at the start of the ESIA process, WSP will publish mandatory advertisements in national, regional and local newspapers. Regional newspapers in the Eastern Cape and Western Cape, and local coastal community newspapers will be targeted. In addition, to secure a wide reach, media announcements will be broadcast by regional, local and community radio stations along the coastal project area stretching between Saldanha and East London. The content of the mandatory newspaper advertisements and radio announcements will be in accordance with the requirements of Regulation 41 c, d, and e of the EIA Regulations, 2014, as amended, and Regulation 3 of the Amendment Regulations to the Mineral and Petroleum Resources Development Regulations, 2020.

The newspaper and radio advertisements will be in English, Afrikaans, and isiXhosa.

Radio advertisements announcing the availability of the DSR will be broadcast early in December 2022. A second round of radio advertisements announcing the details of the public meetings will be broadcast in early January 2023.

The list of media that will be used in the process is provided below (Table 9-2):

Table 9-2 –List of media

Print / Online Media	
George Herald	Suidernuus / Southern Post
GO! Express	Talk of the Town
Hermanus Times	The Rep
Imbhewu	Tygerburger Northern Suburbs
Isolezwe LesiXhosa	Vukani
Knysna-Plett Herald	Weslander
Kouga Express	Daily Sun
Mossel Bay Advertiser	Cape Times
People's Post (False Bay)	Daily Dispatch
People's Post (Mitchell's Plain)	Die Burger Western Cape
Suid-Kaap Forum	Die Burger Eastern Cape

Print / Online Media	
St Francis Bay Chronicle	The Herald Eastern Cape
Radio Stations	
Eden FM	Radio West Coast
Kouga FM	S-FM
Nkqubela FM	Whale Coast FM
Radio Namakwaland	Unitra CR 97.0 FM
Radio Overberg	Ngqushwa CR 99.5, 99.50, 99.6, 99.4 FM
Radio Perpn	Izwi Lethemba CR

9.7 SITE NOTICES

Like the mandatory advertisements, the site notices will give information about the details of the application and state that a ESIA is being undertaken, the nature and location of the activity to which the application relates, where further information on the application can be obtained, the manner in which, and the person to whom representations in respect of the application may be made. The site notice will be published in A2 size. Although the PR and EA application for Block 11B/12B is an offshore project, WSP will place site notices at locations that are visible to the coastal communities, particularly, the fishers, indigenous groups, vulnerable communities, and coastal tourism operations. The site notices will be in English, Afrikaans and isiXhosa.

9.8 PUBLIC NOTIFICATION OF AVAILABILITY OF DRAFT REPORTS

The draft scoping report, and the draft ESIA and ESMP report will be available for at least a 30-day public comment period respectively during the scoping and impact assessment phases of the ESIA. The 30-day public comment period during scoping and impact assessment are stipulated by the NEMA, MPRDA, the EIA Regulations, 2014 (as amended) and the Amendment Regulations to the Mineral and Petroleum Resources Development Regulations, 2020.

WSP will produce two non-technical summaries as follows:

- One non-technical summary of the draft scoping report; and
- One non-technical summary of the draft ESIA and ESMP report.

The non-technical summaries will be available in print and as audio files in English, Afrikaans, and isiXhosa.

Registered I&APs will be notified of the availability of the abovementioned reports, the non-technical summaries and audio files. I&APs will receive notification of the reports, as well as the links to the reports and non-technical summaries and audios by email, bulk SMS, and the radio and newspaper advertisements. The reports and their summaries will be published to the WSP website and data free website.

Hard copies of the reports will also be available for review at the public places listed in Appendix E.

9.9 COLLECTING PUBLIC COMMENT

As mentioned, the reports will be in the public domain for a 30-day comment period during each of the scoping and impact assessment phases.

Apart from opportunities to provide comments in writing during the scoping and impact assessment phases, through a dedicated email address, teepsaEIA@WSP.com, I&APs will also have opportunities to contribute questions, issues of concern and comments as follows:

Completing the comment sheets attached to public documents;
Emailing the project email address (above) directly;
Posting to the PO Box provided;
Phoning the landline provided;
Message via the WhatsApp ; or
Attending meetings in person.

Key spokespeople of different sectors of society will be collaborated with to determine the most appropriate format for the focus group and public meetings. One of the key principles of the public participation process is adaptability and, as such, WSP will adapt the format of the meetings in accordance with local biocultural community protocols and local community customs. In addition, stakeholders will be actively mobilised to attend meetings through the key stakeholder group representatives, timely notifications of meetings, personal contact with stakeholders and by encouraging stakeholders to distribute the invitations to their constituents.

Every effort will be made to facilitate meeting attendance that reflects representativity by gender, cultures, people with different educational backgrounds, and vulnerable groups (e.g., women, youth, elderly, people with disabilities) to allow for meaningful consultation. An important consideration for meaningful consultation to take place, is to collaborate with local, coastal, traditional, and indigenous groups to understand how best to engage with them and follow an inclusive approach to allow for optimum contributions within the limitations of the regulatory timeframes.

9.10 FOCUS GROUP MEETINGS

Focus group meetings will be convened with coastal communities in the Western Cape and Eastern Cape, with the focus being the project-affected area of Mossel Bay and surrounds. Key criteria to be considered in focussing efforts with the focus group meetings include the following:

Geographic relevance of the group to the proposed project area.
Nature and scale of the proposed project.
Socio-cultural interests/connections to the ocean.
Potential impacts of the proposed project on coastal communities, biodiversity, marine ecosystems, conservation, offshore human operations, e.g., marine ecotourism, fishing, aquaculture, etc.

The format of the focus group meetings will be agreed in collaboration with the relevant coastal communities with due consideration of existing community protocols and customs.

Minutes of the focus group meetings will be distributed, and the comments, questions, and issues of concern incorporated into the CRR.

9.11 PUBLIC MEETINGS

Public meetings will be convened during each of the scoping and impact assessment phases of the ESIA. A virtual public meeting will be held in December 2022. Face-to-face meetings along the coast in the Western Cape and Eastern Cape will be held in January 2023.

The primary objectives of the public meetings will be to provide the public with opportunities to obtain information about the proposed project and contribute comments, ask questions, and raise issues of concern.

For the face-to-face meetings, care will be taken to ensure that venues are accessible, safe, well-ventilated and comply with health requirements.

Minutes of the meetings will be distributed, and the issues, questions, and comments raised at the meetings incorporated into the CRR.

9.12 MEETING ITINERARY FOR THE SCOPING PHASE

A virtual public meeting will take place on 07 December 2022 from 17h30 to 19h30. I&APs will need to contact the WSP Public Participation Office to register for the virtual public meeting. Details of face-to-face public meetings to be convened in January 2023 will be shared with I&APs closer to the time.

9.13 COMMENTS AND RESPONSES REGISTER

All the issues, questions, and comments contributed by registered I&APs during the ESIA will be incorporated in a Comments and Responses Register. The CRR will be attached as an appendix to the scoping report and the ESIA and ESMP report.

9.14 NOTIFICATION OF COMPETENT AUTHORITY (CA) DECISION

All registered I&APs will be notified of the decision by the competent authority. Notification letters will be distributed via email, bulk SMS, and identified community structures. I&APs will be notified of the outcome and how and by when the decision may be appealed, should they wish to.

10 POTENTIAL IMPACTS IDENTIFIED

This section provides a preliminary high-level screening of potential impacts associated with the proposed project. This screening will be reviewed, expanded, and adjusted during the ESIA.

10.1 ENVIRONMENTAL AND SOCIAL INTERACTION MATRICES

The first step of the screening is to identify potential sources of impacts, called impact-producing factors (IPFs), corresponding to the various project activities that may affect the host environment for all phases of the project. Routine activities of the project as well as accidental events are both considered.

The preliminary screening considers: 1) the development and production activities; 2) the exploration related components and activities. In each case, the construction, operations, and decommissioning phases are considered along with accidental events. The IPFs are listed in accordance.

A comprehensive list of IPFs will be prepared during the ESIA Process. The list will be developed against the project description activities detailed in Section 4.

They will include, for instance, some of the following IPFs for the construction phase for development and production:

Pipeline laydown including trenching and support structures.
Installation of subsea manifolds within line tees, flowlines, subsea distribution units.
Movement of specialised construction vessels and support vessels.
Discharge / exchange of ballast water.

The IPFs will then be regrouped and simplified for an easy checking of interaction with biophysical and social components of the environment. A series of matrices will be prepared to identify these potential interactions.

For the development and production activities, a preliminary screening is provided in a series of four matrices as following (Table 10-1 to Table 10-4):

Development and production activities - Construction Phase
Development and production activities –Production / Exploration Phase
Development and production activities –Decommissioning Phase
Development and production activities –Accidental Events

For the exploration activities, a preliminary screening in the form of the same matrix is provided in Table 10-5: for the exploration activities and unplanned/accidental event.

The identification of potential interactions in the matrices is based on the experience of the experts and on the following information:

Technical characteristics of the project and planned work methods;
Knowledge of the host environment; and
Impacts of similar projects on the biophysical and social environments.

These matrices will be refined during the ESIA process.

Table 10-1 –Development and Production Activities –Construction Phase –Matrix of Potential Impacts

Impact-Producing Factor (IPF)	Receptors																								
	Biophysical											Social													
	Air Quality and GHGs, Ambient Sound and Light	Important Marine Features Including Corals	Water Quality	Sediment Quality	Benthic Communities	Plankton, Fish and Other Fishery Resources	Marine and Coastal Birds	Marine Mammals	Sea Turtles	Protected Areas and Other Areas of Conservation Interest	Biodiversity	Maritime Navigation	Industrial Fisheries	Artisanal Fisheries and Related Activities	Tourism and Recreation	Other Land and Sea Occupation and Use	Employment & Business Opportunities	Population and Demography	Community Livelihoods	Community Health, Safety and Security	Public Infrastructure and Services	Women and Vulnerable Groups	Cultural and Archaeological Heritage	Landscape and Seascape	Social Climate
Physical presence at sea in Offshore and Pipeline Areas (including physical structures, lights and sounds from drillship, etc.)	●	●	●	●	●	●	●	●	●		●	●	●	●		●			●	●			●	●	●
Maritime exclusion safety zones												●	●	●		●				●	●				●
Vessel and helicopter traffic (including movements and sounds)	●		●	●			●	●	●	●	●	●	●	●		●	●			●	●			●	
Air Emissions	●									●	●									●					
Discharges (including produced water, cooling water, sewage, muds and cuttings, and cement, during drilling, etc. and their associated chemicals when relevant)			●	●	●	●	●	●	●	●	●														
Onshore logistic activities																	●				●				●

"●": means a potential interaction between an IPF and a component.

Table 10-2 –Development and Production Activities-Production Phase-Matrix of Potential Impacts

Impact-Producing Factor (IPF)	Receptors																							
	Biophysical											Social												
	Air Quality and GHGs, Ambient Sound and Light	Important Marine Features Including Corals	Water Quality	Sediment Quality	Benthic Communities	Plankton, Fish and Other Fishery Resources	Marine and Coastal Birds	Marine Mammals	Sea Turtles	Protected Areas and Other Areas of Conservation Interest	Biodiversity	Maritime Navigation	Industrial Fisheries	Artisanal Fisheries and Related Activities	Tourism and Recreation	Other Land and Sea Occupation and Use	Employment & Business Opportunities	Population and Demography	Community Livelihoods	Community Health, Safety and Security	Public Infrastructure and Services	Women and Vulnerable Groups	Cultural and Archaeological Heritage	Landscape and Seascape	Social Climate
ROUTINE ACTIVITES																								
PRODUCTION PHASE																								
Physical presence at sea in Offshore and Pipeline Areas for maintenance purposes (including physical structures, lights and sounds from drillship, etc.)	●	●	●	●	●	●	●	●	●		●	●	●	●		●			●	●			●	●	●
Maritime exclusion safety zones										●	●	●		●				●	●				●		
Vessel and helicopter traffic (including movements and sounds)	●		●	●			●	●	●	●	●	●	●	●		●	●			●	●			●	
Air Emissions	●									●	●									●					
Discharges (including produced water, cooling water, sewage, muds and cuttings during drilling, etc. and their associated chemicals when relevant)			●	●	●	●	●	●	●	●	●														
Onshore logistic activities																	●	●	●	●	●				●

"●": means a potential interaction between an IPF and a component.

Table 10-3 –Development and Production Activities-Decommissioning Phase-Matrix of Potential Impacts

Impact-Producing Factor (IPF)	Receptors																								
	Biophysical											Social													
	Air Quality and GHGs, Ambient Sound and Light	Important Marine Features Including Corals	Water Quality	Sediment Quality	Benthic Communities	Plankton, Fish and Other Fishery Resources	Marine and Coastal Birds	Marine Mammals	Sea Turtles	Protected Areas and Other Areas of Conservation Interest	Biodiversity	Maritime Navigation	Industrial Fisheries	Artisanal Fisheries and Related Activities	Tourism and Recreation	Other Land and Sea Occupation and Use	Employment & Business Opportunities	Population and Demography	Community Livelihoods	Community Health, Safety and Security	Public Infrastructure and Services	Women and Vulnerable Groups	Cultural and Archaeological Heritage	Landscape and Seascape	Social Climate
ROUTINE ACTIVITES																									
DECOMMISSIONING PHASE																									
Physical presence at sea in Offshore and Pipeline Areas (including physical structures, lights and sounds from drillship, etc.)	●		●	●	●	●	●	●	●		●	●	●	●		●			●	●				●	●
Maritime exclusion safety zones												●	●	●		●				●	●				●
Vessel and helicopter traffic (including movements and sounds)	●		●	●			●	●	●	●	●	●	●	●		●	●			●	●			●	
Air Emissions	●									●	●									●					
Discharges (e.g., sewage,)			●	●	●	●	●	●	●	●	●														
Onshore logistic activities																	●				●				●

"●": means a potential interaction between an IPF and a component.

Table 10-4 –Development and Production Activities-Accidental Events-Matrix of Potential Impacts

Impact-Producing Factor (IPF)	Receptors																								
	Biophysical											Social													
	Air Quality and GHGs, Ambient Sound and Light	Important Marine Features Including Corals	Water Quality	Sediment Quality	Benthic Communities	Plankton, Fish and Other Fishery Resources	Marine and Coastal Birds	Marine Mammals	Sea Turtles	Protected Areas and Other Areas of Conservation Interest	Biodiversity	Maritime Navigation	Industrial Fisheries	Artisanal Fisheries and Related Activities	Tourism and Recreation	Other Land and Sea Occupation and Use	Employment & Business Opportunities	Population and Demography	Community Livelihoods	Community Health, Safety and Security	Public Infrastructure and Services	Women and Vulnerable Groups	Cultural and Archaeological Heritage	Landscape and Seascape	Social Climate
UNPLANNED EVENTS																									
Loss of solid waste or other objects at sea			●	●	●	●			●	●	●														
Small spills of hydrocarbons or other chemicals			●	●	●	●	●	●	●	●	●														
Well blowout	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●			●	●
Subsea Production System and vessels collision		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●			●	●

Table 10-5 –Exploration Activities –Matrix of Potential Impacts

Impact-Producing Factor (IPF)	Receptors																								
	Biophysical											Social													
	Air Quality and GHGs, Ambient Sound and Light	Important Marine Features Including Corals	Water Quality	Sediment Quality	Benthic Communities	Plankton, Fish and Other Fishery Resources	Marine and Coastal Birds	Marine Mammals	Sea Turtles	Protected Areas and Other Areas of Conservation Interest	Biodiversity	Maritime Navigation	Industrial Fisheries	Artisanal Fisheries and Related Activities	Tourism and Recreation	Other Land and Sea Occupation and Use	Employment & Business Opportunities	Population and Demography	Community Livelihoods	Community Health, Safety and Security	Public Infrastructure and Services	Women and Vulnerable Groups	Cultural and Archaeological Heritage	Landscape and Seascape	Social Climate
ROUTINE ACTIVITIES																									
Physical presence at sea in Offshore Areas (including physical structures, lights and sounds from drillship, etc.)	●	●	●	●	●	●	●	●	●		●	●	●	●		●			●	●			●	●	●
Maritime exclusion safety zones												●	●	●		●				●	●				●
Vessel and helicopter traffic (including movements and sounds)	●		●	●			●	●	●	●	●	●	●	●		●	●			●	●			●	
Marine surveys	●	●	●	●	●	●	●	●	●		●	●	●			●	●						●		
Metocean buoying			●	●				●	●			●	●												
Air Emissions	●									●	●									●					
Discharges (including produced water, cooling water, sewage, muds and cuttings, and cement, during drilling, etc. and their associated chemicals when relevant)			●	●	●	●	●	●	●	●	●														
Onshore logistic activities																	●				●				●
UNPLANNED EVENTS																									
Loss of solid waste or other objects at sea			●	●	●	●			●	●	●														
Small spills of hydrocarbons or other chemicals			●	●	●	●	●	●	●	●	●														
Well blowout	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●			●	●
Vessel collision		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●			●	●

The above preliminary matrices show that there are numerous potential interactions between IPFs and the biophysical and the social components that will need to be assessed during the ESIA. The comprehensive assessment will examine all the potential interactions. When an interaction has been identified, the potential impacts will be assessed.

Based on similar projects, impacts in normal conditions could include, for instance, the following:

- Reduction in ambient air quality due to air emissions from vessel engines and from well testing which will increase ambient levels of contaminants near the areas of operations;
- Reduction in ambient water quality due to drilling muds and cuttings and cement which will be discharged into the sea during well drilling;
- Changes in sediment quality (bottom contours, grain sized and some chemical parameters) from discharge of drilling muds and cuttings and cement and from seafloor sampling;
- Crushing of benthic communities and coral species below pipeline and subsea manifolds during their installation;
- Incineration of individual birds from well stem test flaring at the drillship;
- Auditory impairment of marine life due to sound from construction activities, and associated physical and behaviour disturbance;
- Marine mammals and sea turtles injury or mortality due to vessel strike during project vessel movements or due to well drilling, VSP and/or sonar survey activities;
- Impact on bird life / nesting due to disturbances caused by marine vessels and helicopter traffic;
- Protection from fish pressure of some fishes and invertebrate species attracted to the project infrastructures where the exclusion zone will be applied;
- Roundabouts for maritime navigation vessels to avoid project activities at sea and their exclusion safety zone;
- Loss of fishing gears due to project vessel movements in fishing areas;
- Loss of small-scale/artisanal fishing grounds due to project infrastructures and their exclusion safety zones;
- Risk of collision between project vessels and small-scale fishing boats due to project vessels movements;
- Social unrest in coastal communities due to the perception of project negative impacts on fisheries combined with very limited local benefits; and
- Infringements on human cultural heritage and spiritual connections to the ocean and coastline is of particular value, tangible and intangible.

The above list provides a few examples of potential impacts during planned project operations. A series of potential impacts is also associated with accidental events. During the ESIA, the pro potential impacts will be fully detailed and discussed.

10.2 CUMULATIVE IMPACTS

The EIA Regulations 2014 (as amended) require the consideration includes the 'reasonably foreseeable future and Cumulative impacts of current and impa planned activities, in the context of other oil and gas exploration and development related activities, including those associated with the F-A Platform and related infrastructure, will be considered in the ESIA, to the extent that this is feasible based on the available information at the time the ESIA is prepared (for more detail on how cumulative impacts will be assessed, refer to Section 12).

11 ESIA PROCESS AND METHODOLOGY

11.1 KEY POTENTIAL IMPACTS ON KEY RECEPTORS

When reviewing the above matrices and the preliminary baseline description of the hosting environment, key potential impacts associated with the Project can be identified on a preliminary basis. The preliminary key impacts and the potential actions to address them include the following:

1. **Potential impacts of the Project on EBSAs in the area surrounding Block 11B/12B:** The northern border of Block 11B/12B falls alongsi lies just to the northeast of the Shackleton Seamount Complex EBSA. The proposed pipeline routing passes through the southwestern corner of the Kingklip Corals EBSA. Particular attention will be paid to the potential impacts of the project components and activities, including the pipeline, on these EBSAs. Potential actions to address the potential impacts include for instance: a strong demonstration that there are no alternative locations for the pipeline; specific mitigation measures to be identified during Project Design to avoid/minimize potential impacts on EBSAs; detailed assessment of project impacts (including from air emissions, airborne sound, and light); and preparation of a Biodiversity Action Plan as part of the ESMP.

2. **Potential impacts of the Project Critical Biodiversity Areas (CBAs) in the area surrounding Block 11B/12B:** The proposed pipeline routing passes through a Critical Biodiversity Area (CBA), specifically a CBA Natural area. CBA Natural sites have natural/near-natural ecological condition, with the management objective of maintaining the sites in that natural/near-natural state. The Impact Management zones of EBSAs and the CBAs and ESA areas are encouraged to be managed by place-based regulations, informed by the reasons for their classification. The development of the subsea pipelines associated with oil and gas processes are considered **non-compatible** within the CBA Natural area. The environmentally preferable option is to reroute the pipeline to avoid CBA areas. However, given that avoidance may not be feasible, it is recommended that the substrate of these CBA Natural areas within the proposed pipeline routing be assessed, and sensitive and/or significant areas, communities or species identified. While the likely direct impacts on the substrate as a result of pipeline construction are expected to be short-term, and of low impact (due to the sufficient adjacent habitat to allow for rapid recolonisation), operational impacts related to oil spills are considered of critical concern. As such, it is considered essential that a comprehensive oil spill risk assessment be undertaken and that a proactive and adaptive management plan be implemented to manage and mitigate the potential risks.

3. **Potential impacts on corals caused by the installation of the pipeline and subsea manifolds for the Project**: Corals presence has been documented in Block 11B/12B (Pisces 2019). The potential presence of coral species in the project pipelines corridor will need to be assessed. The design and planning of the project needs to be developed to avoid any work near the corals. Potential mitigation includes studies and ROV surveys of the pipeline corridor, with an alternate route if required, to avoid the area of the corals. This question could be discussed in the alternative analysis of the ESIA report where assessed options will be compared as well as in the impact assessment chapter of the ESIA report where potential impacts will be described along with mitigation measures if required.

4. **Potential impacts on air quality and climate change of air emissions including greenhouse gases (GHGs) generated by the Project:** During operations air emissions will be emitted by various sources: drillship, specialized vessels, support vessels, flaring, etc. Potential actions to address the potential impacts include for instance: minimize potential air emissions during Project Design; conduct air emissions modelling and GHG calculations as part of the ESIA to assess potential project impacts; and identify specific mitigation measures if required.

5. **Potential impacts on water quality and seabed of discharges generated by the Project**: During the operations periods, discharges to sea are planned via several routes, for instance discharge of drilling muds and cuttings at sea, and discharge of treated sewage from the operations vessels. Calculations and modelling will be conducted as required to assess the impacts of the discharges from the Project on the water quality, and specific measures will be recommended as appropriate.

6. **Potential impacts on fishery resources caused by the Project:** Given the importance of fish and other fishery resources for the Mossel Bay Port fishing industry as well as for biodiversity, the impacts of project activities on fishery resources will be assessed during the ESIA, and specific mitigation measures will be recommended as applicable.

7. **Potential impacts on marine mammals caused by the Project:** Vessel movements and noise are a source of potential impacts on marine mammals. For instance, vessel strikes on large whales are among the factors leading to the decline of several species. The impacts of project activities on marine mammals will be assessed during the ESIA, and specific mitigation measures will be recommended as applicable.

8. **Potential impacts on threatened species associated the Project:** Special attention will be paid to identify potential impacts from project activities that could affect threatened species This includes marine mammals and sea turtles, but also other species classified on the IUCN Red List as Critically Endangered or Endangered that could occur within the study area. Specific mitigation measures will be recommended as appropriate.

9. **Potential impacts on biodiversity and ecosystem services caused by the Project:** The National Environmental Management: Biodiversity Act and regulations provide for control of activities involving listed threatened or protected marine species, which includes numerous whale species that are potentially present in the Block 11B/12B.Additionaly, The seabed communities in Block 11B/12B are known to exhibit high levels of endemism, and as such, the coastal area in the vicinity of Mossel Bay has been recognised as one of seven areas in the biozone in need of additional protection which has been granted in the form of these offshore MPA designations. Several project activities could potentially have direct or indirect impacts on biodiversity and ecosystem services. These impacts will be assessed during the ESIA. Specific mitigation measures will be recommended as appropriate. If needed, a Biodiversity Action Plan will be developed as part of ESMP.

10. **Potential impacts on the small-scale/artisanal fisheries associated with the Project**: The importance of artisanal fishing for the local community needs to be considered during the ESIA. The maritime exclusion safety zones around project infrastructures and activities could interfere with artisanal fishing grounds. Moreover, the potential impacts of the project on maritime safety for these artisanal fishermen due to project vessel movements will also be assessed and specific mitigation measures will be recommended as appropriate.

11. **Potential impacts on the community health, safety and security associated with the Project**: The local community of Mossel Bay could be affected by nuisances associated with the project. Impacts on local communities of air emissions, light and noise will be assessed during the ESIA along with potential nuisances and risks from the w o r k c a m p. Also, the requirements of the construction and decommissioning phases of the project could cause pressure on local infrastructure, resources near the port, and logistic bases. Specific mitigation measures will be recommended as appropriate.

12. **Potential impacts on the traditional rights and cultural heritage sites.** Among others, peoples of Khoisan and Nguni descent claim coastal areas. These groups have a strong spiritual connection to land and sea. Their rights are covered by the Traditional and Khoisan Leadership Act 3 of 2019. Project activities in coastal and sea areas claimed by these groups could raise issues. Potential infringements on their rights and potential impacts on their cultural heritage sites at sea, if any, will be assessed during the ESIA. Specific mitigation measures will be recommended as appropriate.

13. **Potential impacts on the biophysical environment and coastal communities associated with accidental events related to Project:** Major accidental events have a remote likelihood of occurrence. However, the consequences of a well blowout, and of a project vessels collision, require to be evaluated to determine potential impacts on the biophysical environment and the local communities. While the adverse impacts would be variable depending upon a variety of factors, worst credible case scenarios will be used as reference cases. Modelling studies will be used for the risk assessment to assess potential impacts of major accidental events and to recommend appropriate prevention, mitigation, and response measures through a robust safety management plan.

This preliminary list of key potential impacts associated with the Project identifies issues that will be examined thoroughly in the Environmental Impact Assessment. Other potential interactions between the proposed project and the biophysical and social resources of the host environment, as preliminary identified in Tables Table 10-1 to Table 10-4 for the development and production activities, will also be assessed during the Environmental Impact Assessment. This will allow the identification of negative and positive impacts. The positive ones will include, for instance, the following:

Potential positive impacts related to employment opportunities and downstream economic activity in terms of local procurement, vehicle and pipeline repairs, maintenance, and ad-hoc services during the production phase. The proposed development will also support PetroSA production capabilities.

There will be local, regional, and national benefits through taxes, social development projects and support via the social and labour plan. Local procurement, local services and diverse support from Mossel Bay will further enhance the economic benefit.

Additionally, and as mentioned, potential interactions between the exploration activities and the host environment will be covered by the Environmental Impact Assessment. However, it can already be noted that based on previous experience, it can be assumed that under normal exploration conditions, the impacts of exploration activities are likely to be less significant than those for development and production due to their short duration in time.

Following the identification of all potential interactions, the ESIA will examine all potential impacts and proceed to their evaluation using an approach and methodology presented in Sections 11 and 12. Mitigation measures will be identified as needed. Section also provides a list of typical mitigation measures that will be adjusted and completed as required.

11.2 ESIA PROCESS

The overall process and methodology that will be followed for the scoping phase of the ESIA is based on the requirements of South African legislation (specifically NEMA) and best practice standards and guidelines.

The approach included the following key stages:

Gap Analysis of existing information against the project compliance criteria;
Screening (legal and process review) –review of all applicable compliance criteria inclusive of South African legal and administrative requirements;
Environmental and social baseline information review –carrying out desktop assessment, and where required, field assessment, to review the existing baseline conditions of the environment that could be affected by the proposed project;
ESIA scoping (identification of key issues and development of a plan of study for carrying out the impact assessment). This report is presented to the public for comment and to the relevant government departments for a decision on whether the scope proposed for the ESIA is appropriate;
Preparation of an ESIA report –documenting all processes and presenting the findings of the impact assessment. The ESIA report will be presented to the public for comment and to the relevant government departments for a decision on whether the project may proceed, and if so, under what conditions; and
Stakeholder engagement –will continue throughout the remainder of the ESIA process to record issues and comments received from I&APs. All issues and comments will be integrated into the process and considered during the ESIA.
The overarching principles that guide the ESIA include:

- Sustainability –development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs; and
- Mitigation hierarchy –The mitigation hierarchy describes a stepwise approach that illustrates the preferred approach to mitigating adverse impacts as follows (the governing principle is to achieve no net loss and preferably a net positive impact on people and the environment as a result of the project):
  - The preferred mitigation measure is avoidance;
  - Then minimisation;
  - Then rehabilitation or restoration; and
  - Finally, offsetting residual, unavoidable impacts.
- Duty of care towards the environment and affected people.

The assessment of the impacts of the proposed activities will be conducted within the context provided by these principles and objectives.

Figure 9-1 presents a flow-diagram of the ESIA and public participation process. The flow-diagram shows the steps in the ESIA process from preparation of the PR and EA application to final submission of the EIA for a decision.

11.3 SCOPING METHODOLOGY

The methodology specifically adopted for the scoping phase includes the following:

Review of existing data and performing a gap analysis / knowledge maturity assessment;
Undertaking baseline studies to inform closure planning and the impact assessment;
Inputs to the identification of sea uses and screening of the alternatives from an environmental and socio-economic impact perspective;
Identification of key impacts and issues and to outline the plan of study;
Compiling the scoping report; and
Stakeholder consultation as required in terms of the EIA Regulations.

11.4 ASSUMPTIONS AND LIMITATIONS

The ESIA is limited to the scope of the assessment outlined in more detail in Section 4 of this document. Some of the details regarding the Project were not yet finalised at the time of compiling this Draft Scoping Report. Once this information becomes available, this report will need to be updated.

11.5 KEY AUTHORITIES FOR THE EA APPLICATION

The DMRE will be the decision-making authority for the ESIA, which is being undertaken in terms of the latest EIA Regulations; however, the authority delegated by the DMRE to regulate petroleum exploration and production related activities is the Petroleum Agency South Africa (PASA).

The following commenting authorities have been identified in terms of this ESIA:

Department of Cooperative Governances and the Department of Traditional Affairs (COGTA);
National Ports Authority
Cape Nature Conservation
SANParks
Department of Science and Innovation
National Indigenous Knowledge Systems Office
National Department of Public Works and Infrastructure
National Department of Public Enterprises
National Department of Tourism
National Department of Trade, Industry and Competition
National Department of Transport
National Department of Women, Youth and Persons with Disabilities
National Department of International Relations and Cooperation
National Department of Health
National Department of Human Settlements
National Department of Forestry, Fisheries and the Environment
National Department of Water and Sanitation
South African Heritage Resource Agency

Western Cape Department of Environmental Affairs and Development Planning
Western Cape Department of Economic Development and Tourism
Eastern Cape Department of Economic Development, Environmental Affairs and Tourism

11.6 STAGES AT WHICH COMPETENT AUTHORITY WILL BE CONSULTED

The Competent Authority will be consulted:

Prior to submission of the application for an EA;
During the 30-day period for public review of the DSR;
During the 43-day period of evaluation of the Scoping Report;
During the 106-day period of development of the ESIA and ESMP;
During the 30-day period for public review of the draft ESIA and ESMP;
During the 107-day period of evaluation of the ESIA and ESMP; and
In the event of an appeal.

11.7 PLAN OF STUDY FOR IMPACT ASSESSMENT PHASE

The impact assessment component of the ESIA is subdivided into several specialist fields of study. The findings of the specialist studies will be integrated into the ESIA report. The significance of the impacts will be assessed in terms of the methodology described in Section 12.3 of this report.

The following aspects will be assessed as part of the ESIA process:

Marine Acoustic
Marine Ecology
Air Quality and Climate Change
Oil Spill Modelling and Drill Discharge Modelling
Socio-economics
Closure in terms of NEMA financial provisioning regulations

The results of the Cultural Heritage study undertaken for Block 11B/12B will also be taken into consideration in the ESIA process.

11.8 SPECIALIST STUDY TERMS OF REFERENCE

The terms of reference for the specialist investigations are set out below. The description is presented in general terms, but all the issues that need to be addressed by the studies are captured. Where applicable, the cumulative effects of this project on the existing impact experienced in the surrounding areas will also be assessed.

11.8.1 MARINE ACOUSTIC ASSESSMENT

An assessment of underwater noise impacts from the project will be carried out for a number of Project activities. The main sources of project-generated underwater noise that will be considered in the assessment include:

Drilling, including VSP;
Sonar surveys; and
Supply/support vessels.

Assessment of the potential effects of underwater noise on marine fauna require acoustic thresholds against which received sound levels can be compared. Southall et al (2019) as well as the US National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS 2016, 2018) have provided technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing. Thresholds are provided for onset of temporary threshold shifts (i.e., temporary loss of hearing sensitivity, TTS), permanent threshold shifts (i.e., permanent loss of hearing sensitivity, PTS), and behavioural response in marine mammal hearing due to both impulsive and non-impulsive noise sources, as well as injury criteria for impulsive sounds. Sound exposure guidelines for fish, fish eggs, and fish larvae have been developed by Popper et al. (2014) for impulsive and continuos (i.e., non-impulsive) noise sources. Limited information is available for sound exposure thresholds for penguins and other diving birds, however recent studies (Sørensen et al 2020) have examined the behavioural response of penguins to impulsive noise.

Underwater noise levels due to the project will be predicted using the underwater acoustic propagation modelling software which implements a range-dependent parabolic equation acoustic model for fluid seabeds. Environmental inputs to the prediction model include sound speed profiles for the water column, bathymetry, and seabed properties. The model will produce a transmission loss (TL) as a function of range and depth from a sound source at a defined depth. Using source noise emission levels, the predicted TLs will be converted to noise levels in the form of two-dimensional noise contours. Distances to the acoustic thresholds for various marine wildlife will be provided for each Project activity considered in the assessment.

11.8.2 OFFSHORE DISCHARGES AND SPILL MODELLING

Simulation of drill cutting and mud dispersion and the fate and behaviour of oil spills in the marine environment requires an accurate characterisation of the ambient physical oceanographic and meteorological conditions including water levels, winds, waves, currents, and water mass density.

This task will include a desktop review of the available documentation for the project area to develop understanding of the Project, as well as previous work to characterize the environment and identify any specific concerns, at national, regional and local level. It shall include but not limited to ongoing studies, maps, remote sensing studies, literature, web search data, etc.

11.8.2.1 Regional Scale Modelling Tool for Oil Spill Modelling

Block 11B/12B is crossed by the strong Agulhas Ocean current which coupled with the high wind and waves make the harsh metocean conditions the critical challenge for all operations in the area. Characterisation of the ocean environment for 11B/12B will be carried out using a regional scale three-dimensional MIKE3 hydrodynamic model to be driven by a combination of any local high-resolution metocean databases that may be available via TEEPSA from data derived from global hindcast models HYCOM (oceanography), CFSv2 (meteorology) and WW3 (wave conditions). MIKE3 is an industry-standard hydrodynamic modelling code developed by the Danish Hydraulic Institute (DHI) widely applied to simulate site-specific oceanographic conditions. The proposed global hindcast models are leading scientific platforms made freely available by the National Oceanographic and Atmospheric Administration (NOAA).

The MIKE platform provides a wide range of fully coupled and modular modelling tools, allowing the modelling approach to efficiently scale up or down to accommodate the final awarded scope of work within one ensemble of interconnected models. This avoids duplicating effort in developing input

files and processing output files from multiple stand-alone models and provides a flexible approach to see the project thorough regulatory review.

The MIKE3 model domain will cover Block 11B/12B and the surrounding anticipated dispersion footprint drill cuttings and oil spills with a variable mesh resolution that can be readily expanded to accommodate the extent of potential oil dispersion. Mesh resolution will be locally increased at drill cutting and spill release locations, whereas the vertical layering will be refined at the sea surface and, if required for near-bed releases, the seafloor.

A site-specific oceanographic hindcast model will be developed at sufficient resolution and spatial/temporal extent for use in drill-cuttings discharge, oil spill and effluent dispersal studies.

11.8.2.2 Drill Cutting Discharge Modelling

Subsea drilling generates a combination of fluid mud, drill cuttings and chemical additives of various compositions depending on the specific stage of drilling and equipment employed. Releases of drilling fluid can occur at the drilling location near the seabed or at the vessel/platform location near the water surface. Simulation of the fate and behaviour of the drilling-related discharges requires careful consideration of the constituents of the released fluids, the location of their release and the release volume and schedule.

Methodology

The release of drilling materials will be considered as three distinct materials: drill cuttings, water-based muds and synthetic based muds (non-aqueous drilling fluid). Each will have a distinct particle size distribution and settling velocity and, hence, produce a different depositional footprint and potential change to on-bed sediment composition. Additionally, drilling muds include additives that enter the marine environment upon release.

The characteristics of the drill cuttings, water-based mud, synthetic mud and any additives of environmental concern, including conservative and non-conservative tracers (contaminants), will be parametrized as inputs into a model, referred to as the dose-related risks and effects assessment model (DREAM) model, to track the transport, deposition and concentration of particulate matter and associated contaminants.

The DREAM module can simulate the transport and fate of dissolved, suspended and sedimented substances discharged in lakes, estuaries, and coastal areas or in the open sea. The particles/substances may be a pollutant of any kind, conservative or nonconservative, for example suspended sediment particles, inorganic phosphorus, nitrogen, bacteria, or chemicals. Particles are divided into different groups called classes. Each class has specific properties regarding decay, settling/buoyancy, erosion, and dispersion that must be specified separately. Typical examples of classes are different size fractions of sediment particles and organic pollutants with different decay rates.

The following processes may be ascribed to individual particle classes:

Settling in various details including flocculation
Erosion
Decay
Moving sources
Dispersion

The model calculates the path of each particle and outputs the instantaneous concentrations of individual classes in 2D or 3D depending on the hydrodynamic input.

Discharge parameters in the model will be based on data provided by TEEPSA and defined as a timeseries of:

Drilling mud constituents plus drill cuttings particle size distribution
Discharge rate and duration
Discharge depth (typically near the seabed for early stages of well drilling followed by surface release until completion of the well)
The required inputs will be summarized in a modelling input request form (template provided by TEEPSA) and based on component specification by TEEPSA, to be reviewed by WSP.

11.8.2.3 Oil Spill Modelling

The behaviour and fate of hydrocarbons in the marine environment is governed by ocean and tidal currents, winds, wave action, dissolution and evaporation and the physical and chemical changes to hydrocarbons that take place in the marine environment. The processes and interactions are typically simulated using a Lagrangian (particle tracking) oil spill model driven by inputs provided by an ensemble of oceanographic, wave and meteorological models. Industry-leading approaches simulate hydrocarbon behaviour in three-dimensions, tracking the advection of floating oil along the water's surface as well as the fate of submerged weathered oil that has sunk or dissolved hydrocarbon fractions.

Methodology

Potential accidental releases of hydrocarbons to the marine environment in Block 11B/12B will be addressed using stochastic simulations of spill behaviour. In each stochastic simulation, a statistically representative ensemble of separate spill simulations is carried out, holding most aspects of the spill, such as location and volume, constant, while varying the start time and date of the spill. The intent of a stochastic simulation is to simulate a wide range of environmental conditions (e.g., over a typical year) without bias to any particular set of conditions. The resulting set of spills can be analysed to obtain statistical information on the extent of the spill, the probability of reaching a certain area, and the amount of shoreline (minimum, average, median, maximum length) that can be potentially contacted. By simulating such a large ensemble, the specific environmental impacts and potential toxicity of a spill event can be assigned a likelihood and appropriate context for risk assessment and regulatory review.

The fate and behaviour of the hydrocarbon release will be simulated in 3D using the MIKE –Oil Spill (OS) software module coupled to the SAT-OCEAN hydrodynamics data, which is required to complete this task. The spill scenarios will be simulated over 4 representative seasons and the trajectory and fate of credible worst-case volume hydrocarbon release in the form of a subsea blowout or subsurface pipe rupture will be simulated at a statistically representative number of instances in the period.

Subsequently, one worst-case deterministic simulation (selected from the stochastic run results based on a metric determined in discussion with the ESIA team) in each season will be run with sub surface dispersant injection (SSDI) and surface response measures as prescribed by Total.

The release will be defined using several parameters which will include:

Spill constituents (oil and gas fractions, condensate, etc.)
Release rate (constant for all simulations)
Release duration (constant for all simulations)
Surface response strategy (e.g., use of skimmers, booms, dispersants etc.)
Subsea dispersant injection (SSDI) strategy

11.8.3 MARINE ECOLOGY IMPACT STUDY

11.8.3.1 Impact Assessment

Assessment of potential routine impacts and unplanned events to marine biodiversity and associated ecosystem services (fishing, aquaculture, tourism, diving, etc.) induced by the proposed exploration and development activities and resulting disturbances to marine life and waste, discharges and emissions will be characterised and described in term of the type of impact (direct, indirect, secondary, cumulative, short-term, medium- or long-term, permanent or temporary, positive or negative), scope of impact, probability, duration, frequency and reversibility. Evaluation of impacts will be conducted in accordance with the methodology prescribed in the TEEPSA general specifications guideline document on Environmental Impact Assessment of EP Activities (TotalEnergies, 2015b).

The specialist will assist in identifying feasible alternatives to the project plan proposed by TEEPSA including alternative location sites, technology, and design options. All feasible alternatives will be evaluated and assessed in terms of their potential environmental & social impacts. The impact assessment will draw on findings from available reports, as well as the underwater noise modelling study, the drill cuttings discharge modelling study, and oil spill modelling study.

The assessment of noise impacts on different marine mammal groups will follow the recommendations of Southall et al. (2019), specifically Temporary Threshold Shift (TSS) and Permanent Threshold Shift (PTS) impact ranges calculated for the relevant marine mammal hearing groups will be used in conjunction with available information on marine mammal distribution and habitat use in the study area, to inform impact assessment and mitigation measures. Noise impacts on other marine taxa (fish and reptiles) will also be assessed based on predicted Sound Exposure levels (SELs) and Sound Pressure Levels (SPL) at different distances from the sound source (air gun array) in conjunction with available published data on underwater noise impacts and thresholds for these biotic groups. Noise impacts from the seismic survey activities as well as ancillary support activities (e.g., support vessel noise) will be assessed, as well as potential cumulative impacts (from other noise generation in the study areas).

The assessment of impacts on benthic habitats will be informed by available data on the receiving environments (identification of sensitive receptors) and from the outputs of the Drill Cuttings Dispersion Modelling Report and the Oil Spill Modelling Report (extent, intensity, duration and probability of impacts). Similarly, potential impacts on pelagic and shoreline habitats will be informed by these dispersion modelling studies.

A preliminary investigation reveals that Block 11B/12B overlaps with the activities of at least seven commercial fishery sectors including the Large pelagics, Hake deep Sea Trawl, Mid water trawl, Hake Long Line, South Coast Rock Lobster, Large Pelagic sectors and the Small Pelagic sector. Potential impacts on any fisheries operating in the study area will be assessed by comparison of

spatially referenced catch and effort data with the proposed project activities and predicted potential impacts (e.g., oil spill or area of potential seismic impacts on fisheries catch-per-unit-effort).

The potential impact of infrastructure to be placed on the seabed (e.g., wellheads, instrument moorings) and any resulting exclusion zones on fisheries will also be assessed based on the historical catch and effort made within these areas relative to the regional or national total catch and effort distributions. This spatial analysis will be undertaken using ARC-GIS and will inform both the assessment of potential impacts on fisheries and mitigation measures.

11.8.4 CLIMATE CHANGE AND AIR QUALITY STUDY

The climate change risk assessment will assess (GHG) emissions on climate, and the vulnerability of the Project to predicted climate changes. This will include the assessment of a set of feasible alternatives to the proposed Project.

11.8.4.1 Legal Context

The study will be contextualised within national climate change/GHG legislation (e.g., GHG reporting regulations and proposed Climate Change Act) and global commitments. There will be further consideration of the Nationally Determined Contribution (NDC), the Integrated Resource Plan (IRP), and DEAT's Adaptation Scenarios conducted for the Third National Communication under the UNFFC.

11.8.4.2 Baseline Assessment

The baseline assessment will comprise an analysis of the global context (i.e., the global atmosphere as the receiving environment) based on IPPC reporting of global emission trajectories and impacts. Additionally, the study will be contextualised within the national to local contexts in terms of climate change projections, considering expected changes in carbon dioxide levels and ocean acidity, air and water temperature, precipitation patterns, the rate of sea level rise, storm intensity, and wave regime, all of which could have implications for the Project.

11.8.4.3 Climate Change Impact Assessment

The project impact assessment will provide a clear designation of study boundaries, the identification of GHG emissions sources, and the selection of emission factors (with reference to IPCC, 2006, and South Africa's Draft Methodologi Emissions). Emission estimation will follow for Scope 1 (direct), Scope 2 (imported electricity generation), and Scope 3 (indirect) emissions. The impact of cumulative emissions will be assessed relative to South African and global inventories. Climate change impact mitigation will be considered, with reassessment of impacts under a mitigated scenario.

11.8.4.4 Air Quality Specialist Opinion

The air quality specialist opinion will consider for emission sources and associated pollutants identified in exploration activities, and the likely severity of emissions. It is anticipated key sources will comprise fuel combustion in generators and other equipment used for the drilling units and vessel emissions.

11.8.4.5 Climate Change Risk Assessment

This assessment will consider Project exposure to climate changes (changes in carbon dioxide levels and ocean acidity, air and water temperature, precipitation patterns, the rate of sea level rise, storm intensity, and wave regime), the Project sensitivity to such, and any potential climate change adaptations. There will be further assessment of transitional risks, e.g., proposed carbon taxes.

11.8.5 SOCIO-ECONOMIC IMPACT ASSESSMENT

A detailed assessment with due consideration of risks and impacts relating to construction, production, and decommissioning activities will be conducted. Considering that most project activities are offshore, the socio-economic impact assessment will focus on sea and coastal users. It will also consider the closest coastal community to the offshore project area. The following aspects will be assessed:

Population and demography.
Community health, safety and security, including maritime safety.
Human Rights.
Community structure and social dynamics.
Vulnerable PACs and PAPs.
Intra- and inter-community relations.
Lifestyle and cultural habits.
Economy and employment, including fisheries
Basic services such as health, education, access to water and electricity.
Local infrastructure, including the port infrastructure
Living and housing conditions.
Maritime navigation
Coastal and offshore cultural, archaeological, and religious sites.
Sean and coastal tourism and recreational activities
Other sea and coastal uses
Seascape
Social and political tension in the communities.
Conflict in the Project area.

The issues raised and comments made by I&APs in the stakeholder engagement process will be used to inform the ESIA.

11.8.6 ECONOMIC IMPACT ASSESSMENT

The purpose of the economic impact assessment will be to quantify and assess the potential positive and negative economic impacts that could ensue from the proposed development in the context of the affected economies.

11.8.6.1 Scope

Considering the project background, the following will be included in the ESIA:

Delineate the zones of influence in consultation with other specialists on the team.
Determine the affected industries and economic activities located in the zone of influence and identify sensitive receptors and beneficiaries within the delineated study areas, i.e., people, land

uses and economic activities that could be directly or indirectly negatively affected by the proposed project or benefit from it.
Determine the data required to assess potential impacts and review secondary data available to determine the suitability of the data for the analysis and the data gaps.
Conduct a site visit and collect primary economic data (through personal or telephonic interviews) of the parties that may be affected directly or indirectly (positively or negatively) by the project to address data gaps.
Create an economic profile of the potentially affected and benefiting environment, which would then represent a description of the existing impacts exerted on the zones of influence and would be used to assess the potential changes ensued from the proposed project. Potential impacts on fisheries will specifically be addressed.
Assess the sensitivities of the identified sensitive receptors relative to the proposed development and analyse potential positive and negative economic effects of the proposed development on the local and regional economic activities.
Assess cumulative effects of the project given the existing and planned developments in the area.
Evaluate the potential positive and negative i
methodology.
Develop a mitigation plan by proposing mitigation measures for negative effects and enhancement measures for positive impacts.
Provide a reasoned opinion whether he proposed project should be authorised and whether the associated activities are acceptable from the economic perspective.
Compile scoping and impact assessment reports.

11.8.6.2 Approach

Economic impact refers to the effects of the proposed project or intervention on the level of economic activity on the local, regional, national and even international communities. The impact is as result of some form of external intervention in the economy. The intervention can be in the form of new investment in, for example, technology, transport facilities, social development, housing, business development, etc. It can furthermore also be in terms of changes in production processes or downscaling of activities. The economic impacts are measured for each of the phases of the project:

Exploration Activities;
Development Activities; and
Decommissioning of the project.

The economic effects may be categorised in terms of direct and indirect impacts on:

Level of economic activity (Gross value Add)
Job creation
Personal income (including wages)
Business output (or sales volume)
Wealth creation / loss including property value changes.
Impact on loss of current economic activities
Settlement areas (formal, informal and traditional housing).

These measures are indicators of improvement or degradation in the economic well-being of residents that is usually a goal of investment projects. The net economic impact is usually viewed as the expansion or contraction of an area's econom expansion or contraction of) a facility, project, program, or the whole industry.

There may also be interest in assessing the economic impact of an already existing facility, policy, or project. This is usually viewed in terms of the jobs, income and/or business sales that are directly or indirectly caused by the change.

Generally, the focus of the economic impact assessment is to apply project information and set up an economic impact simulation model to fully capture and assess the impact on local, regional and national levels. The impact assessment usually addresses the quantification of, inter alia:

- Capital projects
- Employment expenditure
- Operational revenue stream
- Operational expenditure
- Other relevant transaction flows
- Development spending

All of the above will imply changes in the economy and need to be identified and captured in an impact simulation model identifying impacts locally, regionally and nationally in terms of, inter alia:

- Increased production
- Diversity in employment creation
- Increased revenue
- Small business impact
- Skills requirements
- Increased taxes
- Sectoral impacts
- Poverty alleviation

The approach to undertaking a full ESIA, will comprise of the following two major phases:

Scoping phase: During this phase, the potential zone of influence associated with the proposed exploration and development phase will be defined and will be informed by the extent of potential visual, noise and other envisaged environmental, social, and economic impacts. Relevant government policies and other strategic documents will be reviewed and alignment of the proposed project with these strategic documents assessed. Secondary data and primary data will be gathered to describe the interests and needs of the public as well as socio-economic environment related to the zone of influence, within which the proposed development is to be established. A site visit will be undertaken to meet with the potentially directly affected parties and indirectly affected parties, where necessary. Upon collection of primary and secondary information, socio-economic profile will be developed, and concerns raised by the interested and affected parties will be considered in identifying the potential impacts. An approach to investigation of these impacts and additional data that may need to be collected will also be proposed.

ESIA phase: During this phase, a detailed assessment of the potential impacts will be undertaken. The assessed impacts will cover the effects of the proposed development on numerous capitals, such as natural capital, human capital, financial capital, and institutional and political capital. All economic impacts identified will be assessed and categorised in line with the rating provided by the environmental specialist. A special attention will be paid to the identification and analysis of cumulative effects of the project, as required by the EIA Regulations. A mitigation plan will be formulated whereby recommendations to reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts will be provided.

11.8.7 CLOSURE STUDY IN TERMS OF FINANCIAL PROVISION

11.8.7.1 Environmental risk assessment

An inventory of environmental risks that may occur during closure of the proposed project activities including all infrastructure, will be compiled based on available risks assessments from TEEPSA, previous experience, and other sources.

The purpose and key outcome of the ERA will be to ascertain the significance of the individual closure related risks before and after mitigation, focussing on potential residual or latent risks that could require ongoing management and maintenance once the project components have been fully decommissioned and required remediation undertaken.

11.8.7.2 Closure plan

The Closure Plan will be compiled in line with the appropriate requirements of GN. R.1147, which will include a regulatory checklist that cross references to the relevant sections of the report where these requirements are addressed.

The proposed Closure Plan report structure and key content requirements will be developed. The key aspects to be covered by the report will include the following, amongst others:

Project description and summary of the receiving environment including key considerations pertaining to closure
Description of the anticipated closure scenario i.e., a summary of the end state expected to prevail after closure of the project
Findings of the ERA, including summary of key closure risks, as well as those risks that may require post-closure monitoring and management (residual/latent risks)
Closure objectives, detailed decommissioning, demolition and remediation measures and associated relinquishment performance criteria
Post-closure monitoring, and related ongoing/post-closure requirements to manage long-term risks
Organisational structures and capacity to manage and implement the proposed Closure Plan
Information gaps and recommendations to improve future updates
Summary of the closure costs estimate, including key technical and financial parameters and assumptions that underpin the closure costs.

Specific sections of the Closure Plan requirements prescribed in GN. R. 1147 will however not be relevant to the project, notably requirements dealing with operational rehabilitation, as well as next land use planning. Operational rehabilitation will not be conducted, as wells for exploration will be decommissioned at the end of the well and production wells will only be capped and sealed once

gas production has ceased, and other infrastructure will where feasible be retrieved, or otherwise decommissioned in-situ or left on the seabed. The deep-sea infrastructure that is decommissioned or left in situ will also not impact or change maritime activities taking place after closure.

11.8.8 CULTURAL HERITAGE IMPACT ASSESSMENT

TEEPSA commissioned a Cultural Heritage Impact Assessment (CHIA) for Block 11B/12B. The CHIA was informed by anthropological field research conducted from October 2020 to September 2022. The scope of the research was to investigate human cultural heritage and spiritual connections to the oceans and coasts, and how such practices and beliefs may be impacted by the normal operations and unplanned events related to production in Block 11B/12B. The areas in which research was conducted includes selected sites for Knysna in the Western Cape to Cintsa in the Eastern Cape. The results of the CHIA will be included in the ESIA.

11.9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An Environmental and Social Management Plan (ESMP) will compile all mitigation measures identified in the Environmental Impact Assessment experts and describe the monitoring system to evaluate the performance of these measures, including the identification of those responsible for these measures.

Additionally, specific plans will also be prepared as supplementary documents or appendices to the ESIA report.

The following key aspects will be compiled for inclusion in the ESMP to ensure mitigation of the project impacts during all phases of the project:

Summary of key sensitivities and implication for the Project
Marine Ecosystems and Biodiversity Management Plan including GBIF format reporting when relevant
Environmental Monitoring Plan
Fisheries Management Plan (including Livelihood Restoration if relevant), if required
Decommissioning Plan framework

An Emergency Response and Oil Spill Contingency Plan will also be required as a standalone document. It is not covered by this scope.

11.10 PRELIMINARY MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

The proposed Project will incorporate measures aimed at mitigating and managing impacts. This will assist in the development of a more effective environmental management tool for the proposed operations. The ESIA/ESMP will allow for a greater level of alignment in terms of management measures and monitoring reporting requirements. Detailed mitigation and management measures for identified positive and negative impacts associated with the proposed Project will be developed and included in the ESIA/ESMP report.

Each impact identified within the impact assessment process will be evaluated in terms of whether a mitigation measure can be applied or not, and what kinds of mitigation measures can be applied. This will be reported in detailed impact assessment table that will be completed for the ESIA/ESMP. Therefore, each impact, whether the significance is low or high, will have a mitigation measure stipulated where applicable. Furthermore, a post-mitigation assessment of the significance of the impact will also be completed, which will provide an indication of the effectiveness of said mitigation measure.

Table 11-1 below provides a summary of the preliminary mitigation measures that will be further investigated.

Table 11-1 –Preliminary Mitigation Measures

Activity	Phase	Typical mitigation measures
Sonar surveys, seafloor sampling, coring surveys, exploration and development drilling	Pre-construction / exploration	Ensure the following plans are prepared and/ or measures are implemented: • Avoidance of sensitive areas • Shipboard Oil Pollution Emergency Plan • Clearance surveys with ROV • Emergency Response Plan (including MEDIVAC plan) • South African Search and Rescue Manual • Waste Management Plan. The plan must comply with legal requirements (including MARPOL) for waste management and pollution control (for air and water quality levels at sea) and ensure "good housekeeping" and monitoring practices • Oil spill contingency plan specific to the operations • Incident Management and Reporting • Prevent collisions by ensuring that vessels display correct signals by day and lights by night (including twilight) • Maintain 500 m safety zone around vessels through Notices to Mariners and Navigation Warnings • Ensure all hazardous materials are correctly labelled, stored, packed and sealed with proper markings for shipping • Minimise disturbance / damage to marine life during oil bunkering refuelling at sea • Ensure all crew is trained in spill management • Surveying must only commence once it has been confirmed that there is no large cetacean activity within 500 m of the vessel • Consider limiting certain exploration activities to period of low cetacean activity • Implement a "ssstoafrtt" p rappropriated for VSP activitise r e • Us of high efficiency burners for well testing • Use of low toxicity drilling fluids for drilling operations • Monitoring of discharges to sea

Activity	Phase	Typical mitigation measures
		• Continuous stakeholder engagement, especially with fisheries and coastal communities • Develop and implement a project-specific grievance mechanism and ensure effective functioning. • Consultation with local business organisations and interested stakeholders regarding procurement policies and specific needs, services and products that TEEPSA will require. • Maximise local recruitment as far as possible. • Curtail the appointment of migrants, as this may lead to increase social conflict and mobilisation against TEEPSA. • Maximise the use of local service providers. This aspect could be formalised by the setting of specific local procurement targets. Contractors must also adhere to these obligations. • Encourage and promote small enterprises to develop or provide some of the sources and materials required by TEEPSA. • Provide realistic and practical mentorship to local small businesses that do or could provide services to TEEPSA. • Implement the strategic plans for providing employment security and the local economic development projects indicated in the TEEPSA SLP
• Movement of vessels from procurement, importation and transportation of equipment and bulk materials • Transit of drilling unit and supply vessels to site • Routine maintenance	Construction and Production	• Optimise rig positioning, rig movement and the logistics (number of trips required to and from the onshore logistics base) in order to lower fuel consumption. • All measures prescribed by SAMSA must be adhered to, to minimise risk of collision of marine traffic
• Discharge / exchange of ballast water • Routine maintenance	Construction and Production	• Compliance with requirements of the 2004 International Convention for the Con Ballast Water and Sediments. • Ensure that the drilling vessel has in place a ballast water management plan
• Pipeline laydown including trenching and support structures • Installation of subsea manifolds within line tees,	Construction	• Pipeline routing should be optimised to minimise the amount of trenching required, which will also minimise the unavoidable impacts of increased suspended sediment and sedimentation rates in the vicinity of pipelaying activities • Conduct pre-construction site surveys (with ROV) and implement buffer around sensitive hardgrounds, vulnerable habitats and cultural heritage material.

Activity	Phase	Typical mitigation measures
flowlines, subsea distribution units		• Ensure that installation of pipelines and manifolds locations are not located within a 1 km radius of any vulnerable habitats (e.g., hard grounds), species (e.g., cold corals, sponges) or structural features (e.g., rocky outcrops).
• Presence and operation of drilling unit and supply vessels (including waste management, air emissions, water intake and discharge to sea) • Routine maintenance	Construction and Production	• Ensure minimal generation and disposal of excess cement and cement additives. All disposals at sea should strictly adhere to best management practices recommended in MARPOL 73/78 • Ensure that the drilling vessel has in place a ballast water management plan • Comply with legislative obligations for effluent discharge • Sewage will be comminuted before discharged to sea in accordance with MARPOL standards • Ensure adequate maintenance of diesel motors and generators • Handle and store chemicals in such a way so as to minimise risk of leaks or spills • Reduce volumes of greenhouse gases emitted • Respond to any spills or leaks in such a way that environmental damage does not occur • Provide training and awareness to crew members • Initiate waste minimisation system onboard • Secure on-board storage and safe transfer of solid waste • Stakeholder engagement, especially with fisheries and coastal communities
• Lighting of drilling unit	Production	• Minimise non-essential lighting on all platforms to reduce nocturnal faunal attraction. However, such measures should not undermine work safety aspects or concerns.
• Operation of helicopters	Production	• Minimum flying heights and flight paths to avoid sensitive habitats. • No hovering or circling over whales, dolphins, sharks, turtles or aggregations of sea birds
• Well drilling (including ROV site selection, installation of conductor pipes; wellhead, BOP and riser system, well logging and plugging)	Production	• Pre-drilling site surveys (with ROV) and implement buffer around sensitive hardgrounds, vulnerable habitats and cultural heritage material. • Usage of low-toxicity drilling fluids and cement. • Implement monitoring and management measures in accordance with normal well control practices to assist in detection and control of uncontrolled releases

Activity	Phase	Typical mitigation measures
• Discharge of cuttings and drilling fluid, and residual cement	Production	• Water based muds (drilling fluids) will be used
• Well logging, flow testing	Production	• Use high-efficiency flare to maximise combustion of hydrocarbons • Produced water should be separated from hydrocarbons to be burnt and treated on board before being discharged to sea or stored and shipped for offshore disposal/treatment
• Operation of subsea infrastructure (pipelines, manifolds, well heads)	Production	• All subsea infrastructure will be subjected to scheduled inspection and maintenance • Oil spill contingency plan • Blowout contingency plan • Emergency response plan
• Abandonment of well(s) • Demobilisation of drill unit & supply vessels • Demobilisation of production manifolds, flowline and risers • Demobilisation of Subsea Distribution Units and power cable(s) • Retrieval of flowline end terminations units and risers • Pigging of production flowline incl. subsea tie-in	Decommissioning	• The production wells (deep water) will be plugged and abandoned in situ. • Production manifolds inline tees (deep water) will be left on the seabed following visual inspection. • Flowline end termination units (shallow water) will be retrieved. • Production flowline including subsea tie-ins will be pigged to remove potential contaminants which will be collected and safely disposed of, after which the open-ended pipeline will be left on the seabed to naturally corrode from the inside (as the outer surface is corrosion-protected). • Subsea trenching to bury pipe components in shallow water will be profiled where required, deep-sea concrete pipe supports/anchors will remain in situ. • Production risers (shallow water) will be retrieved. • Subsea distribution unit (connector with the subsea umbilical through the UTA, distributing hydraulic supplies, electrical power supplies, signals, and injection chemicals to the subsea facilities) (deep water) will be left on seabed. • Limited new connection infrastructure and equipment to be installed on the F-A Platform will be decommissioned as part of the overall decommissioning and demolition of the platform at the end of the overall project lifespan.

11.11 PUBLIC PARTICIPATION DURING THE IMPACT ASSESSMENT PHASE

Public participation during the impact assessment phase of the ESIA will entail a review of the findings of the ESIA, presented in the ESIA Report and ESMP, and the specialist studies. These reports will be made available for public comment for a period of at least 30 days. Public and focus group meetings will also be convened.

11.11.1 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

All registered I&APs will be advised timeously and by e-mail, bulk SMS fax or telephone call of the availability of these reports, which they could designated public places or request from WSP's P to comment either in writing (mail or e-mail) or by telephone. Ample notification of due dates will be provided. I&APs will also be notified of the details of the public meetings.

11.11.2 ENGAGEMENT PROCESS TO BE FOLLOWED

All the issues, comments and suggestions raised during the comment period on the draft ESIA report/ESMP will be added to the CRR that will accompany the Final ESIA report/ESMP. The final ESIA report/ESMP will be submitted to the PASA for a decision on the proposed project.

On submission of the Final ESIA Report/ESMP to the authorities, a letter will be sent to every registered I&AP to inform them of the submission and the opportunity to request copies of the final reports.

11.11.3 INFORMATION PROVIDED TO I&APS

In addition to all the information provided in this scoping report, the project description, the description of the baseline environment, the results of the specialist assessments, the potential impacts identified, and the recommended mitigation measures will be provided to I&APs during the impact assessment phase.

12 ENVIRONMENTAL IMPACT ASSESSMENT

12.1 APPROACH TO IMPACT ASSESSMENT

The identification and assessment of environmental and social impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with a proposed project. Impacts are identified throughout the ESIA process by environmental and social assessment practitioners, from specialist studies and stakeholder engagement process, and refined as more detailed baseline information, modelling data or project design information is available. For consistency, the methodology proposed is the one implemented by SLR Consulting for TEEPSA recent offshore Exploration ESIA processes.

For potentially significant impacts or those of stakeholder concern, the impact identification and evaluation process involves the following main steps:

STEP 1: DEFINE AREA OF INFLUENCE:

The area of influence of the project is defined as a basis for defining the boundaries for baseline data gathering by taking into consideration the spatial extent of potential direct and indirect impacts of the project. Direct impacts of the project are typically located within a smaller area around the project activities (i.e., in the direct area of influence) while indirect impacts typically extend across a wider area and often relate to the social sphere of influence of the project and possible extend of an accidental oil spill deduced from modelling studies.

STEP 2: IDENTIFICATION OF POTENTIAL IMPACTS

Potential impacts of a project are identified through a process of examining the potential for interactions between project activities and environmental and social receptors (or features). This requires consideration of the range of project activities across different phases of the project (planning, exploration, construction, operation and decommissioning) and the potential for interactions on each of the environmental receptors, features or aspects occurring in the project area of influence. The results are then presente format (Table 10-1). For each project activity, the degree of interaction is rated through colour coding the level and type of interaction in the matrix. This matrix approach to impact identification is designed to highlight where interactions may occur as a way of focussing the impact assessment.

STEP 3: COMPILE IMPACTS –IPF REGISTER

An impact-producing factor (IPF) register is typically prepared during the Scoping Phase as a basis for further elaborating the potential impacts identified through the initial impact identification stage. For each of the project activities, different aspects associated with the activity and their potential impacts are tabulated. This systematic approach provides a basis for planning the scope of specialist studies to ensure the correct information is obtained to conduct a detailed assessment of the project impacts. It also enables identification of the linkages between different specialist scopes and overlapping impacts, and where there are interdependencies on data and reporting to enable an integrated impact assessment. For instance, social specialists are typically reliant on other specialists for inputs such as water quality, air quality or underwater noise effects and this needs to be factored into work scopes and scheduling. The presentation of an IPF Register further provides stakeholders with a degree of confidence that the specialists and environmental assessment practitioners have adequately identified potential impacts at an early stage.

STEP 4: IMPACT EVALUATION

Evaluation of impact significance follows a stepwise process as set out below with reference to definitions in **Section 12.2.**

4A - Assign sensitivity ratings to receptors

The sensitivity of a receptor is defined on a scale of Very Low, Low, Moderate, High or Very High guided by the definitions for biophysical, ecological and social receptors in **Section 12.2.3.** These are derived from the baseline information, which shall be used to support the sensitivity ratings in the description of impact.

4B - Determine the impact magnitude ratings

Magnitude (or consequence) is determined based on a c "extent" of the designations set out in **Section 12.2.4** Magnitude is assigned to the pre-mitigation impact (i.e. before additional mitigation measures are applied but taking into account embedded controls specified as part of the project description) and residual impacts after additional mitigation is applied.

4C - Determine impact significance rating

The significance of an impact is a function of the intensity and the sensitivity of the impact determined using the matrix table in **Section 12.2.5** and is assigned to the predicted impact pre-mitigation and post-mitigation (residual) after considering all possible feasible mitigation measures in accordance with the mitigation hierarchy.

4D - Applying the Mitigation Hierarchy

Identification of mitigation measures in accordance with the mitigation hierarchy is done throughout the ESIA process with emphasis placed on avoiding significant impacts where feasible. The mitigation hierarchy, as specified in IFC Performance Standard 1, which is widely regarded as a best practice approach to managing risks, is based on a hierarchy of decisions and measures, as presented in Section 12.2.7.

Certain avoidance mitigation measures may be identified early in the Scoping Phase and become 'embedded' in the project design and specified in the project description (e.g., drilling sites may be confirmed to avoid sensitive sea floor areas or the timing of seismic surveys may avoid certain seasons). These embedded controls are not 'added' to the list of mi determine the post-mitigation significance. Additional mitigation measures may be identified during the impact assessment process and those agreed with the proponent will be used to assess the post-mitigation significance ratings.

4E - Assign additional ratings to describe the impact

Qualifying ratings are assigned to criteria such as probability (or likelihood of the impact occurring), confidence (in the impact prediction), mitigation potential, extent of resource loss (as defined in **Section 12.2.6**) reversibility of impact and potential for cumulative impacts.

12.2 DEFINITIONS OF IMPACT TYPES AND CRITERIA USED

12.2.1 IMPACT TYPES

Table 12-1 below defines the criteria used to categorise and describe impacts.

Table 12-1 –Impact Types and Criteria

Term	Definition
Nature of Impact	
Positive	An impact that is considered to represent an improvement to the baseline conditions or introduces a positive change to a receptor.
Negative	An impact that is considered to represent an adverse change from the baseline conditions or receptor or introduces a new adverse effect.
Neutral	An impact that has no or negligible effect on the receptor.
Type of impact can be:	Cause and effect relationship between the project activity and the nature of effect on receptor
Direct	Impacts that result from a direct interaction between a proposed project activity and the receiving environment. Sometimes referred to as primary impact.
Indirect	Impacts that are not a direct result of a proposed project, often produced away from or as a result of a complex impact pathway. Sometimes referred to as secondary impacts.
Induced	A type of indirect impact resulting from factors or activities caused by the presence of the Project but which are not always planned or expected
Residual	The impacts that remain after implementation of the project and all associated mitigation and other environmental management measures.

12.2.2 DEFINITIONS OF IMPACT ASSESSMENT CRITERIA AND CATEGORIES APPLIED

Definitions of the criteria used in assessing impact significance and the assigned categories, and the additional criteria used to describe the impacts, are summarised in Table 12-2 below.

Table 12-2 –Definitions of Impact Assessment Criteria and Categories

Criterion	Definition	Categories
Sensitivity	Sensitivity is a rating given to the importance and/ or vulnerability of a receptor (e.g., conservation value of a biodiversity feature or cultural heritage resource or social receptor)	Very Low Low Medium High Very High
Magnitude (or consequence)	A term describing the actual change predicted to occur to a resource or receptor caused by an action or activity or linked effect. It is derived from a combination of Intensity, Extent and Duration and considers scale, frequency and degree of reversibility	Very Low Low Medium High

Criterion	Definition	Categories
		Very High
Intensity	A descriptor for the degree of change an impact is likely to have on the receptor which considers scale and frequency of occurrence.	Very Low Low Medium High
Extent	The spatial scale over which the impact will occur.	Site Local National Regional International/Transboundary
Duration	Time scale over which the consequence of the effect on the receptor/s will last. [Note that this does not apply to the duration of the project activity]. The terms 'Intermitte describe the duration of an impact.	Short-term Medium-term Long-term Permanent
Probability	A descriptor for the likelihood of the impact occurring. Most assessed impacts are likely to occur but Probability is typically used to qualify and contextualise the significance of unplanned events or major accidents.	Unlikely Possible Likely Highly Likely Definite
Confidence	A descriptor for the degree of confidence in the evaluation of impact significance.	Low Medium High Certain
Mitigation potential	A descriptor for the degree to which the impact can be mitigated to an acceptable level.	None Very Low Low Medium High
Loss of Irreplaceable resources	A descriptor for the degree to which irreplaceable resources will be lost, fragmented or damaged.	Low Medium High
Reversibility	A descriptor for the degree to which an impact can be reversed.	Irreversible Partially Reversible Fully Reversible
Cumulative	A descriptor of the potential for an impact to have cumulative impacts to arise.	Unlikely Possible Likely Highly Likely Definite

12.2.3 DETERMINATION OF SENSITIVITY

Sensitivity is a term e.g., value of an ecological receptor or heritage resource) or e.g., ability of a social receptor to cope (with change) of a receptor to a project-induced change. It measure of the value, and level of adaptability dependence on, impacted resources to society and/ or local communities, as well as of consistency with policy (e.g., conservation) targets or thresholds.

Broad definitions of sensitivity ratings for social, ecological and physical/abiotic receptors are defined in Table 12-3 below. These are not exhaustive and may be modified on a case-by-case basis, as appropriate. Additional ratings can be developed for other receptors such as cultural heritage.

Table 12-3 –Sensitivity Categorisation and Description

Sensitivity Rating	Definition
Social Receptors	Individuals, communities or groups of stakeholders
Very Low	Receptors who are not vulnerable or susceptible to project-related changes and have substantive resources and support to understand and anticipate Project impacts. Such receptors have the ability to avoid negative Project impacts, or to cope with, resist or recover from the consequences of a such an impact with negligible changes to their lives, or will derive little benefit or opportunities from the project.
Low	Receptors who have few vulnerabilities and are marginally susceptible to project-related changes but still have substantive resources and support to understand and anticipate a Project impact. Such receptors are able to easily adapt to changes brought about by the project with marginal impacts on their living conditions, livelihoods, health and safety, and community well-being, or will derive marginal benefits or opportunities from the project.
Medium	Receptors have some vulnerabilities and are more susceptible to project-related changes given they only have moderate access to resources, support, or capacity to understand and anticipate a Project impact. Such receptors are not fully resilient to Project impacts but are generally able to adapt to such changes albeit with some diminished quality of life. For positive impacts, these receptors are likely to derive a moderate level of benefit or opportunities from the project.
High	Receptors are vulnerable and susceptible to project-related changes, and have minimal access to resources, support, or capacity to understand and anticipate a Project impact. Such receptors are not resilient to Project impacts and will not be able to adapt to such changes without substantive adverse consequences on their quality of life. For positive impacts, these receptors are likely to derive a substantial level of benefits or opportunities from the project.
Very High	Receptors are highly vulnerable and have very low resilience to project-related changes. By fact of their unique social setting or context, such receptors have a diminished or lack of capacity to understand, anticipate, cope with, resist or recover from the consequences of a potential impact without substantive external support.

Sensitivity Rating	Definition
	For positive impacts, receptors are likely to derive substantial benefits or opportunities from the project which could lead to significant and sustained improvement in their quality of life.
Ecological Receptor	Species, habitats or ecosystems including processes necessary to maintain ecosystem functions
Very Low	Species or habitats with negligible importance for biodiversity including habitats that are largely transformed or highly modified.
Low	Species or habitats listed as Least Concern (LC) on the International Union for Conservation of Nature (IUCN) Red List or on regional or national Red Lists and/or habitats or species which are common and widespread, of low conservation interest, or habitats which are degraded and qual international definitions (e.g., IFC or World Bank standards).
Medium	Species, habitats or ecosystems listed as globally Vulnerable (VU) or Near Threatened (NT) on IUCN Red List; or listed as VU or NT on national or regional Red Lists, or which meet the IUCN criteria based on expert-driven biodiversity planning processes. It includes habita ecosystems with important functional value in maintaining the biotic integrity of these habitats or VU or NT species.
High	Species, habitats or ecosystems listed as globally Endangered (EN) or Critically Endangered (CR) by IUCN or listed as EN/CR on national or regional Red Lists; or which meet IUCN criteria for range-restricted species[20] or which meet the definition of migratory and congregatory species[21], but which do not qualify as Critical Habitat based on IUCN Key Biodiversity Area thresholds[22]. It includes habitats or ecosystems which are important for meeting national conservation targets based on expert-driven national or regional systematic conservation planning processes, but which do not meet global IUCN thresholds. It can also include protected areas such as national parks, marine protected areas or ecological support areas designated for biodiversity protection containing species that are nationally or globally listed as EN or CR, or other designated areas important for the persistence of EN/CR species or habitats.

[20] Restricted range species are those with limited Extent Of Occurrence (EOO) (GN74):

- For terrestrial vertebrates and plants, a restricted-range species is defined as those species that have an EOO less than 50 000 square kilometres (km^2).
- For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100 000 km^2.
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart)

[21] Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem) (GN76). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.

[22] IUCN, A Global Standard for the Identification of Key Biodiversity Areas, 2016.

Sensitivity Rating	Definition
Very High	Species, habitats or ecosystems listed as globally Endangered (EN) or Critically Endangered (CR) by IUCN or listed as EN/CR on expert-verified national or regional Red Lists; or which meet IUCN criteria for range-restricted or migratory /congregatory species and which meet IUCN thresholds for Key Biodiversity Areas. It includes habitats or ecosystems which are of high importance for maintaining the persistence of species or habitats that meet critical habitat thresholds. Habitats of high sensitivity may typically include legally protected areas that meet IUCN categories 1, 1a and 1b[23], or KBAs or Important Bird Areas (IBAs) with biodiversity features that meet the IUCN KBA criteria and thresholds.
Physical Abiotic Receptors	Water quality, sediment quality, air quality, noise levels
Very Low	Receptors are highly resilient to project-induced change and changes remain undetectable and within any applicable thresholds.
Low	Receptors are resilient to project-induced change and changes, while detectable, are within the range of natural variation and remain within any applicable thresholds.
Medium	Receptors are moderately resilient to project-induced changes, but these changes are easily detectable, exceed the limit of the normal range of variation on an intermittent basis and / or periodically exceed applicable thresholds.
High	Receptors are vulnerable to project-induced change and changes are readily detectable, well outside the range of natural variation or occurrence, and regularly exceed any applicable thresholds.
Very High	Receptors are highly vulnerable to project-induced change and changes are easily detectable, fall well outside the range of natural variation or occurrence, and will continually exceed any applicable thresholds.

12.2.4 DETERMINATION OF MAGNITUDE (CONSEQUENCE)

12.2.4.1 Definitions of Criteria Used to Derive Magnitude (Consequence)

The term 'magnitude' (or consequence) describes predicted impact including:

- The nature of the change (what is affected and how);
- Its size, scale or intensity;
- Degree of reversibility; and
- Its geographical extent and distribution.

Taking the above into account, Magnitude (or Consequence) is derived from a combination of 'Intensity', 'Duration' and 'Extent'.

[23] IUCN, "Protected areas", https://www.iucn.org/theme/protected-areas/about/protected-area-categories

The criteria for deriving Intensity, Extent and Duration are summarised in Table 12-4 below.

Table 12-4 –Categorisation and Description for Intensity, Extent and Duration

Criteria	rating	description
Criteria for ranking of the INTENSITY of environmental impacts considering reversibility and scale	Very Low	Negligible change, disturbance or nuisance which is barely noticeable or may have minimal effect on receptors or affect a tiny proportion of the receptors.
	Low	Minor (Slight) change, disturbance or nuisance which is easily tolerated and/or reversible in the short term without intervention, or which may affect a small proportion of receptors.
	Medium	Moderate change, disturbance or discomfort caused to receptors or which is reversible over the medium term, and/or which may affect a moderate proportion of receptors.
	High	Prominent change, or large degree of modification, disturbance or degradation caused to receptors or which may affect a large proportion of receptors, possibly entire species or community and which is not easily
Criteria for ranking the EXTENT / SPATIAL SCALE of impacts	Site	Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area.
	Local	Impact is confined to within the project concession / licence area and its nearby surroundings.
	Regional	Impact is confined to the region, e.g., coast, basin, catchment, municipal region, district, etc.
	National	Impact may extend beyond district or regional boundaries with national implications.
	International	Impact extends beyond the national scale or may be transboundary.
Criteria for ranking the DURATION of impacts	Short Term	The duration of the impact will be < 1 year or may be intermittent.
	Medium Term	The duration of the impact will be 1-5 years.
	Long Term	The duration of the impact will be 5-25 years, but where the impact will eventually cease either because of natural processes or by human intervention.
	Permanent	The impact will endure for the reasonably foreseeable future (>25 years) and where recovery is not possible either by natural processes or by human intervention.

12.2.4.2 Determining Magnitude (or Consequence) Ratings

Once the intensity, extent and duration are defined based on the definitions set out in Section 12.2.5.2, the magnitude of negative and positive impacts is derived based on Table 12-5 below. It should be noted that there may be times when these definitions may need to be adjusted to suit the specific impact where justification should be provided. For instance, the permanent loss of the only known occurrence of a species in a localised area c rating but could, in this instance, warrant a Very High rating. The justification for amending the rating should be indicated in the impact table.

Table 12-5 –Magnitude Determination

Magnitude rating	Description
Very High	Impacts could be EITHER: of **high intensity** at a **regional level** and endure in the **long term**; OR of **high intensity** at a **national level** in the **medium** or **long term**; OR of **medium intensity** at a **national level** in the **long term**.
High	Impacts could be EITHER: of **high intensity** at a **regional level** and endure in the **medium term**; OR of **high intensity** at a **national level** in the **short term**; OR of **medium intensity** at a **national level** in the **medium term**; OR of **low intensity** at a **national level** in the **long term**; OR of **high intensity** at a **local level** in the **long term**; OR of **medium intensity** at a **regional level** in the **long term**.
Medium	Impacts could be EITHER: of **high intensity** at a **local level** and endure in the **medium term**; OR of **medium intensity** at a **regional level** in the **medium term**; OR of **high intensity** at a **regional level** in the **short term**; OR of **medium intensity** at a **national level** in the **short term**; OR of **medium intensity** at a **local level** in the **long term**; OR of **low intensity** at a **national level** in the **medium term**; OR of **low intensity** at a **regional level** in the **long term**.
Low	Impacts could be EITHER: of **low intensity** at a **regional level** and endure in the **medium term**; OR of **low intensity** at a **national level** in the **short term;** OR of **high intensity** at a **local level** and endure in the **short term**; OR of **medium intensity** at a **regional level** in the **short term;** OR of **low intensity** at a **local level** in the **long term**; OR of **medium intensity** at a **local level** and endure in the **medium term**.
Very Low	Impacts could be EITHER: of **low intensity** at a **local level** and endure in the **medium term**; OR of **low intensity** at a **regional level** and endure in the **short term**; OR of **low** to **medium intensity** at a **local level** and endure in the **short term**. OR **Zero** or **very low intensity** with any combination of extent and duration.

* Note: For any impact that is considered to be "Transnational", "National" ratings, respectively. For impacts at the

12.2.5 DETERMINATION OF IMPACT SIGNIFICANCE

12.2.5.1 Matrix to Derive Impact Significance

The significance of an impact is based on expert judgement of the sensitivity (importance or vulnerability) of a receptor and the magnitude (or consequence) of the effect that will be caused by a project-induced change.

In summary, the impact assessment method is based on the following approach:

Significance = Magnitude (or Consequence) x Sensitivity

Where Magnitude (or Consequence) = Intensity +Extent + Duration

Once ratings are applied to each of these parameters the matrix presented in Table 12-6 is used to derive Significance

Table 12-6 –Matrix for Determining Significance

		SENSITIVITY				
		VERY LOW	**LOW**	**MEDIUM**	**HIGH**	**VERY HIGH**
MAGNITUDE OR CONCEQUENCE	**VERY LOW**	NEGLIGIBLE	NEGLIGIBLE	VERY LOW	LOW	LOW
	LOW	VERY LOW	VERY LOW	LOW	LOW	MEDIUM
	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	HIGH
	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	VERY HIGH
	VERY HIGH	HIGH	HIGH	HIGH	VERY HIGH	VERY HIGH

12.2.5.2 Definitions of Significance Ratings

Broad definitions of impact significance ratings and criteria to be weighed up against potential long- term socioeconomic benefits of the project to inform project authorisation. 'Very High' significance requires careful examination of offset feasibility and confirmation that an offset is possible prior to decision-making. Where there are residual biodiversity impacts of

Table 12-7 –Definition of Significance Ratings

SIGNIFICANCE RATING	INTERPRETATION
VERY HIGH	Impacts where an accepted limit or standard is far exceeded, changes are well outside the range of normal variation, or where long-term to permanent impacts of large magnitude (or consequence) occur to highly sensitive resources or receptors. For adverse residual impacts of very high significance, there is no possible further feasible mitigation that could reduce the impact to an acceptable level or offset the impact, and natural recovery or restoration is unlikely. The impact may represent a

SIGNIFICANCE RATING	INTERPRETATION
	possible fatal flaw and decision-making will need to evaluate the trade- offs with potential social or economic benefits. Positive social impacts of very high significance would be those where substantial economic or social benefits are obtained from the project for significant duration (many years).
HIGH	Impacts where an accepted limit or standard is exceeded; impacts are outside the range of normal variation or adverse changes to a receptor are long-term. Natural recovery is unlikely or may only occur in the long- term and assisted and ongoing rehabilitation is likely to is required to reduce the impact to an acceptable level. High significance residual impacts warrant close scrutiny in decision-making and strict conditions and monitoring to ensure compliance with mitigation or other compensation requirements. Positive social impacts of high significance would be those where considerable economic or social benefits are obtained from the project for an extended duration in the order of several years.
MEDIUM	Moderate adverse changes to a receptor where changes may exceed the range of natural variation or where accepted limits or standards are exceeded at times. Potential for natural recovery in the medium-term is good, although a low level of residual impact may remain. Medium impacts will require mitigation to be undertaken and demonstration that the impact has been reduced to as low as reasonably practicable (even if the residual impact is not reduced to Low significance). Positive social impacts of medium significance would be those where a moderate level of benefit is obtained by several people or a community, or the local, regional or national economy for a sustained period, generally more than a year.
LOW	Minor effects will be experienced, but the impact magnitude (or consequence) is sufficiently small (with and without mitigation) and well within the range of normal variation or accepted standards, or where effects are short-lived. Natural recovery is expected in the short-term, although a low level of localised residual impact may remain. In general, impacts of low significance can be controlled by normal good practice but may require monitoring to ensure operational controls or mitigation is effective. Positive social impacts of low significance would be those where a few people or a small proportion of a community in a localised area may benefit for a few months.
VERY LOW	Very minor effects on resources or receptors are possible but the predicted effect represents a minimal change to the distribution, presence, function or health of the affected receptor, and no mitigation is required.
NEGLIGIBLE	Predicted impacts on resources or receptors of very low or low sensitivity are imperceptible or indistinguishable from natural background variations, and no mitigation is required.

12.2.6 ADDITIONAL ASSESSMENT CRITERIA

Additional criteria that are taken into consideration in the impact assessment process and specified separately to further describe the impact and support the interpretation of significance, include the following:

Probability (Likelihood) of the impact occurring (which is considered mainly for unplanned events);
Degree of Confidence in the impact prediction;
Degree to which the impact can be mitigated;

Degree of Resource Loss (i.e., the extent to which the affected resource/s will be lost, considering irreplaceability); and
Reversibility –the degree to which the impact can be reversed.
Cumulative Potential –potential for cumulative impacts with other planned projects or activities.

Definitions for these supporting criteria are indicated in Table 12-8 below.

Table 12-8 –Categorisation and Description of Additional Assessment Criteria

CRITERIA	RATING	DESCRIPTION
Criteria for determining the PROBABILITY of impacts	UNLIKELY	Where the possibility of the impact to materialise is very low either because of design or historic experience, i.e., ≤ 5% chance of occurring.
	POSSIBLE	Where the impact could occur but is not reasonably expected to occur i.e., 5- 35% chance of occurring.
	LIKELY	here there is a reasonable probability that the impact would occur, i.e., >35 t o75%≤ chance of occurring.
	HIGH LIKELY	Where there is high probability that the impact would occur i.e., >75 to <99% chance of occurring.
	DEFINITE	Where the impact would occur regardless of any prevention measures, i.e. 100% chance of occurring.
Criteria for determining the DEGREE OFCONFIDENCE of the assessment	LOW	Low confidence in impact p
	MEDIUM	Moderate confidence in impact prediction (between 35% and ≤ 70%)
	HIGH	High confidence in impact prediction (> 70%).
	CERTAIN	Absolute certainty in the impact prediction (100%)
Criteria for the DEGREE TO WHICH IMPACT CAN BE MITIGATED	NONE	No mitigation is possible or mitigation even if applied would not change the residual impact.
	VERY LOW	Some mitigation is possible but will have marginal effect in reducing the residual impact or its significance rating.
	LOW	Some mitigation is possible and may reduce the residual impact, possibly reducing the impact significance.
	MEDIUM	Mitigation is feasible and will reduce the residual impact and may reduce the impact significance rating.
	HIGH	Mitigation can be easily applied or is considered standard operating practice for the activity and will reduce the residual impact and impact significance rating.
Criteria for DEGREE OF	LOW	Where the activity results in a marginal effect on an irreplaceable resource.

CRITERIA	RATING	DESCRIPTION
IRREPLACEABLE RESOURCE LOSS	MEDIUM	Where an impact results in a moderate loss, fragmentation or damage to an irreplaceable receptor or resource.
	HIGH	Where the activity results in an extensive or high proportion of loss, fragmentation or damage to an irreplaceable receptor or resource.
Criteria for REVERSIBILITY - the degree to which an impact can be reversed	IRREVERSIBLE	Where the impact cannot be reversed and is permanent.
	PARTIALLY REVERSIBLE	Where the impact can be partially reversed and is temporary
	FULLY REVERSIBLE	Where the impact can be completely reversed.
Criteria for POTENTIAL FOR CUMULATIVE IMPACTS –the extent to which cumulative impacts may arise from interaction or combination from other planned activities or projects	UNLIKELY	Low likelihood of cumulative impacts arising.
	POSSIBLE	Cumulative impacts with other activities or projects may arise.
	LIKELY	Cumulative impacts with other activities or projects either through interaction or in combination can be expected.

12.2.7 APPLICATION OF THE MITIGATION HIERARCHY

A key component of this ESIA process is to explore practical ways of avoiding or reducing potentially significant impacts of the proposed project. These are commonly referred to as mitigation measures and are incorporated into the proposed project as part of the ESMP. Mitigation is aimed at preventing, minimising or managing significant negative impacts to as low as reasonably practicable (ALARP) and optimising and maximising any potential benefits of the proposed project. The mitigation measures are established through the consideration of legal requirements, best practice industry standards and specialist input from the ESIA team.

The mitigation hierarchy, as specified in IFC Performance Standard 1, which is widely regarded as a best practice approach to managing risks, is based on a hierarchy of decisions and measures, as presented in Figure 12-1 and described in Table 12-1. This is aimed at ensuring that wherever possible potential impacts are mitigated at source rather than mitigated through restoration after the impact has occurred. Any remaining significant residual impacts are then highlighted, and additional actions are proposed.

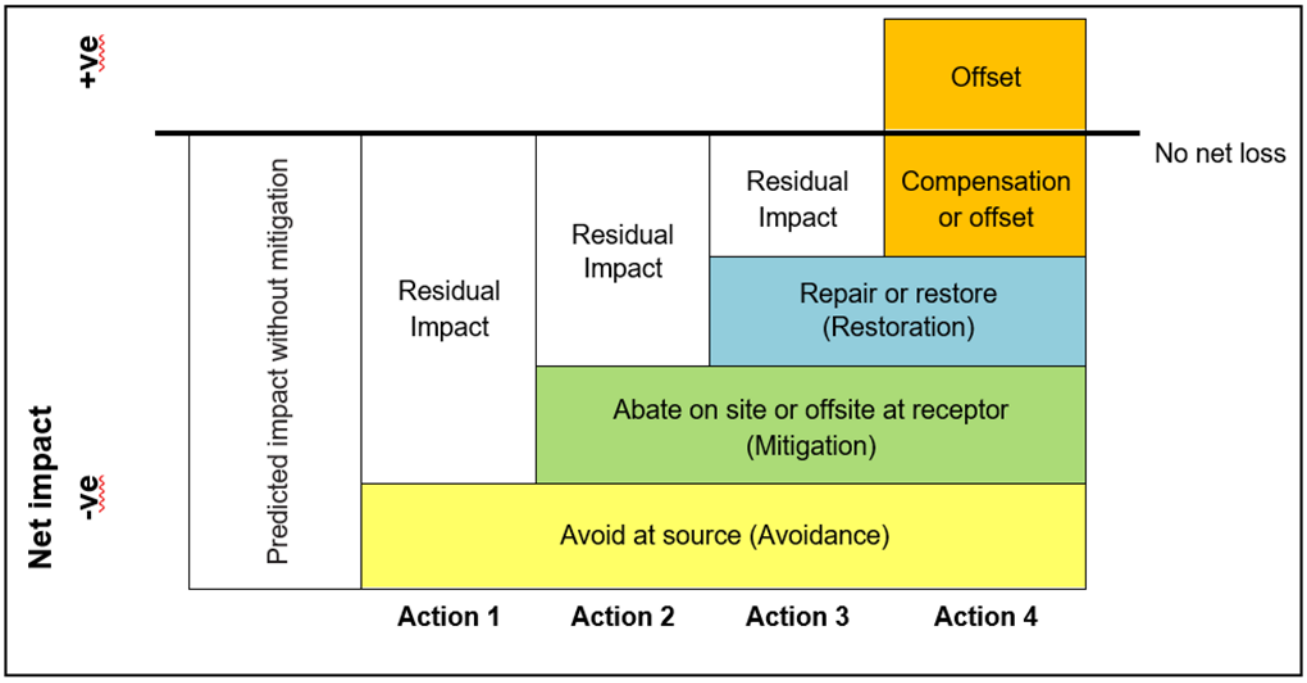


Figure 12-1 - Mitigation Hierarchy

Adapted from: www.thebiodiversityconsultancy.com

Table 12-9 –Sequential Application of the Mitigation Hierarchy

AVOID AT SOURCE	Avoiding or reducing at source is essentially 'de feature causing an impact is designed out (e.g., a waste stream is eliminated).
ABITE ON SITE	This involves adding something to the basic design or procedures to abate the impact (of-t-of-np icpael'l)e dœ.g., reduced waste volume) and is referred to as minimisation Pollution controls fall within this category.
ABATE OFFSITE / AT RECEPTOR	If an impact cannot be abated on-site then measures can be implemented off-site –an example disposing of waste generated on-board at a proper waste facility onshore. Measures may also be taken to protect the receptor.
REPAIR OR RESTORE	Some impacts involve unavoidable damage to a resource, e.g., shoreline pollution arising from an oil spill. Repair essentially involves restoration and reinstatement type measures, such as clean-up of the shoreline
COMPENSATE OR OFFSET	Where other mitigation approaches are not possible or fully effective, then compensation, in some measure, for loss, damage and general intrusion might be appropriate. An example could be compensation for loss of earnings if fisheries were to be permanently impacted by a Project activity.

13 ADDITIONAL INFORMATION

13.1 THE POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES

Refer to Section 8 for the preliminary positive and negative impacts identified for the proposed Project. A detailed assessment of the potential positive and negative impacts associated with the project will be developed and included in the ESIA and ESMP.

13.2 PRELIMINARY MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

The specialist studies will assess potential environmental and social impacts that may occur as a result of the proposed project. Appropriate mitigation and management measures to avoid and /or minimise the identified impacts associated with the project will be developed and included in the ESIA/ESMP report. Refer to Section 8 for the potential positive and negative impacts identified and Section 11.10 for the preliminary mitigation measures.

13.3 THE OUTCOME OF THE SITE SELECTION MATRIX

The location of the proposed Project is constrained to the location of the existing offshore infrastructure which has been positioned based on the location of the gas resource, and proven reserve. As such, no property alternatives were considered for this project.

13.4 MOTIVATION WHERE NO ALTERNATIVES WERE CONSIDERED

The location of the proposed Project is constrained to the location of the existing infrastructure which has been positioned based on the location of the gas resource, and proven reserve. As such, no property alternatives were considered for this project. Existing technologies will also be applied to the activities and therefore no technology alternatives are available at this stage of the study. Engineering design and detail is progressing in parallel to the Scoping/ESIA process. If alternatives are identified as part of the specialist studies, these will be included in the Draft ESIA/ESMP report.

13.5 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE NEMA

Section 24(4)(a) (iii) requires that a description of the environment likely to be significantly affected by the proposed activity be provided. The description of the environment is provided in Section 7of this report;

Section 24(4)(a) (iv) requires an investigation of the potential consequences for or impacts on the environment as a result of the activity and assessment of the significance of those potential consequences or impacts. See Section 10of this report, where potential impacts were identified. Their assessment, as detailed in the Plan of Study for Impact Assessment (Section 11.7will be done during the impact assessment phase of the ESIA); and

Section 24(4)(a) (v) references public information and participation procedures, which have been dealt with in Sections 9 and 0of this report.

14 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

We, the undersigned, the environmental Assessment Practitioner (EAP) responsible for compiling this scoping report, undertake that:

The information provided herein is correct;
The comments and inputs from stakeholders and I&APs will be recorded and included in the Final Scoping Report; and
WSP agrees to implement the Plan of Study for EIA presented in the Scoping Report and that any comments from stakeholders and I&APs on the Plan of Study for EIA will be taken into consideration.

Kavilan Naidoo

Olivia Allen

Brent Baxter

Date: 28 November 2022

15 REFERENCES

Africa - Ports & Ships. (2021). Mossel Bay Port. Africa - Ports & Ships. https://africaports.co.za/mossel-bay/

Andrews, N., Bennett, N. J., le Billon, P., Green, S. J., Cisneros-Montemayor, A. M., Amongin, S., Gray, N. J., & Sumaila, U. R. (2021). Oil, fisheries and coastal communities: A review of impacts on the environment, livelihoods, space and governance. Energy Research and Social Science, 75. https://doi.org/10.1016/j.erss.2021.102009

BBC News. (2021, 28 December). South Africa Court Blocks Sh https://www.bbc.com/news/world-africa-59809821

BusinessTech. (2021, August 25). The best and worst run municipalities in South Africa. BusinessTech. https://businesstech.co.za/news/government/515940/this-map-shows-the-best-and-worst-run-municipalities-in-south-africa/

Beckley LE & van Ballegooyen RC. 1992. Oceanographic conditions during three ichthyoplankton surveys of the Agulhas Current in 1990/91. African Journal of Marine Science 12: 83-93.

Best PB. 1990. Trends in the inshore right whale population off South Africa, 1969 1987. Marine Mammal Science 6: 93-108.

Best PB. 2007. Whales and Dolphins of the Southern African Subregion. Cambridge University Press, Cape Town, South Africa.

Boswell, M. (2022). CULTURAL HERITAGE IMPACT ASSESSMENT FOR BLOCK 11b/12b, EXPLORATION DRILLING PROJECT.

Branch G.& Branch M. 1981. The living shores of southern Africa. Struik Publishers (Pty) Ltd. 272pp.

Brown PC Painting SJ & Cochrane KL. 1991. Estimates of phytoplankton and bacterial biomass and production in the northern and southern Benguela ecosystems. African Journal of Marine Science 11: 537-564

Brown PC. 1992. Spatial and seasonal variation in chlorophyll distribution in the upper30m of the photic zone in the southern Benguela/Agulhas region. African Journal of Marine Science 12: 515-525.

Cornew S, Stuart V & Beckley LE. 1992. Population structure, biomass and distribution of Nyctiphanes capensis (Euphausiacea) in the vicinity of Algoa Bay, South Africa. African Zoology 27 (1): 14-20.

Crawford RJM. 1980. Seasonal patterns in the purse-seine fishery. South A of Fish Biology 16 (6): 649-664.

Creamer Media's Engineering News. (2022, 25 Jan Creamer Media's Engineering News. https://ww opaque-on-job-cuts-union-says-2021-03-11

David JHM. 1989. Seals. In: Oceans of Life off Southern Africa. Payne AIL & Crawford RJM (Eds.). Vlaeberg Publishers. Halfway House, South Africa.

De Wet A. 2013. Factors affecting survivorship of loggerhead (Caretta caretta) and leatherback (Dermochelys coriacea) sea turtles of South Africa. MSc Thesis, Nelson Mandela Metropolitan University.

de Ruijter, W., Ridderinkhof, H., J.R.E. Lutjeharms & M.W. Schouten, 2002. Observations of the flow in the Mozambique Channel. Geophysical Research Letters, pp. 29, 140.1-140.3.

Department of Environment, Forestry and Fisheries (DEFF). 2020. Status of the South African marine fishery resources 2020. Cape Town: DEFF. 132pp.

Department of Mineral Resources and Energy NEDLAC Consultation/Gas Master Plan 2022 Basecase Report 2021.

Duncombe Rae CM, Shillington FA, Agenbag JJ, Taunton-Clark J, Grundlingh ML. 1992. An Agulhas ring in the South Atlantic Ocean and its interaction with the Benguela upwelling frontal system. Deep-Sea Research 39: 2009-2027.

Dutton PH, Bowen BW, Owens DW, Barragan A, Davis SK. 1999. Global phylogeography of the leatherback turtle (Dermochelys coriacea). Journal of Zoology 248, 397-409.

Ellingsen KE. 2002. Soft-sediment benthic biodiversity on the continental shelf in relation to environmental variability. Marine Ecology Progress Series 232: 15-27.

Elwen S & Best PB. 2004. Environmental factors influencing the distribution of southern right whales (Eubalaena australis) on the South Coast of South Africa I: Broad scale patterns. Marine Mammal Science 20(3): 567-582.

FishersNet. (2018). Customary rights of small-scale fishers and coastal communities. FishersNet Vol 34 - April 2018 P3), 34.

Findlay KP & Best PB. 1996a. Estimates of the numbers of humpback whales observed migrating past Cape Vidal, South Africa, 1988-1991. Marine Mammal Science 12(3): 354-370.

Findlay KP & Best PB. 1996b. The Migrations of Humpback Whales past Cape Vidal, South Africa, and a Preliminary Estimate of the Population Increase Rate. Rep Int Whal Commn. SC/A06/HW16

Findlay KP, Best PB, Ross GJB, Cockroft VC. 1992. The distribution of small odontocete cetaceans off the coasts of South Africa and Namibia. South African Journal of Marine Science 12: 237-270.

Flach E & Thomsen L. 1998. Do physical and chemical factors structure the macrobenthic community at a continental slope in the NE Atlantic? Hydrobiologia 375/376: 265-285.

Galal, S. (2021). South Africa: Population by Province. Statista. https://www.statista.com/statistics/1112169/total-population-of-south-africa-by-province/

Garratt PA. 1988. Notes on seasonal abundance and spawning of some important offshore linefish in in Natal and Transkei waters, southern Africa. African Journal of Marine Science 7: 1-8

Garden Route District Municipality. (2021). Garden Route District Municipality: 2021/2022 Final Reviewed IDP.

Golder Associates Africa (Pty) Ltd. (2021a). Minutes of Meeting with Mossel Bay Municipality Youth Representative.

Golder Associates Africa (Pty) Ltd. (2021b). Minutes of the Meeting with Mossel Bay Tourism.

Golder Associates Africa (Pty) Ltd. (2021c). Minutes of Discussion with Mossel Bay Traffic.

Golder Associates Africa (Pty) Ltd. (2021d). Summary of Discussion with Thandolwethu Xixika, a Youth Representative.

Golder Associates Africa (Pty) Ltd. (2021e). Minutes of Meeting with PetroSA.

Golder Associates Africa (Pty) Ltd. (2021f). Minutes of Meeting with BADISA George.

Golder Associates Africa (Pty) Ltd. (2021g). Minutes of Meeting with Business Chambers.

Gordon, A., 1985. Indian-Atlantic transfer of thermocline water at the Agulhas Retroflection. Science, pp. 227, 1030-1033.

Govender, S. (2021, 25 October). Shell's Wild Co Sunday Times Daily. https://www.timeslive.co.za/sunday-times-daily/news/2021-11-25-shells-wild-coast-seismic-survey-fuels-call-for-boycott-at-pumps/

Government of South Africa. South Africa Low-Emission Development Strategy (SA-LEDS) 2050 (2020)

Government of South Africa. First Nationally Determined Contribution Under the Paris Agreement. (Updated September 2021)

Hays GC, Houghton JDR, Isaacs C, King RS, Lloyd C, Lovell P. 2004. First records of oceanic dive profiles for leatherback turtles, Dermochelys coriacea, indicate behavioural plasticity associated with long-distance migration. Animal Behaviour 67: 733-743.

Heydorn AEF & Tinley KL. 1980. Estuaries of the Cape, Part I. Synopsis of the Cape coast. Natural features, dynamics and utilization. Stellenbosch, CSIR Research Report 380, 97 pp.

Hughes GR, Luschi P, Mencacci R & Papi F. 1998. The 7000 km journey of a leatherback turtle tracked by satellite. Journal of Experimental Marine Biology and Ecology 229: 209 - 217.

Hughes GR. 1974a. The sea turtles of south-east Africa I: Status, morphology and distributions. Oceanographic Research Institute, Durban, South Africa.

Hughes GR. 1974b. The sea turtles of south east Africa. PhD Thesis, University of Natal.

Hutchings L, Beckley LE, Griffiths MH, Roberts MJ, Sundby S, van der Lingen C. 2002. Spawning on the edge: spawning grounds and nursery areas around the southern African coastline. Marine and Freshwater Research 53: 307-318.

Hutchings L. 1994. The Agulhas Bank: a synthesis of available information and a brief comparison with other east-coast shelf regions. African Journal of Marine Science 90: 179-185.

Hutchings L. 1994. The Agulhas Bank: a synthesis of available information and a brief comparison with other east-coast shelf regions. African Journal of Marine Science 90: 179-185.

Isaac, J. (2021, 28 December). Wild Coast Commur
Seismic Survey. Sunday World. https://sundayworld.co.za/news/wild-coast-communities-obtain-urgent-interdict-against-shells-seismic-survey/

IUCN 2021. The IUCN Red List of Threatened Species. Version 2021-2. [Online]: https://www.iucnredlist.org (accessed 2021-12-01).

IUCN 2021. The IUCN Red List of Threatened Species. Version 2021-2. [Online]: https://www.iucnredlist.org (accessed 2021-12-01).

Joanna Gyory, L. M. B. B. B. A. J. M. E. H. R., 2004. The Agulhas Current. [Online]

Available at: https://oceancurrents.rsmas.miami.edu/atlantic/agulhas.html

Knysna Plett Herald. 2017. https://www.knysnaplettherald.com/News/Article/General/update-the-kiani-satu-sinks-20170711

Lambardi P, Lutjeharms JRE, Menacci R, Hays GC, Luschi P. 2008. Influence of ocean currents on long-distance movement of leatherback sea turtles in the Southwest Indian Ocean. Marine Ecology Progress Series 353: 289–301.

Lauret-Stepler M, Bourjea J, Roos D, Pelletier D, Ryan P, Ciccione S, Grizel H. 2007. Reproductive seasonality and trend of Chelonia mydas in the SW Indian Ocean: a 20 yearr study based on track counts. Endangered Species Research 3: 217-227.

le Monde avec AFP. (2021, 29 December). Afrique du Sud :
Sismique de Shell. Le Monde Afrique. https://www.lemonde.fr/afrique/article/2021/12/29/afrique-du-sud-la-justice-suspend-l-exploration-sismique-de-shell_6107600_3212.html

Liversidge R and Le Gras Gm. 1981. Observations of seabirds off the eastern Cape, South Africa, 1953-1963. In: Proceedings of the symposium on birds of the sea and shore, 1979. Cooper J. (Ed.). 149-167.

Logic Publishers. (2022). 11 Most Spoken Languages in South Africa 2021. Logic Publishers. https://www.logicpublishers.com/most-spoken-language-south-africa/

Lutjeharms JRE. 2006. The Agulhas Current. Springer Verlag, 314pp.

Michael A. Toman & Brent Sohngen, 2006. Climate Change (Ashgate Publishing, 2004). Springer.

MapQuest. (2021). Mossel Bay Location. MapQuest. https://www.mapquest.com/south-africa/mossel-bay-282772775

MarineTraffic. (2021). Port of Mossel Bay. MarineTraffic. https://www.marinetraffic.com/en/ais/details/ports/1216?name=MOSSEL-BAY&country=South-Africa

Marnewick MD, Retief EF, Theron NT, Wright DR, Anderson TA. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.

Mossel Bay Advertiser. (2021, 9 January). Best fishing spots. Mossel Bay Advertiser. https://www.mosselbayadvertiser.com/news/Sport/Water-Sports/126201/Best-fishing-spots

Mossel Bay Local Government. (2021). Mossel Bay Local Municipality: Annual Financial Statements for the year ended 30 June 2020.

Mossel Bay Local Municipality. (2017). Mossel Bay: Local Economic Development and Tourism Strategy and Implementation Plan.

Mossel Bay Local Municipality. (2020a). Electricity | Mossel Bay Municipality. https://www.mosselbay.gov.za/electricity-0

Mossel Bay Local Municipality. (2020b). Mossel Bay Municipality. https://www.mosselbay.gov.za/

Mossel Bay Local Municipality. (2020c). Press Release: Municipal Audit Status | Mossel Bay Municipality. Mossel Bay Local Municipality. https://www.mosselbay.gov.za/press-release-municipal-audit-status

Mossel Bay Local Municipality. (2021). Mossel Bay: 2021/2022 Integrated Development Plan Review.

Mossel Bay Municipality GIS Viewer. (2021). Mossel Bay Municipality GIS. Mossel Bay Municipality. https://mbm-gis.maps.arcgis.com/apps/webappviewer/index.html?id=a9985be1bc6741609b515ca899e155ca

Mosselbay.info. (2022). Mossel Bay History. Mosselbay.Info. https://www.mosselbay.info/en/history-of-mossel-bay/

Municipal Demarcation Board. (2021). Mossel Bay Local Municipality (WC043) Ward Number 8.

National Ports Authority. (2018). Port of Mossel Bay.

National Business Initiative. Just Transition and Climate Pathways Study for South Africa. The Role of Gas in South Africa's Zero Pathway to Net (Unlated).

NSOVO Environmental Consulting. (2020). Draft Scoping Report for the Proposed Development of the DNG Energy (Pty) Ltd Gas- to - Power Facility and Associated Infrastructure in Mossel Bay within the Jurisdiction of the Mossel Bay Local Municipality, Western Cape Province.

Nel R, Punt AE & Hughes GR. 2013. Are coastal protected areas always effective in achieving population recovery for nesting sea turtles? PloS one 8: e63525.

Okogu, J. (2011). Family Size and its Socio-Economic Implications on the Inhabitants of Delta State, Nigeria. International Journal of Economic Development Research and Investment, 2(3). www.hhs.gov

O'Regan, V. (2021, 21 November). Road to hell fo Maverick. https://www.dailymaverick.co.za/article/2021-11-21-road-to-hell-for-marine-life-shells-wild-coast-seismic-assessment-plans-meet-mounting-public-protest/

Peddemors VM & Oosthuizen WH. 2004. Tursiops aduncus- Indian Ocean Bottlenose Dolphin. In: Friedmann Y. & B. Daly (Eds.). Red Data Book of the Mammals of South Africa: A Conservation Assessment. CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust, South Africa.

Peddemors VM & Oosthuizen WH. 2004. Tursiops aduncus- Indian Ocean Bottlenose Dolphin. In: Friedmann Y. & B. Daly (Eds.). Red Data Book of the Mammals of South Africa: A Conservation Assessment. CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust, South Africa.

Penven P, Lutjeharms JRE, Marchesiello P, Weeks SJ, Roy C. 2001. Generation of cyclonic eddies by the Agulhas Current in the lee of the Agulhas Bank. Geophysical Research Letters 26: 1055-1058.

Pichegru L, Nyengera R, Mcinnes AM, Pistorius P. 2017. Avoidance of seismic survey activities by penguins. Nature: Scientific Reports 7: 16305. DOI:10.1038/s41598-017-16569.

Pisces Environmental Services (Pty) Ltd (Pisces). 2019. Proposed 2D and 3D Seismic Surveys in Block 11b/12b off the South Coast of South Africa. Appendix 1: Marine Faunal Specialist Assessment. Prepared for SLR Consulting (South Africa) (Pty) Ltd on behalf of TOTAL Exploration & Production South Africa B.V. 162pp.

Pisces Environmental Services (Pty) Ltd (Pisces). 2014. Environmental Management Plan for Proposed Bathymetry Surveys and Seabed Sediment Sampling in Block11B/12B, off the South Coast of South Africa. Appendix 2.1 Marine Faunal Assessment. Prepared for CCA Environmental (Pty) Ltd on behalf of TOTAL Exploration & Production South Africa B.V. 83pp.

Pitcher GC & Calder D. 2000. Harmful algal blooms of the southern Benguela current: a review and appraisal of monitoring from 1989 –1997. African Journal of Marine Science 22: 255 –271.

Probyn TA, Mitchell-Innes BA, Brown BA, Hutchings L, Carter RA. 1994. A review of primary production and related processes on the Agulhas Bank. African Journal of Marine Science 90: 160-173.

Purdon J, Shabangu FW, Yemane D, Pienaar M, Somers MJ, Findlay K. 2020. Species distribution modelling of Bryde's whales, humpback whales in the southern African region to inform their conservation in expanding economies. PeerJ. 8: e9997.

Quick R & Sink K. 2005. Specialist benthic study –PetroSA: South Coast Gas Development Project. Report prepared for CCA Environmental pp. 37.

Republic of South Africa. Minster of Forestry, Fisheries and the Environment. Climate Change Bill B9-2022.

Republic of South Africa. Department of Energy. Integrated Resource Plan (IRP) 2019

Revised White Paper on Families in South Africa, Pub. L. No. No. 586, Government Gazette (2021).

Roel BA & Armstrong MJ. 1991. The round herring Etrumeus whiteheadi and anchovy Engraulis capensis off the east coast of southern Africa. African Journal of Marine Science 11: 227-249.

Ryan PG and Rose B. 1989. Migrant seabirds. In: Oceans of life off southern Africa. Payne AIL and Crawford RJM (Eds.). Cape Town. Vlaeberg Publishers, pp. 274-287.

South African Human Rights Commission. (2018). Report of the South African Human Rights Commission National Hearing Relating to the Human Rights Situation of the Khoi-San in South Africa.

Statistics South Africa, 2016. Vulnerable Groups Indicator Report 2016.

Statistics South Africa, 2021. South African Quarterly Labour Force Survey - Quarter 3: 2021. http://www.statssa.gov.za/publications/P0211/P02113rdQuarter2021.pdf

SLR Consulting, 2020. Environmental and Social Impact Assessment for additional exploration drilling and associated activities in Block 11B/12B off the south coast of South Africa - Final Scoping Report - Volume 1: Main Report, s.l.: s.n.

Stramma, L. & J.R.E. Lutjeharms, 1997. The flow field of the subtropical gyre in the South Indian Ocean into the Southeast Atlantic Ocean: a case study. Journal of Geophysical Research, pp. 99, 14053-14070.

Schumann EH, Churchill JRS & Zaayman HJ. 2005. Oceanic variability in the western sector of Algoa Bay, South Africa. African Journal of Marine Science 27(1): 65–80.

Schumann EH, Perrins LA & Hunter IT. 1982. Upwelling along the south coast of the Cape Province, South Africa. South African Journal of Science 78: 238-242.

Schumann EH, Ross GJB & Goschen WS. 1988. Cold water events in Algoa Bay and along the Cape south coast, South Africa, in March/April 1987. South African Journal of Science 84: 579-584.

Shamblin BM, Bolten AB, Abreu-Grobois FA, Bjorndal KA, Cardona L, Carreras C, Clusa M, Monzón-Argüello C, Nairn CJ, Nielsen JT, Nel R. 2014. Geographic patterns of genetic variation in a broadly distributed marine vertebrate: new insights into loggerhead turtle stock structure from expanded mitochondrial DNA sequences. PLoS One 9(1): e85956.

Shipton T & Atkinson L.J. 2010. Benthic specialist impact report for the proposed F-O Gas Field development off the South Coast of South Africa. Enviro-Fish Africa (Pty) Ltd, Grahamstown. 48pp

Sink KJ, Atkinson LJ, Kerwath S, Samaai T. 2010. Assessment of Offshore Benthic biodiversity on the Agulhas Bank and the potential role of petroleum infrastructure in offshore spatial management. Report prepared for WWF South Africa and PetroSA through a SANBI initiative 78pp.

Sink KJ, Attwood CG, Lombard AT, Grantham H, Leslie R, Samaai T, Kerwath S, Majiedt P, Fairweather T, Hutchings L, Van Der Lingen C, Atkinson LJ, Wilkinson S, Holness S, Wolf T. 2011. Spatial planning to identify focus areas for offshore biodiversity protection in South Africa. Unpublished Report. Cape Town: South African National Biodiversity Institute.

Sink KJ, Holness S, Harris L, Majiedt PA, Atkinson L, Robinson T, Kirkman S, Hutchings L, Leslie R, Lamberth S, Kerwath S, von der Heyden S, Lombard AT, Attwood C, Branch G, Fairweather T, Taljaard S, Weerts S, Cowley P, Awad A, Halpern B, Grantham H, Wolf T. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria. 325pp.

Smale MJ, Klages NT, David JHM, Cockroft VG. 1994. Predators of the Agulhas Bank. African Journal of Marine Science 90: 135-142.

Snelgrove PVR & Butman CA. 1994. Animal-sediment relationships revisited: cause versus effect. Oceanography & Marine Biology: An Annual Review 32: 111-177.

South African National Biodiversity Institute (SANBI). 2019. A giant leap for ocean protection in South Africa [Online]: https://www.sanbi.org/media/a-giant-leap-for-ocean-protection-in-south-africa/ (accessed 2021-12-01).

Swart VP & Largier JL. 1987. Thermal structure of Agulhas Bank water. In: The Benguela and Comparable Ecosystems, Payne AIL, Gulland JA & Brink KH. (Eds.) South African Journal of Marine Science 5: 243-254.

The Financial Gazette. (2022, 27 January). IMF cuts South Africa growth forecasts -. The Financial Gazette. https://www.fingaz.co.zw/imf-cuts-south-africa-growth-forecasts/

Universal Declaration of Human Rights Preamble, United Nations Economic and Social Council (1948).

Trading Economics. (2022). South Africa GDP. Tradingeconomics.Com. https://tradingeconomics.com/south-africa/gdp

Urban Econ. (2021). Economic Impact on Mossel Bay Local Municipality.

Urban Econ. (2022). Economic Impact into Scoping Report.

van der Lingen CD, Hutchings L, Brundrit GB, Byrne DA, Duncombe Rae CM, Durholtz MD, Hunter I, Lutjeharms JRE, Shannon LV, Staegemann LA. 2006. Report of the BCLME Southern Boundary Workshop. Cape Town, 3-5 May 2006.

Verheye HM, Hutchings L, Huggett JA, Carter RA, Peterson WT, Painting SJ. 1994. Community structure, distribution and trophic ecology of zooplankton on the Agulhas Bank with special reference to copepods. African Journal of Marine Science 90: 154-165.

Von Meck, A. Knysna Plett Herald. 2017. Update: The Kiani Satu Sinks. [Online]: https://www.knysnaplettherald.com/News/Article/General/update-the-kiani-satu-sinks-20170711 (accessed 2022-11-24).

Wallace JH, Kok HM, Buxton CD, Bennett B. 1984. Inshore small-meshed trawling survey of the Cape South Coast. Part 1. Introduction, methods, stations and catches. African Zoology 19 (3): 154-164.

WESGRO. (2022). An Economic Analysis of the Western Cape.

Western Cape Government. (2015, June). Disaster Management Definitions. Western Cape Government Website. https://www.westerncape.gov.za/general-publication/disaster-management-definitions

Western Cape Government. (2020a). Mossel Bay Municipality Socio-Economic Profile.

Western Cape Government. (2020b). Socio-economic Profile: Mossel Bay Municipality at a Glance.

Western Cape Government. (2021a). Municipal Energy Resilience Initiative. 110 % Green. Commit. Act. Impact. https://www.westerncape.gov.za/110green/energy/municipal-energy-resilience-initiative

Western Cape Government. (2021b). 2021 Provincial Economic Review and Outlook.

Western Cape Government Provincial Treasury. (2020). Western Cape Government: Municipal Economic Review and Outlook.

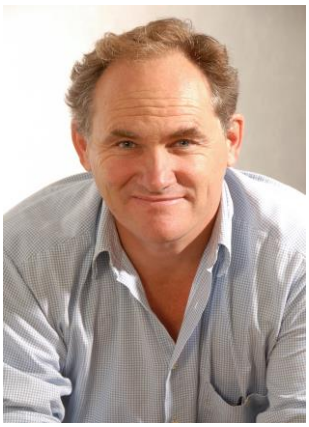
Weir CR. 2011. Distribution and seasonality of cetaceans in tropical waters between Angola and the Gulf of Guinea. *African Journal of Marine Science* 33(1): 1-15.

Witteveen M. 2015. The influence of a changing environment on the breeding biology and diet of Kelp Gulls (Larus dominicanus vetula) in Plettenberg Bay, South Africa. MSc Thesis, University of Cape Town. pp130.

Yes Media. (2021). Municipalities of South Africa: Mossel Bay Local Municipality. Municipalities of South Africa. https://municipalities.co.za/financial/1220/mossel-bay-local-municipality

Appendix A

CVS OF PROJECT TEAM



Education

Ph.D. (Botany) , University of Natal, South Africa

B.Sc. (Hons, Botany), University of Natal, South Africa

B.Sc. (Botany, Zoology), University of Natal, South Africa

Languages

Afrikaans –Fluent

English –Fluent

Johannesburg

Principal, Project Director and Strategic Advisor

Dr Brent Baxter is WSP's Environmental Te
PhD in Natural Sciences and brings more t
environmental professional within the mining industry and in leading consulting teams on projects across Africa. He has worked in more than 20 African countries. Brent has depth of expertise in mine closure, rehabilitation planning, environmental and social impact assessment and the requirements of international lenders.

Brent has lead key parts of WSP's Africa
Mining Environmental team in Africa with staff in four geographies in South Africa and in Mozambique, Ghana and Zambia/DRC. He has previously co-ordinated and lead WSP's ESIA Technical Community. Brent is also currently a Trustee of the WSP Trust for Orphans.

Brent's passion lies in bringing his broad environmental understanding to bear to influence project planning, and improve project sustainability across a range of sectors including mining, Oil and Gas, Energy, Infrastructure and Agriculture.

Employment History

WSP Group Africa (Pty) Ltd –Johannesburg, South Africa
Strategic Advisor, Planning & Advisory. (2002 to Present)
Provides Strategic Leadership to WSPs Environmental Assessment teams in Africa. Previously managed WSPs Planning & Advisory Business Unit comprising of over 70 staff in five offices in Africa grouped in specialist teams in the fields of ESIA, Stakeholder Consultation, Social Assessment and Resettlement Planning and Land Development.

Project Director and senior advisor in the fields of environmental impact assessments, development of environmental management plans, environmental compliance and due diligence auditing, lender compliance against equator principles and international performance standards, rehabilitation and restoration planning, mine closure, ecological assessments, biodiversity management planning and environmental monitoring.

Wates, Meiring and Barnard –Johannesburg, South Africa
Environmental Scientist then Associate (2001 to 2002)

Responsible for environmental consulting services to the mining industry covering environmental impact assessments, development of environmental management plans, environmental auditing, rehabilitation and restoration planning, mine closure, ecological assessments and environmental monitoring.

Envirogreen Consulting –Johannesburg, South Africa
Managing Director and Director (1998 to 2001)

Responsible for co-ordination and management of consulting services to the mining industry covering mine closure, rehabilitation and restoration planning and

contaminated site assessment.

Envirogreen –Potchefstroom, South Africa
Rehabilitation Research Scientist, then Consulting & Research Manager (1997 to 1998)

Responsible for development and implementation of rehabilitation trials and initiation of a small consulting group focussed on rehabilitation and restoration planning and mine closure.

Anglo Coal Environmental Services –Witbank, South Africa
Assistant Scientific Officer, then Environmental Engineer (1994 to 1997)

Responsible for advising Anglo Coal opencast and underground mines on a broad range of environmental issues and completion of various technical studies including post mining land rehabilitation planning, cleanup and restoration of contaminated sites, environmental impact assessments, environmental management plans and environmental audits. Managed Anglo Coals rehabilitation research programme and developed and implemented trials to facilitate the re-establishment of native species.

University of Natal –Pietermaritzburg, South Africa
Researcher (1990 to 1994)

Carried out research programme towards PhD. Research was focussed on eco-physiological aspects of seed dormancy, germination and the establishment of native southern African grasses, particularly the climax species Themeda triandra. Developed techniques for the successful re-establishment of native grasses into disturbed habitats.

PROJECT EXPERIENCE –OIL & GAS

CNOOC, Kingfisher Field Development Uganda	Project manager and ESIA lead: full field development including Wells, CPF and 50 km distribution pipeline in remote Western Uganda.
CGG, Seismic Mozambique	Project director: multiple EIAs for offshore seismic acquisition, Mozambique
Sasol, Block 16/19, PT5C Mozambique	Project director: EIA for shallow water marine seismic acquisition and appraisal well development, EIA for onshore seismic acquisition, Mozambique
Sasol, GTP Project	Project Director; ESIA for gas to power plant permitting. Project entails EIA of power plant, incoming and outgoing linear infrastructure and beach landing of heavy plant and infrastructure.
Mozambique Gas Mozambique	Project Director and Technical Lead on gas power plant permitting. Project entails envronmental impact assessment of power plant, incoming and outgoing linerar infrastructure and beach landing of heavy plant and infrastructure for construction.
Karoo Gas Project, Shell Upstream International	Project manager and technical lead assisting Shell in the siting of potential exploration well sites. Project entailed use of existing National GIS datasets to inform development of a GIS spatial model that spanned the 90,000 km² exploration area. This model was used to inform positioning of exploration wells in order to minimise potential environmental impact prior to commencement of exploration. Required close collaboration between Golder technical team and Shell exploration team.
Karoo Gas Project,	Project director and senior review for development of three environmental management programs in support of Shells three Karoo gas exploration permits totalling 90,000 km². Work entailed development of environmental management programs, high-level evaluation of potential impacts and consultation with stakeholder communities to build capacity and understanding of unconventional gas development, including hydraulic fracturing technology
Waterberg Gas Project, Anglo Coal	Project director for the successful permitting of a 37 well bulk CBM gas yield test well-field. The project included permitting of reverse osmosis water treatment plant and associated waste handling infrastructure. The project is located in the Waterberg coalfield, Limpopo province, South Africa
Waterberg Gas Project, Anglo Coal	Project director for third-party review of specialist groundwater report. The report which was the subject of the technical review had been independently commissioned by the Petroleum Agency of South Africa and evaluated long-term groundwater monitoring data in proximity to Anglo Coals CBM five spot test sites in the Waterberg coalfield.
Technical Study Tour, Unconventional Gas Developments, USA and Canada USA and Canada	While not technically a project it is relevant to include in this experience record that Brent has spent three weeks, during mid-2012, travelling through parts of the USA and Canada where unconventional gas development is taking place. The focus of this study tour, funded entirely by Golder, was to meet with regulators, developers, contractors and members of civil society to discuss and understand how learnings from UCG and CBM development in these regions could be applied to the growing number of UCG / CBM projects in Southern Africa.

PROJECT EXPERIENCE – SITE CLOSURE, DECOMMISSIONING AND REHABILITATION PLANNING

Various clients Africa	Project director and senior review on multiple mine closure plans, preliminary closure plans, closure cost determinations and rehabilitation strategies for mining sites in Africa
Department of Minerals and Energy	Project co-ordinator for technical and economic feasibility of controlling underground coal fires, stabilisation of unsafe ground and rehabilitation of the defunct Transvaal and Delagoa Bay Colliery. Conducted for the South African Department of Minerals and Energy. [Witbank, South Africa].
United Nations Mission in Kosovo	Specialist contributions related to rehabilitation of lead / zinc tailings involving site assessment and sampling to inform development of an appropriate rehabilitation approach and design of field trials to demonstrate the success of proposed measures. [Trepca, Kosovo].
Samancor Manganese Mines	Project manager for development of conceptual closure plan and liability cost determinations for BHP Billitons operational Wessels and Mamatwan manganese mines and the decommissioned Hotazel, Smartt Rissik and Middelplaats manganese mines situated in the Kalahari desert system. [Hotazel, South Africa].
Stilfontein Gold Mine Tailings Dam Complex	Project manager for assessment of the closure and rehabilitation costs for the Stilfontein Gold Mine tailings dam complex. Conducted for Durban Roodepoort Deep. [Stilfontein, South Africa].
Marico Fluorspar Mine	Lead auditor during pre-acquisition audit and determination of closure and rehabilitation costs for the decommissioned Marico Fluorspar Mine. [Zeerust, South Africa].
Gallery Gold, Mupane Gold Mine	Project manager for rehabilitation and mine closure planning as part of the environmental impact assessment being Gold Mine. [Francistown, Botswana].
Steelpoort, South Africa	Project manager for closure planning for the Free State North 6 tailings dam and development and implementation of a post-rehabilitation monitoring programme for rehabilitated tailings dams in the region. [Welkom, South Africa].
Vantech	Project manager for development of a rehabilitation plan for combined mining areas and mining and industrial waste sites. [Steelpoort, South Africa].
Thesen Island Marina Development	Project manager during preparation of rehabilitation and planting plans for greenbelt, residential and estuarine areas of a marina under construction in the Knysna estuary. [Knysna, South Africa].
Iron Duke Gold Mine	Project manager for development of a rehabilitation plan for an iron sulphide waste rock dump at the Anglo American owned Iron Duke Gold Mine. [Zimbabwe].
Hartebeestfontein Gold Mine	Project manager and specialist ecologist for development of closure plan for Avgold's Harmony No. 7 slimes dam and implementation of subsequent post-rehabilitation biological monitoring. [Klerksdorp, South Africa].

Anglo Coal	Specialist rehabilitation planning, sourcing of materials for use in rehabilitation, monitoring of rehabilitated land and implementation and management of rehabilitation trials at a number of operational and closed mine sites. [Mpumalanga, South Africa].
Anglo Gold Ergo	Project manager during monitoring and reporting on performance of various grass covers on the Withok and Daggafontein gold tailings dams. [Johannesburg, South Africa].
De Beers, Premier Diamond Mine	Revegetation and ecological specialist to review performance of rehabilitation trials on fine kimberlite residues, and advise De Beers regarding future revegetation programmes. [Cullinan, South Africa].

PROJECT EXPERIENCE –ENVIRONMENTAL AUDITS

Government of Uganda, Environmental audit of Kasese Cobolt	Lead auditor for environmental compliance audit of Kasese Cobalt Company and development of environmental monitoring programmes [2005] Specialist ecological inputs to the decommissioning and closure plan for Kilembe Cobalt mine. [Uganda].
Kenor, Audit of SMD Gold Mining Operations	Project manager for development of environmental, social and health international best practice standards. Lead auditor for internal audit against these standards to inform development of detailed environmental, health and social action plans and subsequent annual performance auditing against implementation of action plans [2002/2003]. [Lero, Guinea].
Pre Acquisition audit, Iscor	Environmental auditor as part of a pre acquisition due diligence audit of Iscor Iron & Steels Sishen, Thabazimbi and Welgevonden Mines and review of closure cost provision prior to launching of Kumba Resources [2001]. [South Africa].
Idwala, Limpopo Province	Auditor of decommissioned industrial minerals mine as part of corporate environmental due diligence audit. [South Africa].
Anglo Coal South Africa	Environmental auditor of Anglo Coal mines as part of internal environmental audit teams as follows; New Vaal Colliery (1994, 1997), Goedehoop Colliery (1994), New Denmark Colliery (1995), Landau Colliery (1995), Kriel Colliery (1997) and Arnot Colliery (1997)
Maluti-A-Phofung Municipality	Project strategic guidance for compilation of a Status Quo report for the Platberg Nature Reserve to document the condition/status of the land under management, infrastructure and amenities [2002]. [Harrismith, South Africa].

PROJECT EXPERIENCE –ENVIRONMENTAL ASSESSMENT

Mayoko Iron ore Mine Mayoko, Republic of Congo	Project Director for opencast iron ore mine. The project components include rail upgrade, port refurbishment, opencast mine devleopment with supporting infrastructure. Permitting to IFC standards. Key issues include indigenous peoples and high biodiversitgy value, Republic of Congo.
Zambeze Coal Project, Rio Tinto Coal Mozambique	Project director for development of large-scale opencast coal mine including beneficiation plant and waste handling infrastructure. Unique project features include need to engage traditional communities, some of whom will require resettlement. Project is located in the Zambezi Valley, Tete Region, Mozambique.
Bakouma Uranium Mine, UraMin	ESIA project manager for large opencast Greenfields uranium development located in the east of the CAR. Project team is a multinational team comprised of Golder specialists worldwide and external consultants. Project includes development of opencast mine and associated infrastructure, concentrator, mine residue deposits and transport links to site. This is a current project for which we are busy executing baseline studies and initiating the public consultation programme, including liaison with government authorities and stakeholders. [Central African Republic].
Kembe Falls Hydroelectric Project, UraMin	Project lead for initial screening of a proposed hydroelectric dam and associated power generation infrastructure and transmission lines. Project is located in south central Central African Republic, with transmission lines linking to the regional capital Bangassou and to the Bakouma mine site. Project is in its early stages comprising prefeasibility screening and development of high level ESIA and baseline studies work plans. [Central African Republic].
Stiegler's Gorge Hydroelectric Project, Jeffares & Green	Project lead for prefeasibility screening of a proposed hydroelectric dam site located within the Selous Game Reserve, Tanzania. Project involves high level review of previous EIA and associated specialist work conducted during the 1980's and provision of strategic gui plan to developers investigating re-initiation of this project. [Tanzania].
Gold Mega Dam Project, Harmony	Project director for EIA/EMP for three Mega dams planned to receive tailings from the slimes dam reprocessing and re-treatment operations to be located in the Welkom, Randfontein and Leandra areas in the Free State, Gauteng and Mpumalanga provinces respectively. Key responsibility includes strategic advice and review to three independent EIA teams. [South Africa].
Waterberg Gas Project, Anglo Coal	Project lead for EIA and environmental permitting associated with development of the second five spot gas production well located in the Waterberg coalfield. [Limpopo Province, South Africa].
Heidelberg Underground Coal Mine, Anglo Coal	Project lead for EIA/EMP for proposed greenfields underground coal mine. Project is currently in the baseline studies phase. [Gauteng Province, South Africa].
Beira Port, Rio Doce Mozambique	Development of an environmental management plan for phase 1 dredging activities associated with developing coal export port at Beira.[Mozambique].

Namakwa Sands, Anglo Base Metals	Project manager for various projects including EIA/EMP for mine expansion, EIA/EMP for construction of a reverse osmosis water treatment plant at the mineral separation plant, annual performance assessment review audit and development of consolidated environmental management programmes for the mine site and mineral separation plant. [Western Cape Province, South Africa].
Benga Coal Mine, Riversdale	Project director for the environmental impact assessment for a proposed opencast coal mine and associated washing plant, residue disposal and linear infrastructure, Tete, Mozambique. The project includes an independent EIA process for development of a 400 MW coal-fired power station. [Mozambique].
Heidelberg Opencast Coal Mine, Anglo Coal	Project lead for EIA for proposed greenfields opencast coal mine, in a very sensitive environmental and stakeholder setting. [Gauteng Province, South Africa].
Greenfields coal mine, Anglo Coal	Project review and strategic guidance an Environmental Impact Assessment for Anglo Coals Mafube Macro opencast coal mine project. [Greenfields coal mine, Anglo Coal].
Greenfields Copper mine, First Quantum	Project manager for an environmental impact assessment for planned greenfields Frontier opencast copper mine and concentrator located in south eastern DRC. [Democratic Republic of Congo].
Environmental screening, Anglo Coal	Project manager for an environmental screening to identify potential fatal flaws and ascertain, in consultation with stakeholders, whether such issues can be mitigated, for a proposed opencast coal mine in a very sensitive setting. This work is carried out to inform a decision on whether the client should proceed with an EIA. [Gauteng Province, South Africa].
Expansion to Namakwa Sands Operations, Anglo	Project manager for Environmental Impact Assessment for planned expansion to mining and processing operations. Role in project is that of providing strategic direction and review. [Western Cape, South Africa].
New Tailings Dump at Venetia Mine, De Beers	Senior review of Environmental Impact Assessment for a new tailings residue facility at Venetia Mine. Project included land owner consultation, authority liaison, amendment of the environmental management plan and environmental input to the design. [Limpopo Province, South Africa].
New Tailings Dump at Finsch Mine, De Beers	Senior review of Environmental Impact Assessment for a new tailings residue facility at Finsch Mine. Project included land owner consultation, authority liaison, amendment of the environmental management plan and environmental input to the design. [Northern Cape, South Africa].
Coal Transport Infrastructure, Eskom	Project manager for Environmental Impact Assessment for rail or conveyor transport infrastructure to bring coal to Tutuka and Majuba power stations. Project included land owner consultation with owners of farms along almost 400 km of potential routes and final optimisation of the alignment of preferred routes across privately owned land. Also included were assessment of the sensitivity of various competing routes, route selection and development of environmental management plan for construction and operational phases of project. [Mpumalanga, South Africa].

Coal Transport Conveyor, BHP Billiton, Ingwe Coal	Project manager for environmental impact assessment for a 50 km long coal transport conveyor system for Ingwe Coal. The project entailed route selection and refinement, consultation with directly affected land owners and stakeholders and assessment of impacts of the proposed operation on the receiving environment. [Delmas, South Africa].
Letseng Diamonds	Project manager for Environmental Impact Statement and Environmental Management Plan for re-commissioning of diamond mining activities at a remote high altitude mine site in the Lesotho highlands. [Highlands, Lesotho].
BHP Billiton, Lwala Chromite Mine	Project manager for Environmental Impact Assessment and Environmental Management Plan for proposed opencast chrome mine. Project involved grassroots consultation and capacity building in rural communities. [Limpopo Province, South Africa].
Belulane Hazardous Waste Site	Specialist ecological and land rehabilitation review as part of an international team reviewing the Belulane hazardous waste site EIA under the auspices of the Netherlands Commission for EIA. [Maputo, Mozambique].
Rio Tinto	Sustainability Assessment Rossing Uranium Mine. Specialist contribution to assessment of impacts to the biophysical environment associated with various mine life extension scenarios, and evaluation of whether such activities contributed to sustainable development. [Swakopmund, Namibia].
Kumba Resources, Sishen South Iron Ore Mine	Project manager for environmental impact assessment for the proposed Sishen South opencast iron ore mine and development of EMP for mining operations. [Postmasburg, South Africa].
Angel Diamonds	Project manager for environmental assessment of a new mine in Lesotho. Development of a project brief and environmental management plan for proposed kimberlite bulk sampling activities, at a remote site in Lesotho. Project entailed site and project evaluation and grassroots engagement with local directly affected community. [Postmasburg, South Africa].
Manganese Metals Company	Compilation of a conceptual Environmental Management Plan for an industrial hazardous waste site. [Nelspruit, South Africa].
Anglo Coal, New Vaal Colliery	Project manager for environmental impact assessment of the planned 500 hectare opencast coal pit to mine the Maccauvlei West reserve area. This project comprised an extension of existing opencast operations. Particular sensitivities included the site being located directly opposite the towns of Vereeniging and Vanderbijlpark. The site is also located on the banks of the Vaal River. The project was reported as an addendum to the existing mine Environmental Management Programme Report. [Vereeniging, South Africa].
Anglo Coal, Greenside Colliery	Project manager for environmental assessment of planned mine life expansion project and development of an addendum to the mine Environmental Management Programme Report. [Witbank, South Africa].
Anglo Coal	Project manager for fatal flaw assessment of a proposed Greenfields opencast coal mine. Project involved consultation with key stakeholders/authorities and site assessment to identify potential fatal flaws and significant environmental and social issues to a project in a sensitive regional setting. [South Africa].

Anglo Coal	Project manager and biophysical environment specialist conducting screening of a proposed small opencast coal pit site to identify significant social and environmental issues and potential fatal flaws. [Mpumulanga, South Africa].
Assmang, Manganese Mines	Project manager and biophysical environment specialist conducting screening of a proposed small opencast coal pit site to identify significant social and environmental issues and potential fatal flaws. [Mpumulanga, South Africa].
Samancor	Botanical specialist and project manager responsible for development of an alien plant control plan for the Samancor, Meyerton Works industrial site. [Black Rock, South Africa].

Anglo Coal
South Africa

While working with Anglo Coal, the following specialist work was undertaken and reported;
Baseline ecological assessment prior to mining expansions at Kleinkopje Colliery;

Baseline ecological assessment of the proposed Haasfontein mini pit site, Goedehoop Colliery;

Baseline ecological assessment of proposed Block 11 shaft and overland conveyor, Goedehoop Colliery;

Baseline ecological assessment of proposed Schoongesight mini pit site, Landau Colliery;

Baseline ecological survey of proposed Eight Shaft borrow pits, Arnot Colliery;

Baseline ecological survey of proposed Vlaklaagte shafts, mining sections and overland conveyor, Goodehoop Colliery;

Soil survey of proposed Vlaklaagte shaft footprint and conveyor alignments, Goedehoop Colliery;

Soil survey of proposed Block 11 shaft footprint and conveyor alignment, Goedehoop Colliery;

Soil survey within footprint of proposed coal discard dump expansion, Goedehoop Colliery;

Assessment of clean/dirty storm water drainage systems at various mines;

Review of capacity of pollution control dams at select mines;

Assessment of contaminated portions of Anglo Coals Natal Anthracite Colliery and Vryheid Coronation Colliery to inform rehabilitation and closure planning;

Assessment of vegetation performance on rehabilitated opencast land and discard dumps;

Post rehabilitation assessment of depth of soil placement on various rehabilitated dumps;

Specifications for soil conditioning, revegetation and land maintenance of mine affected land;

Reports on maintenance, development and performance of mined land rehabilitation trials.

BHP Billiton

Project manager and biophysical environment specialist for an environmental sensitivity assessment for forty three target prospecting sites in the arid Northern Cape ecosystem. [South Africa].

New Diamond Corporation, Crown Diamond Mine	Project manager for development of an Environmental Management Programme for the recovery of diamonds by re-treatment of old diamond bearing mine residue deposits. [Kroonstad, South Africa].
Anglo Coal	Project manager for development of an Environmental Management Programme Report for a greenfields opencast coal development at Kleinkopje Colliery. [Witbank, South Africa].
Mine Waste Solutions	Project manager for Environmental Management Programme Report for re-mining and processing of a gold slimes dam complex and associated conversion of old uranium plant to a Carbon in Leach (CIL) plant. [Stilfontein, South Africa].

PROFESSIONAL AFFILIATIONS

Certified Environmental Assessment Practitioner (EAPSA No. 0077/06)

Registered Professional Natural Scientist (Pr.Sci.Nat)

Society for Ecological Restoration

International Association of Impact Assessment (International, and South African Chapter)

PUBLICATIONS

Other

Baxter, BJM & Van Der Nest, L.J. (1999) The Economic Implications of Alternate Rehabilitation and Closure Strategies for Gold Tailings Dams. Tailings and Waste Disposal in Mining, AIC, 10-12 May 1999, Sandton

Baxter BJM (1998) Contract Mining and Responsible Environmental Management. Contract Mining in Africa: Summit 98, AIC, 13-14 May 1998, Fourways.

Baxter, BJM & Van Der Nest, LJ (1998) Rehabilitation of Gold Tailings for Closure - Achieving Effective Mine Closure, IBC 22-22 October 1998, Pretoria.

Baxter, B & Heydenrych, G (1998) Mine Closure and Decommissioning Plans: Practical Aspects. Mine Closure: IBC 24-25 February 1998, Pretoria

Baxter B.J.M., van Staden, J. and Granger J.E. (1995) Plant - derived smoke and seed germination: is all smoke good smoke? That is the burning question. South African Journal of Botany 61: 275-277.

Baxter B.J.M., van Staden, J. and Granger J.E. (1994) The growth responses of two ecotypes of Themeda triandra transplants along an altitudinal gradient in Natal: some preliminary results. Twenty-ninth Annual Meeting of the Grassland Society of Southern Africa, Harare, Zimbabwe.

Brown, N.A.C., de Lange, J.H., van Staden, J. and Baxter, B.J.M. (1994) Plant-derived smoke: An important newly discovered natural cue for seed germination. Current Research and its Application to Australian Plant Species. Proceedings of Workshop 3: Revegetation of Mine Sites Using Appropriate Species. Third International Conference on Environmental Issues and Waste Management in

Energy and Mineral Production, Curtin University of Technology, Perth, Western Australia: 69-73

Baxter B.J.M., van Staden J., Granger J.E. and Brown N.A.C. (1994) Plant - derived smoke and smoke extracts stimulate seed germination of the fire - climax grass Themeda triandra Forssk. Environmental and Experimental Botany 34(2): 217-223.

Baxter, B.J.M. and van Staden J. (1994) Plant - derived smoke: An effective seed pre-treatment. Plant Growth Regulation 14: 279-282.

Baxter B.J.M., Cuthbert, B., Granger J.E. & van Staden J. (1993) Viability of indigenous grass seed. Nineteenth Annual Congress of the South African Association of Botanists, Cape Town, South Africa.

Baxter B.J.M., van Staden J. and Granger J.E. (1993) Seed germination response to temperature in two altitudinally separate populations of the perennial grass Themeda triandra Forssk. South African Journal of Science 89: 141-144.

Baxter B.J.M., van Staden J. and Granger J.E. (1993) Technology to improve seed germination in the important indigenous grass Themeda triandra. Biotech SA '93, First South African Biotechnc Africa

Baxter B.J.M., van Staden J. and Granger J.E. (1993) Seed dormancy in the perennial grass Themeda triandra Forssk. Nineteenth Annual Congress of the South African Association of Botanists, Cape Town, South Africa.

Baxter, B.J.M. and van Staden, J (1993) Coat-imposed and embryo dormancy in Themeda triandra Forssk. Proceedings of the Fourth International Workshop on Seeds, Paris, vol. 2 pp 677-682.

Steenkamp, S.J, van Deventer P.W. & Baxter B.J.M. (2001) Gold Tailings – Turnkey Dry Land Rehabilitation. Chamber Of Mines Of South Africa, Conference On Environmentally Responsible Mining In Southern Africa, September 2001, Johannesburg.

Wates, J.A., Lorentz, S.A., Marais, H., Baxter, B.J.M., Theron, M. and Dollar, L. (2006) An evaluation of the performance and effectiveness of improved soil cover designs to limit through flow of water and ingress of air. Water Research Commission. (WRC Report No. 1350/1/06).

Witcomb, A, Baxter, BJM & Wates, J. (2001) The Transvaal & Delagoa Bay Colliery Rehabilitation Plan. Coal Indaba, Johannesburg, South Africa.

Witcomb, A. and Baxter, B.J.M. (2000) Abandoned coal mined land in South Africa. Mining Environmental Management.

Education

B.Sc (cum laude) Zoology and Geography, University of the Free State, South Africa, 2002

B.Sc Hons. (cum laude) Geography, University of the Free State, South Africa, 2003

M.Sc Water Resource Management, University of Pretoria, South Africa, 2014

Certifications

Environmental Assessment Practitioner Association South Africa (EAPASA) Number: 2019/1725

Languages

English –Fluent

Afrikaans –Fluent

Publication

Kruger, E. and Chapman, O. A., 2005: Quality Aspects of Environmental Impact Assessment Reports in the Free State Province, South Africa. South African Geographical Journal, 87 (1), 52-57

Thesis

A Scenario Approach for Determining the Gaps, Enablers and Constraints within the Current Regulatory Framework, and for Developing a Decision- making Tool, with Regard to the Implementation of Direct and Indirect Reuse of Domestic Wastewater for Potable Purposes in South Africa

Regional Lead: Environmental Planning & Advisory - South Africa

PROFESSIONAL SUMMARY

Olivia Allen has 17 years' experience in the di
Sciences. Olivia specialises in environmental assessment, regulatory compliance, and integrated project management.

As a senior consultant, Olivia has successfully led, or been part of, various projects in the mining sector of coal, gold, diamonds, copper and platinum; the petroleum sector of gas extraction; and steel, ferrochrome and electrolytic manganese dioxide industrial sectors. She has extensive experience in projects related to water management; waste management; contaminated land remediation; and decommissioning, rehabilitation and closure.

In the past, Olivia has functioned in various roles within the technical stream, including report writing; leading projects and proposal submissions; project management; project co-ordination; and working closely with engineering teams, environmental specialists, project feasibility teams, regulatory authorities, and stakeholders, to ensure successful project integration and sustainable development outcomes.

Her environmental technical competencies include the following:

- Conducting Environmental Impact Assessments and compiling Environmental Management Plans;
- Development of Integrated Waste Management Plans;
- Compiling Water Use and Waste Management Licence Applications;
- Stakeholder engagement, including Regulatory Authorities;
- Co-ordination of Integrated Regulatory Processes; and
- Environmental Compliance Assessment and Auditing

Olivia is currently the Regional Lead: Environmental Planning and Advisory - WSP Group Africa.

Olivia is a registered environmental impact assessment practitioner (EAP) in terms of the National Environmental Management Act.

KEY PROJECT EXPERIENCE

Feasibility studies

- Ivanhoe Mines SA (Platreef Resources), Waste, Environmental & Permitting Related Inputs into Platreef BFS, Limpopo
- Debswana, Safety and Sustainable Development Inputs into PFS for Cut 9 Jwaneng Mine, Botswana
- Debswana, Safety and Sustainable Development Inputs into PFS for Cut 3 at Orapa Mine, Botswana
- South32, Environmental Risk & Permitting Related Inputs into Closure PFS for Rietspruit Colliery, Mpumalanga
- New Largo Coal, Environmental and Social Risk & Permitting Related Inputs into Pit H BFS, Mpumalanga
- New Largo Coal, Environmental and Social Risk & Permitting Related Inputs into Main Mine BFS, Mpumalanga
- Mafube Coal, Environmental and Social Risk & Permitting Related Inputs into PFS for Mafube Debottleneck Project, Mpumalanga
- Thungela Resources, Environmental and Social & Permitting Related Inputs PFS for into Greenside 3A North Project, Mpumalanga
- Klipspruit Colliery, Environmental and Social Risk & Permitting Related Inputs into BFS for Converting from Opencast to Underground at Pit BD, Mpumalanga
- Khutala Colliery, Environmental and Social Risk & Permitting Related Inputs into BFS for two projects: 5 Seam Plant Re-commissioning & Converting from Opencast to Underground at Central Eastern Extension, Mpumalanga

Due diligence and asset acquisition

- ENSAfrica, Development of an Environmental Action List and Associated Costing for Evraz Highveld Steel and Vanadium Limited, Mpumalanga
- Universal Coal, Phase 1 Environmental Due Diligence for Exxaro Resources Limited New Clydesdale Colliery, Mpumalanga
- Total, Project Star - Environmental Due Diligence
- South32, Environmental Legal and Duty of Care Compliance Assessments for Wolvekrans, Ifalethu, Klipspruit and Khutala Collieries, Mpumalanga
- Jet Demolition, Project Odyssey, Enviro-legal Assessment

Waste management planning

- Eskom Holdings, Industry Waste Management Plan for Eskom's power generating Operating Units, South Africa
- Ivanhoe Mines SA, Integrated Waste Management Plan for underground Platreef platinum mine, Limpopo
- Exxaro Resources Limited, Integrated Waste Management Plan for Mayoko iron ore mining project, Republic of Congo
- Debswana, Integrated Waste Management Plan for Jwaneng Mine, Botswana
- Debswana, Integrated Waste Management Plan Update for Orapa, Letlhakane and Damtshaa Mines, Botswana
- Tubatse Ferrochrome, Development of Waste Removal, Processing and Management Plan for nine historic waste sites, and site-wide Integrated Waste Management Plan, Limpopo
- Wasteman, Waste Impact Report for Bulbul Landfill, Kwa-Zulu Natal
- Palabora Mining Company, Integrated Waste Management Plan, Limpopo
- ASA Metals, Waste Impact Report for Dilokong Chrome Mine, Limpopo

Closure and decommissioning

- Exxaro Resources Limited, Inyanda Coal Closure EMP, Mpumalanga
- Delta (E.M.D.), Closure Liability Assessment, Integrated Waste Management Plan & Integrated Regulatory Process for Electrolytic Manganese Dioxide Manufacturing Facility, Mpumalanga
- Exxaro Resources Limited, Arnot Coal Closure EMP, Mpumalanga
- Kangra Coal, Integrated Regulatory Process for closure of 2 sections of the mine
- Anglo American Inyosi Coal, Compliance Assessment of Closure Kriel Rehabilitation Colliery's Commitments, Mpumalanga
- South32, Development of an Integrated Remediation and Rehabilitation Plan for Metalloys, Gauteng
- South32, Review and Update of the Closure Costs and Integrated Rehabilitation and Remediation Plan for the Unscheduled and Scheduled Closure Scenarios for Metalloys, Gauteng
- Liberty Trust Rehabilitation Fund, Trustee

Oil & gas

- Shell Exploration Company B.V., South Western Karoo Basin Gas Exploration Project, Northern, Western and Eastern Cape: Project Manager, Compilation of three EMPs, Specialist Co-ordination, Stakeholder Engagement (presenting at public meetings, interaction with I&APs)
- Bundu Gas and Oil Exploration, Review (and Update) of EMPr for Gas Exploration, Eastern Cape
- TotalEnergies, Block 11B/12B Industrial and Social Baseline Studies, Western Cape
- Shell Downstream, Applications for Section 24G Rectification for various sites in KZN, Gauteng

Mine water treatment

- Anglo Operations Limited, eMalahleni Mine Water Reclamation
- Expansion Project, Mpumalanga
- Western Utilities Corporation, Mine Water Reclamation Project, Gauteng
- Anglo Operations Limited, New Denmark Colliery Reverse Osmosis Reject Pond, Mpumalanga
- Glencore, Tweefontein Mine Water Reclamation Plant, Mpumalanga
- Optimum Coal, Eikeboom Colliery Mine Water Reclamation Plant, Mpumalanga
- Anglo American Inyosi Coal, Development of a closure water management strategy for Kriel Colliery, Mpumalanga

Other EIAs & EMPs

- Lonmin, Prospecting EMP Amendment for Akanani Mine, Limpopo
- Zululand Anthracite Colliery, EIA & EMP for new shaft developments, Kwa-Zulu Natal
- Exxaro Resources Limited, EIA & EMP for new pit development at Tshikondeni Coal Mine, Limpopo
- Anglo Operations Limited, EIA & EMP for new pit development and mine water reclamation plant at Mafube Colliery, Mpumalanga
- Exxaro Resources Limited, EIA & EMP for new pit development at Leeuwpan Coal, Mpumalanga
- Blyvoor Gold Operations (Pty) Ltd, EMP Update, WULA for tailings reclamation and underground mining at Blyvooruitzicht Gold Mine, Gauteng
- South32, Application for environmental authorisation for indigenous vegetation removal at Metalloys, Gauteng
- Glencore, Application for environmental authorisation for dewatering pipeline for Goedgevonden Colliery, Mpumalanga
- Mafube Coal, Application for EMP amendment for in-pit crusher at Mafube Colliery, Mpumalanga
- New Largo Coal, Application for EMP amendment for Pits D & H, Mpumalanga
- Sopel, ESIA for the By-pass Toll Road, Kolwezi, DRC
- New Largo Coal, Application for EMP amendment for Pit F, Mpumalanga

Waste licence applications

- Sasol, Waste Licence Application for proposed Vanadium Disposal Facility, Mpumalanga
- Tubatse Ferrochrome, Waste Licence Application for decommissioning historic slag dump, Limpopo
- Ivanhoe Mines SA (Platreef Resources), Waste Licence Application for underground Platreef platinum mine, Limpopo
- Rustenburg Municipality, Waste Licence Application for Waterval Landfill Site, North West
- Evraz Highveld Steel and Vanadium Limited, Waste Licence Application for Steelworks, Mpumalanga
- Evraz Highveld Steel and Vanadium Limited, Waste Licence Application for decommissioning of Calcine Waste Disposal Facility, Mpumalanga
- Palabora Mining Company, Waste Licence Application for Palabora Mining Company site, Limpopo
- Anglo Operations Limited, Waste Licence Application for new mine & mine water reclamation plant New Vaal Colliery, Gauteng/Free State
- Glencore, Waste Licence Application for Zonnebloem Coal Mine, Mpumalanga
- Anglo Operations Limited, Waste Licence Application for new pit development and mine water reclamation plant at Mafube Colliery, Mpumalanga
- Africary Holdings, Waste Licence Application for Underground Coal Gasification (UCG) project, Free State
- South32, Waste Licence Application for the decommissioning of dormant waste facilities at Metalloys, Gauteng
- South32, Waste Licence Application for discard dump extension at Klipspruit Colliery, Mpumalanga
- Anglo, Waste Licence Application for discard dump at Zibulo Colliery, Mpumalanga

Exemption applications

- Eskom Holdings, Application for Exemption of Waste Management Activity and Ash Beneficiation in terms of NEMWA, South Africa

Compliance assessments & audits

- New Clydesdale Coal, EMP Performance Assessment, Mpumalanga
- Zululand Anthracite Colliery, Various Compliance Audits, Kwa-Zulu Natal
- Glencore, External Waste Management Licence Audit at Wonderkop Smelter, North West
- Goldplat Recovery, High-level enviro-legal assessment and development of compliance strategy, Gauteng
- GoodRock Chemworks, Confirming the regulatory path for obtaining environmental authorisation for the calciner plant, Northern Cape
- Randlord, High-level enviro-legal assessment for tailings storage facilities earmarked for reworking and/or rehabilitation, Gauteng
- Scaw South Africa, Identification of NEMA listed activities associated with decommissioning of Scaw Standard Foundry, Gauteng
- SA Lime & Gypsum Group, Enviro-legal assessment for the reworking of tailings and waste rock at Witkop Fluorspar Mine, North West
- South32, Environmental Legal Gap Analysis for Middelburg Colliery & Coal Processing, Mpumalanga
- Grindrod Terminals, Enviro-legal gap analysis, KZN

Kavilan Naidoo

Earth & Environment - Environmental Planning & Advisory, Senior Consultant

CAREER SUMMARY

Kavilan Naidoo is a Senior Consultant currently working for WSP Group Africa at the Johannesburg, Waterfall office in the Environmental Planning and Advisory Department. He moved from SRK Consulting in 2022 where He was an Environmental Scientist in the Environmental and Social Governance Department. Kavilan has experience in the environmental management field with expertise in environmental impact assessments, environmental auditing, environmental management plans, environmental due diligence, ESG and compliance auditing, for mining and construction industries.

Countries of work experience gained include South Africa, DRC, Sierra Leone, Mozambique and Zambia.

< 1 year with WSP

9 years of experience

Area of expertise

Environmental Management

Environmental Impact Assessments

Due Diligence

Risk Assessments

Compliance Auditing

Language

English –Fluent

EDUCATION

Bachelor of Science (Honours), Environmental Management, University of South Africa	2021
Bachelor of Social Science, Geography and Environmental Management, University of KwaZulu-Natal	2013

ADDITIONAL TRAINING

Environmental Auditing and Monitoring	2022
Technical Report Writing	2019

PROFESSIONAL MEMBERSHIPS

EAPASA - Environmental Assessment Practitioners Association of South Africa –Registration No. 2019/608 2022

PROFESSIONAL HISTORY

WSP Group Africa (Pty) Ltd	March 2022 –present
SRK Consulting (Pty) Ltd	2018 –2022
KSEMS Environmental Consulting	2016 –2017

Kavilan Naidoo

Earth & Environment - Environmental Planning & Advisory, Senior Consultant

Hazrisk Consulting	2015 –2016
Green Grid Energy	2014 –2015

PROFESSIONAL EXPERIENCE

Environmental Impact Assessment Process

Mopani Copper Mine (MCM), MCM Consolidated Environmental and Social Impact Assessment (ESIA), Zambia
2020 –2022
Project coordinator and Assistant Report Compiler
Assisted in compiling the ESIA and supporting documentation. Site visit for baseline at Mufulira and Nkana operations. Project Value: R 4 711 430,00.

Anglo American Platinum Mine (AAP), Mogalakwena Mine, Integrated Environmental Authorisation (EA), Limpopo Province, South Africa
2018 –2020
Project coordinator
Assisted in compiling the EIA and supporting documentation including the Scoping report and related public participation material.

Anglo American Platinum Limited, Gap Analysis, Amandelbult Complex, Limpopo Province, South Africa
2020
Project coordinator
Compiled an environmental permitting gap analysis report for the inclusion of the Middellaagte farm at Amandelbult Complex. Project Value: 148 435,00.

Anglo American Platinum Mine (AAP), Mogalakwena Mine, Dissolved Air Flotation Basic Assessment (BA), Limpopo Province, South Africa
2020
Project coordinator
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

R&H Rails, Kipushi Environmental Pre-feasibility Assessment, Zambia
2018
Project coordinator and Assistant Report Compiler
Assisted in compiling the environmental screening report and potential impact assessment.

SANRAL, Borrow Pit Scoping and EIR, KwaZulu-Natal Province, South Africa
2017
Project Manager
Assisted in compiling the Scoping and EIR and supporting documentation including the application forms and related public participation material.

Department of Transport (DoT), Culverts BA, KwaZulu-Natal Province, South Africa
2017
Project Manager
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Umbumbulu Municipality, Road Upgrade BA, KwaZulu-Natal Province, South Africa
2017
Project Manager

Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Ndwedwe Municipality, Bridge BA, KwaZulu-Natal Province, South Africa
2017
Project Manager
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Private Client, Petrol Filling Station BA, KwaZulu-Natal Province, South Africa
2017
Project Manager
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Department of Transport (DoT), Road Upgrade BA, KwaZulu-Natal Province, South Africa
2016
Project Manager
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Department of Transport (DoT), Borrow Pit BA, KwaZulu-Natal Province, South Africa
2016
Project Manager
Assisted in compiling the BA and supporting documentation including the application forms and related public participation material.

Water Use Licence Applications

Transnet, EA Amendment and WULA, KwaZulu-Natal, South Africa
2017
Project Manager
Compiled a General Authorisation in terms of Section 21 of the NWA.

Department of Transport (DoT), WULA, KwaZulu-Natal, South Africa
2017
Project Manager
Compiled a General Authorisation in terms of Section 21 of the NWA.

Umbumbulu Municipality, WULA, KwaZulu-Natal, South Africa
2017
Project Manager
Compiled a General Authorisation in terms of Section 21 of the NWA.

Compliance Auditing

AAP, Rustenburg Platinum Mine (RPM), EMPr Audit, South Africa
2020
Lead Auditor
Undertook an EMPr audit for RPM and facilitated associated client meetings.

AAP, Amandelbult Platinum Mine Complex (AMB), EMPr Audit, South Africa
2021
Lead Auditor
Undertook an EMPr audit for RPM and facilitated associated client meetings.

eThekwini Municipality, Oakford Housing Development, Environmental Construction Monitoring, KwaZulu-Natal, South Africa

Kavilan Naidoo

Earth & Environment - Environmental Planning & Advisory, Senior Consultant

2017
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the construction of the housing development.

Department of Transport (DoT), P96 Road Upgrade, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2017
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the road upgrade.

Department of Transport (DoT), Mangwenya Bridge, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2017
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the construction of Mangwenya Bridge.

Department of Transport (DoT), P36-2 Road Upgrade, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2016
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the road upgrade.

Department of Transport (DoT), D1252 Road Upgrade, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2016
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the road upgrade.

Mr Price, Warehouse Development, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2016
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the construction of the warehouse.

SANRAL, N5 Road Upgrade, Environmental Construction Monitoring, KwaZulu-Natal, South Africa
2016
Environmental Control Officer
Provided Environmental Control Officer (ECO) services by conduction monthly EMPr audits for the road upgrade.

Appendix B

OTHER NATIONAL APPLICABLE LEGISLATION

OTHER NATIONAL APPLICABLE LEGISLATION

Legislation	Applicability
Carriage of Goods by Sea Act, 1986	This Act provides for the carriage of goods by sea and applies where: (a) the port of shipment is a port in South Africa; (2) the bill of lading is issued in a state which applies the Hague-Visby Rules; (3) the carriage is from a port in a contracting state; and (4) the contract contained in or evidenced by the bill of lading provides that the South African COGSA applies.
The Constitution (No. 108 of 1996)	Chapter 2 - Bill of Rights Section 24 - Environmental rights Section 25 - Rights in property Section 32 - This section provides that every person has the constitutional right of access to information held by the state, including for example a state department such as the DFFE, and any information held by another person in so far as that information is required for the exercise or protection of any of their rights, including their environmental right.
Environment Conservation Act (No. 73 of 1989) (ECA) and Regulations	Although the Environment Conservation Act has been substantially repealed by the NEMA and the NEM:WA, certain Regulations promulgated under the Act remain in effect. Of importance are the National Noise Control Regulations.
National Environmental Management: Biodiversity Act, 2004	This Act regulates the carrying out of restricted activities that may harm listed threatened or protected species or activities that encourage the spread of alien or invasive species subject to a permit.
Hazardous Substances Act (No. 15 of 1973)	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Merchant Shipping Act, 1951 (as amended)	Provides for the control of merchant shipping and matters incidental thereto.
Ship Registration Act, (No. 58 of 1998)	This act aims to provide anew for the registration of ships in South Africa and to provide for incidental matters.
Marine Traffic Act, 1981	To regulate marine traffic in the Republic of South Africa; and to provide for matters connected therewith. This includes matters related to offshore installations and

Legislation	Applicability
	navigations routes of ships as well as determination of safety zone of offshore installations.
Marine Pollution (Control and Civil Liability) Act, 1981	Provides for the protection of the marine environment from pollution by oil and other harmful substances, and for that purpose to provide for the prevention and combating of pollution of the sea by oil and other harmful substances; to determine liability in certain respects for loss or damage caused by the discharge of oil from ships, tankers and offshore installations; and to provide for matters connected therewith.
Marine Spatial Planning Act, 16 of 2018	The Act intends to provide for the development of marine spatial plans with the institutional arrangements for the use of the ocean by multiple sectors.
Carriage of Goods by Sea Act, 1986	This Act provides for the carriage of goods by sea and applies where: (a) the port of shipment is a port in South Africa; (2) the bill of lading is issued in a state which applies the Hague-Visby Rules; (3) the carriage is from a port in a contracting state; and (4) the contract contained in or evidenced by the bill of lading provides that the South African COGSA applies.
Marine Pollution (Prevention of Pollution from Ships) Act, 1986	This Act regulates pollution from ships, tankers and offshore installations, and for that purpose gives effect to MARPOL 73/78. In terms of the Act, it is an offence to discharge any oil from a ship, tanker or offshore installation within 12 miles (19 km) off the South African coast. The discharge of oily water or oil and any other substance which contains more than a hundred parts per million of oil is prohibited between 19 –80 km offshore.
Marine Pollution (Intervention) Act, 1987	This Act gives effect to the international convention relating to the Intervention of the High Seas in cases of oil pollution casualties, and to the Protocol relating to Intervention of the High Seas in cases of Marine Pollution by substances other than Oil in South African Waters.
Marine Pollution (Control and Civil Liability) Act, 1981	The Act provides for the protection of the marine environment from pollution by oil and other harmful substances, and for that purpose to provide for the prevention and combating of pollution of the sea by oil and other harmful substances. The Act further determines liability for loss or damage caused by the discharge of oil from ships, tankers and offshore installations in certain respects. Of particular relevance is section 24 dealing with offshore installation pollution safety certificates

Legislation	Applicability
Maritime Zones Act, 1994	To provide for the maritime zones of the Republic; and to provide for matters connected therewith. This includes zoning of the internal and territorial waters, contiguous zone, maritime cultural zone, Exclusive Economic Zone (EEZ) and continental shelf.
Merchant Shipping (Civil Liability Convention) Act, 2013	The Act enacts the International Maritime Organization Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage of 29 November 1969 into law and provides for matters connected therewith.
Merchant Shipping (International Oil Pollution Compensation Fund) Act, 2013	Enacted the International Maritime Organization Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage of 18 December 1971 into law, and to provide for matters connected therewith.
Merchant Shipping (International Oil Pollution Compensation Fund) Administration Act, 2013	The Act provides amongst others for administrative matters in connection with the levy imposed in terms of the Merchant Shipping (International Oil Pollution Compensation Fund) Contributions Act, 2013
Merchant Shipping (International Oil Pollution Compensation Fund) Contributions Act, 2013	The Act provides for the imposition of the International Oil Pollution Compensation Fund Contributions Levy on persons referred to in Article 10 of the 1992 Fund Convention
Merchant Shipping (Safe Containers Convention) Act, 2011	The Act gives effect to the International Convention for Safe Containers, and to provide for matters connected therewith.
Wreck and Salvage Act, 1996	To provide for the salvage of certain vessels and for the application in the Republic of the International Convention of Salvage, 1989
World Heritage Convention Act, 49 of 1999	The act aims to provide for :the incorporation of the World Heritage Convention into South African law; the enforcement and implementation of the World Heritage Convention in South Africa ;the recognition and establishment of World Heritage Sites; the establishment of Authorities and the granting of additional powers to existing organs of state; the powers and duties of such Authorities, especially those safeguarding the integrity of World Heritage Sites; where appropriate, the establishment of Boards and Executive Staff Components of the Authorities ;Integrated management plans over World Heritage Sites; land matters in relation to World Heritage Sites; financial, auditing and reporting

Legislation	Applicability
	controls over the Authorities; and to provide for incidental matters
South African Maritime Safety Authority Act, 1998	To provide for the establishment and functions of the South African Maritime Safety Authority (SAMSA) and incidental matters.
The Human Rights Commission Act of 1994	This Act establishes a legal commission to monitor, pro-actively and by way of complaints brought before it, violations of human rights and redress for such violations.
National Environmental Management: Integrated Coastal Management Act, 2008 (No. 24 of 2008)	The Act aims to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable.
National Ports Act, 2005 (No. 12 of 2005)	This Act regulates and controls navigation within port limits and the approaches to ports, cargo handling, and the pollution and the protection of the environment within the port limits. The Act specifies a requirement for an agreement with or a licence from the National Ports Authority to operate a port facility or service.
National Water Act, 1998 (No. 36 of 1998)	This Act provides the legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders.
Nuclear Energy Act, 1999 (No. 46 of 1999)	This Act provides for, inter alia, the regulation of the acquisition, possession and use of nuclear fuel, certain nuclear and related material and certain related equipment and prescribes measures regarding the discarding of radioactive waste and the storage of irradiated nuclear fuel. Authorisation is required for the acquisition, possession and use of nuclear material (i.e. source material and special nuclear material), restricted material and nuclear-related equipment and material.
Nuclear Energy Act, 1999 (No. 47 of 1999)	This Act provides for the establishment of a National Nuclear Regulator in order to regulate nuclear activities, for its objects and functions, for the manner in which it is to be managed and for its staff matters; to provide for safety standards and regulatory practices for protection of

Legislation	Applicability
	persons, property and the environment against nuclear damage; and to provide for matters connected therewith.
Carbon Tax Act, 2019 (No. 15 of 2019)	The Carbon Tax Act gives effect to the polluter-pays-principle for large emitters and helps to ensure that firms and consumers take the negative adverse costs (externalities) into account in their future production, consumption and investment decisions. Firms are incentivized towards adopting cleaner technologies.
Marine Living Resources Act, 1998 (No. 18 of 1998)	The Marine Living Resources Act intends to provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources; and for these purposes to provide for the exercise of control over marine living resources in a fair and equitable manner to the benefit of all the citizens of South Africa.
Maritime Safety Authority Act, 1998 (No. 5 of 1998)	The South African Maritime Safety Authority Act 5 of 1998 intend to provide for the establishment and functions of the South African Maritime Safety Authority; and to provide for incidental matters.
Maritime Safety Authority Levies Act, 1998 (No. 6 of 1998)	This Act provides for the imposition of levies by the South African Maritime Safety Authority; and for matters connected therewith
Mine Health and Safety Act, 1996 (No. 29 of 1996)	This Act provides for protection of the health and safety of employees and other persons at mines and, for that purpose - to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development;

Legislation	Applicability
	to regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations of the Republic relating to mining health and safety.
The Occupational Health and Safety Act, 85 of 1933	This act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.
National Policy on South African Living Heritage, 2009	This national policy framework is an attempt to arrest continuing marginalisation of this important heritage. It is also aimed at affirming cultural diversity and mutual social existence. Living heritage is at the centre of people's culture and ident space for its continued existence and practice in the South African nation. In recognition of the significance of this heritage, South Africa has ratified the 2003 UNESCO Convention. This will lead to the exchange of international best practice as well as harmonisation of norms and standards in the safeguarding of living heritage. It is also the objective of the policy to encourage regional collaboration on issues of living heritage.
Sea Birds and Seals Protection Act, 1973 (No. 46 of 1973)	This Act aims to provide for the control over certain islands and rocks;for the protection, and the control of the capture and killing, of sea birds and seals; and for the disposal of the products of sea birds and seals and for matters incidental thereto. In addition, the act serves to repeal the Fish Protection Act, 1893 (Act No. 15 of 1893 of the Cape of Good Hope), and the provisions of the Sealing and Fisheries Ordinance, 1949 (Ordinance No. 12 of 1949 of South West Africa), relating to the killing, pursuit or capture of seals.
Traditional and Khoi-San Leadership Act, 2019 (No. 3 of 2019)	The Traditional and Khoi-San Leadership Act aims: To provide for the recognition of traditional and Khoi-San communities, leadership positions and for the withdrawal of such recognition. It also provides for the functions and roles of traditional and Khoi-San leaders; to provide for the recognition, establishment, functions, roles and administration of kingship or queenship councils, principal traditional councils, traditional councils,

Legislation	Applicability
	Khoi-San councils and traditional sub-councils, as well as the support to such councils; to provide for the establishment, composition and functioning of the National House of Traditional and Khoi-San Leaders; to provide for the establishment of provincial houses of traditional and Khoi-San leaders; to provide for the establishment and composition of local houses of traditional and Khoi-San leaders; to provide for the establishment and operation of the Commission on Khoi-San Matters; to provide for a code of conduct for members of the National House, provincial houses, local houses and all traditional and Khoi-San councils; to provide for regulatory powers of the Minister and Premiers; to provide for transitional arrangements; to amend certain Acts; to provide for the repeal of legislation; and to provide for matters connected therewith.

Appendix C

RATIFIED INTERNATIONAL LAWS AND CONVENTIONS

RATIFIED INTERNATIONAL CONVENTIONS AND TREATIES

Tittle	Description
International Marine Pollution	
International Convention for the Prevention of Pollution from Ships, 1973/1978 (MARPOL)	MARPOL 73/78 was developed by the International Maritime Organization with an objective to minimise pollution of the oceans and seas, including dumping, oil and air pollution. MARPOL is divided into Annexes according to various categories of pollutants, each of which deals with the regulation of a particular group of ship emissions. Annex I: Prevention of pollution by oil and oily water Annex II: Control of pollution by noxious liquid substances in bulk Annex III: Prevention of pollution by harmful substances carried by sea in packaged form Annex IV: Pollution by sewage from ships Annex V: Pollution by garbage from ships Annex VI: Prevention of air pollution from ships All ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail, and member nations are responsible for vessels registered on their national ship registry.
International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention)	OPRC is an international maritime convention establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.
United Nations Convention on Law of the Sea, 1982 (UNCLOS)	UNCLOS defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (the London Convention) and the 1996 Protocol (the Protocol)	The London Convention is an agreement to control pollution of the sea from dumping and to encourage regional agreements supplementary to the Convention. It covers the deliberate disposal at sea of wastes or other matter from vessels, aircraft and platforms. It does not cover discharges from land-based sources, such as pipes and outfalls, wastes generated incidental to normal operation of vessels, or placement of materials for purposes other than mere disposal, providing such disposal is not contrary to aims of the Convention.

Tittle	Description
International Convention relating to Intervention on the High Seas in case of Oil Pollution Casualties (1969) and Protocol on the Intervention on the High Seas in Cases of Marine Pollution by substances other than oil, 1973	This Convention is an international maritime convention affirming the right of a coastal State to "take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil, following upon a maritime casualty or acts related to
International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2017 (BWM)	This Convention aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments.
Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, 1989	This Convention is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries. It does not, however, address the movement of radioactive waste.
International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001	The Convention prohibits the use of harmful compounds in anti-fouling paints used on ships and rigs and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971, (as amended by the 1992 Protocol)	The purposes of the Fund Convention are to (i) Provide compensation for pollution damage to the extent that the protection afforded by the 1969 Civil Liability Convention is inadequate. (ii) To give relief to shipowners in respect of the additional financial burden imposed on them by the 1969 Civil Liability Convention, such relief being subject to conditions designed to ensure compliance with safety at sea and other conventions. (iii) To give effect to the related purposes set out in the Convention. This 1992 Protocol amends the provisions of the 1971 Convention, to harmonise them with the amendment to the International Convention on Civil Liability for Oil Pollution Damage, 1969 set out in its protocol of 1992.
Air and Climate	
Kyoto Protocol on the Framework Convention on Climate Change, 1997	This Protocol was the key instrument on which the 1992 United National Framework Convention on Climate Change is based. It is the first legally binding global agreement setting out specific obligations for the reduction of the amount of greenhouse gases.

Tittle	Description
Montreal Protocol on Substances that Delete the Ozone Layer, 1987	This Protocol lays down a timetable for the reduction of controlled substances that deplete the ozone layer and have adverse effects on health and the environment.
Vienna Convention for the Protection of the Ozone Layer, 1985	The Convention is the first global agreement that recognised that the ozone was a serious enough problem to warrant international regulation.
United Nations Framework Convention on Climate Change, 1992	The objective of the Convention is to "stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".
Paris Agreement (United Nations Framework Convention on Climate Change), 2016	South Africa signed the Paris Agreement on 22 April 2016. This Agreement aims to strengthen the global response to the threat of climate change by limiting the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognising that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century.
Nature and protected areas	
Revised African Convention for the Conservation of Nature and Natural Resources, 2017	The objectives of this Convention are to enhance environmental protection, to foster the conservation and sustainable used of natural resources, and to harmonise and coordinate polices in these fields.
United Nations Convention on Biological Diversity, 1992	This Convention has three main goals: (1) conservation of biological diversity (or biodiversity); (2) sustainable use of its components; and (3) fair and equitable sharing of benefits arising from genetic resources. Its objective is to develop national strategies for the conservation and sustainable use of biological diversity.
Convention on the Conservation of Migratory Species of Wild Animals, 1983 (Bonn Convention)	This Convention aims to conserve terrestrial, marine and avian migratory species throughout their range.
Memorandum of Understanding (MoU) on the Conservation of Migratory Sharks, 2010	The MoU was founded under the auspices of the Bonn Convention and serves as an international instrument for

Tittle	Description
	the conservation of migratory shark species, including species occurring off the South Coast of South Africa.
The MoU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia, 2001	The MoU is an intergovernmental agreement that aims to protect, conserve, replenish and recover sea turtles and their habitats in the Indian Ocean and South-East Asian region.
Agreement on the Conservation of Albatrosses and Petrels, 2004 (ACAP)	The Agreement protects all seven southern hemisphere petrel and two shearwater species. A number of these occur off the South Coast of South Africa.
International Convention for the Conservation of Atlantic Tunas (ICCAT)	This Convention provides for the management and conservation of tuna and tuna-like species in the Atlantic Ocean and adjacent seas.
Convention on International Trade of Wild Fauna and Flora Endangered Species, 1973 (CITES)	CITES is a multilateral treaty to protect endangered plants and animals.
Ramsar Conventions on Wetlands	The Ramsar Convention's broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain. This requires international cooperation, policy making, capacity building and technology transfer.
The African-Eurasian Migratory Waterbird Agreement	The African-Eurasian Migratory Waterbird Agreement (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago
International Convention for the Regulation of Whaling	The International Whaling Commission was established under the 1946 International Convention for the Regulation of Whaling to provide for the proper conservation of whale stocks and orderly development of the whaling industry.
Archaeology and cultural heritage	
Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)	This Convention provides for the identification, protection and conservation of the cultural and natural heritage for future generations.
United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention	This Convention is intended to protect all traces of human existence having a cultural, historical or archaeological character, which have been under water for over 100 years. This extends to the protection of shipwrecks,

Tittle	Description
on the Protection of the Underwater Cultural Heritage, 2001	sunken cities, prehistoric artwork, treasures that may be looted, sacrificial and burial sites, and old ports that cover the oceans' floors.
UN Declaration on the Rights of Indigenous Peoples	The Declaration addresses both individual and collective rights; cultural rights and identity; rights to education, health, employment, language, and others. It outlaws discrimination against indigenous peoples and promotes their full and effective participation in all matters that concern them.
Convention on the Protection of the Underwater Cultural Heritage	Underwater cultural heritage is defined as all traces of human existence of a cultural, historical or archaeological nature which, for at least 100 years, have been partially or totally immersed, periodically or permanently, under the oceans and in lakes and rivers.
Convention on the Elimination of All Forms of Discrimination Against Women	Convention on the Elimination of All Forms of Discrimination Against Women. In 1974, the CSW began drafting the Convention on the Elimination of All Forms of Discrimination Against Women. Described as an international bill of rights for women, it was instituted on 3 September 1981 and has been ratified by 189 states.
Marine Safety	
Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS)	This Convention sets an international standard for shipping and navigation. It deals with safety at sea issues and prescribes international standards for shipping, particularly to reduce the risk of collisions at sea. The rules for the prevention of collisions at sea apply to all vessels using the high seas.
International Convention for the Safety of Life at Sea, 1974 (SOLAS) with its protocol of 1978	This Convention is an international maritime treaty which requires signatory flag states to ensure that ships flagged by them comply with minimum safety standards in construction, equipment and operation.
The International Convention on Load Lines, 1966 and its protocol of 1988	This Protocol was adopted to harmonise the survey and certification requirement of the 1966 Convention with those contained in SOLAS and MARPOL 73/78. All assigned load lines must be marked amidships on each side of the ships engaged in international voyages.
International Commission on Radiological Protection (ICRP)	ICRP is an independent, international non-governmental organisation providing recommendations and guidance on radiation protection.

Tittle	Description
International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material, 1984	IAEA is an international organisation that seeks to promote the peaceful use of nuclear energy, and to inhibit its use for any military purpose, including nuclear weapons. These regulations provide international standards and approaches to safety promote consistency, help to provide assurance that nuclear and radiation related technologies are used safely, and facilitate international technical cooperation and trade.
Human Rights and Labour	
International Labour Convention (ILO)	The main aims of the ILO are to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues.

Appendix D

TEEPSA STANDARDS, HSE POLICY AND SUSTAINABLE DEVELOPMENT COMMITMENTS

TEEPSA STANDARDS, HSE POLICY AND SUBSTAINABLE DEVELOPMENT COMMITMENTS

STANDARDS FOR EXPLORATION AND DEVELOPMENT ACTIVITIES

Apart from the requirement to comply with the national legislation described in Section 8.1 above and the conditions of an Environmental Authorisation issued by authorities, TEEPSA complies with a set of corporate specifications regulating environmental and social procedures and reporting requirements for undertaking ESIAs on its projects. The proposed Offshore Project will comply with the General Specification for Environment –Environmental Requirements for Project Design and Exploration and Production Activities (GS EP ENV 001). To reduce any potentially significant impacts of proposed future activities, mitigation measures shall be identified and selected according to the Best Available Techniques (BAT) concept and approved by the Company.

This specification deals with: Environmental Footprint; Flaring and Air Emissions; Fuel Gas and Energy Use; Management of Liquid Effluents; Waste Management; Drill Fluids and Cuttings; Chemicals; Noise; Dust, Odours and Lighting; Spill Response Equipment; and Decommissioning of Installations.

With respect to Oil Spill Contingency Planning and the management of responses related to unplanned events (e.g., well blow-out and oils spills), including the assessment of economic effects and related compensation, TEEPSA subscribes to the International Petroleum Industry Environmental Conservation Association (IPIECA) - International Association of Oil and Gas Producers (IOGP) Good Practice Guide Series. The primary reference document in this regard is the "Economic assessment and compensation for ma plan for and implement responses in terms of this guideline document.

GENERAL STANDARDS FOR ESIA

This ESIA will be conducted within the framework of Corporate General Specifications for Environmental and Social Impact Assessments, implemented by TEEPSA, including:

General Specification for ESIAs for Exploration and Production activities (i.e. GS EP ENV 120): This document defines the processes and requirements to be implemented for conducting an ESIA. It recognises that the purpose of the ESIA is to ensure that the environment is given full and proper consideration in the decision-making process with respect to potential activities having possible negative and positive consequences on the environment. It outlines the minimum standard required by the Company to assess impacts on the environment and is adapted to the type and nature of a given project to define the Scope of Work.

General Specification for Social Performance –Social Baseline Study (SBS) (i.e. GS EP SDV 101) and **General Specification for Social Performance –Social Impact Assessment** (i.e. GS EP SDV 102): These specifications define the Company requirements for establishing an SBS and for undertaking a Social Impact Assessment, including stakeholder engagement. Together they specify the requirement for the content of the baseline studies and the process and requirements for stakeholder engagement (including disclosure) and the assessment of social impacts. The specifications require local laws and rules to be respected, and for further specific conditions to be added, if necessary.

General Specification for Sustainable Development –Human Rights Impact Assessment (HRIA) (i.e. GS EP SDV 103): This specification defines the Company guidelines for conducting an HRIA on projects where human rights issues are a potential concern. Where relevant, it requires identification of and engagement with stakeholders who are vulnerable to Human Rights abuses and the assessment of human rights impa potential mitigation measures.

It should be noted that an HRIA is not directly applicable to exploration activities in the South Coast offshore. Thus, an HRIA as such will not be undertaken, however, the possible implications of the project on human rights will be considered as part of the SIA.

TEEPSA HSE POLICIES AND SOCIAL COMMITMENTS

TEEPSA is committed to upholding a number of global policies and principles on its projects. These include the Voluntary Principles for Security and Human Rights, the International Labour Organisation Conventions, United Nations Declaration of Human Rights, the United Nations Guiding Principles on Business and Human Rights, Partnering Against Corruption Initiative and sustainable performance reporting, amongst others. TEEPSA also has a Code of Conduct for its staff and supply chain governing health, safety, security, bribery and corruption, and respect for human rights.

TEPPSA's HSE pol below. is provided

HEALTH, SAFETY & ENVIRONMENT POLICY

TotalEnergies EP South Africa B.V. is committed to conduct its business in a sustainable manner, which provides for and maintains a safe working environment, which is without risk to the wellbeing of its employees, contractors and stakeholders, and which furthermore will have a limiting impact on the surrounding environment.

The Management of TotalEnergies EP South Africa B.V. takes the responsibility to apply, drive and sustain the principles listed in this policy in order to ensure continued improvement of our HSE performance and impact.

IT IS OUR POLICY TO:

- Encourage and promote a positive HSE work culture throughout the organisation, by demonstrating strong visible felt leadership from management and supervision, and to involve the workforce, to take personal ownership, responsibility and accountability for Health, Safety and the Environment in the workplace.
- Comply with all Local and International Laws and Regulations, as well as all Corporate Policies and Specifications applicable to our operations.
- Pro-actively identify and implement continuous improvement initiatives by setting measurable HSE targets and objectives, and regularly review our actual performance against these targets and objectives.
- Ensure that all risks associated with our operations are continuously identified, monitored and reviewed in order to mitigate and maintain our risk profiles as low as reasonably possible.
- Continuously communicate with and consult all personnel, contractors and stakeholders on any HSE related matters.
- Incorporate and plan for effective HSE management methods in all ongoing engineering and operations activities.
- Ensure all people are trained and competent for any task they perform and ensure that such work is performed under the supervision of a person who has been trained to acknowledge the related hazards and has the authority to implement precautionary measures
- Provide for appropriate and sufficient resources, including training, in order to achieve targeted performance levels on ongoing bases.
- Work and partner with those industrial and commercial partners who demonstrate a similar commitment to our own HSE visions.
- Implement, maintain and regularly test emergency response and contingency plans.

Each and every employee, contractor and person acting on behalf of the company, has the responsibility to prevent harm to themselves, others and the surrounding environment, which may be affected by their acts or omissions.

TotalEnergies EP South Africa B.V. is committed to ensure that our resources, organisational strategies and processes are aligned with the goals and objectives as set out in this policy, in order to satisfy our stakeholder's needs.

Bertrand BOUVET
General Manager

TEEPSA/1/POL/HSE/01.01

October 2022

TOTALENERGIES EP SOUTH AFRICA B.V.

TOTALENERGIES SUSTAINABLE PERFORMANCE

Energy is one of the major challenges of the 21st century: to preserve the planet threatened by climate change, while enabling majority of humanity to escape from poverty. In this sense, energy is inseparable from the major global challenges of sustainable development.

TotalEnergies purpose is to supply to as many people as possible a more affordable, more available and cleaner energy. As a supporting component o

resource for economic, social and human development, which currently faces a twofold challenge: (1) satisfying the energy needs of an ever-growing world population, while (2) reducing global warming. TotalEnergies intention in becoming a broad energy company is to help meet that challenge in a responsible way, in line with its support of the United Nations Sustainable Development Goals (SDG) since 2016. Main pillars of this strategy are introduced below. For further information on TEEPSA's sustainable investments, refer to https://totalenergies.com/sustainability-performance.totalenergies.com/en.

Energy Transition

TotalEnergies ambition is to become a world-class player in the energy transition. TotalEnergies strategy consists of transforming it into a broad energy company by profitably growing its energy production, particularly from liquefied natural gas (LNG) and electricity, the two fastest growing energy markets, to create long-term value for its shareholders. In the next decade, TotalEnergies sales of oil products are expected to diminish by almost 30% and its sales mix will become 30% oil products, 5% biofuels, 50% natural gas and 15% electricity, primarily of renewable origin

Climate and carbon neutrality ambition

TotalEnergies supports the objectives of the Paris Agreement, which calls for the reduction in greenhouse gas emissions and its goal of limiting the average rise in planetary temperatures to well below 2°C from pre-industrial levels.

TotalEnergies also supports the objective set out in the Paris Agreement of achieving global carbon neutrality –i.e. net zero emissions, which is the balance between GHG emissions and anthropogenic removals in the form of sinks and reservoirs, such as forests, carbon capture and storage facilities. TotalEnergies has set an ambition of reaching carbon neutrality (net zero emissions) by 2050 in Europe, from the production to the use of the energy products sold to its customers (Scopes 1, 2, 3 as defined by the GHG Protocol) and the objective of 60% or more reduction in the average carbon intensity of energy products used worldwide.

Sustainable value creation

TotalEnergies' model of value creation is based on integrated exploration and production of oil, gas and electricity (including renewables) to energy distribution to the end customer, and including refining, liquefaction, petrochemicals, trading, and energy transportation and storage. This integrated business model enables TotalEnergies to capitalise on synergies among the various businesses, while responding to volatility in feedstock prices. With this integration of its operations across the entire value chain, TotalEnergies can manage the bottom of the cycle more effectively and capture margins when the market improves. This transition will cement the durability and resilience of TotalEnergies value creation model and bolster its ambition of getting to Net Zero (net zero emission).

Preservation of the Environment

TotalEnergies considers the respect for the environment to be a priority and, therefore, strives to minimise the footprint of its activities by controlling its energy consumption, its emissions in natural environments (water, air, soil), its residual waste production, its use of natural resources and its impact on biodiversity. Prevention and management of accidental pollution risk are covered by a strong policies framework. In 2020, TotalEnergies set itself a new biodiversity ambition to coincide

with the preparation of the United Nations' glob
principles, including voluntary exclusion zones on more sensitive areas such as UNESCO World Cultural Heritage sites and Arctic sea-ice regions. Regarding the "circular economy", since 2017, TotalEnergies has focused on waste reduction and valorisation (i.e. increase in the value of), including developing polymers from recycled plastics.

Business ethics

TotalEnergies operates in many different countries with disparate and complex economic, social and cultural environments, where governments and civil society have especially high expectations of TotalEnergies as an exemplar. Within this context, TotalEnergies strives to act as an agent for positive change in society by helping to promote ethical principles in every region where it operates. Accordingly, TotalEnergies is committed to respecting internationally recognised human rights wherever it operates. TotalEnergies is also fully committed to fighting corruption and has adopted a policy of zero tolerance in that area.

Participative Stakeholder Engagement

Dialogue with its external stakeholders is essential for TotalEnergies to conduct its business responsibly and integrate the long-term challenges of sustainable development in its strategy and policies. This dialogue informs TotalEnergies decision-making, by, in addition to specific studies, helping it identify the non-technical risks and impacts of its operations, including the Human Rights component and, more generally, by providing greater insight into changing societal patterns and expectations. TotalEnergies believes that transparency is an essential factor in building a trust-based relationship with its stakeholders and ensuring that it is on a path of continuous improvement. TotalEnergies' financial / non-financial reporting is published in a Universal Registration Document (https://totalenergies.com/system/files/documents/2022-03/DEU_21_VA.pdf).

Appendix E

LIST OF PUBLIC PLACES

PUBLIC PLACES

WESTERN CAPE

Location	Name of public places	Physical address
Cape Town	City of Cape Town Central Public Library	1 Parade Street, Cape Town City Centre
Hout Bay	Hangberg Community Hall	Bayview Road
Hout Bay	Hout Bay Public Library	Melkhout Crescent
Mitchells Plain	Mitchells Plain Library	1st Avenue, Mitchells Plain
Fish Hoek	Fish Hoek Public Library	Central Cir
Simon's Town	Simon's Town Public Library	St George's Street
Muizenberg	Muizenberg Library	Corner Atlantic and Beach Roads
Khayelitsha	Khayelitsha Public Library	Corner Bonga and Sulani Drive
Ocean View	Ocean View Multi-purpose Centre	Ocean View Multipurpose Centre in Milky Way Street, next to Marine Primary School
Delft	Delft Public Library and Civic Centre	Voorbrug Road
Grassy Park	Grassy Park Public Library	Market Square, Reddy Avenue
Strand	Strand Public Library	22 Piet Retief Street
Somerset West	Somerset West Library	10 Victoria Street, Audas Estate
Gordon's Bay	Gordon's Bay Publi	6 Watt Street, Gordons Bay Central
Gansbaai	Gansbaai Library	Corner Main and Kapokblom Streets
Hermanus	Hermanus Public Library	66 Duiker Street
Hawston	Hawston Public Library	423 Church Street
Mount Pleasant / Zwelihle	Mount Pleasant Public Library	Heide St, Mount Pleasant, Hermanus
Struisbaai /	Struisbaai Public Library	Corner 1st Avenue and Deining Avenue
Arniston	Arniston Library	39 Kamp Street
Bredasdorp	Cape Agulhas Municipal Office	1 Church Street
Witsand	Witsand Municipal Office.	Hoofweg (No street nr)
Stilbaai	Stilbaai Municipality	Main Road West
Mossel Bay	Mossel Bay Tourism	7 Market Street
Mossel Bay	Mossel Bay Municipality	99 Marsh Street, Mossel Bay Central
Mossel Bay	Kwanonqaba Library	Adriaan Street, Asla Park Kwanonqaba
Mossel Bay	D'Almedia Civic Ha	Mossel Street
Mossel Bay	Fishers/Local Community	2nd Ave, Harfield Village
George	Fishing permit office	95 York Street (At the Post Office)
George	Thembalethu Library	867 Bhacela Street Thembalethu
Knysna	Knysna Tourism Offices	40 Main Road, Knysna Central

WESTERN CAPE

Location	Name of public places	Physical address
Knysna	Khayalethu Library	Mbhethane Street
Plettenberg Bay	Keurbooms River Marina/ CapeNature Offices	Corner of Beacon Way & Zenon Street
Plettenberg Bay	Keurbooms Angling Club	N2 Keurbooms River Plattenberg Bay
Gourits River	Library Gourits Municipal Office	Library in Voortrekker Street
Wilderness	Wilderness Tourism Office	189 George Road Wilderness
Sedgefield	Sedgefield Municipality	12 Flamingo Avenue (near post office)
Saldanha	Saldanha Public Library	Municipal Building, Berg Street
Noordhoek	Noordhoek	No2 Albatros Noordhoek, Velddrif,
St Helena	St Helena Public Library	Municipal Building, 2 Albertros
Langebaan	Municipal Offices	12 Main Road, Vredenburg
Yzerfontein	Yzerfontein Municipal Office	46 Main Road
Veldrift	Veldrift Public Library	Voortrekker Road

EASTERN CAPE

Location	Name of public places	Physical address
Cape St. Francis	Coastal Collective	2 Suffolk Lane
St Francis Bay	St Francis Tourism and Municipal Offices	Municipal Offices, Assisi Drive
Jeffreys Bay	Jeffreys Bay Tourism	17 Da Gama Road
Gqeberha	Newton Park Library	Hurd Street, Newton Park
Sundays River	Sundays River Angling Club	29 Aquavista Cres, Colchester
Sundays River	Kirkwood Hospital	2 White Street
Cannon Rocks	Alexandria Municipality	No 1 Causeway Road
Boknes	Boknes Petrol Station & Supermarket	Daniel Scheepers Street
Boesmansriviermond / Kenton-on-Sea	Spar Sunshine Coast	34-36 Kenton Road, Jecana Centre, Kenton-on-Sea
Port Alfred	Royal Alfred Marina	1 Albany Road
Seafield	Ndlambe Local Municipality Public Library	No 1 Causeway Road
Hamburg	Hamburg Caravan Park	Main Road
East London	Eastern Cape Parks and Tourism Offices	17-25 Oxford Street, East London
East London	Harbour -Transnet National Ports Authority	Port Control Building. Ganteaume Crescent, Quigney
East London	Buffalo River Yacht Club	Buffalo - Westbank, 1 ferry Hill Rd
East London	Spirit Fish Market	25 Pontoon Road, Parkside

Appendix F

DEFINITIONS

Term	Definition
Applicant	"Applicant" means a person who has submitted an application for an environmental authorisation to the competent authority and has paid the prescribed fee.
Block	"Block" as defined in the Upstream Petroleum Resources Development Act (MPRDA), 28 of 2002, means any area of land or sea, including the seabed, identified as a block by co-ordinates on a map prepared by the Petroleum Agency and situated wholly or partly in the Republic (of South Africa) or its exclusive economic zone, and includes any part of such block.
Competent Authority	"Competent authority" in respect of a listed activity, means the organ of state charged by the National Environmental Management Act (NEMA), 107 of 1998, with evaluating the environmental impact of that activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Community	The Mineral and Petroleum Resources Development Act (MPRDA), 28 of 2002, defines "community" as *a group of historically disadvantaged persons with interest or rights in a particular area of land on which the members have or exercise communal rights in terms of an agreement, custom or law: Provided that, where as a consequence of the provisions of this act, negotiations or consultations with the community is required, the community shall include the members or part of the community directly affect by mining on land occupied by such members or part of the community."*
Community-based Organisation	Community-based organisations (CBOs) are non-profit, non-governmental, or charitable organisations that represent community needs and work to help them. CBOs may be associated with a particular area of concern or segment of the community.
Condensate	Condensate is a hydrocarbon that exists in gaseous form in the subsurface but condenses at surface temperature and conditions into a liquid phase or light oil.
Civil Society Organisations	According to the World Bank, civil society groups, non-governmental organisations [NGOs], labour unions, indigenous groups, charitable organisations, faith-based organisations, professional associations, and foundations."
Cultural heritage	The National Environmental Management: Integrated Coastal Management Act, 24 of 2008, defines cultural heritage as any place or object of aesthetic, architectural, historical, scientific, social, or spiritual value or significance.
Environmental Assessment Practitioner	"Environmental assessment practitioner" or "EAP", means an individual registered in terms of NEMA, means the individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Authorisation (EA)	"Environmental authorisation", when used in relation to a listed activity, means the authorisation by a competent authority of a listed activity or specified activity in terms of the NEMA, and includes a similar authorisation contemplated in a specific environmental management Act.
Focus Group Meeting	A focus group is a group of people, usually between 6 and 12 who meet in an informal setting to talk about a particular topic that has been set by the researcher/interviewer. The facilitator keeps the group on topic but is otherwise non-directive, allowing the group to explore the subject from as many angles as they please.
Free Prior Informed Consent (FPIC)	According to the Food and Agriculture Organisation, Free Prior Informed Consent (FPIC) is a specific right that pertains to indigenous peoples and is

Term	Definition
	recognised in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). It allows them to give or withhold consent to a project that may affect them or their territories. Once they have given their consent, they can withdraw it at any stage. Furthermore, FPIC enables them to negotiate the conditions under which the project will be designed, implemented, monitored, and evaluated. This is also embedded within the universal right to self-determination. The Protection, Promotion, Development and Management of Indigenous Knowledge Act, 6 of 2019, defines "prior informed consent" granted by a trustee, which has been obtained – (a) free from any manipulation, interference, or coercion; (b) after full disclosure of the intent and scope of the activity; and (c) in a language and process understandable to the community.
Historically Disadvantage Person	The MPRDA defines an historically disadvantaged person as- (a) any person, category of persons or community, disadvantaged by unfair discrimination before the Constitution took effect; (b) any association, a majority of whose members are persons contemplated in paragraph (a); (c) a juristic person, other than an association, which- (i) is managed and controlled by a person contemplated in paragraph (a) and that the persons collectively or as a group own and control a majority of the issued share capital or members' interest, and are able to control the majority of the members' vote (ii) is a subsidiary, as defined in Section 1 (e) of the Companies Act, 1973, as a juristic person who is a historically disadvantaged person by virtue of the provisions of paragraph (c)(i);
Independent	"Independent", in relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means - (a) that such EAP, specialist, or person has no business, financial, personal, or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of the EIA Regulations; or (b) that there are no circumstances that may compromise the objectivity of that EAP, specialist, or person in performing such work; excluding - (i) normal remuneration for a specialist permanently employed by the EAP; or (ii) fair remuneration for work performed in connection with that activity, application, or environmental audit.
Interested and Affected Party (I&AP)	"Interested and affected party" in terms of the NEMA and in relation to p the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v), and which includes- (a) any person, group of persons or organisation interested in or affected by such operation or activity; and (b) any organ of stale that may have jurisdiction over any aspect of the operation or activity. In terms of Chapter 1 of the Amendment Regulations to the Mineral and Petroleum Resources Development Regulations, 2020 "i natural or juristic person or an association of persons with a direct interest in the proposed or existing prospecting or mining operation or who may be affected by the proposed or existing prospecting or mining operations. These include, but are not limited to: - Mine communities as defined in these Regulations. Landowners Traditional Council as defined in Section 1 of the Traditional Leadership and Governance Framework Act, 2003. Land Claimants who have lodged claims in terms of the Restitution of Land Rights Act, 1994 which have not been rejected or settled in terms thereof.

Term	Definition
	Lawful land occupier. Holders of informal rights to land as defined in section 1 of the Interim Protection of Informal Land Rights Act, 1996; and The Department responsible for Agriculture, Land Reform and Rural Development.
Interests of the whole community	The National Environmental Management: Integrated Coastal Management Act, 24 of 2008, defines interests of the whole community as the collective interests of the community determined by- Prioritising the collective interests in coastal public property of all persons living in the Republic over the interests of a particular group or sector of society Adopting a long-term perspective that takes into account the interests of future generations in inheriting coastal public property and a coastal environment characterised by healthy and productive ecosystems and economic activities that are ecologically and socially sustainable; and Taking into account the interests of other living organisms that are dependent on the coastal environment.
International Finance Corporation (IFC) Performance Standards	IFC, a member of the World Bank Group, advances economic development and improves the lives of people by encouraging the growth of the private sector in developing countries.
Local community	In terms of the National Environmental Management: Integrated Coastal Management Act, 24 of 2008, local community means any community of people living, or having rights or interests, in a distinct geographical area within the coastal zone.
Mine community	"Mine community" refers to communities whe areas, adjacent communities within a local municipality, metropolitan municipality, or district municipality." (Chapter 1, Amendment Regul Development Regulations, 2020.)
Non-Governmental Organisation	An organisation that tries to achieve social or political aims but is not controlled by a government.
Pigging	Pigging is a process in which highly viscous fluids are conveyed of out of pipelines. The pig is a cleaning device that is pumped through the pipeline under pressure. Thus, contaminations are conveyed out of the piping
Project-Affected Persons (PAPs)	According to the World Bank, project-affected persons means persons who, for reasons of the involuntary taking or voluntary contribution of their land and other assets under the project, result in direct economic and or social adverse impacts, regardless of whether or not the said project-affected persons physically relocate. These people will have their: (a) standard of living adversely affected, whether or not the project-affected Person must move to another location; (b) right, title, interest in any house, land (including premises, agricultural and grazing land) or any other fixed or movable asset acquired or possessed, temporarily or permanently, adversely affected; (c) access to productive assets adversely affected, temporarily or permanently; or (d) business, occupation, work or place of residence or habitat adversely affected.
Production Right	A PR issued in terms of Section 84 of MPRDA allows the holder to conduct any operation, activity or matter that relates to the exploration, appraisal, development, and production of petroleum. The right is valid for a period of 30 years, renewable for further periods each not exceeding 30years, is transferable and can be encumbered by mortgage.
Production Works Programme	The planned programme to be followed in order to develop a petroleum resource optimally.

Term	Definition
Public Meeting	The International Association for Public P organised large group meeting usually used to make a presentation and give the public an opportunity to ask questions and give comments. Public meetings are open to the public at large.
Registered I&AP	"Registered interested and affected party", in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of Regulation 42 of the 2014 EIA Regulations, as amended.
Slug	A slug is an uneven distribution of liquid and gas in a pipeline. Pipelines transport both gas and liquids in two-phase flow. Liquids tend to settle in the bottom of pipelines, while the gases occupy the top section. Under certain conditions, the liquids and gases may group together to form slugs.
Specialist	"Specialist" means a person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.
Traditional community	In terms of the Traditional Leadership and Governance Framework Act, 41 of 2003, traditional community means a traditional community recognised as such in Section 2 of the Act. A community may be recognised as a traditional community if it- (a) is subject to a system of traditional leadership (b) observes a system of customary law.
Traditional council	In terms of the National Environmental Management: Integrated Coastal Management Act, 24 of 2008, traditional council means a traditional council established and recognised in terms of Section 3 of the Traditional Leadership and Governance Framework Act, 41 of 2003. Section 3 (2) (a) A traditional council may have no more than 30 members, depending on the needs of the traditional community concerned. (b) At least a third of the members of a traditional council must be women. (c) The members of a traditional council must comprise- (i) traditional leaders and members of the traditional community selected by the senior traditional leader concerned in terms of that community's customs, taking into account the need for overall compliance with paragraph (b); and (ii) other members of the traditional community who are democratically elected for a term of five years, and who must constitute 40% of the members of the traditional council.
Traditional leader	In terms of the Traditional Leadership and Governance Framework Act, 41 of 2003, traditional leader means any person who, in terms of customary law of the traditional community concerned, holds a traditional leadership position, and is recognised in terms of this Act.
Umbilical	Umbilical links sea floor and oil and gas equipment for controls, power and heat. They provide electric and fibre optic signals, electrical power and hydraulic and chemical injection fluids to the subsea unit.

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