SEISMIC SURVEY PROGRAMME IN LICENCE BLOCKS 2912 AND 2913B, ORANGE BASIN, NAMIBIA

ENVIRONMENTAL CLEARANCE CERTIFICATE RENEWAL AND AMENDMENT REPORT

For: TotalEnergies EP Namibia B.V.

SLR PROJECT No: 733.20071.00005 Revision: 1

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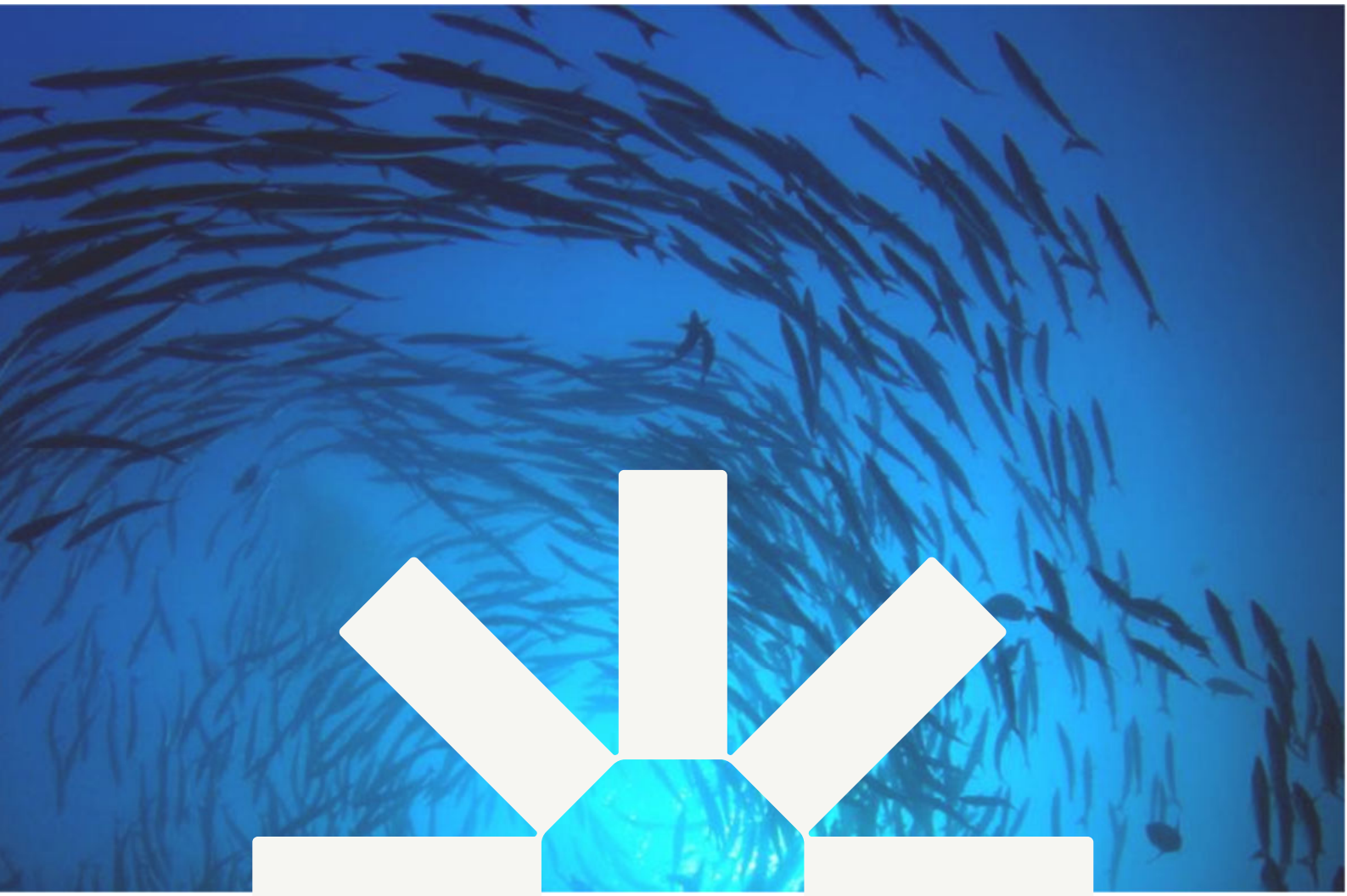

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Executive Summary

1. INTRODUCTION AND RATIONALE FOR RENEWAL AND AMENDMENT OF THE ECC

TotalEnergies EP Namibia B.V. (TEEPNA) is the holder of two Exploration Licences for Blocks 2912 and 2913B. TEEPNA holds the controlling interest in Licence Blocks 2912 (37.77%) and 2913B (40%) with Impact, Qatar Petroleum and the National Petroleum Corporation of Namibia (NAMCOR) holding the remaining interest.

Blocks 2912 and 2913B are located in the deepwater Orange Basin off the coast of southern Namibia (see Figure 1). Block 2912 is located the furthest offshore (290 km at its closest point) in water depths of 3 300 m to 3 800 m. Block 2913B is located immediately to the east (240 km offshore at its closest point) in water depths ranging from approximately 2 600 m to 3 300 m.

TEEPNA currently holds an Environmental Clearance Certificate (ECC) and approved Environmental and Social Management Plan (ESMP) for a 3D seismic survey (dated 29 June 2021) over a portion of Blocks 2912 and 2913B. TEEPNA completed a 3D seismic survey under the ECC between 1 December 2022 and 10 February 2023. A further 3D seismic survey was undertaken from 1 December 2023 to 30 April 2024. The 2023/2024 campaign was undertaken in line with an agreement with the Ministry of Environment Forestry and Tourism (MEFT) to continue survey activities under the current ECC.

TEEPNA is now proposing to acquire further detailed 3D seismic data anywhere across the full extent of the two licence blocks and to undertake surveys over multiple seismic survey seasons. The full licence block area is 18 170 km^2 in extent. For this continued seismic survey programme, TEEPNA would want to use standard streamer technology as well as utilise Ocean Bottom Node (OBN) seismic survey technology to acquire more detailed data of the subsurface. TEEPNA is thus applying to amend its current ECC to allow for the further expanded 3D seismic surveying as well as utilisation of the additional OBN technology. As its current ECC expires on 29 June 2024, TEEPNA is also, as a parallel process, applying to renew its current ECC for a further three-year period.

SLR Environmental Consulting (Namibia) (Pty) Ltd has been appointed by TEEPNA as the Independent Environmental Assessment Practitioner to undertake the required ECC Renewal and Amendment and process.

2. PROPOSED AMENDMENTS

TEEPNA is applying to acquire further seismic data across the entire extent of Blocks 2912 and 2913B. As part of its planned ongoing seismic survey programme, TEEPNA is proposing to undertake the following activities over multiple seismic survey seasons:

- 3D Streamer Seismic Surveys; and/or
- 3D OBN Seismic Surveys.

TEEPNA would also want to potentially undertake more than one survey per seismic survey season (December to end May) and/or more than one survey at the same time in different areas of the licence blocks.

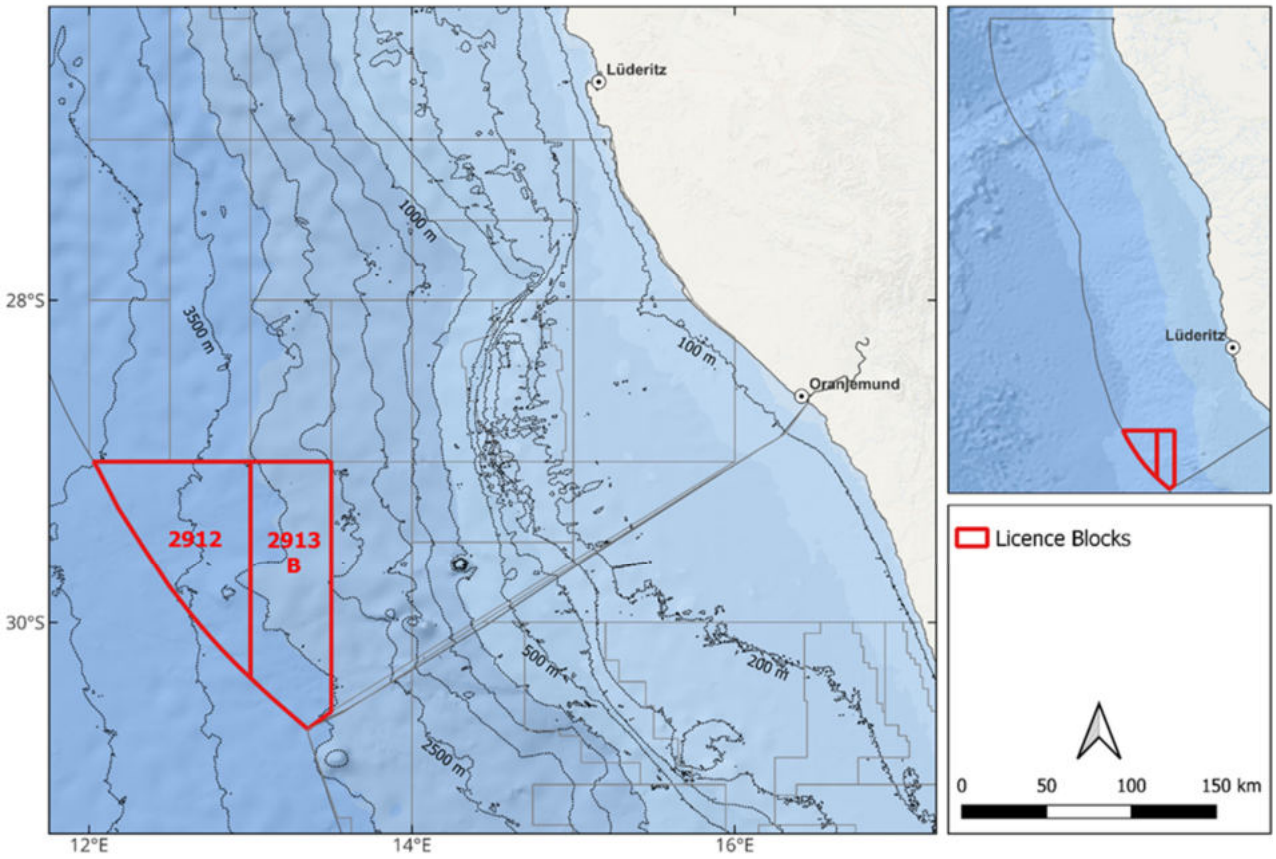

Figure 1: Locality map of Licence Blocks 2912 and 2913B, Orange Basin, off the coast of Southern Namibia.

3. EVALUATION OF POTENTIAL IMPACTS FROM THE PROPOSED AMENDMENTS

All the impacts from the 2020 EIA Report have been re-analysed based on the proposed amendments related to further 3D seismic streamer and additional OBN surveys across the entire extent of Blocks 2912 and 2913B and additional potential impacts related to node deployment on the seafloor addressed. As there have been minimal changes to the baseline environment, there would be no significant changes to the previously assessed impacts.

With regards to the biophysical environment, some impacts have been re-evaluated (see Table 1). These mainly relate to the updating of the noise modelling study and its implications for the assessment of the impact of underwater noise on marine fauna and OBN technology, which was not previously assessed.

Based on the similar overlap with fishing grounds, there would be no change to the previously assessed socio-economic impacts as a result of the proposed amendments. Impacts have, however, been re-evaluated to include OBN survey technology which was not previously considered (see Table 2).

Considering the recent increase in exploration activities off the southern coast of Namibia and West Coast of South Africa, the potential cumulative impacts from multiple seismic surveys or exploration well drilling activities being undertaken in and in the vicinity of Blocks 2912 and 2913B also needed to be considered. However, based on the transitory nature of seismic surveys, the relatively small area of influence at any given time and the required distances between different exploration activities to avoid interference with data acquisition, it is not expected that significant cumulative impacts would be

experienced should multiple surveys be undertaken in parallel or within the same survey window period within Blocks 2912 and 2913B and neighbouring licence blocks.

Table 1: Evaluation of Impacts on the Biophysical Environment from Amended Project Description

No.	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Revised Residual Impact Significance	Recommendations for Additional Mitigation
1	**SEISMIC ACQUISITION**			
1.1	Increase in underwater noise levels Negative effect on marine faunal groups (physiological injury, mortality, behavioural avoidance): - Plankton abundance - Benthic and pelagic invertebrates - Fish - Diving seabirds - Turtles - Seals - Mysticete cetaceans (LF) - Odontocete cetaceans (HF & VHF)	Negligible (plankton, benthic and pelagic invertebrates) Very Low (diving seabirds, seals) Low (fish, turtles, cetaceans)	Negligible (plankton, benthic and pelagic invertebrates) Very Low (diving seabirds, seals) Low (fish, turtles, cetaceans)	None in addition to recommendations in 2020 EIA. The mitigation zone for turtles was, however, reduced to a precautionary 200 m in line with PTS and TTS impact zones from single pulses both being less than 100 m. This change was made based on experience from TEEPNA 2023/2024 survey in Blocks 2912 and 2913B and to align the turtle pause mitigation with mitigation for short breaks in airgun firing.
2	**PLACEMENT OF NODES**			
2.1	Placement of nodes on the seafloor Disturbance or crushing of benthic macrofauna in the footprint of each node and/or from ROV operations during deployment	Not assessed in 2020 EIA	Negligible	Mitigation measures have been included in Table 6-1 to ensure that disturbance of the seabed is limited.
3	**UNPLANNED EVENTS**			
3.1	Accidental loss of equipment to seabed or water column Increase in hard substrate and faunal entanglement	Very Low	Very Low	None in addition to recommendations in 2020 EIA.

Table 2: Evaluation of Impacts on the Socio-Economic Environment from Amended Project Description

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Revised Residual Impact Significance	Recommendations for Additional Mitigation
1	**DEPLOYMENT OF SEISMIC EQUIPMENT**			
1.1	Safety exclusion zone around survey vessel and towed array Exclusion of Fisheries from Fishing Grounds - Large Pelagic Long-Line	Very Low	Very Low	None in addition to recommendations in 2020 EIA.
1.2	Placement of nodes on the seafloor Potential damage to subsea cables from placement of nodes and/or ROV operations	Not assessed in 2020 EIA	Negligible	Mitigation measures have been included in Table 6-1 to ensure that there is no interference with subsea telecommunications cables.
2	**AIRGUN ARRAY DEPLOYMENT, TESTING, OPERATION AND RETRIEVAL**			
2.1	Acoustic emissions from the airgun array Change in catch rate due to behavioural avoidance of fish in and around survey areas	Very Low	Very Low	None in addition to recommendations in 2020 EIA.

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Revised Residual Impact Significance	Recommendations for Additional Mitigation
3	**UNPLANNED EVENTS**			
3.1	Loss of equipment at sea • Potential snagging of demersal gear with regards to equipment that sinks to the seabed; • Potential entanglement hazards with regards to lost streamers, arrays and tail buoys drifting on the surface or in the water column; and • Potential entanglement hazards from OBN nodes on the seafloor.	Very Low	Very Low	None in addition to recommendations in 2020 EIA.

4. CONCLUSIONS AND RECOMMENDATIONS

The ECC Renewal and Amendment process concludes that there would be no significant changes to the results of the 2020 EIA process and any of the impacts assessed therein and additional impacts not previously assessed are deemed to be of negligible significance after mitigation.

A few additional mitigation measures to those described in the 2020 EIA are, however, considered necessary and have been incorporated into an updated ESMP document to mitigate the proposed amendments associated with the updated project description. The changes largely relate to bringing the ESMP in line with the latest best practice measures being implemented by other operators in the Namibian and South African offshore environment and to include measures specifically related to OBN technology.

Based on the findings of the ECC Renewal and Amendment process, SLR is of the opinion that this ECC Renewal and Amendment Report is sufficiently robust and provides sufficient information for MEFT to make an informed decision on the Renewal and Amendment Application taking into consideration the significance of potential impacts. SLR recommends that the commitments presented in the updated ESMP should be conditional to the ECC Renewal and Amendment, should the application be approved.

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Acronyms and Abbreviations

2D	Two-dimensional
3D	Three-dimensional
ACE	African Coast to Europe
ALARP	As Low As Reasonably Practicable
BAT	Best Available Technology
BOD	Biological Oxygen Demand
EBSA	Ecologically or Biologically Significant Area
ECC	Environmental Clearance Certificate
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ERP	Emergency Response Plan
ESA	Ecological Support Area
EIA	Environmental Impact Assessment
ESMP	Environmental and Social Management Plan
HSE	Health, Safety and Environment
I&APs	Interested and Affected Parties
ICCAT	International Commission for the Conservation of Atlantic Tunas
IMO	International Maritime Organisation
IUCN	International Union for Conservation of Nature
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MME	Ministry of Mines and Energy
MMO	Marine Mammal Observer
NAMPORT	Namibian Ports Authority
NIMPA	Namibian Islands' Marine Protected Area
OBN	Ocean Bottom Nodes
PAM	Passive Acoustic Monitoring
PTS	Permanent hearing Threshold Shift
SOPEP	Shipboard Oil Pollution Emergency Plan
SLR	SLR Environmental Consulting (Namibia) (Pty) Ltd
TEEPNA	TotalEnergies EP Namibia B.V.
TTS	Temporary hearing Threshold Shift
WACS	West Africa Cable System

1.0 INTRODUCTION

1.1 Background

TotalEnergies EP Namibia B.V. (TEEPNA) holds two Exploration Licences for Block 2912 and 2913B in the deep-water Orange Basin off the coast of southern Namibia (see Figure 1-1). Block 2912 is located the furthest offshore (290 km at its closest point) in water depths of 3 300 m to 3 800 m. Block 2913B is located immediately to the east (240 km offshore at its closest point) in water depths ranging from approximately 2 600 m to 3 300 m.

TEEPNA was issued with an Environmental Clearance Certificate (ECC) to undertake a 3D seismic survey programme within the Licence Blocks 2912 and 2913B. The current ECC, which expires on 29 June 2024, provides for a seismic survey programme across a 9 797 km^2 operational area across both blocks. Under this ECC, TEEPNA completed a seismic survey during the 2022/2023 seismic survey window period (01 December 2022 to 10 February 2023). Subsequent to this survey, the Ministry of Environment, Forestry and Tourism (MEFT) granted TEEPNA permission to undertake another survey under its current ECC on 21 August 2023. TEEPNA, then, performed another seismic acquisition campaign from December 2023 to end of March 2024.

TEEPNA is now applying to renew and amend its ECC to cover the entire extent of Blocks 2912 and 2913B (18 170 km^2). TEEPNA is also applying to add the option of undertaking Ocean Bottom Nodes (OBN) seismic surveys in selected areas of interest to acquire further fine-scale 3D seismic data over the three-year ECC validity period and to potentially undertake more than one survey per seismic survey season.

SLR Environmental Consulting (Namibia) (Pty) Ltd (SLR) has been appointed by TEEPNA as the Independent Environmental Assessment Practitioner to undertake the required ECC Renewal and Amendment process. This report reflects updates to the baseline environment since the original Environmental Impact Assessment (EIA) process[1] conducted for the seismic survey programme in 2020 and considers whether the updated project description would affect the original impact assessment ratings or result in any new impacts.

1.2 Assumptions and Limitations

The assumptions and limitations made during preparation of this ECC Renewal and Amendment are:

- SLR assumes that all relevant project information has been provided by TEEPNA and that it was correct and valid at the time it was provided.
- An expanded survey area of interest has been proposed and the ECC Renewal and Amendment assumes that targeted seismic surveys could be undertaken anywhere within the two licence blocks.
- There will be no significant changes to the project description or surrounding environment between the completion of the ECC Renewal and Amendment process and implementation of the proposed amended project description.

[1] Proposed 3D Seismic Survey in Licence Blocks 2912 and 2913B, Orange Basin, Namibia. Final Environmental Impact Assessment Report and Environmental & Social Management Plan. 2020. SLR Namibia.

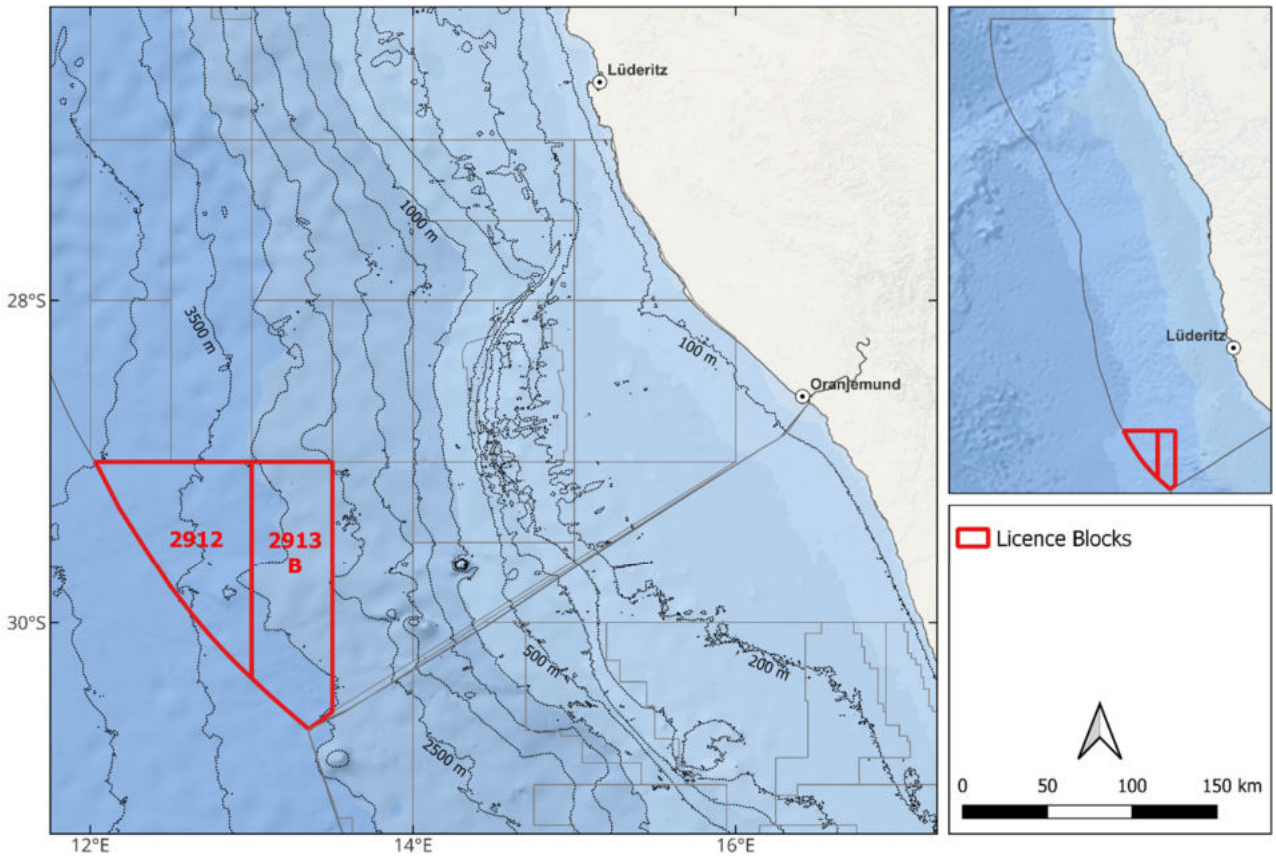

Figure 1-1: Locality map of Licence Blocks 2912 and 2913B, Orange Basin, off the coast of Southern Namibia.

2.0 ECC RENEWAL AND AMENDMENT PROCESS

2.1 Process Steps

This ECC Renewal and Amendment process has been undertaken in terms of Section 39 of the Environmental Management Act (EMA) and Regulation 19 of the EIA Regulations (Government Notice No. 30 of 2012). Steps undertaken during the ECC Renewal and Amendment process are summarised in Figure 2-1.

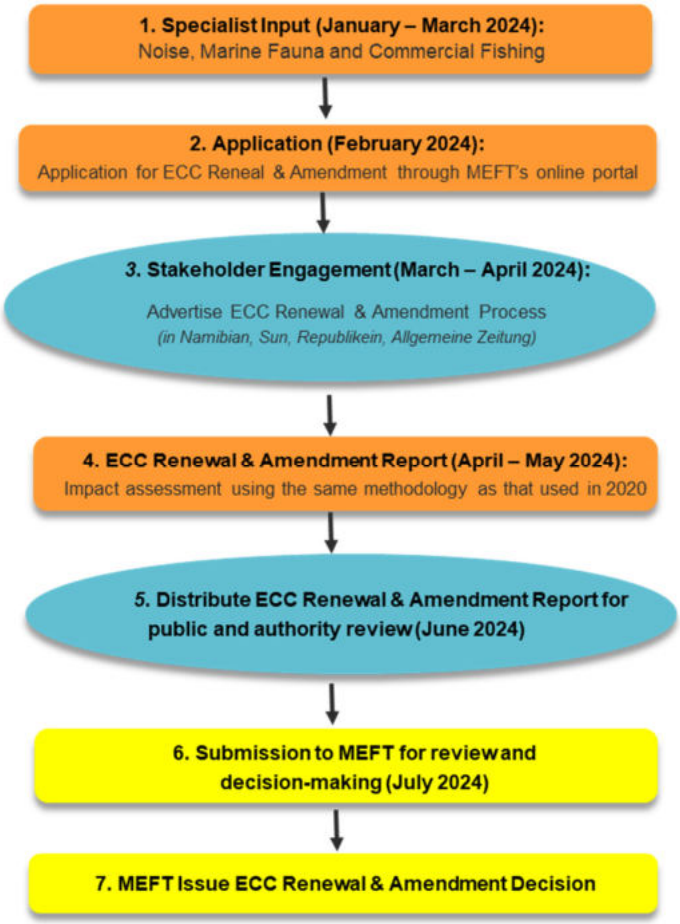

Figure 2-1: ECC Renewal and Amendment Process

2.2 Stakeholder Engagement

Due to the time that has passed since the undertaking of the original EIA process in 2020, the decision was made to provide the public with another opportunity to register on the stakeholder database in order to be informed of further exploration activities and the findings of the ECC Renewal and Amendment process. The public was also encouraged to provide initial comments or queries on the amended project proposal and to indicate whether there was any interest for the project team to arrange an online public meeting to discuss the ECC Renewal and Amendment process.

The ECC Renewal and Amendment Application was advertised in four regional newspapers (Namibian, Sun, Republikein, and Allgemeine Zeitung) on 28 March and 04 April 2024. The advertisement invited new stakeholders to register on the stakeholder database by 22 April 2024. Proof of placement of advertisements is provided in Appendix A. Only two requests to be registered on the project database were received in response to the placement of advertisements, with no other comments on the proposed amendments or ECC Renewal and Amendment process being submitted.

The ECC Renewal and Amendment Report was made available for a 21-day review and comment period to stakeholders on the latest TEEPNA stakeholder database and new stakeholders that registered by 22 April 2024. A notification letter was sent to stakeholders on the database to notify them of the availability of the ECC Renewal and Amendment Report for comment from **11 June to 2 July 2024**. A copy of the notification letter is provided in Appendix B. Although confirmation of mail delivery and reading of the notification was received from various parties, no comments on the draft report were received during the 21-day review and comment period. This version of the report is thus being submitted to MEFT for decision-making.

2.3 Assessment Update

The original specialist studies for seismic survey activities in Blocks 2912 and 2913B were undertaken in 2020. The marine fauna and commercial fisheries specialists were approached to confirm whether there were any recent updates to the baseline affected environment descriptions provided at the time that would affect the assessment of impacts related to the proposed amended project description. The Marine Fauna specialist (Pisces Environmental Services) and Commercial Fisheries Specialist (Capricorn Marine Environmental) had confirmed that no major updates had taken place and that it was not expected that the minor updates available from more recent publications for the Namibian offshore would affect their 2020 assessments or assessment of the proposed amended project description. In addition, there have been no notable regulatory changes in Namibia since the 2020 assessment.

As the specialist assessments considered an indicative survey area within the blocks in 2020, three of the original technical and specialist assessments were reviewed as part of the ECC Renewal and Amendment process and updated to consider the full extent of the two blocks (18 170 km^2) and the addition of OBN survey technology. As there has been a steady increase in interest in oil and gas exploration within the Orange Basin since 2020, specialists were also requested to consider the implications of cumulative impacts related to increased exploration activities in the vicinity of Blocks 2912 and 2913B, as well as multiple surveys per seismic survey season (December to end May).

Technical Study

The original 2020 EIA process had included a noise modelling study (Sound Transmission Loss Modelling) (SLR Australia, 2020) which considered two modelling locations: L1 at 3 700 m depth and L2 at 2 700 m depth. With TEEPNA proposing to now include the full extent of the licence blocks in its seismic survey area of interest, the decision was made to update the noise modelling study to include a third shallower modelling location, i.e. L3 at 2 504 m, depth and two parallel north-south survey transects along the inshore boundary of Block 2913B. L3 is considered as the shallowest point within the licence blocks and the closest to the sensitive feature, Tripp Seamount, located approximately 85 km east of the inshore boundary of Block 2913B.

Based on the proposed amended survey specifications (refer to Section 3), both the standard streamer and OBN surveys would use sound source levels of at least 3 000 cubic inches (cui), with a maximum level of 3 480 cui proposed for standard streamer surveys. For the shot intervals, the standard streamer survey would use 18.75 m intervals, while OBN surveys would use 25 m intervals. As the standard streamer survey shot interval would result in a higher number of shots per minute when compared to the OBN surveys, the standard streamer survey design was used as the worst-case scenario in terms of noise input into the environment and thus used for the updated modelling at the third modelling location and transects.

Specialist Studies

The following studies were reviewed in order to inform the analysis of the previously assessed impacts against the proposed amendments, as well as to provide updated mitigation measures, where applicable:

- Marine Fauna Specialist Study update considering updated noise study and project description,
- Commercial Fisheries Specialist Study update considering updated noise study and project description.

An analysis of the marine fauna and commercial fisheries specialist study updates is provided in Chapters 4 and 5, with updated ESMP specifications captured in Chapter 6. The same impact assessment methodology as used during the 2020 assessments were used for the specialist study updates.

3.0 UPDATED PROJECT DESCRIPTION

TEEPNA is applying to acquire further seismic data across Blocks 2912 and 2913B. As part of its planned ongoing seismic survey programme, TEEPNA is proposing to undertake the following activities over multiple approved seismic survey periods:

- 3D Streamer Seismic Surveys; and/or
- 3D OBN Seismic Surveys.

The updated project scope and activities are set out below. TEEPNA's 2020 EIA Report already included a description and assessment of traditional 3D seismic acquisition involving the use of multiple hydrophone streamers. The principles of seismic surveys are, nevertheless, again provided below. In addition, a description is provided for the 3D OBN survey technology which has not previously been utilised, neither applied for, by TEEPNA in its licence blocks in the Namibian offshore.

3.1 Exploration Licence Holders

TEEPNA holds the majority interest and the operatorship of Blocks 2912 and 2913B with 37.77% interest in Block 2912 and 40% interest in Block 2913B. Impact, Qatar Petroleum and the National Petroleum Corporation of Namibia (NAMCOR) hold the remaining interest in the two blocks.

3.2 Summary of Site Information

Licence Blocks 2912 and 2913B are located in the deepwater Orange Basin off the coast of southern Namibia. These blocks have a combined area of 18 170 km^2, with water depths ranging from 2 600 m to 3 800 m. Further information is provided in Tables 3-1 and 3-2.

Table 3-1: Summary of Licence Blocks

Licence Block	2912	2913B
Size	9 955 km^2	8 215 km^2
Water depth	2 900 m to 3 800 m	2 600 m to 3 300 m
Distance offshore (at closest point)	290 km	240 km

Table 3-2: Corner Coordinates (WGS84) of Licence Blocks

	Corner no.	Latitude (s)	Longitude (E)
2912	1	29°0'19.822"S	12°1'39.956"E
	2	28°59'57.732"S	12°59'57.559"E
	3	30°21'27.012"S	13°0'19.649"E
2913B	1	28°59'57.732"S	12°59'57.559"E
	2	28°59'57.732"S	13°29'32.132"E
	3	30°33'43.35"S	13°29'39.495"E
	4	30°39'14.701"S	13°20'19.879"E
	5	30°21'27.012"S	13°0'19.649"E

3.3 Project Scope and Activities

The proposal is to acquire 3D seismic data using standard streamer and OBN technology across the extent of Blocks 2912 and 2913B. A summary of the project phases and anticipated activities is provided in Table 3-3.

Table 3-3: Summary of Project Phases and Activities

Phase	Activity
1. Mobilisation Phase	Transit of survey vessels to survey area, including routine discharges
	Discharge of ballast water
2. Operation Phase	Seismic acquisition, including the deployment of seismic equipment (sources and streamers or Ocean Bottom Nodes)
	Operation of supply vessels, including routine discharges to sea
	Provision of services from local service providers (e.g. catering and refuelling)
	Berthing during crew changes
	Operation of helicopters during crew changes
	Bunkering at sea
3. Demobilisation Phase	Seismic equipment is retrieved, survey vessels leave survey area and transit to port or next destination

3.4 Principles of Seismic Surveys

Marine seismic acquisition is a geophysical technique using acoustic energy and seismology to map the geological structures of the seabed. This technique makes it possible to identify possible structures in the underground rocks, favourable to the possible discovery of hydrocarbons.

During seismic surveys, high-level, low frequency sounds are directed towards the seabed from near-surface sound sources (airgun arrays) towed by a seismic vessel. The acoustic signal emitted into the water column penetrates the seabed, then is reflected by the rock formations in the basement. For 3D seismic surveys, the reflected signals are recorded by multiple receivers (or hydrophones). Analyses of the returned signals allow for interpretation of subsea geological formations. The receivers can either be towed behind the survey vessel in a multiple streamer configuration (traditional streamer technology – see Section 3.5) or placed in a grid on the seafloor (OBN technology – see Section 3.6).

For this continued seismic survey programme, TEEPNA is proposing to undertake further 3D seismic surveys over multiple seasons.

3D Seismic surveys are typically acquired over promising petroleum prospects to assist in fault interpretation, distribution of sand bodies, estimates of oil and gas in place and the location of boreholes. 3D seismic acquisition aims to provide a three-dimensional image of the geology of the seabed.

3.5 Traditional 3D Seismic Methodology and Airgun Array

Seismic surveys are usually conducted using a purpose-built seismic vessel. The seismic vessel would travel along specific pre-plotted survey lines covering a prescribed grid within the survey area that have been carefully chosen to cross any known or suspected geological structure. During surveying, the seismic vessel would travel on specific line headings at a speed of between four and five knots (i.e. 2 to 3 metres per second).

The 3D seismic acquisition technique requires at least two seismic sources and several streamers, placed in parallel and separated from each other by several tens of meters. The sound sources or airgun arrays will be situated some 250 m behind the vessel at a depth of approximately 8 m below the surface.

A traditional 3D survey uses multiple streamers (10 to 12 streamers spaced from 150 m to 180 m apart) up to 8 800 m long (see Figure 3-1). The streamers would be towed at a depth of 8 to 25 m and would not be visible, except for the tail-buoy (also emits a signal to other users of the sea) at the far end of the cable. The buoyancy of the streamers is ensured by the speed of the towing and the tail buoys.

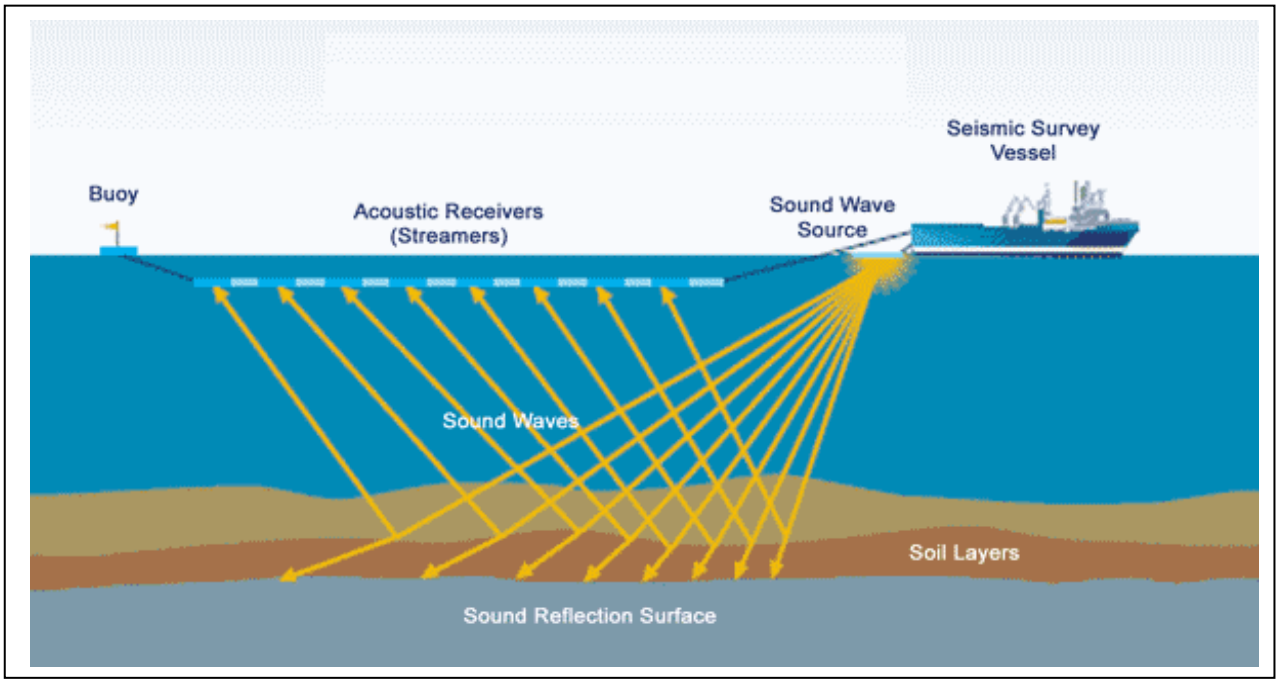

Figure 3-1: Principles of offshore seismic acquisition surveys

Source: fishsafe.eu

3.6 Ocean Bottom Node Technology

Like traditional 3D seismic surveys, OBN surveys also involve a seismic sound source that is towed by a specific vessel across a predetermined grid within the survey area of interest. The main difference, however, is that the hydrophones or sound receivers are not housed in streamers towed behind the seismic vessel but are rather included in bottom receivers (nodes) that are placed in a grid configuration directly on the seafloor.

The hydrophones are typically made from piezoelectric material and contain batteries allowing recording for up to 200 days, flash memory to store seismic data and a clock for data synchronization. These components are encased in a plastic container which is called a node (see Figure 3-2 and Figure 3-3).

The reflected acoustic signals are directly recorded in the nodes. These data are retrieved at the same time as the nodes are retrieved from the seabed. Analyses of the recorded signals allow for interpretation of subsea geological formations.

Figure 3-2: Examples of Ocean Bottom Nodes used in offshore seismic data acquisition

Source: https://www.tgs.com/seismic/acquisition-obn/technology/ocean-bottom-nodes/

Figure 3-3: Photograph showing the general size of the nodes that might be used

Source: https://www.tgs.com/seismic/acquisition-obn/technology/

The nodes are deployed using an underwater Remotely Operated Vehicle (ROV) (see Figure 3-4). The nodes do not need to be anchored as they are heavy enough to remain on the seafloor. The deepwater nodes can be up to 50 kg in weight in water.

OBN seismic surveys are usually conducted using a purpose-built Nodes Handling Vessel and Seismic Source Vessel (further details in Section 3.11). The Nodes Handling Vessel lays the nodes on the seafloor along a pre-plotted survey grid, covering a prescribed grid within the survey area that has been carefully chosen to cross any known or suspected geological structure with a potential for hydrocarbons (see Figure 3-5).

Similar to traditional streamer surveys, during surveying, the source vessel also travels along specific pre-plotted survey lines, on specific line headings at a speed of 3 to 4 knots. The node count on board the Nodes Handling Vessel is a limiting factor regarding the area that can be covered in one source swath. Depending on the survey extent, retrievals and re-deployments of the nodes might thus be required to complete a specific survey.

Figure 3-4: Example of a node deployment ROV
Source: https://www.rovop.com/ocean-bottom-node-deployment-in-central-north-sea/

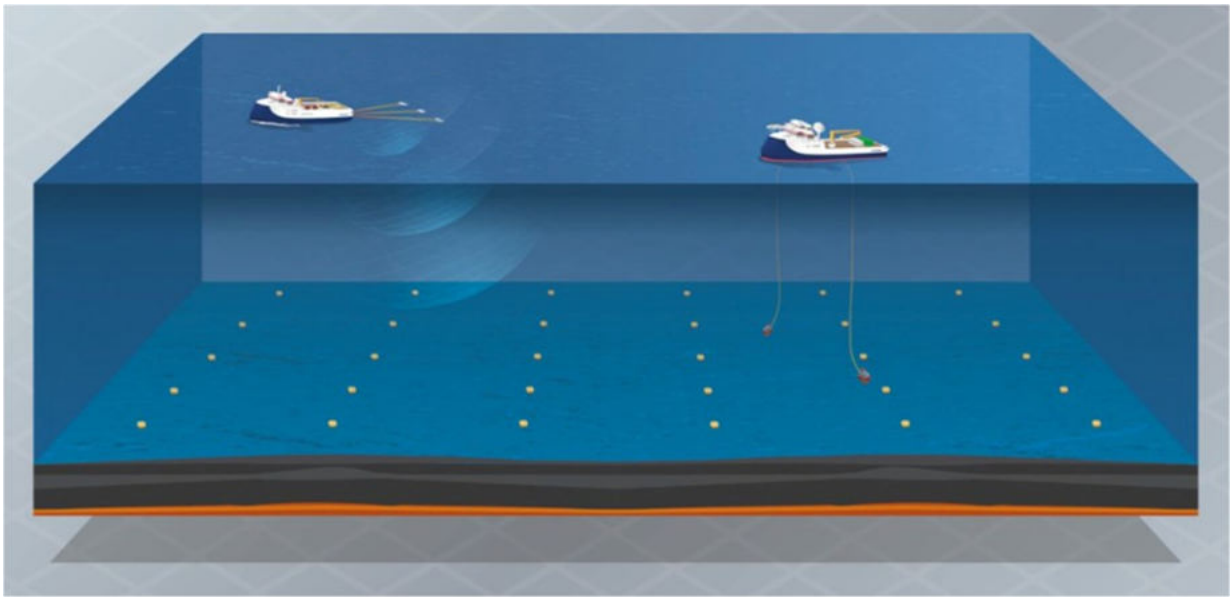

Figure 3-5: Principles of offshore OBN acquisition surveys, showing a Nodes Handling Vessel with ROVs and seismic source vessel towing airgun arrays
Source: adapted from https://www.shearwatergeo.com/186/marine-acquisition/ocean-bottom-seismic

3.7 Sound Source and Sound Pressure Emission Levels

Airguns are the most common sound source used in modern seismic surveys (see Figure 3-6). The airgun is an underwater pneumatic device from which high-pressure air is released suddenly into the surrounding water. Airguns are normally used in arrays, usually consisting of between 18 and 48 airguns arranged in a rectangular configuration parallel to the sea surface, which enables the added energy of the individual elements to be directed primarily downward (Gisiner, 2016).

The sound produced by a compressed air source is a function of the volume, size and shape of the ports by which the air escapes and the air pressure. An air pressure of 2 000 psi (13 789.5 kPa) is most commonly used, but can range from 1 500 to 3 000 psi (Gisiner, 2016). On release of pressure the resulting bubble pulsates rapidly producing an acoustic signal that is proportional to the rate of change of the volume of the bubble.

The primary output of an airgun source typically has most of the energy in the frequency bandwidth between 4 and 200 Hz, which is the frequency bandwidth of most interest in seismic surveying (OGP, 2011). The output characteristics of typical seismic source arrays are commonly presented in terms of a “nominal” peak source level or sound pressure level (SPL) in dB re 1 i.iPa @ 1 m (OGP, 2011). It is, however, important to note that the “nominal” source level will represents the so-called ‘back calculated’. Actual measurable levels around the array are typically 10-20 dB sound pressure level (SPL), which is the pressure level that would be achieved if all the elements in the source were concentrated into a single point (i.e. point source equivalent dimension) (Caldwell and Dragoset, 2000).

For example, a nominal source level of 260 dB peak SPL re 1 i.iPa @ 1 m would produce measurable received sound levels between 225 and 243 dB (see Figure 3-7) (Gisiner, 2016).

One of the required characteristics of a seismic shot is that it is of short duration (the main pulse is usually between 5 and 30 milliseconds in duration). The main pulse is followed by a negative pressure reflection from the sea surface of several lower magnitude bubble pulses (see Figure 3-8). An important reason for using different size seismic sources in an array is the cancellation of sound from oscillating bubbles after the initial formation. Any sound after the initial pulse clutters the return signal. Thus, by using multiple sources of different volumes, the bubbles oscillate at different rates, interfere with each other, and produce a “cleaner” pulse, as seen in the white composite waveform in Figure 3-8.

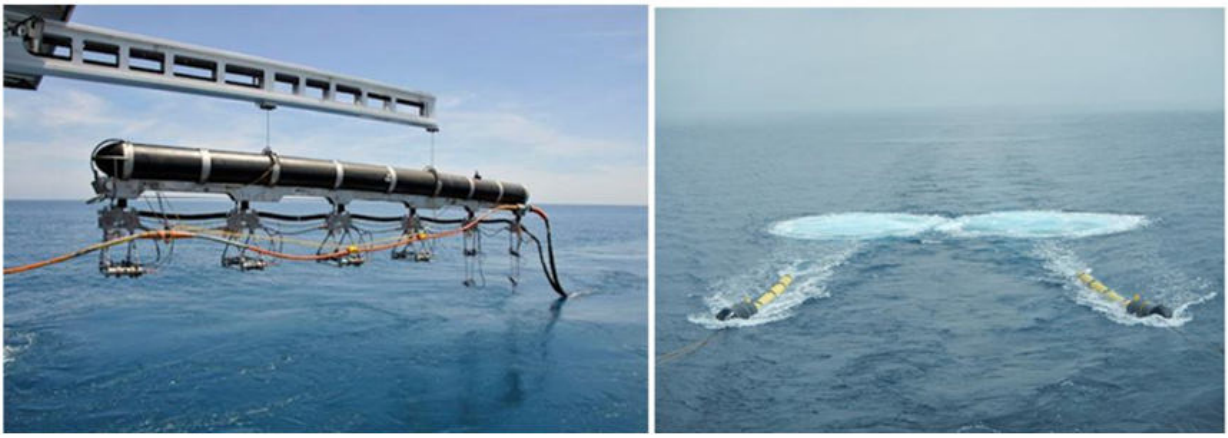

Figure 3-6: Example of a Seismic Source (Airgun Array)
Source: TEEPNA

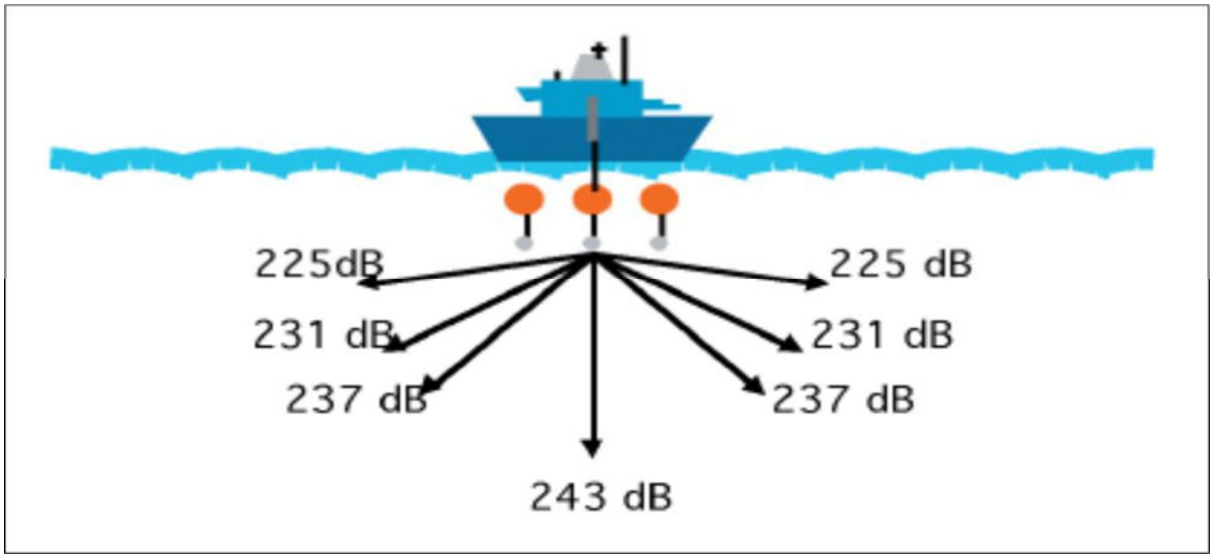

Figure 3-7: Pattern of measurable received sound levels around a schematic representation of an array – assuming a nominal point source level of 260 dB peak sound pressure level

Source: Caldwell and Dragoset, 2000 in Gisiner, 2016

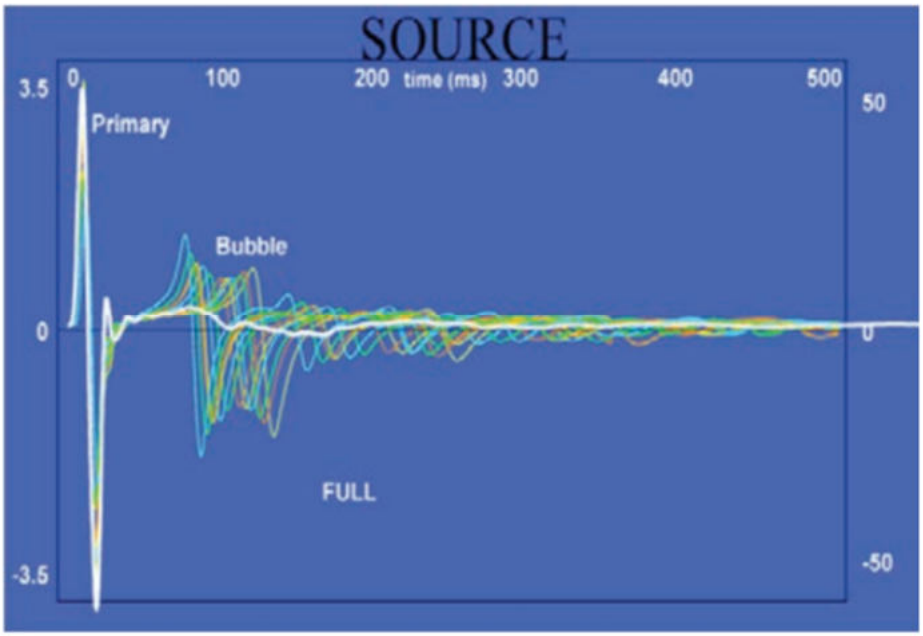

Figure 3-8: Typical pressure signature produced on firing of an airgun

Source: Gisiner, 2016

3.8 Indicative Seismic Survey Programme

The proposed updated 3D seismic survey programme would entail covering the majority of the remaining areas of Blocks 2912 and 2913B where data has not yet been acquired as well as refinement of data across areas already surveyed. It is anticipated that surveys would be undertaken over multiple seismic survey seasons within the 3-year validity period of the ECC and that more than one survey might be undertaken per seismic survey season, depending on the size and location of the target areas.

TEEPNA proposes to commence with the first of these 3D seismic surveys at the earliest in **December 2024** subject to obtaining a Renewed and Amended ECC.

3.9 Indicative Technical Characteristics

The indicative main technical characteristics of the proposed seismic surveys to be undertaken as part of the ongoing survey programme are summarised in Table 3-4.

Table 3-4: Characteristics of seismic acquisition operations (indicative)

Seismic Source (traditional streamer and OBN)	
Type of Energy source	Pressurized air
No. of airgun arrays	2 to 3
No. of active airguns	Approximately 36 (note: only one active array for each shot point)
Towing depth of the airgun	Approximately 8 m
Spacing between airgun arrays	50 m to 60 m
Source Volume	Max 3 480 cubic inches
Total volume of the cannon chamber	The individual volume of the chambers is between 40 and 300 cubic inches
Operational pressure	2 000 psi
Shot interval	18.75 m shot-point interval (streamer) 25 m shot-point interval (OBN)
Traditional Streamer Technology	
Number of streamers	10 to 14
Overall spread length (back deck to tail buoy)	8 600 to 8800 m including 250 m source layback
Spacings between Streamers	100 m to 180 m
Spread width	1 100 m to 1 620 m
Types of streamer	Solid - Polymer or gel
Depths of streamers	8 to 25 m
Ocean Bottom Node	
Spread length of source equipment	~ 500 m
Spread width of source equipment	~ 150 m
Types of nodes	4 components (1 hydrophone + 3 geophones / accelerometer)
Deployment method	ROV
Number of nodes	5 to 10 nodes per km^2
Spacing between nodes	300 to 600 m
Depth of nodes	On seafloor (~ 3 000 m depth)

3.10 Survey and Operational Areas

In order to ensure full fold coverage of specific survey target areas, the operator would need to acquire data up to 10 km outside of the block boundaries for standard 3D seismic surveys. This would only apply should the target area(s) be located close the outside boundary of the blocks. This is considered as common practice in order to acquire consolidated data along block boundaries and would require consent from the relevant neighbouring block holders.

In terms of the Petroleum (Exploration and Production) Act, 1991 (No. 2 of 1991), a seismic vessel is considered an “offshore installation” and as such it (including the source array for the Source Vessel and streamers for standard streamer surveys) is protected by a 500 m exclusion zone. Unauthorized vessels may not enter the restricted area without being explicitly authorized by the installation.

The actual safety exclusion zone implemented by seismic operators while surveying is larger than the 500 m stipulated by the above legislation. For a standard seismic streamer survey, seismic operators normally implement a safety exclusion zone of 6 km ahead and abeam and 15 km astern, resulting in an approximate 250 km^2 exclusion zone around the vessel. This zone is implemented for surveying during the day and night. When considering the 15 km safety distance (astern) and the requirement to survey up to 10 km outside of the block boundary (when surveying close to the edge), the effective maximum survey operational area could thus extend to 25 km outside of the block boundary in places (see Figure 3-9).

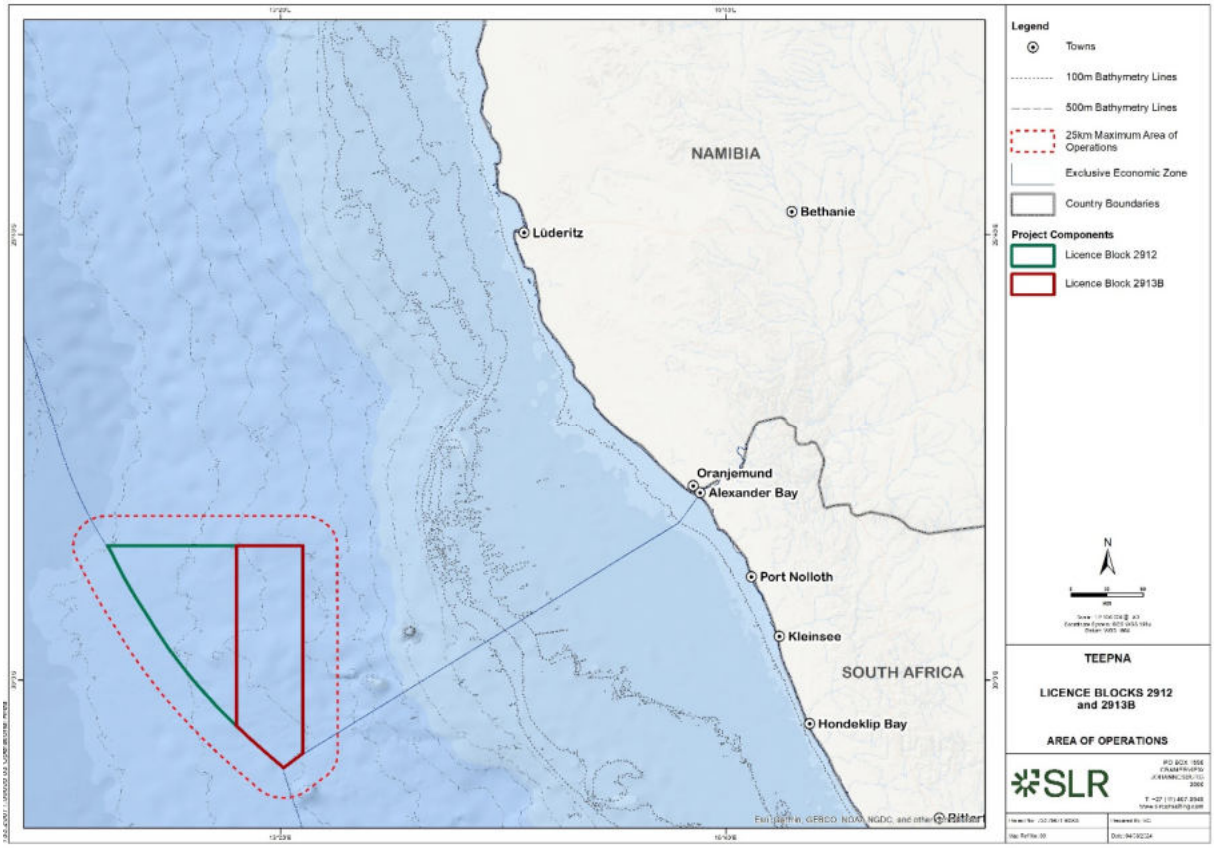

Figure 3-9: Location of Blocks 2912 and 2913B with the maximum 25 km operational area for standard 3D seismic survey vessels

For the proposed OBN surveys in Blocks 2912 and 2913B, the maximum operational area is estimated to be around 1 400 km^2, while the maximum area of node deployment at any given time could be up to 788 km^2 within a selected target area, with nodes remaining on the seafloor for up to 100 days.

As the OBN survey does not require a large streamer array, the exclusion zone can be much smaller. An exclusion zone of 1 000 m radius (3.14 km^2) is implemented around the survey source vessel, while a 500 m zone is implemented around the NHV while the ROV is placing the nodes. Due to the depth of the survey area of interest and minimal fishing activities taking place, it is not expected that other vessel traffic would interfere with the nodes deployed on the seafloor. It is thus not deemed necessary to exclude all other vessel traffic from the nodes field, once deployed.

The temporary safety exclusion zone around the vessels will always be enforced during operation. The restricted area will be described in a Notice to Mariners as a navigational warning.

3.11 Main Project Components for OBN Seismic Surveying

This section describes the main project components for OBN seismic surveying. The description of project components for standard 3D streamer seismic surveys were provided in detail in the 2020 EIA (refer to Section 6.4 of the 2020 EIA) and are not repeated here. It must be noted that apart from the Node Handling Vessel, the supporting logistic components described below would also apply to standard 3D streamer seismic surveys. The main project components for an OBN survey include the following:

- Field Units:
  - 1 Node Handling Vessel (OBN only)
  - 1 Source Vessel
  - 1 Chase Vessel
  - 1 Support Vessel
- Possible helicopter support; and
- Onshore logistics base.

3.11.1 Node Handling and Source Vessels

As stated in Section 3.6, OBN seismic surveys are usually conducted using purpose-built Nodes Handling Vessel (NHV) and Seismic Source Vessel.

The NHV lays the nodes on the seafloor along a pre-plotted survey grid, covering a prescribed grid within the survey area that has been carefully chosen to cross any known or suspected geological structure with a potential for hydrocarbons, generally using two Remotely Operated Underwater Vehicle (ROV). Nodes deployment by the ROVs can be done whilst the NHV navigates at 0.5 to 0.7 knots, whereas recovery of these nodes is generally slightly faster and can be carried out at 0.7-1 knots. The node count on board the NHV is a limiting factor regarding the area that can be covered in one source swath. As such, retrieval and re-deployment of the nodes might be needed – this method is called a “roll-along” acquisition.

During surveying, the Source Vessel tows this seismic source above the OBN carpet lying on the sea floor, and triggers it at regular intervals, along specific pre-plotted survey lines and with specific headings, at a speed of ~3.5 knots (2-3 m.s-1).

TEEPNA has not yet identified a contractor to undertake the proposed seismic surveys, thus, this section only presents generic specifications of the vessels needed for this acquisition. In all cases, there will be a seismic source vessel equipped with airguns and another vessel, the NHV, transporting the nodes and the ROVs.

Depending on the selected contractor, the generic specifications may vary slightly, but will be of the same order of magnitude as the SW Cook, for the source vessel (see Figure 3-10 and Table 3-5) and the SW Tasman, for the nodes and nodes-deployment ROVs vessel (see Figure 3-11 and Table 3-5). During the acquisition operations, both vessels would get supplies at sea.

Figure 3-10: An example of a Seismic Source Vessel, the SW Cook
Source: https://www.shearwatergeo.com/316/marine-acquisition/seismic-fleet

Figure 3-11: An example of a Nodes Handling Vessel, the SW Tasman
Source: https://www.shearwatergeo.com/316/marine-acquisition/seismic-fleet

Table 3-5: Generic specifications of the SW Cook (source) and SW Tasman (NHV)

	SW Cook	SW Tasman
Length	90.8 m	89.8 m
Width	21.3 m	21 m
Gross tonnage	6 599 Tons	6 665 Tons
Crew capacity	69 crew members	69 crew members
Fuel capacity	54 days	100+ Days
Cruising speed	14.2 knots	14.5 knots
Average fuel consumption	29.5 m^3/day	29.5 m^3/day
Combustible to be used –	Marine Gasoil (MGO)	Marine Gasoil (MGO)
Sewage treatment onboard	Yes	Yes
Incinerator onboard (yes/no)	Yes	Yes

3.11.2 Support and Escort Vessels

Two additional vessels will be commissioned for the survey: one support vessel and one escort vessel (or "chase boat"). The support vessel will be required to perform logistics support (including crew changes, supply of equipment, fuel, food and water) to the rest of the field units.

The escort vessel will be equipped with appropriate radar and communications to patrol the area during the seismic survey to ensure that other vessels adhere to the safe operational limits. This vessel would assist in alerting other vessels (e.g., fishing, transport, etc.) about the survey. At a minimum, one Fisheries Liaison Officer (FLO) person speaking English and Afrikaans will be on board each escort vessel to facilitate communication in the local language with the fishing vessels that are in the area.

3.11.3 Helicopter

Helicopters may also be used to transfer personnel to and from the Seismic Source Vessel and Nodes Handling Vessel, and Lüderitz or a suitable location nearby.

3.11.4 Staffing and Logistics

The onshore logistics base will be in either the Port of Lüderitz or the Port of Walvis Bay. The preferred alternative is Lüderitz due to proximity to the survey area. The service infrastructure required to provide the necessary onshore support is already in place in Lüderitz and Walvis Bay. Thus, no additional onshore infrastructure should be necessary for this project.

The vessels will accommodate up to 69 people each, working on 12-hour shifts. In addition, the support and escort vessels will include a crew of approximately 6 to 10 people each. Depending on the solutions proposed by the contractors, the teams will crew change either by the support vessel or by helicopter, as presented above. The support vessel will call into port every 22 to 45 days during the survey for supplies (equipment, fuel, food and water) and crew changes. The supply vessels will occupy the quay for about 24 hours per trip, depending on the quantity of material to be loaded / unloaded.

The methods of refuelling will depend on the contractor and the vessels selected. It is, however, anticipated that the Source and Nodes Handling vessels will be refuelled at sea ('offshore bunkering') by the support vessel if needed, except in the event of extreme weather conditions which would force refuelling at port (mostly likely the Port of Lüderitz).

3.12 Emissions, Discharges and Wastes

3.12.1 Introduction

This section presents the main sources of emissions to air, discharges to water and waste generated that will result from survey operations (including mobilisation and demobilisation).

All vessels will have equipment, systems and protocols in place for prevention of pollution by oil, sewage and garbage in accordance with Namibian legislation, the MARPOL convention, Total standards, national and international standards, and good international practices. A specific Waste Management Plan (covering all wastes generated offshore and onshore) will be developed in accordance with MARPOL requirements, Namibian legislation and international standards. Waste disposal sites and waste management facilities will be identified, verified and approved prior to commencement of survey operations.

3.12.2 Atmospheric Emissions

The principal sources of emissions to air from the proposed surveys will be from vessel engines. The vessels will be supplied with marine gasoil (MGO) or heavy fuel oil (HFO) with less 0.5% sulphur (mass), which will lead to emissions of sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon dioxide (CO_2) and carbon monoxide (CO). These emissions are released during the normal operation of any marine vessel and have the potential to result in a short-term localised increase in pollutant concentrations. They also contribute to regional and global atmospheric pollution. The estimated fuel consumption for a standard

streamer survey was provided as part of the 2020 assessment (Section 6.6.2 of the Final EIR). Only estimates of an indicative 100-day OBN survey is thus provided in this section.

Fuel consumption by the Source and Nodes Handling vessels is estimated at 10 and 12 m^3/day, that of the support vessel at 6 m^3/day and that of the escort vessels at 1.5 m^3/ day. Fuel consumption estimates are presented in Table 3-6 and the estimate of total air emissions is presented in Table 3-7. The emissions were estimated based on the emission factors of the methodology proposed by the international Association of Gas and Oil Producers (E&P Forum / UNEP, 1994).

Incineration of certain wastes onboard and compressors associated with energy sources will also produce limited occasional emissions. As with any combustion engine powered by fossil fuels, very limited emissions of unburned hydrocarbons, volatile organic compounds and particles are also likely to be generated by the propulsion system of the vessels.

Table 3-6: Estimated Fuel Consumption

Source	Value	Units	No. units	Consumption of marine fuel (Tons)	Kerosene consumption (Tons)
Source vessel	10	m^3 / day	100 days	860	-
Nodes vessel	12	m^3 / day	100 days	1 032	-
Escort 1	1.5*	m^3 / day	100 days	129	-
Support	6.0*	m^3 / day	100 days	516	-
Helicopter (possible)	0.5	Tons / hr	14 journeys (3.5 hrs each)	-	24
Total				**2 537**	**24**
* Values provided by TEEPNA, based on previous survey campaigns					

Table 3-7: Estimated Total Atmospheric Emissions

Gas	Emission factor (marine fuel) t/t	Emission factor (kerosene) t/t	Emitted GHG (marine fuel) Tons	Emitted GHG (kerosene) Tons	Emitted GHG-total - Tons
CO_2	3.2	3.2	8 118.4	76.8	8 195.2
CO	0.008	0.0052	20.3	0.1	20.4
NO_x	0.059	0.0125	149.7	0.3	150.0
N_2O	0.00022	0.00022	0.6	0.0	0.6
SO_x	0.008	0.008	20.3	0.2	20.5
CH_4	0.00027	0.000087	0.7	0.0	0.7
VOC	0.0024	0.0008	6.1	0.0	6.1
Greenhouse gas (GHG) expressed as CO_2 equivalent (either sum of CO_2 + 265 N_2O + 28 CH_4)					**8 393.5**

A large single standard streamer survey as was included in the 2020 assessment would emit up to 28 807.5 tons of greenhouse gases over a 120-day survey period. If up to two smaller targeted OBN surveys or a standard streamer survey are conducted within a single survey window period, as is proposed as part of the amended project description, it is not anticipated that the cumulative emitted greenhouse gasses would amount to more than the total emissions estimated during the 2020 assessment for a single 3D standard survey. If, however, more than a standard streamer survey is undertaken during the same seismic survey window period, the total cumulative greenhouse gas emissions could exceed the total volume estimated during the 2020 assessment. It is, however, not

expected that the significance of the cumulative impact would be affected. The estimated emissions were thus not further assessed as part of this updated assessment.

3.12.3 Liquid Discharges

The following main effluents will be discharged into the marine environment:

- Treated grey water[2];
- Treated sewage (black water);
- Treated bilge water[3] used to clean engine rooms and other potentially polluted sources; and
- Engine cooling water.

The seismic source vessel, nodes handling vessel and support vessels will be equipped with a water treatment system. Different types of effluents will be treated according to the following prescriptions:

- The disposal into the sea of food waste is permitted, in terms of MARPOL Annex V, when it has been comminuted or ground to particle sizes smaller than 25 mm and the vessel is en route and located more than 3 nautical miles (approximately 5.5 km) from land. Disposal overboard without macerating can occur greater than 12 nautical miles (approximately 22 km) from the coast when the vessel is sailing. The volumes of sewage wastes released from the seismic and support vessels would be small and comparable to volumes produced by vessels of similar crew compliment (up to 80 people in total on all three vessels). Sewage would not be discharged instantaneously but at a moderate rate when the vessel is en route and travelling at no less than 4 knots.
- Bilge water will be treated by a hydrocarbon separator certified in accordance with MARPOL. In accordance with MARPOL Annex I, bilge water will be retained on board until it can be discharged to an approved reception facility, unless it is treated by an approved oily water separator to <15 ppm oil content and monitored before discharge. The residue from the onboard oil/water separator will be treated / disposed of via the vessels' waste incinerator (depending on specifications) or onshore at an approved hazardous landfill site.
- Grey water and sewage will be discharged intermittently throughout the survey and will vary according to the number of persons on board. All sewage discharges will be in compliance with MARPOL Annex IV.
    - a biological oxygen demand (BOD) of <25 mg l-1 (if the treatment plant was installed after 1/1/2010) or <50 mg l-1 (if installed before this date);
    - minimal residual chlorine concentration of 0.5 mg/l; and
    - no visible floating solids or oil and grease.
- Deck drainage consists of liquid waste resulting from rainfall, deck and equipment washing (using water and an approved detergent). Deck drainage will be variable depending on the vessel characteristics, deck activities and rainfall amounts. In areas where oil contamination of rainwater is more likely, drainage is routed to an oil/water separator for treatment before discharge in accordance with MARPOL Annex I (i.e. 15 ppm oil and grease maximum). There will be no discharge of free oil that could cause either a film, sheen or discolouration of the surface water or a sludge or emulsion to be deposited below the water's surface. Only non-oily water (i.e. <15 ppm oil and grease, maximum instantaneous oil discharge monitor reading) will be discharged overboard. If separation facilities are not available (due to overload or

[2] Grey water: water from the kitchen, washing and laundry activities and non-oily water used for cleaning.

[3] Bilge water: water collected in the lower sections of the vessel. One of the main contributors to bilge water is the cleaning of the engine rooms of the vessel. These waters can, therefore, be contaminated by hydrocarbons and other substances, some of which are likely to be toxic if discharged directly into the marine environment.

maintenance) the drainage water will be retained on board until it can be discharged to an approved reception facility. The oily residue from the onboard oil/water separator will be treated / disposed of via the vessel's waste incinerator (depending on specifications) or onshore at an approved hazardous landfill site.

- The cooling water and surplus freshwater are likely to contain a residual concentration of chlorine (generally less than 0.5 mg/l for freshwater supply systems).

The treated sanitary effluents discharged into the sea are estimated at around 27 600 litres per day, based on 200 litres per day for a maximum of 138 persons by OBN survey.

3.12.4 Solid Waste

Several other types of wastes generated during the survey will not be discharged at sea, but – depending on the incinerator specification - can be incinerated (e.g. paper waste, food waste, wood, oily residues and plastics) or transported to shore for ultimate disposal (e.g. glass, metal and ash from incinerators). All onboard waste will be segregated, duly identified and transported to shore for disposal at a licenced waste management facility approved by TEEPNA. The disposal of all waste onshore will be fully traceable.

General waste landfill sites are located at Walvis Bay, Swakopmund and Lüderitz; the closest of which to the licence area is Lüderitz. The landfill site at Walvis Bay is also designated to accept hazardous waste; whilst the Lüderitz site is not. TEEPNA will, however, evaluate the suitability of this site prior to the start of operation and will decide on the best waste facilities to be used according with international best practices and Namibian legislation. The services of a waste contractor will be used to collect and transport all operation al waste for disposal or recycling.

A summary of the typical wastes expected to be generated and their management options are detailed in Table 3-8. It is estimated that approximately 14 m^3 of solid waste per month will be generated during the seismic survey. For a program lasting almost four months, this implies a total volume of waste of the order of 56 m^3.

Table 3-8: Summary of Potential Solid Waste Streams

Waste stream	Main sources	Main possible constituents	Comment
Garbage	Various	Packaging materials, paper, cans, etc.	The vessel will be equipped with an incinerator. The metals will be stored on the vessel, all other fuels will be incinerated (depending on incinerator specifications). Some waste will be transported ashore (including metallic waste, and other waste such as glass and incinerator ash).
Medical waste	Dressings, clinical and cleaning materials	Pathogenic organisms, plastic, glass, drugs, needles	A syringe box will be made available onboard to collect medical equipment which will be disposed of by incineration (depending on incinerator specifications) or at an approved facility ashore.
Potentially hazardous waste	Batteries, paint cans, lubricating oils, etc.	Hydrocarbons, metals, acids, etc.	Transferred to land for disposal by an approved facility. There will be no discharge of hazardous waste at sea.

3.12.5 Noise Emissions

The key sources generating underwater noise are vessel propellers, with a contribution from the hull (e.g. noise originating from within the hull and on-deck machinery), and from seismic airgun operations (see Section 3.7). Helicopters will also form a source of noise, which can affect marine fauna both in terms of underwater noise beneath the helicopter and airborne noise.

The extent of project-related noise above the background noise level may vary considerably depending on the specific vessels used, the number of supply vessels operating and the airgun array. It will also depend on the variation in the background noise level with weather and with the proximity of other vessel traffic (not associated with the project). A sound transmission loss modelling study was undertaken in 2020 and updated for the amended project description to determine the noise transmission loss with distance from the survey area and relative zones of noise impact (see Section 2.3 and 5.2).

3.12.6 Light Emissions

Operational lighting will be required on all vessels for safe operations and navigation purposes during the hours of darkness. Where feasible, operational lights will be shielded in such a way as to minimise their spill out to sea.

4.0 MINOR UPDATES TO RECEIVING ENVIRONMENT

As stated in Section 2.3, the marine fauna and commercial fisheries specialists had confirmed that the minor updates to the 2020 baseline description has not affected the significance of the impacts assessed at the time. For completeness, this section, however, provides a description of those attributes of the biophysical and socio-economic baseline environments that have changed since 2020. For attributes where updated information became available since the 2020 EIA process this information has confirmed the veracity of the previous baseline description. Key sources of information that became available after completion of the 2020 EIA include the following:

- Marine Spatial Planning process in Namibia (MFMR, 2021).
- Ecologically and Biologically Significant Areas (EBSA) status update and management zones.
- Environmental Baseline Surveys for Blocks 2912 and 2913B (Benthic Solutions, 2023a, c).
- Pro-active marine mammal observations prior to well drilling activities for the recording of incidental marine fauna sightings, launched by TEEPNA in 2023.

As there had only been minor updates to the 2020 baseline description, all the information is not being repeated here. Some key findings of the environmental baseline surveys over the two blocks have, however, been provided in the below sections to highlight where these surveys support previous desktop publications on the biophysical environment. The environmental baseline surveys entailed localised baseline and habitat assessments across representative areas of Blocks 2912 and 2913B and aimed to provide an understanding of the conditions of the deep-water bathyal plains across the blocks by characterising the physico-chemistry properties of the sediment and the habitats present (Benthic Solutions, 2023a, c). The surveys included video recordings at the seafloor, water quality sampling, plankton sampling and taking of sediment samples.

4.1 Updated Area of Influence

The Area of Influence of the project considers the spatial extent of potential direct and indirect impacts of the project and this is used to define the boundaries for baseline data gathering. With the amended project description, the direct Area of Influence for the current project (normal operations) includes the following:

- The licence area (i.e. Blocks 2912 and 2913B) and associated seismic survey / operational areas (see Figure 4-1);
- The coastal town of Lüderitz, the location of the onshore logistics base and Walvis Bay as the alternative base; and
- The central to southern Namibian offshore regional area between the port or airport and the licence area, from the coast to the border of the Namibian Exclusive Economic Zone (EEZ).

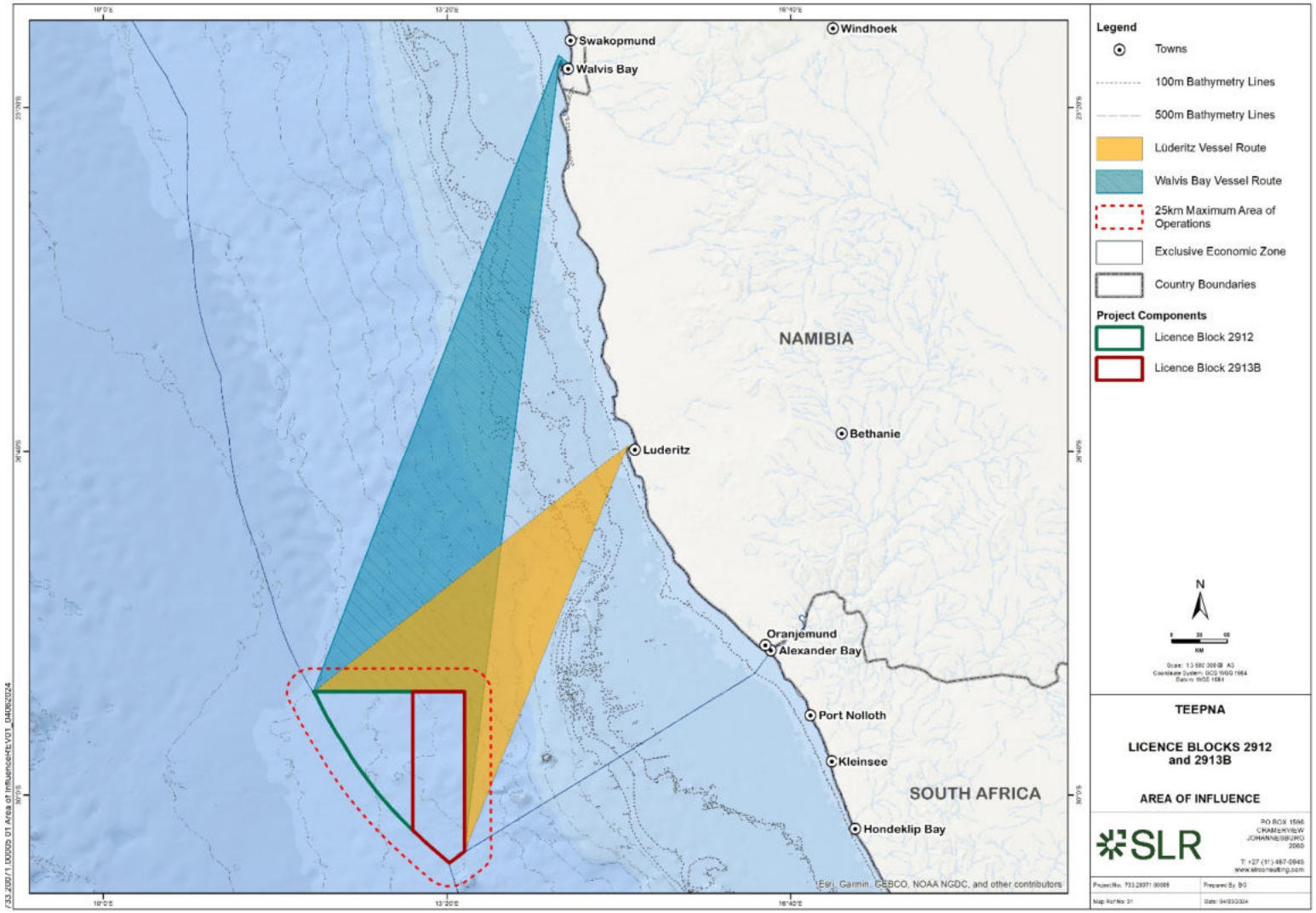

Figure 4-1: Areas of Influence during normal seismic operations

4.2 Geophysical Characteristics

As part of the Marine Spatial Planning (MSP) process in Namibia, the marine geology of the Namibian continental shelf and geomorphic seafloor features within the EEZ were mapped in further detail following the 2020 EIA process (MFMR, 2021). Figure 4-2 illustrates the location of geomorphic seafloor features in relation to the licence area, while Figure 4-3 illustrates the distribution of seabed surface sediment types off the southern Namibian coast.

The environmental baseline surveys undertaken in Blocks 2912 and 2913B (Benthic Solutions, 2023a, b) confirmed that the seabed in both the blocks is characterised by homogeneous poorly to very poorly sorted fine to medium silts (muddy sands). In Block 2912, sediment samples confirmed a consolidated clay layer underling the muddy sands (Benthic Solutions, 2023c). The seabed across the blocks was deemed to include a single habitat type, namely 'Atlantic abyssal mud' (MG62) (see Figure 4-3).

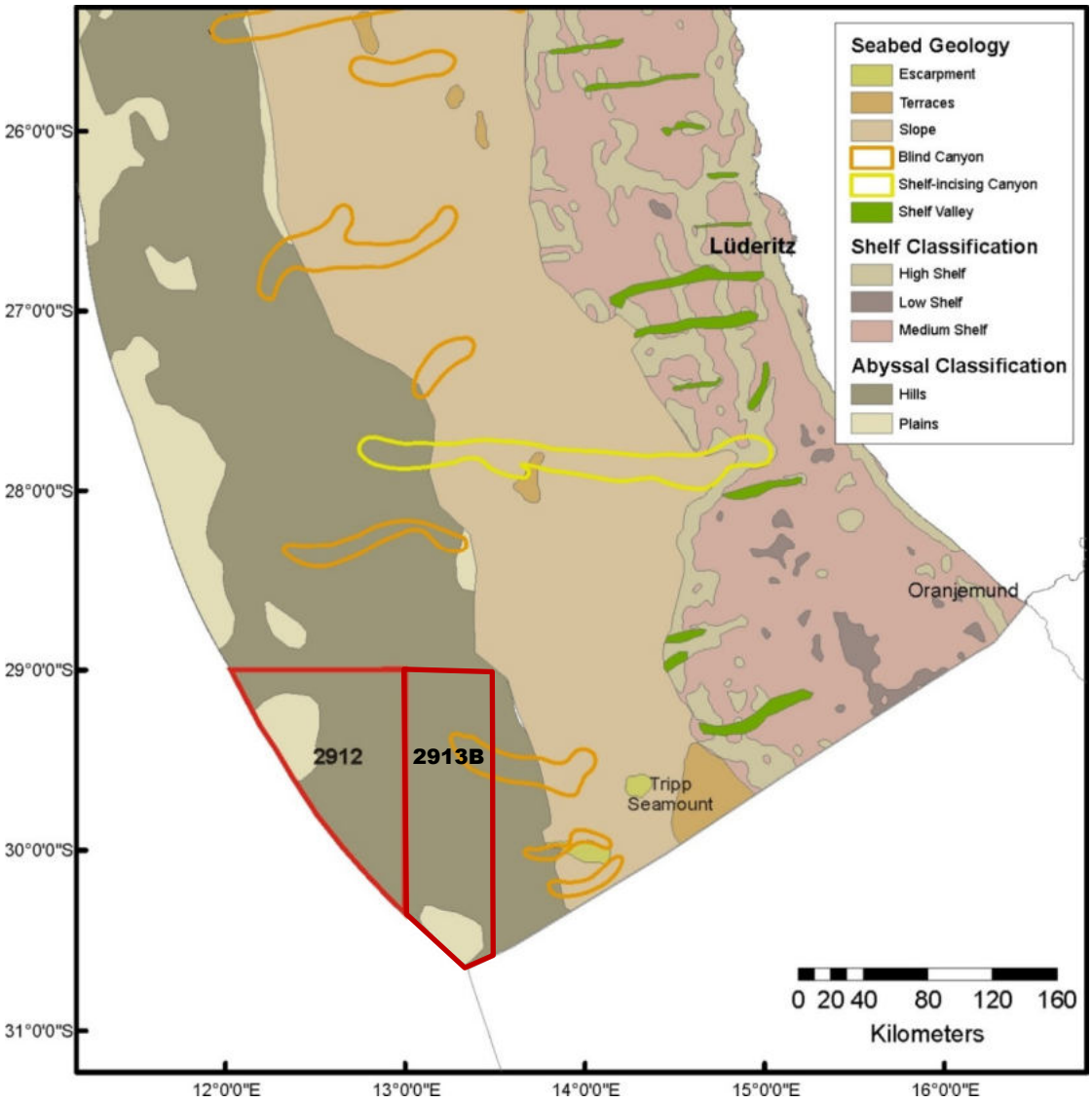

Figure 4-2: The Licence Area in relation to seabed geomorphic features off southern Namibia
Adapted from MFMR, 2021

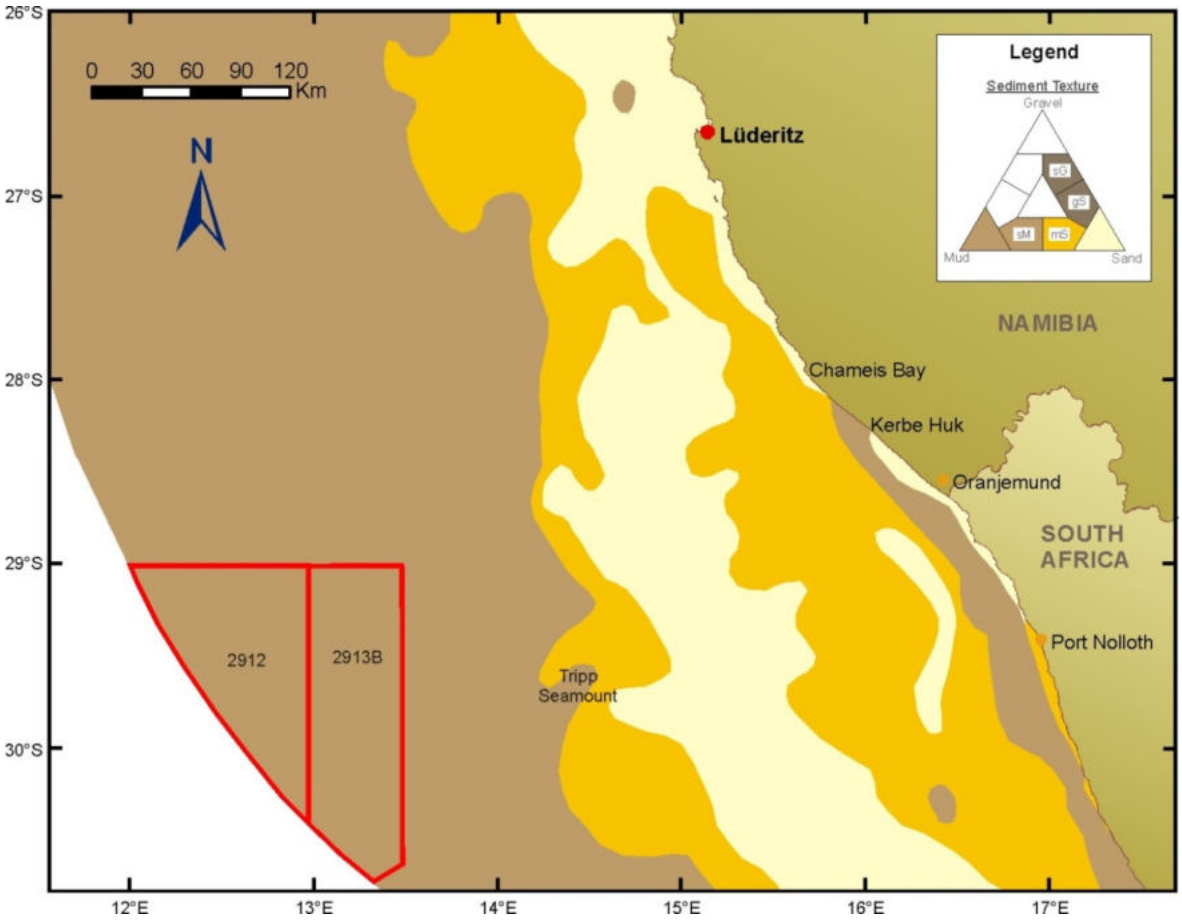

Figure 4-3: The Licence Area in relation to the sediment distribution on the continental shelf off southern Namibia

Source: Adapted from Rogers 1977 and Holness et al. 2014

4.3 Biophysical Characteristics

Petroleum discharges, both from natural seeps at the seabed and discharges occurring during the production and transport of petroleum are a common source of toxic substances in marine ecosystems (NRC 2003a). An analysis by TEEPNA of 2016 and 2021 satellite imagery detected several oil spills from boats corresponding with the orientation of the main shipping lanes along the southwestern African coast. No anomaly centre points were, however, identified in the vicinity of Blocks 2912 and 2913B that could be considered as potential oil seeps.

In addition to the above, the environmental baseline surveys confirmed that Total organic carbon, total organic matter, nitrogen and phosphorous were low through the blocks. Similarly, total hydrocarbon content, saturate alkanes and polycyclic aromatic hydrocarbons were low and indicative of a pristine deep-sea environment. Concentrations of most metals remained at low concentrations throughout the blocks, with only nickel showing elevated levels at some stations. Barium and barium by fusion were consistently low throughout the blocks (Benthic Solutions, 2023a).

In spite of low concentrations of organic and nutrient contents and hydrocarbons, spatial distribution of results of the environmental baseline survey showed higher values in the eastern part of Block 2912, which suggests a slight decreasing sediment quality eastward, with no obvious link to bathymetry (Benthic Solutions, 2023c).

4.4 Biological Oceanography

4.4.1 Ecosystem Threat Status

As stated above, the environmental baseline surveys across Blocks 2912 and 2913B confirmed the homogeneity of the habitats in the blocks and thus also the ecosystem threat status (Least Threatened) (Benthic Solutions, 2023a,c; Holness *et al.*, 2014; Sink *et al.*, 2019).

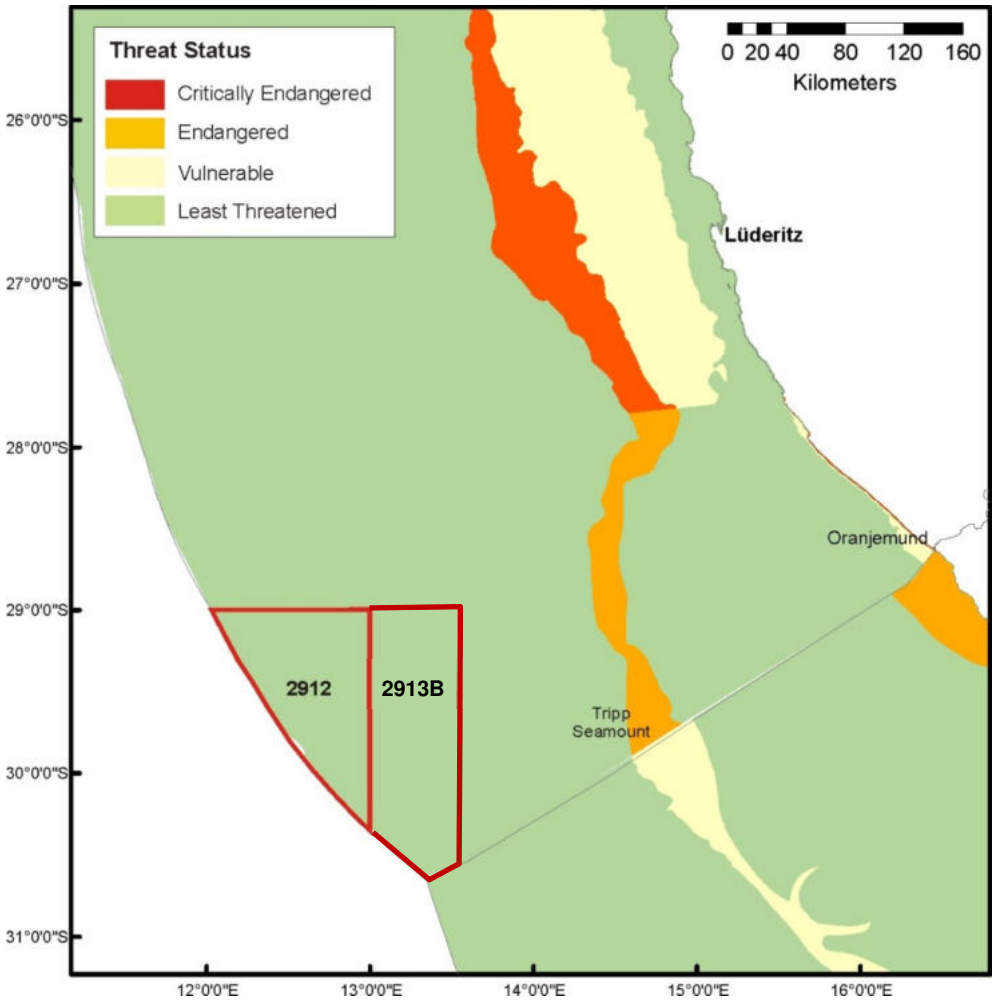

Figure 4-4: Blocks 2912 and 2913B in relation to ecosystem threat status for offshore benthic habitat types off southern Namibia. The threat status of adjacent South African substratum types are also shown.

Source: Holness *et al.*, 2014 and Sink *et al.*, 2019

4.4.2 Marine Fauna

Since the submission of the 2020 EIA, the conservation status of some of the faunal species likely to be encountered in the Namibian offshore have been re-assessed. Where updates were made since 2020 and where other notable information became available, the relevant information has been included below.

4.4.2.1 Benthic Fauna

The environmental baseline surveys (Benthic Solutions, 2023a, c) found that the surface sediments across the blocks were heavily reworked by bioturbation ("living tracks") with evidence of crustacean and polychaete burrows, urchin tracks and Hemichordata (possibly *Tergivelum cinnabarinum*) feeding spirals. Taking a conservative precautionary approach, a single potentially sensitive habitat, 'Seapen and burrowing megafauna communities' was identified during the environmental baseline survey in Block 2913B as potentially forming isolated patches within the block. This habitat is listed by one or more International Conventions, European Directives or UK Legislation, which can be used as a good indicator of the sensitive habitats present. No megafauna was, however, observed interacting with the burrows in the seafloor video footage, and these areas are thus not thought to be of conservation interest in Namibian waters, where this habitat does not appear to be particularly rare or at risk from anthropogenic impacts (Benthic Solutions, 2023a).

Of the samples analysed from Block 2913B, 54.1 % of the total number (2 534 individuals from 66 samples) of benthic faunal individuals were classified as annelid species (segmented worms). Analysis of the findings indicate 'good' diversity across Block 2913B (Shannon-Wiener Diversity Index). The findings reflected typical background communities for deep-sea sediments, with differences thought to reflect natural patchiness in the distribution of benthic faunal communities or differences in sample grab retention, as opposed to the influence of notable physical or chemical gradients. Aerobic heterotrophic microorganisms were present in high quantities across Block 2913B, while hydrocarbon degrading microorganisms were recorded in variable quantities at the sampling stations (Benthic Solutions 2023a).

In Block 2912, sediment sampling results were also dominated by annelid species, in addition to crustaceans and molluscs. The most abundant taxa recorded at the 31 sampling stations were two polychaetes (*Spiophanes* sp. A and *Spiophanes* sp. B) and the bivalve *Microgloma mirmidina*. None of the species recorded are considered endemic or invasive. Overall, the species and individual biomass was low across all the sampling stations, indicating a 'low' diversity across Block 2912 (Shannon-Wiener Diversity Index). This overall biological poverty was found to be consistent with the low organic and nutrient content of the sediments. Observations of other epibenthic fauna in Block 2912 included slime stars, burrowing anemone, sea pens, hermit crabs, Holothurians (including *Benthodytes lingua* and the sea pig, family Elpidiidae), urchins, brittle stars, shrimps, acorn worms, molluscs and cephalopods (possible dumbo octopus, *Grimpoteuthis* sp.) (Benthic Solutions, 2023c).

4.4.2.2 Plankton

Plankton sampling showed that chlorophyll-a and phaeopigments were low in Block 2913B and similar results are expected in Block 2912. Phytoplankton numbers were found to be moderate, with assemblages mainly dominated by diatoms, followed by dinoflagellates. Zooplankton in the samples consisted mainly of copepods (Benthic Solutions, 2023 a, c).

4.4.2.3 Pelagic Fish

The conservation status of some of the more important large migratory pelagic fish species expected to be encountered in the vicinity of Blocks 2912 and 2913B have been updated since the 2020 assessment. An updated list of pelagic fish species and their 2021 IUCN conservation status is provided in Table 4-1.

Table 4-1: Some of the more important large migratory pelagic fish likely to occur in the offshore waters around Blocks 2912 and 2913B

Common Name	Species	IUCN Conservation Status (2021)
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	*Euthynnus affinis*	Least concern
Skipjack Tuna	*Katsuwonus pelamis*	Least concern
Billfish		
Black Marlin	*Istiompax indica*	Data deficient
Blue Marlin	*Makaira nigricans*	Vulnerable
Striped Marlin	*Kajikia audax*	Least Concern*
Sailfish	*Istiophorus platypterus*	**Vulnerable****
Swordfish	*Xiphias gladius*	Near Threatened*
Pelagic Sharks		
Oceanic Whitetip Shark	*Carcharhinus longimanus*	**Critically Endangered****
Dusky Shark	*Carcharhinus obscurus*	Endangered*
Great White Shark	*Carcharodon carcharias*	Vulnerable
Shortfin Mako	*Isurus oxyrinchus*	Endangered
Longfin Mako	*Isurus paucus*	**Endangered****
Whale Shark	*Rhincodon typus*	Endangered
Blue Shark	*Prionace glauca*	Near Threatened

* Decreased threat status ** **Increased threat status**

Source: IUCN 2021

4.4.2.4 Marine Mammals

The conservation status of some of the cetaceans likely to occur in Namibian water have been updated since the 2020 assessment (see Table 4-2). Some new marine mammal sightings and updated information on humpback whales along the southwestern coast of Africa also became available since the 2020 report (see Figure 4-5). New sightings include records from TEEPNA's 2022 and 2023 drilling campaigns, incidental sightings from the environmental baseline survey processes (Benthic Solutions, 2023 b, d) and MMO and PAM records from the 2022/2023 and 2023/2024 seismic survey campaigns over Blocks 2912 and 2913B.

Table 4-2: List of cetacean species known or likely to occur in Namibian waters

Common Name	Species	Hearing Frequency	Shelf (<200 m)	Offshore (>200 m)	Seasonality	RSA Regional Assessment	IUCN Global Assessment
Delphinids							
Dusky dolphin	*Lagenorhynchus obscurus*	HF	Yes (0- 800 m)	No	Year round	Least Concern	Least Concern*
Heaviside's dolphin	*Cephalorhynchus heavisidii*	VHF	Yes (0-200 m)	No	Year round	Least Concern	**Near Threatened****
Common bottlenose dolphin	*Tursiops truncatus*	HF	Yes	Yes	Year round	Least Concern	Least Concern
Common dolphin	*Delphinus delphis*	HF	Yes	Yes	Year round	Least Concern	Least Concern
Southern right whale dolphin	*Lissodelphis peronii*	HF	Yes	Yes	Year round	Least Concern	Least Concern
Striped dolphin	*Stenella coeruleoalba*	HF	No	Yes	Year round	Least Concern	Least Concern
Pantropical spotted dolphin	*Stenella attenuata*	HF	Edge	Yes	Year round	Least Concern	Least Concern
Long-finned pilot whale	*Globicephala melas*	HF	Edge	Yes	Year round	Least Concern	Least Concern
Short-finned pilot whale	*Globicephala macrorhynchus*	HF	Edge	Yes	Year round	Least Concern	Least Concern
Rough-toothed dolphin	*Steno bredanensis*	HF	No	Yes	Year round	Not Assessed	Least Concern
Killer whale	*Orcinus orca*	HF	Occasional	Yes	Year round	Least Concern	Data deficient
False killer whale	*Pseudorca crassidens*	HF	Occasional	Yes	Year round	Least Concern	**Near Threatened****
Pygmy killer whale	*Feresa attenuata*	HF	No	Yes	Year round	Least Concern	Least Concern
Risso's dolphin	*Grampus griseus*	HF	Yes (edge)	Yes	Year round	Data Deficient	Least Concern
Sperm whales							
Pygmy sperm whale	*Kogia breviceps*	VHF	Edge	Yes	Year round	Data Deficient	Least Concern*
Dwarf sperm whale	*Kogia sima*	VHF	Edge	Yes	Year round	Data Deficient	Least Concern*
Sperm whale	*Physeter macrocephalus*	HF	Edge	Yes	Year round	Vulnerable	Vulnerable

Common Name	Species	Hearing Frequency	Shelf (<200 m)	Offshore (>200 m)	Seasonality	RSA Regional Assessment	IUCN Global Assessment
Beaked whales							
Cuvier's	*Ziphius cavirostris*	HF	No	Yes	Year round	Data Deficient	Least Concern*
Arnoux's	*Berardius arnuxii*	HF	No	Yes	Year round	Data Deficient	Least Concern*
Southern bottlenose	*Hyperoodon planifrons*	HF	No	Yes	Year round	Least Concern	Least Concern
Layard's	*Mesoplodon layardii*	HF	No	Yes	Year round	Data Deficient	Least Concern*
True's	*Mesoplodon mirus*	HF	No	Yes	Year round	Data Deficient	Least Concern*
Gray's	*Mesoplodon grayi*	HF	No	Yes	Year round	Data Deficient	Least Concern*
Blainville's	*Mesoplodon densirostris*	HF	No	Yes	Year round	Data Deficient	Least Concern*
Baleen whales							
Antarctic Minke	*Balaenoptera bonaerensis*	LF	Yes	Yes	>Winter	Least Concern	**Near Threatened****
Dwarf minke	*B. acutorostrata*	LF	Yes	Yes	Year round	Least Concern	Least Concern
Fin whale	*B. physalus*	LF	Yes	Yes	MJJ & ON	Endangered	Vulnerable*
Blue whale (Antarctic)	*B. musculus intermedia*	LF	No	Yes	Winter peak	Critically Endangered	Critically Endangered
Sei whale	*B. borealis*	LF	Yes	Yes	MJ & ASO	Endangered	Endangered
Bryde's (inshore)	*B. edeni (subspp)*	LF	Yes	Edge	Year round	Vulnerable	Least Concern*
Bryde's (offshore)	*B. edeni*	LF	Edge	Yes	Summer (JFM)	Data Deficient	Least Concern*
Pygmy right	*Caperea marginata*	LF	Yes	?	Year round	Least Concern	Least Concern*
Humpback	*Megaptera novaeangliae*	LF	Yes	Yes	Year round (SONDJF)	Least Concern	Least Concern*
Humpback B2 subpopulation	*Megaptera novaeangliae*	LF	Yes	Yes	Spring/Summer peak (ONDJF)	Vulnerable	Not Assessed
Southern right	*Eubalaena australis*	LF	Yes	No	Year round (ONDJFMA)	Least Concern	Least Concern

Notes: Species recorded by Marine Mammal Observers (MMOs) in and en route to Blocks 2912 and 2913B are highlighted in grey (SLR MMO Sightings Database 2024)
VHF = Very High Frequency; HF = High Frequency; LF = Low Frequency * Decreased threat status **** Increased threat status**
Source: SA Red List Assessment, 2014; Child *et al.*, 2016 and IUCN, 2021

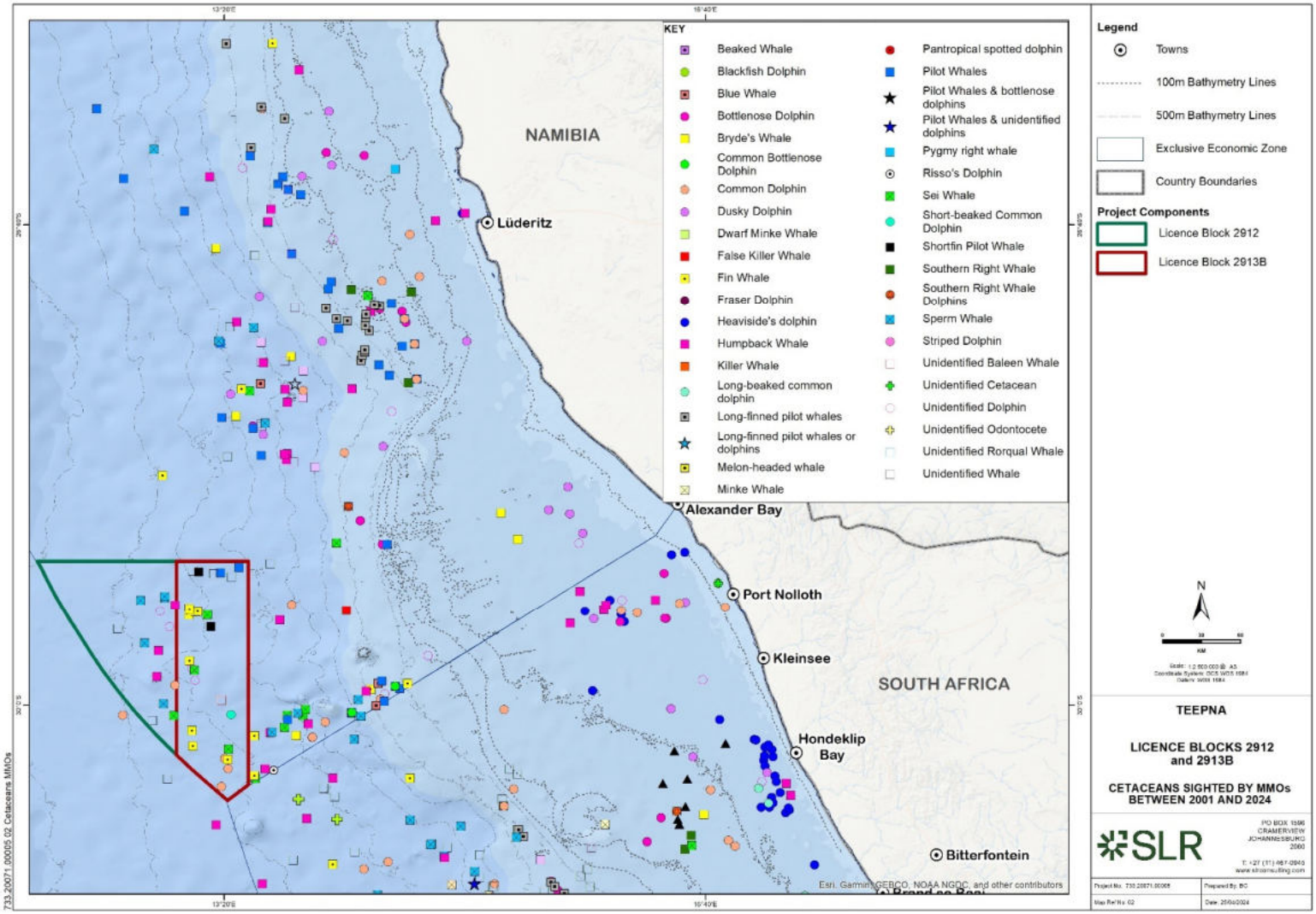

Figure 4-5: The Licence Area in relation to incidental cetacean sightings by MMOs along the Namibian coastline, collated between 2001 and 2024 (SLR MMO sightings database, 2024)

The majority of **humpback whales** passing through the Benguela region are those migrating to breeding grounds off tropical West Africa, between Angola and the Gulf of Guinea (Rosenbaum *et al*., 2009; Barendse *et al*., 2010). A recent synthesis of available humpback whale data from Namibia (Elwen *et al*., 2013) shows that in coastal waters, the northward migration stream is larger than the southward peak supporting earlier observations from whale catches (Best & Allison, 2010). This supports previous suggestions that animals migrating north strike the coast at varying places mostly north of St Helena Bay (South Africa) resulting in increasing whale density on shelf waters as one moves north towards Angola. On the southward migration, there is evidence from satellite tagged animals and the smaller secondary peak in numbers in Walvis Bay, that many humpback whales follow the Walvis Ridge offshore then head directly to high latitude feeding grounds, while others follow a more coastal route (including the majority of mother-calf pairs) possibly lingering in the feeding grounds off the West Coast of South Africa in summer (Elwen *et al.,* 2013; Rosenbaum *et al*., 2014) (see Figure 4-6). Although migrating through the Benguela, there is no existing evidence of a clear 'corridor' and humpback whales appear to be spread out widely across the shelf and into deeper pelagic waters, especially during the southward migration (Barendse *et al.,* 2010; Best and Allison, 2010; Elwen *et al.,* 2013). Regular sightings of humpback whales in spring and summer months in Namibia, especially in the Lüderitz area, suggest that summer feeding is occurring in Namibian waters as well (or at least that animals foraging off West South Africa range up into southern Namibia). Recent abundance estimates put the number of animals in the west African breeding population in excess of 9 000 individuals in 2005 (IWC, 2012), and it is likely to have increased since this time at about 5% per annum (IWC, 2012). Humpback whales are thus likely to be the most frequently encountered baleen whale in Blocks 2912 and 2913B, ranging from the coast out beyond the shelf, with year-round presence but numbers peaking in June – July (northern migration) and a smaller peak with the southern breeding migration around September – October, but with regular encounters until February associated with subsequent feeding in the Benguela ecosystem. Sightings of humpback whales in the vicinity of the licence blocks as captured in SLR's Marine Mammal Observer database between 2001 and 2024 are included in Figure 4-5.

In the first half of 2017 (when numbers are expected to be at their lowest) more than 10 humpback whales were reported stranded along the Namibian and west South African coasts. A similar event was recorded in late 2021-early 2022 when numerous strandings of young humpbacks were reported along the Western Cape Coast and in Namibia (Simon Elwen, Sea Search, pers. Comm.). The cause of these deaths is not known, but a similar event off Brazil in 2010 was linked to possible infectious disease or malnutrition (Siciliano *et al.* 2013), which suggests the West African population may be undergoing similar stresses and caution should be taken in increasing stress through human activities. Unusual mortality events of humpback whales between 2016 and 2022 have similarly been reported along the US Atlantic Coast from Maine to Florida (https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2022-humpback-whale-unusual-mortality-event-along-atlantic-coast). The West African population may be undergoing similar stresses in response to changes in their ecosystem (see for example Kershaw *et al.* 2021). It is not yet understood what may be driving these ecosystem changes and what the long-term effects to populations could potentially be.

The seismic operations would be undertaken between December and end of May and thus outside of the key humpback whale migration period.

Figure 4-6: Blocks 2912 and 2913B in relation to 'blue corridors' or 'whale superhighways' showing tracks of humpback whales (orange) and Southern right whales (green) between southern Africa and the Southern Ocean feeding grounds

Source: Johnson *et al.*, 2022

4.5 Conservation Areas and Marine Protected Areas

4.5.1 Ecologically and Biologically Significant Areas (EBSAs)

The proposed delineation of EBSAs in the southern Namibian offshore had not undergone any updates since the 2020 seismic EIA process for Blocks 2912 and 2913B and no specific management actions have as yet been formulated for the proposed EBSAs. What has changed, however, is that two biodiversity zones ('Conservation' and 'Impact Management') have recently been defined within each EBSA as part of the ongoing Marine Spatial Planning (MSP) process in South African and Namibian waters (https://cmr.mandela.ac.za/EBSA-Portal/Namibia/Namibian-EBSA-Status-Assessment-Management) (see Figure 4-7). Although the proposed zonation of the EBSAs is still under discussion, the proposed management objective in the zones marked for 'Conservation' is *"strict place-based biodiversity protection aimed at securing key biodiversity features in a natural or semi-natural state, or as near to this state as possible".* The proposed management objective in the zones marked for 'Impact Management' is *"management of impacts on key biodiversity features in a mixed-use area to keep key biodiversity features in at least a functional state"*. In the list of sea-use activities provided for the EBSAs, the marine spatial planning zone for petroleum activities recommends that non-destructive exploration (e.g. seismic acquisition) and localised destructive exploration (e.g. exploration drilling) is conditionally permissible within the biodiversity conservation zone. Conditional activities are defined as

activities that "are recommended to be managed as Consent activities, which are those that can continue in the zone subject to specific regulations and controls, e.g. to avoid unacceptable impacts on biodiversity features, or to avoid intensification or expansion of impact footprints of uses that are already occurring and where there are no realistic prospects of excluding these activities" (MARISMA Project 2019). **Blocks 2912 and 2913B do not overlap with any currently mapped EBSAs, but the Orange Seamount and Canyon Complex EBSA is located immediately east of the inshore boundary of Block 2913B.**

At this stage, the proposed EBSAs or proposed sea-use guidelines have not undergone any form of stakeholder consultation for the southern area and therefore may be subject to further changes in the future.

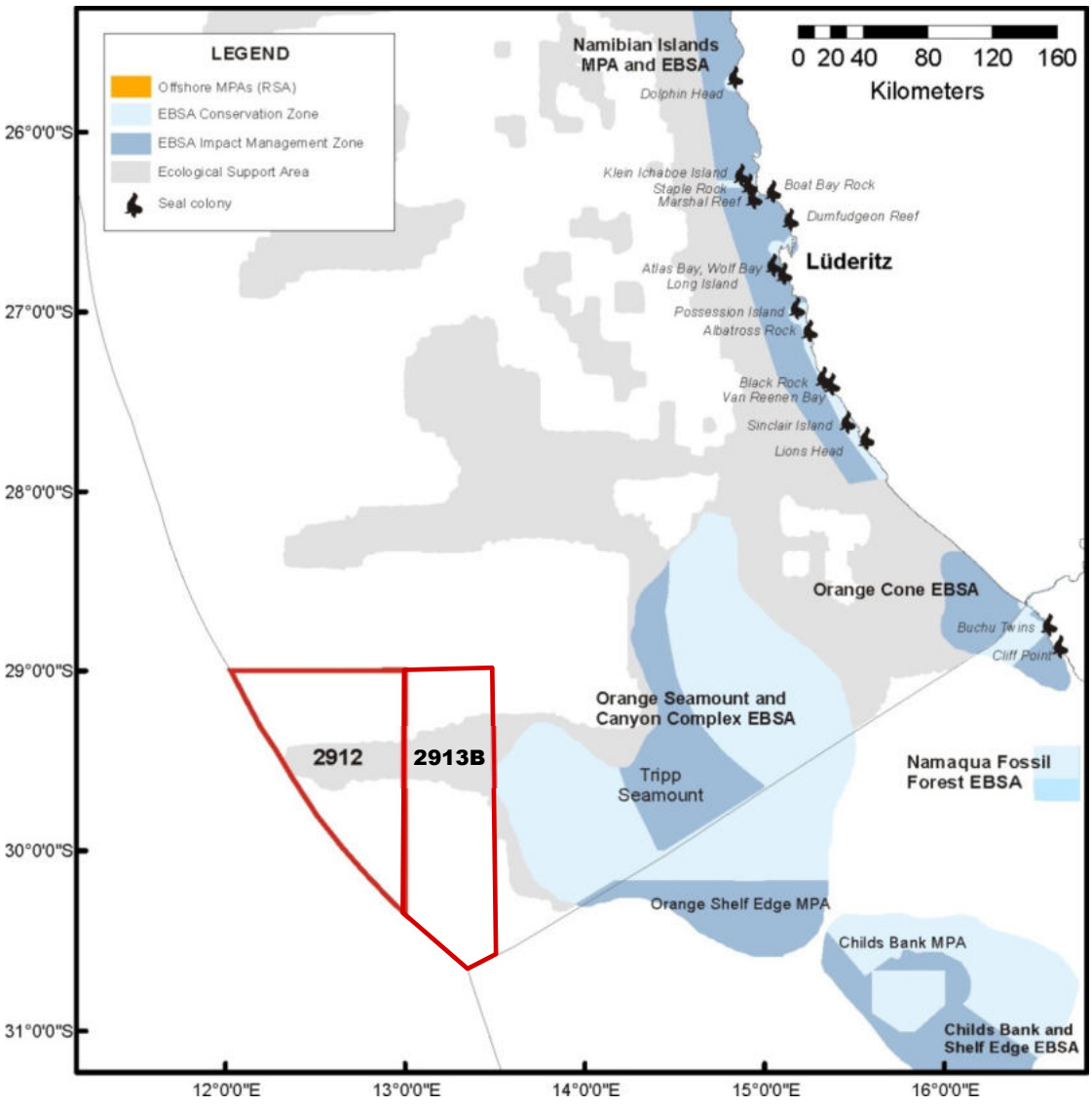

Figure 4-7: Blocks 2912 and 2913B (red polygon) in relation to EBSAs and the marine spatial planning zones within these. ESAs mapped by MFMR (2021), CBAs mapped by Harris *et al.* (2022) in South Africa, and the location of seal colonies are also shown.

Based on the proposed new management objectives for EBSAs, it must be noted that seismic data acquisition is not viewed as explicitly excluded from these areas, but might require future consent use, should the proposed objectives be legislated. As noted above, the MSP process related to the proposed EBSAs in Southern Namibia is still underway, with these proposed areas not having any legal standing yet and are at this stage proposed.

On the Namibian side of the border, the Orange Seamount and Canyon Complex includes Tripp Seamount (located 85 km east of the inshore boundary of Block 2913B) and a shelf-indenting canyon. The EBSA comprises shelf and shelf-edge habitat with hard and unconsolidated substrates, including at least eleven offshore benthic habitat types of which four habitat types are “Threatened”, one is “Critically Endangered” and one “Endangered”. The Orange Shelf Edge Marine Protected Area across the border in South African waters is one of few places where these threatened habitat types are in relatively natural/pristine condition. The local habitat heterogeneity is also thought to contribute to the Orange Shelf Edge being a persistent hotspot of species richness for demersal fish species. Although focussed primarily on the conservation of benthic biodiversity and threatened benthic habitats, the EBSA also considers the pelagic habitat, which is characterized by medium productivity, cold to moderate Atlantic temperatures and moderate chlorophyll levels related to the eastern limit of the Benguela upwelling on the outer shelf.

4.5.2 Marine Spatial Planning and Ecological Support Areas

In addition to EBSAs, Ecological Support Areas (ESAs) have recently been identified in Namibian waters. Although these areas do not meet the EBSA criteria, they reflect secondary priority conservation areas with special attributes that support a healthy and functioning marine ecosystem (see Figure 4-7). One of these ESAs extends roughly through the centre of Blocks 2912 and 2913B in an east-west direction, thought to be linked to a shallow canyon (see Figure 4-2 and Figure 4-7). **It must be noted that the results of environmental baseline surveys undertaken over Blocks 2912 (2022) and 2913B (2019) did not pick up signs of the suspected shallow canyon linked to the mapped ESA or any other unique or sensitive habitats.**

Namibia’s ongoing Marine Spatial Planning (MSP) process is being implemented as a development planning approach to organize the use of the country’s marine territory in such a way that comprehensive, integrated and complementary planning and management across sectors and for all ocean uses is enabled. MSP in Namibia is highly precautionary and forward-looking given the relatively low intensity of current uses, has a strong ecosystem-based perspective due to the fairly pristine environment, is driven by a social equity and distributive justice agenda, and features a strong collaborative process governance (Finke *et al.* 2020a, 2020b). Although at this stage, MSP lacks legislation and has only weak links to broader ocean governance, the MSP process has resulted in a clear framework for the development of the first marine plan (MFMR 2019), as it was linked to a systematic conservation planning process from the outset.

The objectives and principles for MSP, as well as the steps each planning process is expected to follow, is set out in the National MSP Framework (MFMR 2019). The Framework provides high-level direction to ensure consistent and coherent plan development, implementation and review across Namibia’s marine space and its three proposed planning areas: a northern, central and southern area. It also describes the background to MSP and its overarching objectives in Namibia and identifies relevant institutional structures, roles and responsibilities (MFMR 2022). The first MSP for Namibia is being developed for the central area, followed by the northern and the southern areas. Although all three areas have sites of high ecological sensitivity and importance, growing economic interests and increasingly overlapping human uses, particularly in the central and southern MSP areas call for improved management.

The MSPs in each of the three planning areas will translate the National Framework for MSP into integrated and strategic sustainable development plans that guide users, developers and regulators in their decision-making, setting out which activities should take place where, when and under what conditions. As stated above, any future licensing decisions would need to be in line with the provisions set out in the respective plans and their status at the time of application.

As with the EBSAs, the mapped ESAs also do not currently have any legal standing.

4.6 Commercial Fisheries

Blocks 2912 and 2913B still only overlaps with the fishing grounds of one commercial fishery, namely the large pelagic longline sector. Taking the latest available catch and effort data into consideration, an updated baseline description for the large pelagic longline sector and its overlap with the survey area of interest is provided below.

This sector makes use of surface longlines to target migratory pelagic species including albacore tuna (*Thunnus alalunga*), yellowfin tuna (*T. albacares*), bigeye tuna (*T. obesus*), swordfish (*Xiphias gladius*) and various pelagic shark species. There is provision for up to 26 fishing rights and 40 vessels.

Namibia is a full member of the Regional Fisheries Management Organisation (RFMO) in the Southeast Atlantic, namely the International Commission for the Conservation of Atlantic Tuna (ICCAT). Since independence in 1990, Namibia has reported their catches of large pelagic species to ICCAT. The shark directed sector of this fishery targets two main species, blue shark (*Prionace glauca*) and mako shark (*Isurus oxyrinchus*). These catches augment the total catch of the large pelagic longline fishery and are included in the reports to ICCAT.

Catches of tuna and shark species show interannual variation as shown in Figure 4-8 (ICCAT, 2023). Following independence, catches increased as Namibia systematically expanded its fishing capacity. There was a peak in catches in 2005 (9 594 tonnes), however annual average catch has approximated 4 200 tonnes since. The reported catches for 2020 (8 555 tonnes) and 2021 (13 216 tonnes) were far higher than this average, with tuna species contributing the most to the annual catch in 2021.

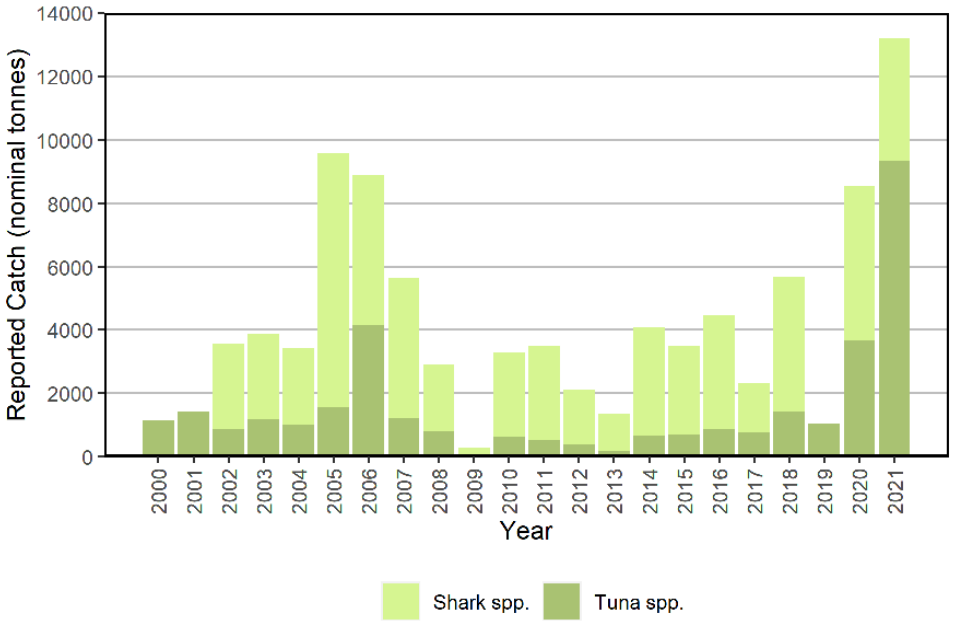

Figure 4-8: Annual longline catch (nominal tonnes) of large pelagic species reported to ICCAT by the Namibian longline fleet between 2000 and 2021.

Source: ICCAT Statistical Bulletin (2023)

Longline vessels targeting pelagic tuna species and swordfish operate extensively around the entire coast along the shelf-break and into deeper waters. The spatial distribution of **fishing effort is widespread and may be expected predominantly along the shelf break (approximately along the 500 m isobath) and into deeper waters (2 000 m). Effort occurs year-round with peaks from March to May and December to a lesser degree** (see Figure 4-9Figure 4-9). This seasonality is also seen in catch data. Figure 4-10 shows the spatial distribution of average commercial catches along the Namibian coastline and in the vicinity of Blocks 2912 and 2913B over the period 2004-2019. **Block 2912 and 2913B coincide with fishing grounds utilised by the sector with an estimated average of 6.3 tons of catch per year (0.3% of the annual average catch within the EEZ) was taken, while annual average effort expended amounted to 5 647 hooks (0.3% of the total effort).** Annual catch and effort recorded within the blocks has fluctuated by year, with the highest annual catch of 27.7 tons (23 600 hooks) recorded in 2014 (0.9% of the national landings for that year).

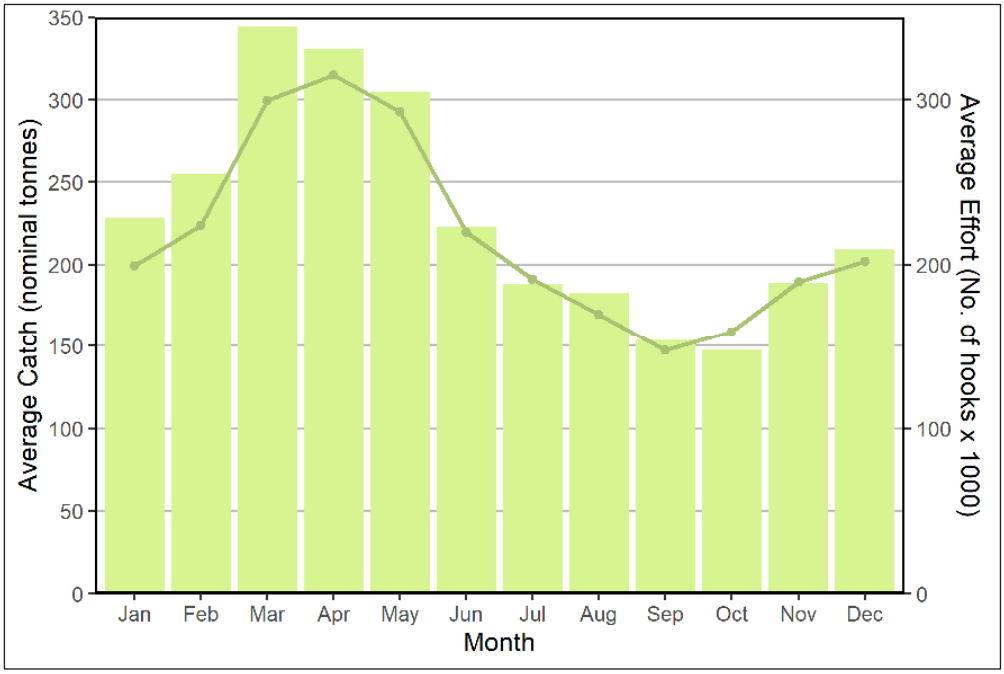

Figure 4-9: Monthly average catch (bars) and effort (line) recorded by the large pelagic longline sector within Namibian waters (2004 – 2019).

Source: MFMR, 2019

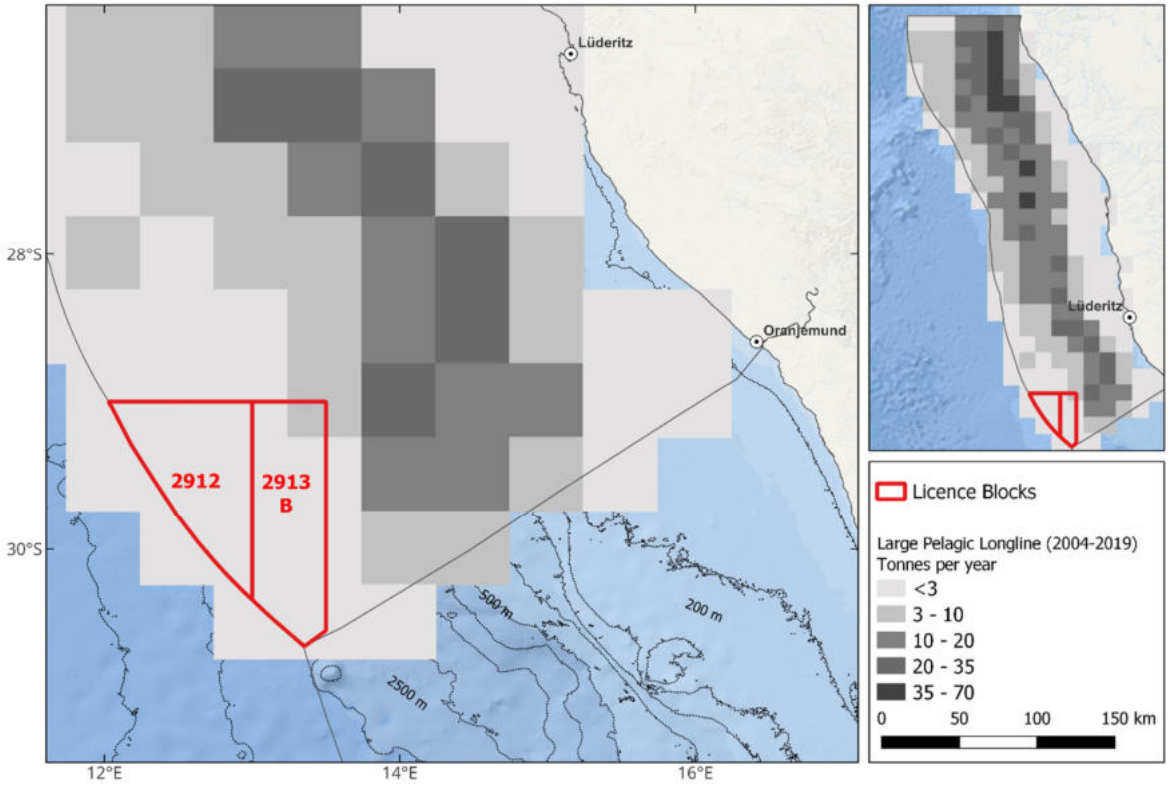

Figure 4-10: Spatial distribution of catch recorded by the pelagic longline fishery in relation to Blocks 2912 and 2913B. Average annual catch (tonnes) over the period 2004 to 2019 is displayed on a 60 x 60 minute grid (111 km x 111 km).

Source: MFMR, 2019

4.7 Oil and Gas Exploration

In recent years there has been a resurgence in Namibian hydrocarbon exploration, with the government allocating exploration licences to major oil companies. Improvements in deep-water drilling technology have increased the economic viability of what were previously considered sub-commercial reserves. Between 2010 and 2014, 13 wells were drilled in Namibia, bringing the total number of offshore hydrocarbon wells drilled in Namibian waters to 32. Of these, 15 had been exploratory wells, seven appraisal wells and a further ten had been drilled for scientific research (NAMCOR, 2017a). Since 2018, more than seven wells have been drilled in the Walvis and Lüderitz basins.

The collection of survey, seismic and aeromagnetic data has contributed to a substantial geological and geophysical database for the country and has revealed the existence of four offshore frontier basins of interest to explorers: the Orange, Lüderitz, Walvis and Namibe basins. More than 30 2D seismic surveys have been undertaken in Namibia's offshore EEZ, with close to a similar number of additional infill 3D surveys having been completed up to 2024.

Recent exploration activities in Blocks 2912 and 2913B include 3D seismic surveys during the 2022/2023 and 2023/2024 Summer survey window seasons and exploration and appraisal drilling campaigns in Blocks 2912 (Nara 1X [2023]) and 2913B (Venus 1X & 1A, Venus 2A and Mangetti 1X [2021-2024]). Other recent exploration well drilling activities in nearby Licence Blocks include those in Blocks 2813A (Mopane wells), 2913A (Cullinan, Jonker, Lesedi and Graff wells), and 2914B (La Rona well). A number of historic wells were also drilled in Block 2814A (Kudu) (see Figure 4-11). Applications are also underway for exploration well drilling in Blocks 2813B (Chevron) and 2914A (Rhino).

4.8 Submarine cables

There are a number of submarine telecommunications cable systems across the Atlantic and the Indian Ocean (see Figure 4-11). At the time of the 2020 assessment, only three submarine cables were indicated as crossing through or in close proximity to Blocks 2912 and 2913B, namely the African Coast to Europe (ACE) and West Africa Cable System (WACS), with a third decommissioned cable, South Atlantic Telecommunications Cable No. 1 (SAT1), crossing through the middle of Block 2912. A fourth, SAT3, not indicated in 2020, crosses through the centre of Block 2913B and the north-eastern corner of Block 2912.

In 2023 a fifth cable, the Equiano, a 15 000 km cable connecting Africa to Europe, came online. The Equiano is located offshore of Blocks 2912 and 2913B and has a Namibian landing point at Swakopmund as ACE and WACS.

The location of the submarine cables would need to be considered during node placement and ROV operations.

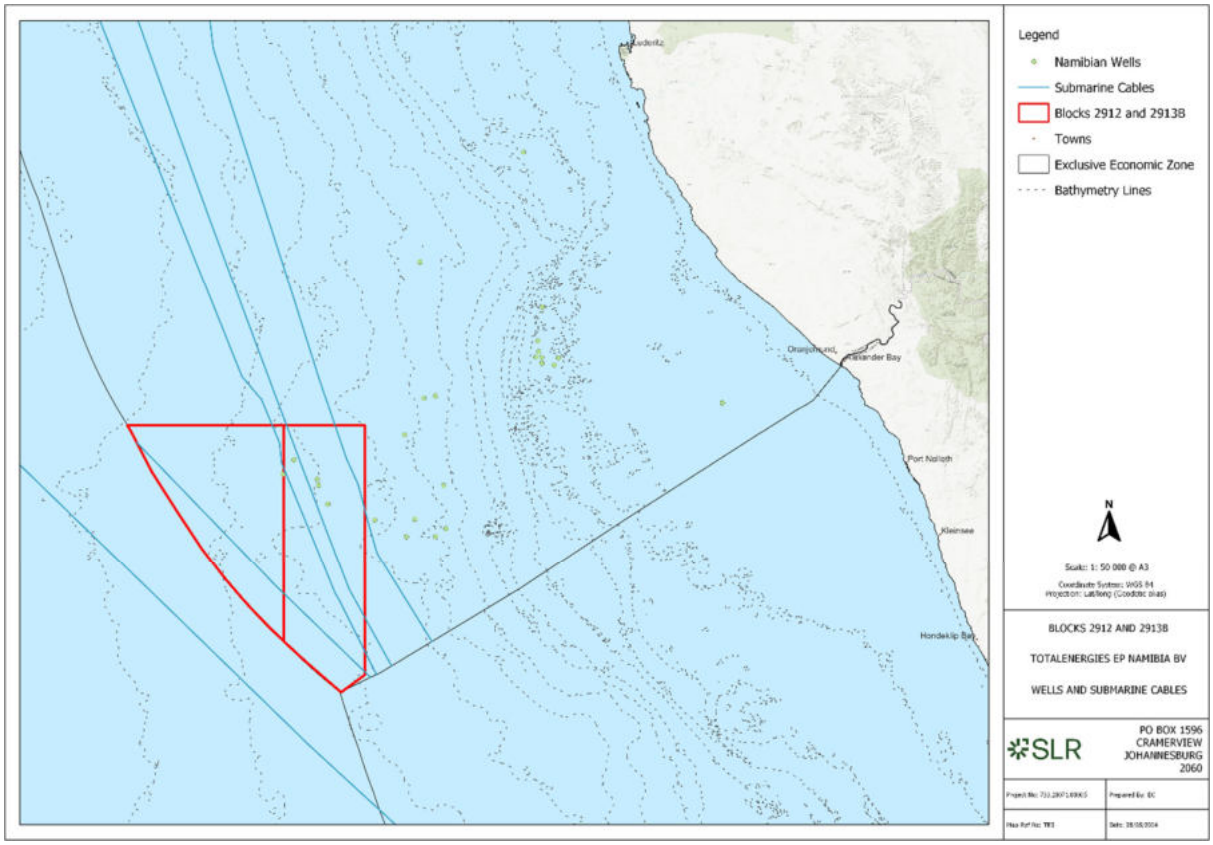

Figure 4-11: Blocks 2912 and 2913B in relation to exploration wells and submarine cables

Source: data provided by SAN Hydrographic Office, 2021

5.0 EVALUATION OF POTENTIAL IMPACTS FROM THE PROPOSED AMENDMENTS

5.1 Introduction

All the impacts from the 2020 EIA Report have been re-analysed based on the proposed amendments related to further 3D seismic streamer and additional OBN surveys within Blocks 2912 and 2913B and additional potential impacts related to node deployment on the seafloor addressed. As there have been minimal changes to the baseline environment, there would be no significant changes to the previously assessed impacts.

With regards to the biophysical environment, some impacts have been re-evaluated (see Table 5-3). These mainly relate to the updating of the noise modelling study (Sound Transmission Loss Modelling) and its implications for the assessment of the impact of underwater noise on marine fauna and OBN technology, which was not previously assessed.

Based on the similar overlap with fishing grounds, there would be no change to the previously assessed socio-economic impacts as a result of the proposed amendments. Impacts have, however, been re-evaluated to include OBN survey technology which was not previously considered (see Table 5-4).

Considering the recent increase in exploration activities off the southern coast of Namibia and West Coast of South Africa, the potential cumulative impacts from multiple seismic surveys or exploration well drilling activities being undertaken in and in the vicinity of Blocks 2912 and 2913B has also been considered and is further described at the end of this section.

5.2 Sound Transmission Loss Modelling Update

The re-evaluation of impacts on marine fauna and commercial fisheries were based on the maximum impact zones as estimated during the 2024 updated noise modelling study. As stated in Section 2.3, the updated modelling was based on the shallowest point within the two blocks (2 504 m) and closest point to the sensitive Tripp Seamount (85 km). Modelling at this depth also aligns with the depth ranges in the larger proposed survey area that might extend up to 10 km inshore into neighbouring blocks. The maximum estimated zones of impact from single pulse and cumulative (24-hour exposure) source pulses for the different faunal groups are set out in Tables 5-1 and 5-2.

It must be noted that the project design for a standard 3D seismic survey (refer to Table 3-4) was considered as the worst-case scenario (or most intrusive) for use in the noise modelling and that OBN surveys would entail fewer shots per survey line. The modelling process and results are thus considered as conservative with OBN survey noise impact zones likely to be smaller than the results provided in Tables 5-1 and 5-2.

Table 5-1: Estimated maximum zones of impact for marine mammals and turtles from single (blue) and multiple (red) pulses

Animal hearing group		Zones of impact – maximum horizontal distance from source to edge impact zone, either from single (immediate exposure) or multiple (cumulative exposure) source pulses											
		Injury (PTS) onset				TTS onset				Behavioural Response			
		Single pulse		Multiple pulses		Single pulse		Multiple pulses		Single pulse		Multiple pulses	
		L_{pk} dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)	L_{pk} dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)	SPL dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)
Marine mammal	All groups									160	5 200		
	LF	219	70	183	2 150	213	80	168	17 090			163	27 010
	HF	230	50	185	60	224	60	170	80			165	100
	VHF	202	280	155	100	196	500	140	520			135	880
	PCW	218	80	185	340	212	100	170	1 570			165	3 020
	OCW	232	50	203	60	226	60	188	140			183	260
Turtles		232	50	204	300	226	60	189	1 440	175	1 080	-	-

LF = low frequency cetacean; HF = high frequency cetacean; VHF = very high frequency cetacean; PCW = phocid carnivores in water (seals); OCW = other marine carnivores in water
PTS = permanent hearing threshold shift; TTS = temporary hearing threshold shift; a dash indicates the threshold is not applicable/reached.
SEL_W = weighted sound exposure level; SPL = root-mean-square sound pressure level

Table 5-2: Estimated maximum zones of impact for fish from single (blue) or multiple (red) pulses

Fish hearing group	Zones of impact – maximum horizontal distance from source to edge impact zone from single (immediate exposure) and cumulative (24-hour exposure) source pulses											
	Mortal or Permanent Injury (PTS) onset				Recoverable Injury				Behavioural Disturbance			
	Single pulse		Multiple pulses		Single pulse		Multiple pulses		Single pulse		Multiple pulses	
	L_{pk} dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)	L_{pk} dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)	SPL dB re 1µPa	Max distance (m)	SEL_W dB re 1µPa^2·s	Max distance (m)
All Groups									150	13 550		
Fish without swim bladder	>213	80	>219[a]	80	>213	80	>216[a]	100	-	-	>186	3 560
Fish with swim bladder not involved in hearing	>207	170	210[a]	240	>207	170	203[a]	440	-	-	>186	3 560
Fish with swim bladder involved in hearing	>207	170	207[a]	300	>207	170	203[a]	440	-	-	186	3 560
Fish eggs and fish larvae	>207	170	>210[a]	240	-	-	-	-	-		-	-
Fish ≥ 2g	-	-	-	-	206	190	187[a]	3 420	-		-	-
Fish < 2g	-	-	-	-	206	190	183[a]	4 660	-		-	-

[a] SEL unweighted for all fish hearing groups.

The estimated zones of impact for PTS, TTS and injuries from single pulses were largely comparable to the maximum zones of impact considered in the 2020 assessment for all hearing groups. The maximum zones of impact for behavioural disturbance and cumulative zones of impact from multiple pulses were, however, estimated at greater distances from the sound source at the shallower 2024 updated modelling location (L3). The maximum zones for behavioural disturbance (5.2 km for marine mammals and 13.6 km for fish) were, thus used by the specialists to re-evaluate impacts[4].

It must be noted that for exposure to multiple seismic pulses from a single survey, the cumulative level at the modelling locations is based on the assumption that the animals remain in proximity to the seismic noise source over the entire survey period and would thus need to move with the sound source to be continuously exposed to the maximum noise impacts. In reality, marine fauna species, such as marine mammals, some fish species and turtles, would not stay in the vicinity of the operational survey vessel for the entire period and are thus unlikely to be exposed over a cumulative 24-hour period. In the case of a single seismic survey, the cumulative impact zones are thus considered as extremely conservative and it is more appropriate to consider the impact zones for single pulses when assessing likely impact zones. Should more than one survey, however, be undertaken simultaneously within the same licence area or neighbouring licence area, the cumulative impact zones could become more appropriate, as species could be exposed to noise from two sources. However, even with two parallel simultaneous seismic surveys, it is also unlikely that animals would remain within the same area where they could be exposed to the two sound sources over a cumulative 24-hour period.

Nevertheless, the maximum zones of impact for single pulses (13.6 km for fish behaviour) and multiple pulses (27 km for Low Frequency cetaceans) do not overlap with any known sensitive habitats or Tripp Seamount, even with the extension of the data acquisition area to 10 km inshore of the block boundary. It must also be noted that it is proposed to undertake the seismic surveys within the generally accepted Austral Summer survey window period (beginning of December to end of May), which avoids overlap with the key migration periods for Low Frequency cetaceans, i.e. humpback and Southern right whales. The maximum impact zones for these species are thus unlikely to be a realistic driver for a larger mitigation zone. Based on the avoidance of the above migration periods, the more appropriate impact zone for cumulative behaviour disturbance for all species is considered as the 3.56 km impact zone estimated for fish species.

5.3 Re-evaluation of Biophysical and Socio-Economic Impacts

Any changes to impacts previously assessed and impacts related to OBN not previously assessed are set out in Table 5-3 and Table 5-4.

In summary, the amended project description is not expected to result in any additional significant impacts or changes in the significance of impacts previously assessed. Any additional mitigation measures that might be required are indicated in the below tables and in the updated ESMP table in Section 6.

[4] It must be noted that since the 2020 noise modelling study, the algorithm used in the modelling process has been refined, leading to a more conservative prediction of potential impact zones. This algorithm is, however, considered as in line with the latest best available technology.

Table 5-3: Evaluation of Impacts on the Biophysical Environment from Amended Project Description

No.	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
1	**SEISMIC ACQUISITION**					
1.1	Increase in underwater noise levels Negative effect on marine faunal groups (physiological injury, mortality, behavioural avoidance): - Plankton abundance - Benthic and pelagic invertebrates - Fish - Diving seabirds - Turtles - Seals - Mysticete cetaceans (LF) - Odontocete cetaceans (HF & VHF)	Negligible (plankton, benthic and pelagic invertebrates) Very Low (diving seabirds, seals) Low (fish, turtles, cetaceans)	**Increased Survey Area of Interest:** It is proposed to increase the survey area of interest to allow for targeted surveys anywhere within the 18 170 km^2 extent of the two licence blocks and a possible 10 km area outside of the blocks boundaries. Considering the results of the updated noise modelling study at the shallower modelling point (closer, but still more than 85km away from Tripp Seamount), the maximum zones of impact from single pulses for all faunal groups would range between 50 m and 280 m for PTS and 60 m and 500 m for TTS from the sound source. This is in line with zones of impact from immediate exposure as assessed in 2020. It is thus not expected that the increased survey area of interest closer to the coast would affect the significance of impacts as rated in 2020. In addition, cumulative maximum zones of impact from multiple pulses of up to a maximum distance of 27 km (behavioural response for LF cetaceans) would still be around 40 km away from Tripp Seamount, an area where cetaceans are known to congregate. **OBN Technology:** As the sound source and array would be the same as for standard streamer seismic acquisition, but in smaller areas, any impacts on marine fauna from OBN would be the same or lower than those described above. **Assessment:** The proposed amendments are unlikely to increase the extent, duration, intensity and magnitude of the noise impacts on the different faunal groups from what was previously assessed. The residual impacts (after mitigation) thus remain as previously assessed, i.e. **NEGLIGIBLE to LOW**.	No	Negligible (plankton, benthic and pelagic invertebrates) Very Low (diving seabirds, seals) Low (fish, turtles, cetaceans)	None in addition to recommendations in 2020 EIA. The mitigation zone for turtles was, however, reduced to a precautionary 200 m in line with PTS and TTS impact zones from single pulses both being less than 100 m. This change was made based on experience from a 2023/2024 survey in Blocks 2912 and 2913B and to align the turtle pause mitigation with mitigation for short breaks in airgun firing. See updates in Table 6-1.

No.	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
2	**PLACEMENT OF NODES**					
2.1	Placement of nodes on the seafloor Disturbance or crushing of benthic macrofauna in the footprint of each node and/or from ROV operations during deployment	Not assessed in 2020 EIA	**OBN Technology:** Modular node receivers are temporarily positioned in a grid formation on the seafloor (5 to 10 nodes / km^2) across selected areas of interest by a remotely operated vehicle (ROV) deployed from a specialized vessel. Deepwater nodes can be up to 50 kg in weight and thus do not need to be anchored as they are heavy enough to remain on the seafloor. They are powered by batteries that can last up to 200 days in water depths exceeding 3 400 m. **Assessment:** Due to the relatively homogenous nature of the seafloor habitats across the two licence blocks (as confirmed by the environmental baseline surveys), the relatively small size of the OBN receivers, the fact that they are retrieved after completion of the survey and unlikely to be left in the same position for more than 100 days, the permanent significantly negative impacts on low sensitivity deep-sea benthic habitats are unlikely. The disturbance or loss of benthic macrofauna from placement of nodes (ROV operations and within node footprint) on the seabed is deemed to be of **NEGLIGIBLE** significance.	Should OBN be implemented, the impacts on benthic macrofauna would be highly localised (restricted to the footprint of each node), of very low intensity, short duration. Impacts would be of very low magnitude	Negligible	Mitigation measures have been included in Table 6-1 to ensure that disturbance of the seabed is limited.
3	**UNPLANNED EVENTS**					
3.1	Accidental loss of equipment to seabed or water column Increase in hard substrate and faunal entanglement	Very Low	**Increased Survey Area of Interest:** Increasing the survey area of interest would not affect the potential impacts of equipment loss to the seabed. Although two vessels may be operational concurrently, cumulative impacts of equipment loss are not expected. **OBN Technology:** As equipment is purposely deployed on the seafloor during OBN surveys, there would be a higher risk of potential loss of equipment, should it not be possible to recover a node. Due to the relatively small size of these nodes and low risk of faunal entanglement, no additional impacts to those previously assessed for seismic streamers are expected. **Assessment:** The proposed amendments are unlikely to increase the extent (local), duration (short-term), intensity (very low), magnitude (very low), with mitigation, as previously assessed. Thus, the residual impact remains as previously assessed, i.e. of **VERY LOW** significance with mitigation.	No	Very Low	None in addition to recommendations in 2020 EIA.

Table 5-4: Evaluation of Impacts on the Socio-Economic Environment from Amended Project Description

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
1	**DEPLOYMENT OF SEISMIC EQUIPMENT**					
1.1	Safety exclusion zone around survey vessel and towed array Exclusion of Fisheries from Fishing Grounds - Large Pelagic Long-Line	Very Low	**Increased Survey Area of Interest:** It is proposed to increase the survey area of interest to allow for targeted surveys anywhere within the 18 170 km^2 extent of the two licence blocks, plus possibly 10 km outside the boundaries of the Blocks 2912 and 2913B. As it is anticipated that smaller targeted surveys would be undertaken going forward, it is not proposed to exclude fishing activities from the entire area of interest while surveying. In 2020, an exclusion zone of 240 km^2 was considered around the seismic vessel, however for this assessment the exclusion zone has been increased to 250 km^2 based on recent practice in the region. The exclusion zone is related to the moving survey vessel and not the entire area of interest or targeted survey area. As the survey vessel is constantly moving, any one geographical location would lie within the exclusion zone (250 km^2 around the vessel) for a few hours only. Based on the fishing method of setting drifting long lines, longline vessel operators would still, however, be obliged to take a precautionary approach to reduce the risk of gear entanglement with the seismic streamer or source array by avoiding a much wider exclusion area. Based on an assumed average line length of 60 km, operators could be expected to avoid setting lines within a distance of 30 km from the target survey area. Targeted survey areas may extend 10 km outside the boundaries of Blocks 2912 and 2913B, in this case pelagic longline operators could thus be expected to avoid setting lines within a distance of 40 km of the blocks boundaries. From 2004 to 2019, less than 1% of the average annual catch and effort was recorded within Blocks 2912 and 2913B (18 170 km^2) for this fishery. **OBN Technology:** The OBN modules would be deployed within a targeted survey area included in the seismic area of interest which has been considered above, and would require a smaller vessel exclusion zone (maximum of 1 km around vessel = 3.14 km^2) due to the fact that a large seismic streamer array would not be required and only the source will be towed, resulting in the survey vessel not being as restricted in its manoeuvrability. As a worst-case scenario, however, the operator might require marine traffic to also remain outside of the field where nodes have been deployed for the duration of the survey, thus	No	Very Low	None in addition to recommendations in 2020 EIA.

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
			extending the exclusion zone. Based on the maximum number of nodes that could be deployed at the same time, the maximum node field size would equate to approximately 788 km^2, with the total operational area being approximately 1 400 km^2 for a single survey. Based on the depth of the licence blocks (more than 2 500 m), there is, however, very little risk of vessels interacting with deployed nodes and there would thus be no real need for an exclusion zone around the full nodes field. **Assessment:** Considering the relatively small temporary exclusion zone for both seismic streamer and OBN surveys and the limited fishing activities taking place in the blocks, the extent (regional), duration (short-term), intensity (low) and magnitude (very low) of the impact remains the same, with mitigation, as previously proposed. Thus, the residual impact significance remains **VERY LOW.**			
1.2	Placement of nodes on the seafloor Potential damage to subsea cables from placement of nodes and/or ROV operations	Not previously assessed	**Increased Survey Area of Interest:** Increasing the survey area to the full extent of the two blocks would not affect the potential impacts of OBN node placement on subsea cables. **OBN Technology:** Four subsea cables currently cross through Blocks 2912 and 2913B and their locations would need to be considered when refining the node positions and while placing nodes. ROV operations and placement of nodes could affect subsea cables and potentially lead to cable damage, should the exact cable positions not be considered. **Assessment:** Considering that cable positions are largely known and can be actively avoided during node deployment (using of ROVs), as well as no anchoring requirements, it is unlikely that cable damage would occur during normal operations. The potential impact to subsea cables during node placement and ROV operations is considered as of **NEGLIGIBLE** significance with the implementation of the recommended mitigation measures.	N/A	Negligible	Mitigation measures have been included in Table 6-1 to ensure that there is no interference with subsea telecommunications cables.

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
2	**AIRGUN ARRAY DEPLOYMENT, TESTING, OPERATION AND RETRIEVAL**					
2.1	Acoustic emissions from the airgun array Change in catch rate due to behavioural avoidance of fish in and around survey areas	Very Low	**Increased Survey Area of Interest:** The updated noise modelling study considered the shallower regions of the area of interest (i.e. around 2 500 m water depth). These results were considered in the updated assessment of impacts. Based on the water depth within the licence area (2 500 m to 3 800 m), demersal fish would receive the sound in the far-field and no mortality, physiological injury or behavioural avoidance is expected. Pelagic fish would be capable of avoiding seismic noise at levels below those where physiological injury or mortality would result. Adult and juvenile fish have been shown to display several behavioural responses to seismic sound. Behaviour disturbance of fish is believed to cease at received noise levels below 150 dB re 1µPa. This was taken as the threshold level, and the updated noise modelling study found that noise generated during the survey operation in the shallowest parts of the licence area (i.e. 85 km from the sensitive Tripp Seamount) would attenuate to below this behavioural disturbance threshold at a distance of 13.6 km from the source (seismic array). This behavioural impact zone is related to the moving survey vessel (sound source). As the survey vessel is constantly moving, any one geographical location would lie within the impact zone for a few hours only (if the vessel moves directly overhead). From 2004 to 2019, less than 1% of the average annual catch and effort was recorded within Blocks 2912 and 2913B (18 170 km^2) for this fishery. **OBN Technology:** As the sound source and array would be the less or the same as for standard streamer seismic acquisition, any impacts on fish from OBN would be the same or lower than those described above. **Assessment:** Considering the above, the extent (regional), duration (short-term), intensity (low), and magnitude (very low) of the impact remains, with mitigation, as previously assessed. Thus, the residual impact significance remains **VERY LOW.**	No	Very Low	None in addition to recommendations in 2020 EIA.

No	Description of environmental aspect and potential impact	Residual Impact Significance Rating as per the 2020 EIA	Evaluation	Has the Impact Extent, Duration, Intensity or Receptors Changed?	Revised Residual Impact Significance	Recommendations for Additional Mitigation
3	**UNPLANNED EVENTS**					
3.1	Loss of equipment at sea • Potential snagging of demersal gear with regards to equipment that sinks to the seabed; • Potential entanglement hazards with regards to lost streamers, arrays and tail buoys drifting on the surface or in the water column; and • Potential entanglement hazards from OBN nodes on the seafloor.	Very Low	**Increased Survey Area of Interest:** Increasing the survey area would not affect the potential impacts of accidental loss of equipment on commercial fishing. Although two vessels may be operational concurrently, cumulative impacts of equipment loss are not expected. **OBN Technology:** Due to the water depth within the licence blocks (2 500 m to 3 800 m) and the fact that no demersal trawl or demersal longline fishing takes place within the licence area, it is not anticipated that temporarily placing the OBN nodes on the seafloor would create an entanglement hazard. **Assessment:** Considering the above, the extent (site), duration (short-term), intensity (very low) and magnitude (very low) of the impact remains, with mitigation, as previously assessed. Thus, the residual impact remains **VERY LOW.**	No	Very Low	None in addition to recommendations in 2020 EIA.

5.4 Cumulative Impacts

Due to the distance offshore and considerable water depths within Blocks 2912 and 2913B, the only current activities that could be expected to lead to cumulative impacts with those of the proposed project, e.g. affect the same or similar features or areas, would be oil and gas exploration, especially seismic surveys, underway in neighbouring blocks in Namibia and in the northern parts of the Orange Basin on the South African side of the border.

As stated in Section 4.7, there has been renewed interest in exploration along the West Coast of Southern Africa based on recent hydrocarbon finds in Block 2913B and neighbouring Blocks 2914A and 2914B (PEL0039) in Namibia. Intermittent exploration activities are also taking place in the Orange Basin on the South African side of the border with Namibia. Table 5-5 lists the applications for petroleum exploration rights in the Southern Benguela region (South African West Coast and southern Namibia) since 2007 and the activities conducted. Concurrent activities could lead to potential cumulative impacts on marine fauna and habitats related to noise. This could also add to the cumulative impact on the pelagic longline fisheries sector. It must be noted that only the exercising of valid exploration rights could potentially lead to simultaneous operations and that it is not guaranteed that all permits granted by the authorities. The status of all the exploration rights listed in Table 5-5 is not known, but would need to be considered when planning activities in consultation with operators of neighbouring licence blocks.

In addition, exploration activities are temporary, and it cannot be predicted which activities will take place at the same time as the implementation of the further seismic data acquisition programme in Blocks 2912 and 2913B. Based on current levels of exploration activity in the region, it is likely that some exploration (drilling and/or seismic) will take place in other blocks concurrently with TEEPNA's proposed seismic surveys over the three-year validity period of an Amended ECC (assuming a favourable decision is received).

Though the exact location of targeted seismic survey areas within Blocks 2912 and 2913B and any planned seismic surveys or new wells in neighbouring blocks are not yet known, seismic surveys tend to be located at least several kilometres from each other to avoid interference with data acquisition. As a conservative approach, a 20 km distance between active seismic sources is proposed to avoid the cumulative noise impact for all marine fauna groups based on the behavioural disturbance for fish (i.e. ~3.6 km from each source).

Likely impact footprints / magnitudes of the other exploration activities that could generate cumulative impacts with the project are summarised in Table 5-6.

Based on the transitory nature of seismic surveys, the relatively small area of influence at any given time and the required distances between different exploration activities to avoid interference with data acquisition, it is not expected that significant cumulative impacts would be experienced should multiple surveys be undertaken in parallel or within the same survey window period within Blocks 2912 and 2913B and neighbouring licence blocks.

Table 5-5: Applications for petroleum exploration in the Southern Benguela region (southern Namibia and South African West Coast) since 2007, indicating operations undertaken.

Year	Right holder / operator	Block	Activity	Approval	Conducted / completed
SOUTHERN NAMIBIA PETROLEUM EXPLORATION					
2011	Signet	Block 2914B (now part of PEL39)	2D and 3D Seismic; development of production facility	unknown	unknown
2011	PGS	Block 2815	3D Seismic	Yes	3D: 2011 (HRT)
2013	Spectrum Namibia	Orange Basin multiclient	2D Seismic	Yes	2D: April 2014
2014	Shell Namibia	2913A; 2914B	3D Seismic	Yes	3D: 2015
2016	Spectrum	Southern Namibia regional	2D Seismic	Yes	2D: April 2019
2017	Shell Namibia	PEL39	Exploration drilling	Yes	Ongoing
2018	Shell Namibia	PEL39	3D Seismic	Yes	Yes
2019	Galp Namibia	PEL83	Exploration drilling	Yes	No (Applying for ECC extension)
2019	TEEPNA	Block 2913B (PEL56)	Exploration drilling	Yes, ECC renewed in 2022	Ongoing (2022 commencement)
2020	TEEPNA	Block 2912, 2913B (PEL91; PEL56)	3D Seismic	Yes	3D: 2022/2023 3D 2023/2024 (applying for ECC renewal and amendment)
2020	TGS Namibia	Blocks 2711, 2712A, 2712B, 2713, 2811, 2812A, 2812B, 2913B in the Orange Basin	3D Seismic	Yes	Yes
2020	Tullow Namibia (Harmattan Energy Ltd)	Block 2813B (PEL90)	3D Seismic	Yes	3D: 2023
2022	Searcher	Blocks 2614, 2613, 2612A&B, 2714A&B, 2713, 2712A&B, 2812B, 2813A, 2814A&B, 2912, 2913B, 2914A&B	2D and 3D Seismic	Yes	3D: 2023
2023	PGS	Blocks 2713, 2712A&B, 2812A&B, 2813A&B, 2814B, 2714A&B, 2614, 2613, 2612A&B	3D Seismic	Yes	3D: 2022-2023
2023	TEEPNA	Block 2912	Exploration drilling	Yes	2023

Year	Right holder / operator	Block	Activity	Approval	Conducted / completed
2024	Shell	PEL39	3D Seismic & OBN	ECC Amendment Application underway	N/A
2024	Harmattan/ Chevron	Block 2813B	Exploration drilling	Application underway	N/A
2024	Rhino	Block 2914A	Exploration drilling	Application underway	N/A
SOUTH AFRICAN WEST COAST PETROLEUM EXPLORATION					
2007	PASA (Petroleum Agency of South Africa)	Orange Basin	2D Seismic	Yes	Nov-Dec 2007
2008	PASA	West Coast	2D Seismic	Yes	Sep 2008
2008	PetroSA	Block 1	3D Seismic	Yes	Jan-Apr 2009
2011	Forest Oil (Ibhubesi)	Block 2A	3D Seismic	Yes	May-Jul 2011
2011	PetroSA / Anadarko	Block 5/6 (ER224); Block 7 (ER228)	2D / 3D Seismic and CSEM (Controlled source electromagnetic method)	Yes	2D: Dec 2012 – Feb 2013 3D: Jan–Apr 2020
2011	PetroSA	Block 1	Exploration drilling	Yes	unknown
2012	BHP Billiton (now Ricocure Azinam & Africa Oil)	Block 3B/4B	2D and 3D Seismic	Yes	unknown
2013	Spectrum	West Coast regional	2D Seismic	Yes	2D: April 2015
2013	PetroSA	Block 1	2D and 3D Seismic	Yes	3D: Feb-May 2013 (conducted by Cairn)
2013	Anadarko	Block 2C	2D and 3D Seismic, MBES (Multi-Beam Echo-Sounder), heat flow, seabed sampling	Yes	unknown
2013	Anadarko	Block 5/6/7	MBES, heat flow, coring	Yes	Jan-Mar 2013
2014	OK/Shell	Northern Cape Ultra Deep ER274	2D and 3D Seismic, MBES, magnetics, seabed sampling	Yes	2D: Feb-Mar 2021
2014	Shell	Deep Water Orange Basin	Exploration drilling	Yes	No (Shell relinquished block to TEEPSA)
2014	Cairn	ER 12/3/083	2D Seismic	Yes (obtained by PetroSA)	2D: Feb-Mar 2014

Year	Right holder / operator	Block	Activity	Approval	Conducted / completed
2014	Cairn	Block 1	Seabed sampling	Yes	unknown
2014 - 2015	Thombo	Block 2B (ER105)	Exploration drilling	Yes	Nov 2022
2014	New Age Energy	Southwest Orange Basin	2D Seismic	unknown	unknown
2015	Cairn	Block 1	Exploration drilling	unknown	unknown
2015	Sunbird	West Coast	Production pipeline (Ibhubesi)	Yes	No (EA was renewed for an additional 5 years on 30 June 2022)
2015	Rhino	Southwest coast (inshore)	2D Seismic, MBES	unknown	unknown
2015	Rhino	Block 3617/3717	2D and 3D Seismic, MBES	Yes	unknown
2017	Impact Africa / TEEPSA	Southwest Orange Deep	2D and 3D Seismic	unknown	unknown
2018	PGS	West Coast regional	2D and 3D Seismic	Yes	-
2019	Anadarko	Block 5/6/7	2D Seismic	Yes	-
2021	Searcher	West Coast regional	2D and 3D Seismic	Yes	2D: Jan 2022 (incomplete)
2021	TGS	West Coast regional	2D Seismic	Yes	No
2021	Tosaco	Block 1, ER362	3D Seismic	Withdrawn	-
2022	Searcher	Deep Water Orange Basin	3D Seismic	Yes	3D: Jan-Apr 2024
2022	TGS	Deep Water Orange Basin	3D Seismic	Yes	No
2022	TEEPSA	Block 5/6/7	Exploration drilling	Yes	No, legal challenge pending
2022	TEEPSA	Deep Water Orange Basin	Exploration drilling	Yes	No (appeal decision awaited)
2023	Africa Oil SA Corp, Ricocure, Azinam (Eco Atlantic Oil and Gas)	Block 3B/4B	Exploration drilling	EIA ongoing	No
2024	Searcher	Deep Water Orange Basin	3D Seismic	EIA ongoing	No. Planned for 2025, pending approvals

Table 5-6: Impact footprints / magnitude of offshore activities and key potential cumulative impacts

Aspect	Amended Project	Other offshore exploration	Cumulative
Underwater noise	For single pulse (short term exposure): • Behavioural effects on mammals up to 5.2 km from the seismic source for single pulses and 13.6 km for fish. • PTS and TTS up to 280 m and 500 m respectively for VHF mammals, and <200 m for all other faunal groups.	Seismic: Same as project, but transient impact zones (moving sound source), restricted to December to May survey window period Drilling: Single point impact within 10 km of project	Seismic: The overlap with other seismic surveys may not be as significant, as the sound source travels and the impact is thus very short-term in any one area. Seismic noise, however, adds to the overall portion of the ocean where mammal behaviour in particular may be affected at the time. Seismic surveys are generally restricted to periods of the year when fewer migrating whales are present, thus avoiding disruption of migration routes. In order to ensure that quieter movement corridors are maintained between different seismic surveys undertaken at the same time in the same block or neighbouring blocks, seismic sources would need to stay at least 20 km away from each other, thus further reducing the likelihood of significant cumulative noise impacts on marine fauna in one given area. Drilling: Impact footprints of different exploration wells in addition to seismic acquisition on mammals could overlap if wells are drilled within ~20 km (10 km + 10 km) of each other and seismic activities are undertaken in close proximity at the same time, which is possible and may affect fish and marine mammal behaviour (depending on the direction of noise travel). As drilling units are the main source of noise impact and in place for the entire duration of drill activities (3-4 months at a time), impacts from concurrent exploration well drilling in other areas would be additive and cumulatively increase the portions of the ocean where mammal behaviour in particular may be affected.

Aspect	Amended Project	Other offshore exploration	Cumulative
Exclusion zone	Short-term impact of minimum 500 m (NHV), 1 km (OBN survey source vessel) and up to 15 km (Standard 3D) around the survey vessels Standard shipping safety distances for supply vessels	Streamer seismic and OBN: Exclusion zones measuring several km from survey vessel, moving with the vessel Drilling: Similar to project	Multiple concurrent seismic surveys will add to areas that are inaccessible to other vessels. As minimal fishing is undertaken in Blocks 2912 and 2913B, it is unlikely that the required exclusion zones would significantly add to the potential impacts of exclusion zones from other activities on the large pelagic fishing sector. Impacts footprints of different exploration wells are unlikely to overlap, but safety zones of 2 nm around nearby wells drilled concurrently could cumulatively reduce accessibility to a region of ~20 km diameter for up to ~3 to 4 months in addition to seismic exclusion zones. Several concurrent exploration activities would result in narrowing navigation routes while drilling and seismic surveys take place.
Atmospheric emissions / Air quality	No exceedance of ambient NO_X, SO_2, CO and PM concentrations from vessels, helicopters and flaring expected	Seismic: Emission levels akin to other vessels Drilling: Minor local short-term impacts	Emissions from seismic, shipping and fishing vessels are mobile and make a negligible contribution to pollutant concentrations. Project emissions from drilling activities are generally below guideline levels and thus have a limited footprint around the well. Emission concentrations will reduce quickly in the offshore environment and will not persist long enough to create cumulative impacts with subsequent nearby drilling activities or concurrent seismic activities.
Atmospheric emissions / GHG contribution	Negligible contribution to GHG emissions	Seismic: Emissions from vessel fuel Drilling: Medium to Low contribution annually (vessels + well tests)	GHGs persist in the atmosphere for many years. Impacts are global irrespective of where the GHG are emitted. All emissions will thus generate a cumulative impact with all other global GHG emissions. Seismic surveys would, however, have a minimal contribution which would be in line with normal vessel traffic.

6.0 UPDATED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Table 6-1 provides an update to the specific management commitments that will be implemented to prevent, minimise or manage significant potential negative impacts and optimise and maximise any potential benefits of the amended project. Only minor additions have been made to the table from the 2020 version included as Table 9-5 under the Environmental and Social Management Plan (Chapter 9) of the Final EIA Report for Proposed 3D Seismic Survey in Licence Blocks 2912 and 2913B, Orange Basin, Namibia.

Table 6-2 sets out the monitoring requirements referenced in the updated ESMP table.

The minor updates to the ESMP commitment register relate to the following:

- addition of measures specific to OBN survey methodology not previously addressed.
- potential larger survey area in the licence blocks up to possibly 10 km outside of the block boundaries where targeted survey areas are located close to the edge of the licence blocks.
- consideration of cumulative impacts related to renewed interest in exploration activities along the southern coast of Namibia.
- change to the short break in airgun firing procedure to align with the 'turtle pause' procedure.
- minor additional measures in line with the latest best practice.

While the review of the ESMP has identified some specifications that require updating, the overall effectiveness of the original ESMP in terms of impact avoidance and mitigation is not affected.

Note: Additions or changes to the ESMP based on the amendment application are highlighted in **red text**, while general best practice additions are highlighted in **blue text**.

Table 6-1: Updated Environmental and Social Management Plan Specifications (Note: additions based on amendment application in red and general best practice additions in blue)

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
1. PLANNING PHASE							
1.1 SEISMIC SURVEY SCHEDULING	Survey Planning	Avoidance of sensitive periods and protect marine fauna Minimise disturbance to marine fauna	Survey Design	• Plan seismic survey to avoid the periods of movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (June to November inclusive) and ensure that migration paths are not blocked by seismic operations. Thus, surveying should, therefore, be undertaken between December and May (inclusive). • Coordinate survey design and timing with marine authorities and other operators, if required and as far as possible, to avoid potential cumulative noise impacts associated with more than one survey occurring in Blocks 2912 and 2913B at the same time or in parallel to surveys in adjacent licence blocks. • Where multiple surveys are planned within the two Blocks during the same survey period, ensure that at least a 20 km distance is implemented between seismic sources. Coordinate with operators of neighbouring licence blocks to ensure that the 20 km distance is implemented between surveys sources by different operators as well.	TEEPNA, Seismic Contractor	Prior to finalising of survey schedule	MMO confirmation / report

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• Plan surveys, as far as possible, so that the first commencement of airgun firing in the survey area (including gun tests) is undertaken during daylight hours.	TEEPNA, Seismic Contractor		
1.2 PREPARATION OF SUBSIDIARY PLANS	Planning and Management	Identification of all parties and their responsibilities documented and communicated	Plans and Procedures of the HSE Management System	Ensure the following subsidiary plans are in place: • TEEPNA's Emergency Procedures document and Medical Emergency Response Plan. • Seismic Contractor Emergency Response Plan (including MEDIVAC plan). • Helicopter Operator Emergency Response Plan. • Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL. • Emergency Response Plan. • Marine Faunal Management Plan. • Ballast Water Management Plan • Waste and Discharges Management Plan. • Stakeholder Engagement Plan. • Local Employment and Supply Management Plan. • Preventive Maintenance Plan. • Chemical Management Plan. • Corrective Action Plan. • Dropped object procedure in line with survey area depth and metocean conditions. • Simultaneous operations (SIMOPs) procedure, where required. In addition to the above, ensure that:	Seismic Contractor	30 days prior to commencement of operation	Copies of all plans and certificates Confirm compliance and justify any omissions

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• There is adequate protection and indemnity insurance cover for oil pollution incidents. • There is a record of the vessel's seaworthiness certificate and/or classification stamp. • A valid International Sewage Pollution Prevention Certificate, as required by vessel class. • International Oil Pollution Prevention (IOPP) Certificate, as required by vessel class.			
1.3 PREPARATION FOR SEISMIC ACQUISITION	Survey personnel for faunal and vessel monitoring	Minimise impact on and disturbance of marine fauna	Marine Faunal Management Plan	• Make provision for the placing of at least two qualified MMOs on board the seismic vessel. As a minimum, one must be on watch during daylight hours for the pre-shoot observations and when the acoustic source is active. • Make provision for placing of at least two qualified PAM operators on board the seismic vessel. As a minimum, one must be on "watch" during the pre-shoot observations and when the acoustic source is active. • Ensure the seismic vessel is fitted with Passive Acoustic Monitoring (PAM) technology, which detects some animals through their vocalisations. • As the survey area would largely be in waters deeper than 1 000 m where sperm whales and other deep-diving odontocetes are likely to be encountered, implement the use of PAM 24-hr a day when the airgun is in operation. • Ensure that the PAM hydrophone streamer is towed in such a way that the interference of vessel noise is minimised.	Seismic Contractor	Prior to commencement of operations	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) MMO and PAM operator reports

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
1.3 PREPARATION FOR SEISMIC ACQUISITION				• Ensure the PAM streamer is fitted with at least four hydrophones, of which two are HF and two LF, to allow directional detection of cetaceans. • Ensure spare PAM hydrophone streamers (e.g. 4 heavy tow cables and 6 hydrophone cables) are readily available in the event that PAM breaks down, in order to ensure timeous redeployment.		Prior to commencement of operations	
		Minimum disruption to fishing operations and other users of the sea Clear liaison with fisheries and other users of the sea	Stakeholder Engagement Plan	• Make provision for the placing independent FLO on board the seismic/escort vessel.	Seismic Contractor		FLO monitoring (see Row M4-1 in Table 6-2) FLO log / report
	Survey equipment	Minimise impacts on cetaceans	Survey design	• Provide PAM technology onboard the seismic vessel for use 24-hours a day. • Ensure the PAM hydrophone streamer is fitted with at least four hydrophones, of which two are HF and two LF, to allow directional detection of cetaceans. • Ensure spare PAM hydrophone streamers (4 heavy tow cables and 6 hydrophone cables) are readily available in the event that PAM breaks down, in order to ensure timeous redeployment.	Seismic Contractor		PAM operator confirmation / report
		Minimise impacts on marine fauna	Survey design	• Define the use of the lowest practicable airgun volume for production, and design arrays to maximise downward propagation, minimise horizontal propagation and minimise high frequencies in airgun pulses.			MMO confirmation / report

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• Ensure a display screen for the acoustic source operations is provided to the marine observers. All information relating to the activation of the acoustic source and the power output levels must be readily available to support the independent observers in real time via the display screen and to ensure that operational capacity is not exceeded. • Ensure the ramp-up noise volumes do not exceed the production volume.			
		Minimise impacts on turtles from tail buoy strikes	Survey design	• Use 'turtle-friendly' tail buoys. Alternatively, the existing tail buoys should be fitted with either exclusion or deflector 'turtle guards'.			MMO confirmation / report
		Protect marine environment from contamination from streamer breaks Minimise risk of spills or leaks	Survey design	• Solid seismic streamers rather than fluid-filled streamers are to be used. Alternatively, low toxicity fluid-filled streamers could be used.			MMO confirmation / report
	Identification and appointment of suppliers	Ensure fair, transparent and reasonable preferential contracting of local companies	Societal Management Plan	Apply fair, transparent and reasonable preferential contracting of local companies to maximise benefits in Walvis Bay or Lüderitz.	Seismic Contractor	During contracting	Contracts
				Include as a condition of contracting that any non-local service providers will apply reasonable preferential sub-contracting of companies located in Walvis Bay or Lüderitz.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2. MOBILISATION PHASE							
2.1 STAKEHOLDER CONSULTATION AND NOTIFICATION	Interaction, engagement & communication with national authorities and key stakeholders	Inform Minister of Mines Energy about the commencement of the project	Stakeholder Engagement Plan	Compile the survey details into a notification document and submit to Ministry of Mines and Energy (Petroleum Commissioner). The notification should provide, *inter alia*, the details on the following: • Survey programme (timing, co-ordinates and duration). • Contractor details. • Survey vessel specifications (including relevant certification and insurance).	TEEPNA, Seismic Contractor	Notification to be submitted 30 days prior to survey commencement	Correspondence to Minister of Mines and Energy
		Ensure that other users of the sea are aware of the survey and navigational safety and parties are aware of the mechanism to follow for raising concerns Minimise disruption to the survey and other users of the sea	Stakeholder Engagement Plan	Notify key stakeholders of the navigational co-ordinates of the operational area (inclusive of the acquisition area, run-ins and vessel turning circles), timing and duration of the activities, and implications of the safety clearance requirements. The following stakeholders shall be notified: • Fishing industry / associations: Association of Namibian Fishing Industries and Namibian Large Pelagic and Hake Longlining Association. • Directorate of Maritime Affairs. • South African Navy Hydrographic Office (HydroSAN). • Namibian Ports Authority. • MFMR Monitoring, Control and Surveillance Unit in Walvis Bay (Vessel Monitoring System).	TEEPNA, Seismic Contractor	2 weeks prior to commencement of operations	Provide copies of all correspondence and list of those to whom it was sent
2.1 STAKEHOLDER CONSULTATION	Interaction, engagement & communication with national	Ensure that other users of the sea are aware of the survey and navigational	Stakeholder Engagement Plan	Implement a public information programme to ensure local fisheries and the interested and affected parties are regularly informed of the seismic survey activities.	TEEPNA,	Prior to survey commencement	Copies of any newspaper articles, public

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
AND NOTIFICATION	authorities and key stakeholders	safety and parties are aware of the mechanism to follow for raising concerns Minimise disruption to the survey and other users of the sea		This will support ongoing engagement and assist in drawing out any ongoing or new issues and concerns. Focus should be placed on Lüderitz and possibly Walvis Bay (dependent on location of onshore logistic base).	Seismic Contractor		notices, newsletters and websites
				Request, in writing, the HydroSAN to broadcast a navigational warning via Navigational Telex (Navtext), Lüderitz Port Control and Walvis Bay radio for the duration of the survey activities.	Seismic Contractor	7 days prior to commencement of operations	Confirm that request was sent to the SAN Hydrographer
				Maintain a functional grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	TEEPNA, Seismic Contractor	Throughout the survey campaign	Grievance monitoring (see Row M4-1 in Table 6-2) Copy of grievance register and responses
		Manage community expectations related to local procurement, local content, and local employment opportunities	Stakeholder Engagement Plan Local Employment and Supply management Plan	Ensure that all service providers/contractors actively manage community expectations related to local procurement, local content, and local employment opportunities, with support from TEEPNA	Seismic Contractor	At contract award	Copy of public messages / statements

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.2 MOBILISATION OF PROJECT STAFF	Training and allocation of responsibilities	Project staff have the capability and competence to achieve the ESMP objectives and know what the ESMP environmental requirements are All staff receive HSSE training as part of their HSSE induction, refresher training and an ongoing awareness and behaviour system	Environmental and Social awareness	• Ensure that a copy of the EIA Report and ESMP is supplied to the contractor and sub-contractors and is on board all project vessels during the operation.	TEEPNA	At survey commencement meeting and before new staff commence with work on the project	Acknowledge-ment of Receipt
				• Undertake HSSE Awareness Training, including induction training to ensure the project personnel (including seismic and support vessels, MMO, PAM operator, FLO) are appropriately informed of the purpose and requirements of the ESMP, including emergency procedures, spill management, etc.	TEEPNA, Seismic Contractor	At survey commencement meeting (Kick-off Meeting) and before new staff commence with work on the project	Copy of attendance register and training records
				• Ensure that ESMP responsibilities are clearly defined in Job Descriptions of relevant staff.			
				• Establish training and exercise programmes to ensure that the response activities can be effectively executed.			
				• Ensure that MMOs and PAM operators are briefed on the area-specific sensitivities and on the seismic survey planning (including roles and responsibilities, and lines of communication). • Ensure FLOs are briefed on their role regarding stakeholder engagement and grievance management.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.3 AIR POLLUTION CONTROL DURING TRANSIT TO SURVEY AREA	Emissions to the atmosphere during operation	Reduce amount of diesel burned and emissions to the air	Waste and Discharges Management Plan	Use a low sulphur fuel that has a maximum sulphur content as specified by MARPOL.	Contractors	Throughout mobilisation	Fuel consumption monitoring (see Row M1-4 in Table 6-2) Inventory of volume and type of fuel used
			Waste and Discharges Management Plan	Ensure no incineration of waste occurs within the port limits.			Incineration monitoring (see Row M1-1 & 1-2 in Table 6-2) Inventory of volume of waste discharged and discharge location
			Maintenance and Discharges Management Plan	Implement a maintenance plan to ensure all diesel motors and generators receive adequate maintenance to minimise soot and unburnt diesel released to the atmosphere.			Maintenance records

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan SOPEP	Implement the following plans: • Waste and Discharges Management Plan. • Shipboard Oil Pollution Emergency Plan (SOPEP).	Contractors	Throughout mobilisation	Copy of all plans Report the total discharge waste stream volumes
			Waste and Discharges Management Plan	Vessels will have: • an onboard sewage treatment plant; • a sewage comminuting and disinfecting system, and/or • a sewage holding tank.		Throughout mobilisation	Sewage monitoring (see Row M1-5 & M2-2 in Table 6-2) Sewage Certificate containing the test results of the sewage treatment plant
				Ensure sewage discharges comply with : • a BOD of <25 mg/l (if the treatment plant was installed after 1/1/2010,) or <50 mg/l (if installed before this date); and • minimal residual chlorine concentration of 0.5 mg/l.		Throughout mobilisation, during discharges	
				Sewage discharge to comply with the following: • No visible floating solids must be produced or discolouration of the surrounding water must occur. • Sewage must be comminuted and disinfected for discharges between 3 nm and 12 nm from the coast. • Disposal of sewage from holding tanks must be discharged at a moderate rate while the ship is proceeding on route at a speed not less than 4 knots.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan	Galley waste discharge to comply with the following: • No disposal to occur within 3 nm of the coast. • Disposal at >3 nm from coast to be comminuted to particle sizes smaller than 25 mm.	Contractors	Throughout mobilisation, during discharges	Waste monitoring (see Row M1-1 & 1-2 in Table 6-2) Inventory of volume of waste discharged and discharge location
				Minimise the discharge of waste material should obvious attraction of fauna be observed.			
				Ensure all deck and machinery drainage is routed to: • equipment for the control of oil discharge from machinery space bilges and oil fuel tanks, e.g. oil separating/filtering equipment and oil content meter. • oil residue holding tanks. • oil discharge monitoring and control system.			Waste monitoring (see Row M1-3 & M2-2 in Table 6-2) Oil Record Book
				Oil in water concentration must be less than 15 ppm prior to discharge overboard			
				Ensure all process areas are bunded to ensure drainage water flows into the closed drainage system.			Waste monitoring (see Row M1-3 & M2-2 in
				Use low-toxicity biodegradable detergents in cleaning of all deck spillage.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan	• Mop up any spills immediately with biodegradable low toxicity detergents. • Use oil absorbent.	Contractors	After Spills	Table 6-2) Quantity of oil residue (sludge) produced. Record all discharges, together with date, time and method of discharge, disposal route, any system failure and accidental oil spills in the Oil Record Book
				Use drip trays to collect run-off from equipment that is not contained within a bunded area and route contents to a closed drainage system.		Throughout mobilisation, during discharges	
				Implement leak detection and maintenance programmes for valves, flanges, fittings, seals, hydraulic systems, hoses, etc.		Throughout mobilisation	
				• Initiate a waste minimisation system.		Throughout mobilisation	Waste monitoring (see Row M1 in Table 6-2) Inventory volume of waste generated Inventory of volume transferred for
				• No disposal of general waste overboard.			
				• Ensure on-board solid waste storage is secure.			
				• Incinerate (non-hazardous) or transport to a licensed onshore waste management facility for disposal/recycling. Retain waste receipts.			
				• Recycle metal waste onshore.			
				• Segregate, classify and store all hazardous waste in suitable receptacles on board in order to ensure the safe containment and transportation of waste			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• Dispose of hazardous waste at a facility that is appropriately licensed and accredited.			onshore disposal / incinerated Waste receipts
2.5 LIGHT POLLUTION CONTROL DURING TRANSIT TO SURVEY AREA	Increased ambient lighting	Protect marine fauna, migratory birds and seabirds by managing illumination of the project vessels Zero fatalities of marine fauna, migratory birds and seabirds	Marine Faunal Management Plan	Reduce lighting to a minimum compatible with safe operations whenever and wherever possible by: • Minimising the number of lights and the intensity of the lights. • Automatically or manually controlling lighting in areas where it is not a continuous requirement through the process control system. • Positioning light sources in places where emissions to the surrounding environment are minimised.	Contractors	During mobilisation	
				Keep disorientated, but otherwise unharmed, seabirds in dark containers (e.g. cardboard box) for subsequent release during daylight hours.	Contractors	During mobilisation	Record information on patterns of bird reaction to lights and real incidents of injury/death, including stray land birds resting on the project vessels
				Report ringed/banded birds to the appropriate ringing/banding scheme (details are provided on the ring).			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.6 EXCHANGE OF BALLAST WATER AND EQUIPMENT TRANSFER	Introduction of non-indigenous invasive marine species	Control the spread of non-native invasive species to vulnerable ecosystems by fulfilling the requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments ("the Ballast Water Management Convention")	Ballast Water Management Plan	• Implement the Ballast Water Management Plan. • Summit Ballast Water Management Plans to Namport and the Directorate of Maritime Affairs, Ministry of Works and Transport at least 24 hours prior to arrival.	Contractors	During ballast water discharge	Waste monitoring (see Row M6-1 in Table 6-2) Copy of Ballast Water Management Plan and ballast water management certificate Maintain a complete and accurate Ballast Water Record System Records are to be maintained of ballast water uptakes, discharges and exchanges as per the Ballast Water Management Plan
				• Avoid the unnecessary discharge of ballast water. • Avoid uptake of ballast in darkness when bottom-dwelling organisms may rise up the water column. Avoid uptake in very shallow water or where propellers may stir up sediment. Carry out routine removal and appropriate disposal of ballast water sediment. • No discharging of ballast water in Namibian harbours.			
				Use filtration procedures during loading in order to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms.			
				Whenever possible, conduct the exchange of ballast water at least 200 nm (± 370 km) from the nearest land and in water of at least 200 m depth. Where this is not feasible, the exchange should be as far from the nearest land as possible, and in all cases a minimum of 50 nm (± 93 km) from the nearest land and preferably in water at least 200 m in depth.			
				Ensure that routine cleaning of the ballast tank is carried out, where practicable, in mid-ocean in accordance with Ballast Water Management Plan.		During ballast tank cleaning	

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.7 CONTROL OF NON-NATIVE SPECIES DURING TRANSIT TO SURVEY AREA	Introduction of non-indigenous invasive marine species	Control the spread of non-native invasive species to vulnerable ecosystems Ships' Ballast Water	Preventive Maintenance Plan	Ensure all equipment (e.g. arrays, streamers, tail buoys, OBN nodes, etc.) that has been used in other regions is thoroughly cleaned prior to deployment	Seismic Contractor	Prior to entry into Namibia waters	Confirmation (see Row M4-2 in Table 6-2)
2.8 ACCIDENTAL OIL SPILLS DURING TRANSIT TO SURVEY AREA	Refer to Unplanned Events in Section 5 of this table.						
2.9 EQUIPMENT LOSS DURING TRANSIT TO SURVEY AREA	Refer to Unplanned Events in Section 5 of this table.						

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3 OPERATIONAL PHASE							
3.1 STAKEHOLDER CONSULTATION AND NOTIFICATION OF VESSEL OPERATION	Exclusion zone around survey vessel	Ensure other users of the sea are notified and navigational safety, and prevention of emergencies / accidents Minimum disruption to survey and other users of the sea	Stakeholder Engagement Plan	If necessary, distribute an updated Notice to Mariners to fishing companies and directly onto vessels. The notice should give updated notice of: • the co-ordinates of the survey / sampling area; and • an indication of the proposed survey / sampling timeframes.	TEEPNA, Seismic Contractor	7 days prior to surveying / sampling	Copies of all correspondence
				Circulate a daily survey schedule (look-ahead), via email, to key fishing associations.	FLO	Daily, throughout operation	Daly reports
				Maintain a functional grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	TEEPNA, Seismic Contractor	Throughout the survey campaign	Grievance monitoring (see Row M4-1 in Table 6-2) Copy of grievance register and responses

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.2 PREVENTION OF ACCIDENTS	Presence of survey vessel	Ensure navigational safety, prevention of accidents, preparation for emergencies and minimise the chance subsequent damage to the environment occurring	Stakeholder Engagement Plan	Maintain standard vessel watch procedures. Enforce the following safety exclusion zones around the survey vessels and seismic array: • Standard streamer survey: 6 km ahead and abeam and 15 km astern. • OBN survey: 500 m radius around node handling vessel (NHV) and 1 km radius around survey source vessel. Notify any fishing vessels at a radar range of 10 nm from the survey / sampling vessel via radio regarding the safety requirements around the vessel. Ensure project vessels fly standard flags and /or lights to indicate that they are engaged in towing surveys and are restricted in manoeuvrability. Practice weekly emergency response drills. Ensure access to current weather information. Use flares or fog horn where necessary.	Seismic Contractor, FLO	Throughout operation	FLO monitoring (see Row M4-1 in Table 6-2) Provide record of any incidents and interaction with other vessels. Provide record of safety drills FLO Report
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	Acoustic Source • Define and enforce the use of the lowest practicable airgun volume for production. • Ensure the ramp-up noise volumes do not exceed the production volume. • Prohibit the use of airguns outside the area of operation.	Seismic Contractor, MMO, PAM operator	During seismic survey	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) MMO confirmation / report

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	<u>Airgun Testing</u> • Maintain a pre-shoot watch of **60 minutes** before any instances of airgun testing. • If only a single lowest power airgun is tested, the pre-shoot watch period can be reduced to **30 minutes**.	MMO, PAM operator	During airgun testing	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken
				• Implement a "soft-start" procedure if testing multiple higher-powered airguns. o The "soft-start" should be carried out over a time period proportional to the number of guns being tested and not exceed 20 minutes; airguns should be tested in order of increasing volume. o If testing all airguns at the same time, a 20 minute "soft-start" is required. o If testing a single lowest power airgun a "soft-start" is not required.	Seismic Contractor		
				<u>Pre-start Protocols</u> Implement a dedicated MMO and PAM pre-shoot watch of at least 60 minutes (to accommodate deep-diving species in water depths greater than 200 m).	MMO, PAM operator	Prior to initiation of the seismic source at full power	

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	Implement a "soft-start" procedure of a minimum of 20 minutes' duration on initiation of the seismic source if: • **during daylight** hours it is confirmed: – visually by the MMO during the pre-shoot watch (60 minutes) that there are no penguins or feeding aggregations of diving seabirds, shoaling large pelagic fish, turtles, seals or cetaceans within 500 m of the seismic source, and – by PAM technology that there are no vocalising cetaceans detected in the 500 m mitigation zone. • **during times of poor visibility or darkness** it is confirmed by PAM technology that no vocalising cetaceans are present in the 500 m mitigation zone during the pre-shoot watch (60 minutes).	Seismic Contractor	During "soft-start" procedure	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken
				Delay "soft-starts" if penguins or feeding aggregations of diving seabirds, shoaling large pelagic fish, turtles, seals or cetaceans are observed within the mitigation zone. • A "soft-start" should not begin until 30 minutes after cetaceans depart the mitigation zone or 30 minutes after they are last seen or acoustically detected by PAM in the mitigation zone. • In the case of penguins, feeding aggregation of diving seabirds, shoaling large pelagic fish and turtles, delay the "soft-start" until animals are outside the 500 m mitigation zone. • In the case of fur seals, which may occur commonly around the vessel, delay "soft-starts" for at least 10 minutes until it has been confirmed that the	Seismic Contractor, MMO, PAM operator		

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				mitigation zone is clear of all seal activity. However, if after a period of 10 minutes seals are still observed within 500 m of the airguns, the normal "soft-start" procedure should be allowed to commence for at least a 20-minute duration. Seal activity should be carefully monitored during "soft-starts" to determine if they display any obvious negative responses to the airguns and gear or if there are any signs of injury or mortality as a direct result of the seismic activities.			
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	• Plan survey, as far as possible, so that the commencement of airgun firing in the survey area for the first time (including gun tests) is undertaken during daylight hours. However, if this is not possible due to prolonged periods of poor visibility (e.g. thick fog) or unforeseen technical issue which results in a night-time start, the initial acoustic source activation (including gun tests) may only be undertaken if the normal 60-minute PAM pre-watch and "soft-start" procedures have been followed.	Seismic Contractor, MMO, PAM operator	Prior to commencement of first survey line	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken
				• Schedule "soft-starts" so as to minimise, as far as possible, the interval between reaching full power operation and commencing a survey line. The period between the end of the soft start and commencing with a survey line must not exceed 20 minutes. If it does exceed 20 minutes, refer to breaks in firing below.	Seismic Contractor	During "soft-starts" / surveying	

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	<u>Line Changes/Turns</u> If line changes are expected to take **longer than 40 minutes**: • Terminate airgun firing at the end of the survey line and implement a pre-shoot search (60 minutes) and "soft-start" procedure (20 minutes) when approaching the next survey line. • If line turn is shorter than 80 minutes (i.e. shorter than a 60-minute pre-shoot watch and 20-minute "soft-start" combined), the pre-shoot watch can commence before the end of the previous survey line. If line changes are expected to take **less than 40 minutes**, airgun firing can continue during the line change if: • The power is reduced to 180 cubic inches (or as close as is practically feasible) at standard pressure. Airgun volumes of less than 180 cubic inches can continue to fire at their operational volume and pressure; • The Shot Point Interval (SPI) is increased to provide a longer duration between shots, with the SPI not to exceed 5 minutes; and • The power is increased and the SPI is decreased in uniform stages during the final 10 minutes of the line change (or geophone repositioning), prior to data collection re-commencing (i.e. a form of mini soft start).	Seismic Contractor, MMO, PAM operator	During line changes	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• Normal MMO and PAM observations continue during this period when reduced power airgun is firing.			
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	<u>Shut-Downs</u> • Terminate seismic shooting on: – observation and/or detection of penguins or feeding aggregations of diving seabirds, slow swimming large pelagic fish (including whale sharks, basking sharks, manta rays and devil rays) or cetaceans within the 500 m mitigation zone. The mitigation zone for turtles is 200 m (based on the noise modelling study). – observation of any obvious mortality or injuries to cetaceans, turtles, seals or mass mortalities of squid and fish (specifically large shoals of tuna or surface shoaling small pelagic species such as sardine, anchovy and mackerel) when estimated by the MMO to be as a direct result of the survey. • Depending the species, specific mitigation will be implemented to continue the survey operations, as specified below: – For specific species such as penguins, feeding aggregation of diving seabirds and slow swimming large pelagic fish (including whale sharks, basking sharks, manta rays and devil rays), terminate shooting until such time as the animals are outside of the 500 m mitigation zone (seismic "pause", no soft-start required). For turtles, terminate shooting until such time as the animals are outside of the 200 m mitigation zone.	Contractor, MMO and PAM Operator	As indicated	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				– For cetaceans, terminate shooting until such time as there has been a 30 minute delay from the time the animal was last sighted within the mitigation zone before the commencement of the normal soft start procedure.			
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	<u>Breaks in Airgun Firing</u> • If after breaks in firing, airguns can be restarted **within 5 minutes**, no soft-start is required and firing can recommence at the same power level provided no marine mammals have been detected in the mitigation zone during the break-down period. • For all breaks in airgun firing of **longer than 5 minutes, but less than 20 minutes**, implement a "soft-start" of similar duration, assuming there is continuous observation by the MMO and PAM operator during the break. • For all breaks in firing of **20 minutes or longer**, implement a 60-minute pre-shoot watch and 20-minute "soft-start" procedure prior to the survey operation continuing. • For planned breaks, ensure that there is good communication between the seismic contractor and MMOs and PAM operators in order for all parties to be aware of these breaks and that early commencement of pre-watch periods can be implemented to limit delays.	Seismic Contractor, MMO and PAM operator	During surveying	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Plan	<u>PAM Malfunctions</u> • If the PAM system malfunctions or becomes damaged during **night-time operations or periods of low visibility**, continue operations for 30 minutes without PAM if no marine mammals were detected by PAM in the mitigation zones in the previous 2 hours, while the PAM operator diagnoses the issue. If after 30 minutes the diagnosis indicates that the PAM gear must be repaired to solve the problem, reduce power to 180 cubic inches. Firing of the reduced power gun may continue for 30 minutes while PAM is being repaired, the last 10 minutes of which is a 10-minute ramp up to full power (mini "soft-start"). If the PAM diagnosis and repair will take longer than 60 minutes, stop surveying until such time as a functional PAM system can be redeployed and tested. • If the PAM system breaks down during **daylight hours**, continue operations for 20 minutes without PAM, while the PAM operator diagnoses the issue. If the diagnosis indicates that the PAM gear must be repaired to solve the problem, operations may continue for an additional 2 hours without PAM monitoring as long as: – No marine mammals were detected by PAM in the mitigation zones in the previous 2 hours; – Two MMOs maintain watch at all times during operations when PAM is not operational; and – The time and location in which operations began without an active PAM system is	PAM operator	During PAM malfunctions	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 6-2) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				recorded.			
3.4 DEPLOYMENT OF OCEAN BOTTOM NODES	Physical disturbance of seabed habitat	Reduce disturbance of seabed habitats	Survey design	• Limit the area directly affected by physical contact with nodes to the smallest area required. • Ensure that the ROV contact with the seabed is limited to the minimum required time for efficient node deployment.	Contractor	During operation	Seabed monitoring during operations
	Interference with/damage to subsea cables	Avoid disturbance/damage of submarine cables		• Implement a buffer between the node position and subsea cables: ○ Where the subsea cable position is confirmed, the buffer is as per the acquisition safety distances for subsurface obstructions ○ Where the subsea cable position is unknown, the no-go buffer should be 150 m from the anticipated cable location as provided by the cable owner or HydroSAN • In addition, where the exact cable location is not known, implement a ROV cautious approach protocol when deploying nodes within an area between 150 m and 1 nautical mile (~1.8 km) from the anticipated location of a submarine cable • Keep a photographic record of before and after conditions of the node deployment sites within an area between 150 m and 1 nautical mile from a submarine cable		Prior to finalising of node field design and during operations	Photographic record (see Row M5-2 in Table 6-2)
3.5 AIR POLLUTION CONTROL DURING OPERATION	Emissions to the atmosphere	As per mobilisation phase – refer to Row 2.3 above.					
		Reduce amount of diesel burned and emissions to the air	Survey design	Optimise survey line acquisition and vessel operations/logistics to minimise the survey time and the number of trips required to and from the onshore logistics base.	Contractors, TEEPNA	During operation	Fuel consumption monitoring (see Row M1-4 in

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
			Waste and Discharges Management Plan				Table 6-2) Inventory of volume and type of fuel used
3.6 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING OPERATION	Discharge of liquid and solid waste to sea	As per mobilisation phase – refer to Row 2.4 above.					
3.7 LIGHT POLLUTION CONTROL DURING OPERATION	Increased ambient lighting	As per mobilisation phase – refer to Row 2.5 above.					

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.8 BUNKERING / REFUELLING AT SEA	Spill of hydrocarbons to sea during bunkering	Protect marine environment Minimise disturbance / damage to marine life	Stakeholder Engagement Plan	Submit an application for the transfer of oil at sea (outside a harbour but within 50 nm of the Namibian coast) to Ministry of Works and Transport.	Contractors	As required, at least two weeks prior to date of refuelling	Provide copies of the correspondence with Ministry of Works and Transport and approval for bunkering
				Inform the Ministry of Works and Transport, in writing, that the ship is, and will be kept, in a fit state to undertake the transfer operation and to contend with any emergency that may arise.		Not less than 24 hours prior to the commencement of the transfer operation	
			Contractor HSE Plan Contractor Bridging Document SOPEP	Offshore bunkering should not be undertaken in the following circumstances: • Wind force and sea state conditions of ≥6 on the Beaufort Wind Scale; • During any workboat or mobilisation boat operations; • During helicopter operations; • During the transfer of in-sea equipment; and • At night or times of low visibility.		During bunkering	Spill monitoring (see Row M5-3 in Table 6-2) Record of all spills (Spill Record Book), including spill reports; emergency exercise reports; audit reports. Incident log
3.9 ACCIDENTAL OIL SPILLS	Diesel spills from refuelling or from tank	Refer to Unplanned Events in Section 5 of this table.					

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
DURING OPERATION	rupture (e.g. vessel collision)						
3.10 EQUIPMENT LOSS DURING OPERATION	Obstruction on seafloor or in water column	Refer to Unplanned Events in Section 5 of this table.					
3.11 OPERATION OF HELICOPTERS for crew changes, servicing, etc.	Increased ambient noise levels	Minimise disturbance / damage to marine and coastal fauna All pilots are briefed on sensitivity of bird and seal colonies and whale breeding areas	Survey design	Ensure all flight paths avoid (except in medical emergency): • Lüderitz Lagoon. • Offshore islands (including Halifax and Possession) by at least 1 852 m (i.e. 1 nm). • Seal colonies (including Atlas Bay, Wolf Bay and Long Islands).	Seismic and Helicopter contractors	All flights between survey vessel and Lüderitz airport	Copy of set flight path (including altitude) Helicopter logs Deviations from set flight paths
				Maintain an altitude of at least 1 000 m within the NIMPA and a cruising altitude of greater than 300 m, except when taking off and landing or in a medical emergency	Helicopter contractor		
				Avoid extensive low altitude coastal flights by ensuring that the flight path is perpendicular to the coast, as far as possible.	Helicopter contractor		
			Environmental Awareness Training	Comply with aviation and authority guidelines and rules.	Helicopter contractor		
				Brief of all pilots, as part of the HSSE indication for pilots, on the ecological risks associated with flying at a low altitude along the coast or above marine mammals.	TEEPNA and Helicopter contractor		

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
4. DEMOBILISATION PHASE							
4.1 SURVEY VESSEL TO LEAVE AREA	Presence of survey vessel and towed array	Leave survey area as it was prior to survey Ensure navigational safety	Survey design	Ensure that all deployed equipment, including all nodes, are retrieved.	Seismic Contractor	On completion of survey	On completion of survey
4.2 INFORM RELEVANT PARTIES OF SURVEY COMPLETION	Exclusion zone around survey vessel	Ensure navigational safety Notification of all key maritime stakeholders	Stakeholder Engagement Plan	Inform all key stakeholders (refer to Row 2.1) that the vessels are off location.	TEEPNA, Seismic Contractor	Within two weeks after completion of survey	Copies of notification documentation required.
				Maintain a functional grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	TEEPNA, Seismic Contractor	Throughout the survey campaign	Copy of grievance register and responses

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
4.3 AIR POLLUTION CONTROL DURING DEMOBILISATION	Emissions to the atmosphere	As per mobilisation phase – refer to Row 2.3 above.					
4.4 POLLUTION CONTROL AND WASTE AND DISCHARGE MANAGEMENT DURING DEMOBILISATION	Discharge of liquid and solid waste to sea	As per mobilisation phase – refer to Row 2.4 above.					
		Minimise pollution discharges and ensure correct disposal of waste	Waste and Discharge Management Plan	Dispose all waste retained onboard at a licensed waste site using a licensed waste disposal contractor.	Contractors	When vessel is in port	Waste monitoring (see Row M1-2 in Table 6-2) Inventory volume of waste generated Inventory of volume transferred for onshore disposal / incinerated Waste Receipts
4.5 LIGHT POLLUTION CONTROL DURING DEMOBILISATION	Increased ambient lighting	As per mobilisation phase – refer to Row 2.5 above.					

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
4.6 ACCIDENTAL OIL SPILLS DURING DEMOBILISATION	Diesel spills from refuelling or from tank rupture (e.g. vessel collision)	Refer to Unplanned Events in Section 5 of this table.					
4.7 EQUIPMENT LOSS DURING DEMOBILISATION	Obstruction on seafloor or in water column	Refer to Unplanned Events in Section 5 of this table.					
5. UNPLANNED EVENTS							
5.1 ACCIDENTAL OIL SPILLS	Diesel spills from refuelling or from tank failure	Minimise impact to the marine fauna and the environment by implementing response procedures efficiently	SOPEP Emergency Response Plan	Implement emergency plans in Row 1.2. Ensure personnel are adequately trained in both accident prevention and immediate response, and resources are available on each vessel. Attempt to control and contain the spill at sea, as far as possible and whenever the sea state permits, using suitable recovery techniques to reduce the spatial and temporal impact of the spill. Where diesel, which evaporates relatively quickly, has been spilled, the water should be agitated or mixed using a propeller boat/dinghy to aid dispersal and evaporation. • Use low toxicity dispersants that rapidly dilute to concentrations below most acute toxicity thresholds. • Use dispersants only with the permission of Ministry of Environment and Tourism / Ministry of Fisheries and Marine Resources.	Contractors	In event of spill	Spill monitoring (see Row M5-3 in Table 6-2) Record of all spills (Spill Record Book), including spill reports; emergency exercise reports; audit reports Incident log

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				• Ensure adequate resources are provided to collect and transport oiled birds to a cleaning station.			
5.2 EQUIPMENT LOSS	Obstruction on seafloor or in water column	Protect sensitive seabed habitat	Preventive Maintenance Plan	Ensuring that loads are lifted using the correct lifting procedure and within the maximum lifting capacity of crane system.	Contractors	During operation	Equipment monitoring (see Row M5-1 in Table 6-2) Establish a hazards database listing: • the type of gear lost • date of abandon-ment / loss • location; and • where applicable, the dates of retrieval
				Minimise the lifting path between vessels.			
				Undertake frequent checks to ensure items and equipment are stored and secured safely on board each vessel.			
		Minimise risk of collision / accident / entanglement and inform relevant parties	Emergency Response Plan	Retrieve all deployed OBN nodes, lost objects / equipment, where practicable, after assessing the safety and metocean conditions.		As required	
				Notify Ministry of Works and Transport (Directorate of Maritime Affairs) and the SAN Hydrographer of any items left on the seabed or floating in the water column that constitute a seafloor or navigational hazard, and request that they send out a Notice to Mariners with this information.	Seismic Contractor		Copies of all correspondence

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
5.3 FAUNAL COLLISIONS WITH PROJECT VESSELS	Vessel strikes during transit	Minimise risk of collision with large cetaceans	Marine Faunal management Plan	Ensure vessel transit speed between the survey area and port is a maximum of 12 knots (22 km/hr), except in the NIMPA where it is reduced further to 10 knots (18 km/hr).	Seismic Contractor	During operation	MMO observations / report

Table 6-2: Monitoring Requirements (additions based on amendment application in red and general best practice additions in blue)

No.	Risk	Criteria to be monitored	Inspections	Accountability (indicative)
M1	**Waste and Discharge Management Plan**			
M1-1	Galley waste and air emissions	• Type and volume discharged/incinerated • Air emissions from incineration	Recorded daily in the operational log inspection	Contractors (Vessel Captain)
M1-2	General waste	• Type and volume of waste generated • Type and volume transferred for onshore disposal/incinerated • Compliance with Waste Management Plan	Prior to waste transfers to supply vessel / port	Contractor (Vessel Captain)
M1-3	Hazardous waste	• Volume of waste generated • Volume transferred for onshore disposal • Compliance with Waste Management Plan	Prior to waste transfers to supply vessel / port	Contractors (Vessel Captain)
M1-4	Fuel usage and air emissions	• Type and volume on board • Volume consumed • Air emissions from fuel combustion	Daily operational log inspection Fuel transfer log sheet	Contractors (Vessel Captain)
M1-5	Sewage	• Discharge volumes	Recorded daily in the operational log inspection	Contractors (Vessel Captain)
M2	**Preventive Maintenance Plan**			
M2-1	Deck drainage/ machinery space/ bilge water	• Correct operation of oil separating / filtering equipment and oil content meter (compliance with MARPOL 73/78 standards)	Prior to surveying and once during campaign	Contractors (Vessel Captain)
M2-2	Sewage discharge	• Correct operation of sewage treatment system (compliance with MARPOL 73/78 standards)	At start and once during campaign	Contractors (Vessel Captain)
M2-3	Galley waste and air emissions	• Correct operation of macerator	At start and once during campaign	Contractors (Vessel Captain)

No.	Risk	Criteria to be monitored	Inspections	Accountability (indicative)
M2-4	Equipment fouling	• Ensure all equipment (e.g., airguns, streamers, OBN nodes) that has been used in other regions is thoroughly cleaned prior to deployment.	Prior to deployment	Contractors (Vessel Captain)
M3	**Marine Fauna Management Plan**			
M3-1	Fauna interaction	• Presence of marine faunal activity (cetaceans, penguins, shoaling large pelagic fish or turtles) within 500 m of the vessel prior to commencing with the "soft-start" procedures (visually during the day) • Responses for marine fauna to seismic shooting, including seabird, fish (e.g. sharks, shoaling tuna, sunfish), turtle, seal and cetacean incidence and behaviour and any mortality of marine fauna as a result of the seismic survey. Data captured should include species identification, position (latitude/longitude), distance/bearing from the vessel, swimming speed and direction (if applicable) and any obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns) as a result of the seismic activities • A log of all seismic activity and shut-down decisions	Daily throughout operations	Marine Mammal Observer (MMO)
M3-2		• Presence of marine mammal activity detected by PAM within 500 m prior to commencing with the "soft-start" procedures • Species, position (latitude/longitude) and distance from the vessel, where possible • A log of all seismic activity and shut-down decisions	Daily throughout operations	Passive Acoustic Monitoring (PAM) Operator
M4	**Stakeholder Engagement Plan**			
M4-1	Disruption/ interference to fishing/shipping	• Number of meetings/phone calls with interested stakeholders • Interactions with other vessels (via radio) • Number of grievances/incidents logged	Continuous throughout operations	FLO
M5	**Emergency Management Plan**			
M5-1	Lost equipment	• Scan of seafloor for any dropped equipment within the concerned area • Confirmation of retrieval of these objects, where practicable, after assessing the safety and metocean conditions	Prior to survey vessels leaving site using ROV	Survey Contractor

No.	Risk	Criteria to be monitored	Inspections	Accountability (indicative)
		• Update of OBN contractor's dropped object procedure specific to depth and metocean conditions	Prior to survey commencement	
		• Establish a hazards database listing: > the type of gear left on the seabed > date of abandonment/loss > location; and > where applicable, the dates of retrieval	Ongoing through daily operational log and incident reporting system	Contractors (Vessel Captain) and MMO
M5-2	Subsea cables	• Photographic record of site conditions before and after node deployment and retrieval within 150 m to 1 nautical mile of a subsea cable (no go zone 150 m both side of the cable)	Ongoing during and after node deployment within 150 m to 1 nautical mile (~1.8 km) of a subsea cable	OBN Survey Contractor
M5-3	Oil / fuel spill	• Record of all spills (Spill Record Book), including spill reports; emergency exercise reports; contacts update, audit reports as per SOPEP	Ongoing through daily operational log and incident reporting system	Contractors (Vessel Captain)
M6	**Ballast Water Management Plan**			
M6-1	Ballast water	• Compliance with Ballast Water Management Plan • Volume discharged and location (start and finish coordinates) • Start and finish times for pumping water during an exchange • Actual pumping times • Residual volume remaining in the tank at the end the empty cycle prior to refill (empty refill method only)	During and after de-ballasting	Contractor (Vessel Captain)
M7	**Hazardous Substances Management Plan**			
M7-1	Accidental oil and chemical spills	• Type of chemical spilled • Volume	Ongoing through daily operational log and incident reporting system	Contractors (Vessel Captain)

7.0 CONCLUSIONS AND RECOMMENDATIONS

The ECC Renewal and Amendment process concludes that there would be no significant changes to the results of the 2020 EIA process and any of the impacts assessed therein and additional impacts not previously assessed are deemed to be of negligible significance after mitigation.

A few additional mitigation measures to those described in the 2020 EIA are, however, considered necessary and have been incorporated into an updated ESMP document (refer to Chapter 6) to mitigate the proposed amendments associated with the updated project description. The changes largely relate to bringing the ESMP in line with the latest best practice measures being implemented by other operators in the Namibian and South African offshore environment and to include measures specifically related to OBN technology.

Based on the findings of the ECC Renewal and Amendment process, SLR is of the opinion that this ECC Renewal and Amendment Report is sufficiently robust and provides sufficient information for MEFT to make an informed decision on the Renewal and Amendment Application taking into consideration the significance of potential impacts. SLR recommends that the commitments presented in the updated ESMP should be conditional to the ECC Renewal and Amendment, should the application be approved.

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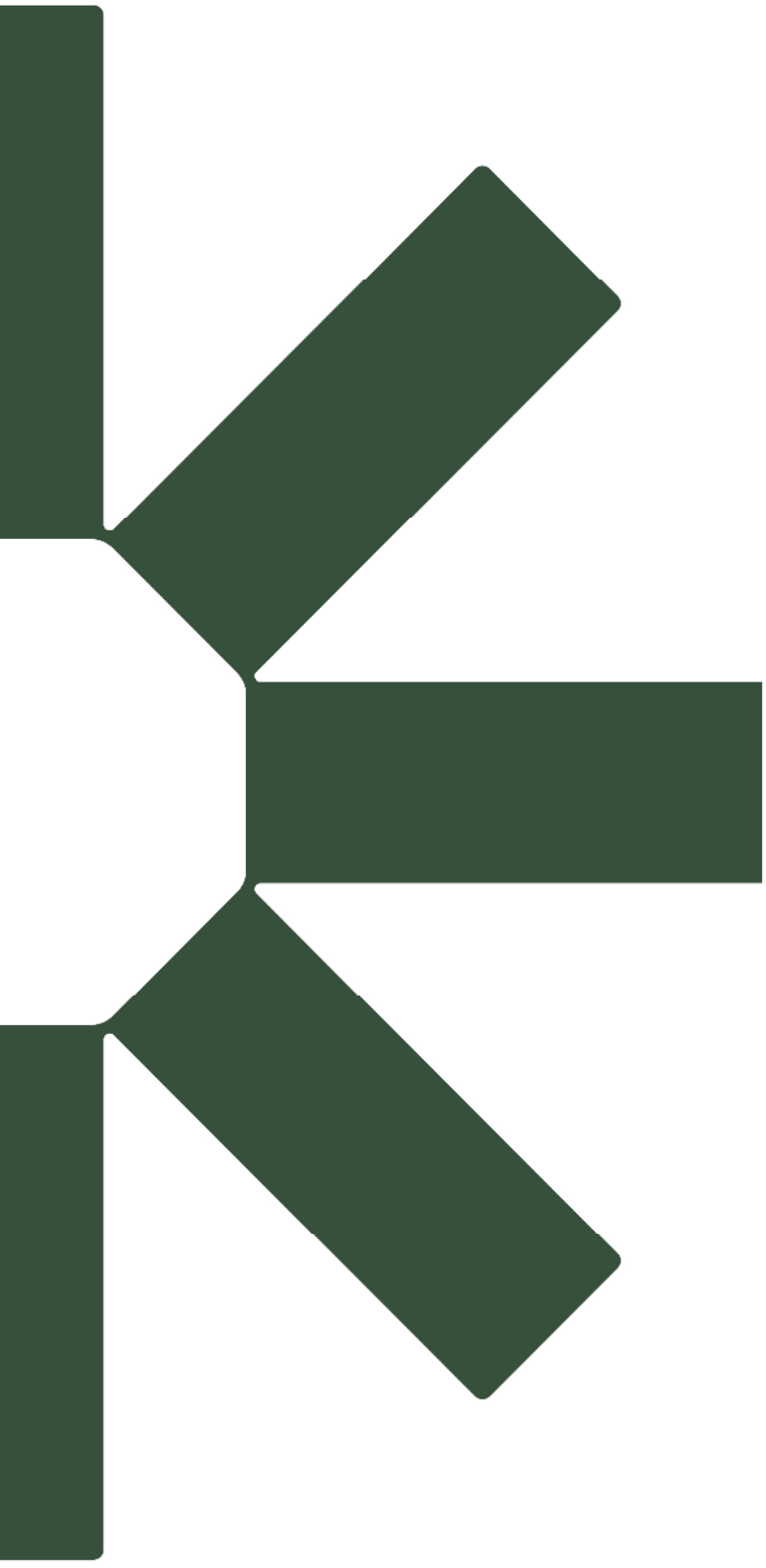
Record of Report Distribution

SLR Reference:	733.20071.00005
Title:	APPLICATION FOR RENEWAL AND AMENDMENT OF ENVIRONMENTAL CLEARANCE CERTIFICATE FOR SEISMIC SURVEYS IN BLOCKS 2912 AND 2913B
Report Number:	1
Client:	TotalEnergies EP Namibia B.V.

Name	Entity	Copy No.	Date Issued	Issuer
MEFT	Decision-making	1	09 July 2024	EC



Making Sustainability Happen

Appendix A: Proof of Placement of Advertisements

Environmental Clearance Certificate Renewal and Amendment Report

Seismic Survey Programme in Licence Blocks 2912 and 2913B, Orange Basin, Namibia

TotalEnergies EP Namibia B.V.

SLR Project No.: 733.20071.00005

3 July 2024

MOTIVATION ... Linwill van Wyk engages the youth in discussions on drug and alcohol abuse.

DRUG ADDICTION:
continued from page 6

Ackermann says she then started Alcoholics Anonymous (AA) groups at Walvis Bay and Swakopmund.

"I remind myself every day that I am an addict . . .

"When I met this drug, I thought I would enjoy the trip. It rather took me to hell," she says.

She urges those who are addicted to talk about it.

ON THE VERGE OF SUICIDE

Wally Strauss started drinking and smoking when he was 14 years old. His lifestyle affected his academic life negatively, so he decided to stop drinking after completing Grade 12.

"I enrolled for a diploma in storekeeping and stock control and another in commerce. I even became the best student in one of the courses. However, I started drinking again.

"Seven years later, I almost committed suicide," he says.

Strauss says he joined Alcoholics Anonymous in 2005 and has been sober for 18 years.

MEMORIES ... Linwill van Wyk as a young police officer.

He completed a bachelor's degree in business administration and has a good job, he says.

"We are now running a Christian-based programme that also has the AA steps. It is amazing what God can do," he says.

Walvis Bay community educator Hubert Mukosho says substance abuse cases are worrying.

"From February, we received 29 cases, with the youngest being nine years old. It is also increasing crime," he says.

THE STATS

The Namibian Police have arrested 112 people in connection with illegal substances to the value of about N$9 million in December last year.

Another arrest was made in March 2023 at Keetmanshoop, involving two Namibian men who were found in possession of almost 21kg of cannabis at Tseiblaagte.

In January this year, two Congolese men were arrested at Otjomuise following the discovery of illegal substances with a value of N$930 500.

In June 2023, a truck bound for Namibia was seized at Upington in South Africa with contraband and illegal substances weighing a total of 1 4434kg, with an estimated street value of R3,6 million.

South African Michael Mpangela was arrested at the Hosea Kutako International Airport by customs officials in January 2023, and a Namibian woman was arrested in January this year at Bole international aiport in Adis Ababa for suspected cocaine trafficking.

ILLICIT ... The Namibian Police have arrested 112 people in connection with illegal substances to the value of about N$9 million in December last year.

Photo: BBC

WORKFORCE ... Growing and maintaining a successful oil and gas industry in Namibia will require significant investments in infrastructure, workforce development and regulatory frameworks.

Photo: Contributed

Namibia Energy Sector Needs Local Content Guidelines

• NJ AYUK

NAMIBIA'S OIL AND gas sector is still looking forward to reaching the production phase – S&P Global analysts don't anticipate Namibia's first oil to come until 2029, and the country's first gas-to-power project is scheduled to begin in 2027.

Before Namibia achieves these hotly anticipated milestones, Namibian lawmakers have the opportunity to implement thoughtful, effective policy to benefit their people.

Local content laws are broad policy tools governments use across many industries.

Namibia is fortunate to be in a position to benefit from the experiences of other oil- and gas-producing states.

The country can use the best practices that have benefited others and learn from their mistakes.

Lawmakers in Namibia have something of an advantage, and they need to capitalise on this.

RECENT FINDS

What's driving the need for local content directives in Namibia' nascent oil and gas sector are recent petroleum discoveries, in the Orange Basin, in particular.

That's where, in 2022, Shell and TotalEnergies made significant finds in blocks Graff-1 and Venus-1, respectively.

While the commercial viability of extracting the oil still needs to be assessed, these initial discoveries have already sparked further exploration efforts.

> **We must ensure that the industry has an effective local content policy and regulatory landscape so that Namibians reap the fruits of their labour. This is central to sustainable governance.**
>
> – Maggy Shino

DRAFTING EFFECTIVE LEGISLATION

Namibia currently has a draft of the national upstream petroleum local content policy, but it hasn't been passed into law yet.

The ministry is consulting with stakeholders to make revisions that would best serve the country and its people.

The draft reflects the government's desire to leverage its recent oil and gas discoveries for broader national development.

There's a focus on achieving a balance between local participation and attracting foreign investment.

Unlike too many other African nations, Namibian policymakers are not throwing roadblocks in the way of exploration companies.

They also realise that the country will reap the benefits of its new petroleum bounty only if all key stakeholders seize this historic opportunity to put the right policies in place and continue encouraging investments in energy.

CHALLENGES AHEAD

Still, Namibia has several key local content hurdles to overcome.

For one, growing and maintaining a successful oil and gas industry in Namibia will require significant investments in infrastructure, workforce development and regulatory frameworks.

Because the complex energy sector requires high initial investment, it can be difficult for local companies to readily participate.

Namibia also needs to invest in training and education programmes to create a skilled workforce.

Without substantial input from external experts, domestic involvement will likely remain limited.

At the same time, Namibian policymakers need to avoid government overreach.

While local content regulations can have positive effects, they can also raise concerns about potential drawbacks, such as increased costs or limitations on competition.

Striking the right balance between local requirements and international competitiveness will be key to success.

TRUST AND COOPERATION

Meanwhile, the energy sector must tread carefully to avoid any backlash from the Namibian citizenry.

Simply focusing on resource extraction isn't enough.

Oil and gas companies that want to prosper in Namibia must also embrace corporate social responsibility (CSR).

Companies that neglect CSR, risk facing community opposition and protests, potentially delaying or derailing projects.

Conversely, companies with a strong CSR reputation attract and retain top talent, creating a more positive work environment.

That, of course, includes women.

The Namibian government can foster this cooperation by favouring companies with strong CSR initiatives when awarding licences and concessions.

COMMITTED TO NAMIBIANS

As long as the country continues along the path toward local content which the Geingob administration initiated, we might well see it becoming obligatory for companies to provide a local content plan and supplier development plan to be eligible to win contracts.

Consider the recent ultimatum issued by Maggy Shino, the petroleum commissioner of Namibia's Ministry of Mines and Energy.

"We would like to inform those envisaging to service the Namibian oil industry that local content is mandatory, and that the Namibian government will not compromise on providing opportunities for its people to participate meaningfully in the industry," Shino said.

In January, Shino shared the vision of the nation's pathway to first oil. It is evident from her comments to World Oil that her people are foremost in her mind.

"First, we need to build the capacity, both in the local workforce and in the institutions that will help oversee, develop and regulate Namibia's oil and gas industry.

"We also have an obligation to share up-to-date information with the Namibian people so that they can prepare effectively for first oil production," she said.

Shino emphasised the importance of knowledge and skills transfer.

She also called on Namibians themselves, tasking them with some amount of self-determination.

"A much bigger obligation is further placed on the Namibian people to ensure that they equip themselves with the necessary skills required. The oil industry is a highly specialised industry with high standards for health, safety and environment, and we will not compromise on the international requirements.

"We must ensure that the industry has an effective local content policy and regulatory landscape so that Namibians reap the fruits of their labour. This is central to sustainable governance."

On his part, the minister, who has been a strong advocate for local content, focused on the role of Namibians to step up their entrepreneurial skills and personal responsibility.

"Without local entrepreneurs who are curious, innovative, and willing to invest their time and energy in acquiring the necessary skills to succeed, it would be extremely challenging, and possibly even impossible, to embark on our local content journey," says Tom Alweendo, mines and energy minister.

With this mindset, Namibia's foray into oil and gas would reignite the country's sluggish economy by encouraging new investment and revitalising the manufacturing sector.

At the same time, a proactive introduction of solid local content regulations would no doubt foster job creation, help combat energy poverty and promote hope and human dignity for the Namibian people.

– African Energy Chamber

Republikein Sun Allgemeine Zeitung

EXPRESSION OF INTEREST

First date of publication: 25 March 2024

DBMNE0502 - LABORATORY ANALYSIS FOR THE DETERMINATION OF PHYSICAL, CHEMICAL AND BIOLOGICAL IN MARINE SEDIMENTS AND SEAWATER SAMPLES.

DESCRIPTION:
Debmarine Namibia is a marine diamond recovery company operating in the Atlantic 1 Mining Licence Area (ML47). Currently, diamond recovery operations occur at 90 to 140m water depths from approximately 20 kilometres from shore, off the south-western coast of Namibia. The key objective of Debmarine Namibia's research programme is to assess the effect of diamond recovery operations on the seabed and surrounding environment and to monitor the time of recovery after disturbance. Debmarine Namibia is seeking a reliable and technically proficient laboratory to support the analysis of seawater and sediment samples using the latest environmental analysis instruments and techniques.

SCOPE OF WORK:
The scope of work will primarily focus on physical, chemical, and biological analysis of marine sediment and water samples.
The requirements for laboratory services include, but are not limited to:

1. Sediment Analysis
- Particle size distribution analysis
- Total Organic Carbon (TOC) analysis
- Total Organic Nitrogen (TON) analysis
- Trace metals analysis
- Dissolved Inorganic Carbon (DIC)

2. Environmental DNA (eDNA)
- Sediment and seawater analysis

CLOSING DATE: 19 April 2024 at 12H00, by electronic submission.

DOCUMENTS TO SUBMIT:
- Company or Laboratory Profile.
- Clear outline of expertise in physical, chemical and biological analyses in the marine environment.
- At least two Senior staff members should possess a cumulative experience of at least 10 years in conducting physical, chemical, and biological analyses of sediment and seawater samples.
- Highlight at least five (5) projects undertaken related to marine sediments and seawater analysis.
- Relevant equipment list.
- Outline of the analysis techniques employed.

The laboratory should possess the necessary accreditations and certifications, such as ISO 17025, for the aforementioned analytical methods. Furthermore, Debmarine Namibia requires a laboratory with experienced personnel who can provide prompt and accurate analytical results, as well as the associated statistical data analysis, quantification of results, interpretation and reporting.

ELECTRONIC SUBMISSION OF DOCUMENT:
Registered businesses interested in providing such services are requested to submit the company profiles with all relevant documents. Local academic institutions are encouraged to apply.

Email Address: **Tenders@debmarine.com**
Subject line: DBMNE0502 - LABORATORY ANALYSIS FOR THE DETERMINATION OF PHYSICAL, CHEMICAL AND BIOLOGICAL IN MARINE SEDIMENTS AND SEAWATER SAMPLES.

ENQUIRIES:
The Procurement Officer
Tel: +264 61 297 8460
Email: **Tenders@debmarine.com**
Subject line: DBMNE0502 - LABORATORY ANALYSIS FOR THE DETERMINATION OF PHYSICAL, CHEMICAL AND BIOLOGICAL IN MARINE SEDIMENTS AND SEAWATER SAMPLES.

DISCLAIMER:
Debmarine Namibia shall not be responsible for any costs incurred in the preparation and submission of a response to this Expression of Interest and furthermore reserves the right not to extend this Expression of Interest into any future tenders, negotiations and/or engagements.
Debmarine Namibia will not accept submissions rendered after the closing date and time.

DEBMARINE NAMIBIA

TOT WA

VACANCY: INTERNATIONAL BUSINESS DEVELOPER

Main purpose: The position will be responsible to perform market research and develop business opportunities in foreign market, specifically the United States of America.

Minimum requirements
- Bachelor qualification specializing in International Trade, Marketing and Finance. Bachelor of Arts Business Administration, or Bachelor of Commerce Business Administration, academic record required.
- Computer literacy in applications, Microsoft Office. High typing speed enabling affective communication with clients.
- Proficiency in English at an advanced level or higher is required, enabling effective communication with diverse clients.
- Multilingual to enable communication with clients in foreign markets.
- Proven track record of established connections in the United States or European markets, the ideal candidate will leverage their existing relationships to drive business development.
- Skilled in sales and marketing, lead generation and market research.
- Five years experience in international trade, marketing, and finance.

Key responsibilities
- Analyse business strategies and develop improvement plans to provide appropriate growth in foreign markets.
- Identify opportunities and develop strategic plans to enhance sales in foreign markets.
- Design plans to achieve all objectives and develop plans for new business.
- Train and provide guidance to existing staff members and business development issues.
- Manage all foreign travel agencies communication and maintain effective relationship with all.

Kindly submit your CV and supporting documents to **info@tot-wa.com**
Closing date: Friday, 19 April 2024

EMBASSY OF THE UNITED STATES OF AMERICA

The United States Embassy in Windhoek has the following vacancy as detailed below. Please note that applications must be submitted electronically via the Electronic Recruitment Application (ERA) system, by April 18, 2024 to be considered.

Interested applicants should visit the U.S. Embassy website at https://na.usembassy.gov/embassy/jobs/ to apply for this vacancy.

Electrical Controls Technician FSN-07

The incumbent reports to the Supervisory Building Engineer. The incumbent is employed as a journeyman level Electrical Controls Technician to carry out skilled maintenance and repair work throughout the New Embassy Compound (NEC) on critical and non-critical electrical components within the functional/office buildings, on-compound ancillary support and residential buildings, above and below ground infrastructures, recreational facilities, and other owned/leased properties.

FOR FURTHER INFORMATION: The complete position description listing all of the duties and responsibilities may be obtained on our website at https://na.usembassy.gov/embassy/jobs/

EQUAL EMPLOYMENT OPPORTUNITY: The U.S. Mission provides equal opportunity and fair and equitable treatment in employment to all people without regard to race, color, religion, sex, national origin, age, disability, political affiliation, marital status, or sexual orientation. The Department of State also strives to achieve equal employment opportunity in all personnel operations through continuing diversity enhancement programs.

PUBLIC NOTICE

Application for Renewal and Amendment of the Environmental Clearance Certificate (ECC) for a Seismic Survey Programme in License Blocks 2912 and 2913B, Orange Basin, Namibia

TotalEnergies EP Namibia B.V. (TEEPNA), the Proponent and Operator, together with its Joint Venture partners, Qatar Energy, Impact and NAMCOR, hold Petroleum Exploration Licenses over Blocks 2912 and 2913B in the Orange Basin, offshore of Southern Namibia. The licence blocks are located 240 km offshore at the closest point and in water depths ranging between 2 600 m and 3 800 m. The Proponent and its Partners currently hold an Environmental Clearance Certificate (ECC) for a 3D seismic survey programme across a portion of the two licence blocks (valid until 29 June 2024). The Proponent and its Partners are now proposing to acquire further 3D seismic data in order to cover the full extent of the two licence blocks and to undertake surveys over multiple survey seasons. It is proposed to acquire data using standard streamer seismic technology as well as Ocean Bottom Node (OBN) technology. OBN technology uses a similar seismic source to a streamer 3D survey, but instead of having hydrophones towed in streamers behind the seismic survey vessel to record the reflected acoustic sound, OBN uses small receivers temporarily placed on the seafloor to record the reflected sound.
The Proponent and its Partners intend to apply to the Ministry of Environment, Forestry and Tourism (MEFT) for the renewal and amendment of the conditions of the current ECC granted on 29 June 2021. The renewed and amended ECC will allow the Proponent and its Partners to undertake surveys over the full extent of the blocks (up to 18 170 km^2) over multiple survey seasons, and to use both standard streamer and OBN technology to acquire detailed subsurface data.

Environmental Assessment Practitioner:
SLR Environmental Consulting (Namibia) (Pty) Ltd (SLR) has been appointed by TEEPNA to undertake the ECC Renewal and Amendment process.
Contact: SLR Stakeholder Engagement Team
Tel: +264 61 231 287; **SMS/WhatsApp:** +264 81 357 2109
E-mail: teepna-2912@slrconsulting.com

Opportunity to Participate:
Interested and Affected Parties (I&APs) are hereby invited to register as new stakeholders for the ECC renewal and amendment application process and to provide initial comments by **22 April 2024.** Registered stakeholders will be notified of when amended documents are available for review and comment. The project team can also make themselves available for online meetings to discuss the findings of the amendment application process, should it be requested.

Further project information will be made available at:
https://www.slrconsulting.com/public-documents/teepna-2912/

SLR

To register as an I&AP, please send your details to teepna-2912@slrconsulting.com **and provide initial comments by 22 April 2024.**

Appendix B: Notification Letter

Environmental Clearance Certificate Renewal and Amendment Report

Seismic Survey Programme in Licence Blocks 2912 and 2913B, Orange Basin, Namibia

TotalEnergies EP Namibia B.V.

SLR Project No.: 733.20071.00005

3 July 2024

SLR Environmental Consulting (Namibia) (Proprietary) Limited

June 11, 2024

Dear Sir/Madam,

SLR Project No.: 733.20071.00005

TOTALENERGIES EP NAMIBIA B.V. - SEISMIC SURVEY PROGRAMME IN LICENCE BLOCKS 2912 AND 2913B, ORANGE BASIN, NAMIBIA: ENVIRONMENTAL CLEARANCE CERTIFICATE RENEWAL AND AMENDMENT

NOTIFICATION OF AVAILABILITY OF DRAFT ECC RENEWAL AND AMENDMENT REPORT FOR REVIEW AND COMMENT

TotalEnergies EP Namibia B.V. (TEEPNA) is the holder of two Exploration Licences for Blocks 2912 and 2913B and currently holds an Environmental Clearance Certificate (ECC) and approved Environmental and Social Management Plan (ESMP) for a 3D seismic survey (dated 29 June 2021) over a portion of Blocks 2912 and 2913B.

TEEPNA is now proposing to acquire further detailed 3D seismic data anywhere across the full extent of the two licence blocks and to undertake surveys over multiple seismic survey seasons. The full licence block area is 18 170 km^2 in extent. For this continued seismic survey programme, TEEPNA would want to use standard streamer technology as well as utilise Ocean Bottom Node (OBN) seismic survey technology to acquire more detailed data of the subsurface. TEEPNA is thus applying to amend its current ECC to allow for the further expanded 3D seismic surveying as well as utilisation of the additional OBN technology. As its current ECC expires on 29 June 2024, TEEPNA is also, as a parallel process, applying to renew its current ECC for a further three-year period.

SLR Environmental Consulting (Namibia) (Pty) Ltd has been appointed by TEEPNA as the Independent Environmental Assessment Practitioner to undertake the required ECC Renewal and Amendment process. This ECC Renewal and Amendment process is being undertaken in terms of Section 39 of the Environmental Management Act (EMA) and Regulation 19 of the EIA Regulations (Government Notice No. 30 of 2012).

As part of this process, the draft ECC Renewal and Amendment Report has been made available for a 21-day review and comment period **from 11 June to 2 July 2024**. This provides an opportunity for Interested and Affected Parties (I&APs) to comment on any aspect of the proposed project and the ECC Renewal and Amendment process findings.

The full report is available for download from the SLR Website (https://www.slrconsulting.com/public-documents/teepna-2912/).

Comments on the draft ECC Amendment Report should reach SLR by **no later than Tuesday, 2 July 2024** using the contact details below.

SLR Environmental Consulting (Namibia) (Pty) Ltd
Postal Address: 8 General Murtala Muhammed Ave, Eros Windhoek
Tel: +264 61 231 287
E-mail: teepna-2912@slrconsulting.com
SLR Website: https://www.slrconsulting.com/public-documents/teepna-2912/

All comments received will be incorporated and responded to in a Comments and Responses Report, which will be appended to the Final ECC Renewal and Amendment Report. The Final ECC Renewal and Amendment Report will be submitted to the Ministry of Minerals and Energy and Ministry of Environment, Forestry and Tourism for consideration and decision-making. The Final ECC Renewal and Amendment Report will also be made available to I&APs on the SLR website for information purposes.

Should you have any queries in this regard please do not hesitate to contact the undersigned SLR Stakeholder Engagement Team.

Your sincerely,

SLR Stakeholder Engagement Team

Note: SLR is committed to the protection of any personal information submitted as part of this public participation process