SundaGas Banda Unipessoal, Lda

TERMS OF REFERENCE (TOR)

DRILLING ACTIVITIES

PSC TL-SO-19-16

Under

Decree Law No.5/2011 Environmental Licensing

Ministerial Decision No. 46/2017

SG-TOR-001

Authorization

	Name/Function	Signature/date
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Revisions

Revision	Date	Author	Change Description
Submission of 1st Draft	6 June 2024	Halona Serena Lda	Final for submission
Revision 1			
Revision 2			

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ABBREVIATIONS

ANP	:	*Autoridade Nacional do Petróleo*
ANPM	:	*Autoridade Nacional do Petróleo e Minerais*
APORTIL	:	*Autoridade Portuário Timor-Leste*
ATSEA	:	Arafura & Timor Seas Ecosystem Action
ATS	:	Arafura and Timor Seas
BoM	:	Bureau of Meteorology
CPR	:	Competent Personal Report
CSO	:	Civil Society Organizations
DNCPIA	:	*Direcção Nacional do Controlo Polução e Impacto Ambeintal*
DST	:	Drill Stem Test
EAI	:	Environmental Examination
EIA	:	Environmental Impact Assessment
EIS	:	Environmental Impact Statement
ESIA	:	Environmental and Social Impact Assessment
ENSO	:	El Niño-Southern Oscillation
EMP	:	Environmental Management Plan
G&G	:	Geology and Geophysics
GHG	:	Green House Gases
GoTL	:	Government of Timor-Leste
HSE	:	Health, Safety & Environment
HSEQ	:	Health, Safety, and Environment Quality
IBAs	:	Important Bird Areas
IFC	:	International Finance Corporation
IUCN	:	International Union for Conservation of Nature
ITF	:	Indonesian Throughflow
INSTANT	:	International Nusantara Stratification and Transport Program
JPDA	:	Joint Petroleum Development Area
LNG	:	Liquified Natural Gas
MD	:	Measured Depth
MDKB	:	Measured Depth Below Rotary Kelly Bushing.
MSL	:	Mean Sea Level
MPAs	:	Marine Protected Area
NE	:	Northeast

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NT	:	Northern Territory
NW	:	Northwest
OTL	:	*Oras Timor-Leste*
PD	:	Project Documents
PNTL	:	*Polícia Nacional Timor-Leste*
PNG	:	Papua New Guinea
PSC	:	Production Sharing Contract
PSDM	:	Pre-Stack Depth Migration
PSTM	:	Pre-Stack Time Migration
SBM	:	Synthetic Based Mud
SE	:	Southeast
SW	:	Southwest
SundaGas	:	SundaGas Banda Unipessoal Lda
SSS	:	Sea Surface Salinity
SST	:	Sea Surface Temperature
TD	:	Total depth
TG	:	TIMOR GAP Chuditch Unipessoal Lda
TL	:	Timor-Leste
TLEA	:	Timor-Leste Exclusive Area
TOR	:	Term of Reference
TVD	:	True Vertical Depth
TWT	:	Two Way Time
UN	:	United Nations
UPF	:	*Unidade Polícia Fronteira*
Q1, Q2, Q3, Q4	:	Fiscal Quarters
ZOCA	:	Zone of Corporation Area

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MEASUREMENT UNITS

Bcf	Billion cubic feet
Degree	Celsius
Hz	Hertz
km	kilometre
km2	square kilometres
km/h	kilometres per hour
kn/kt/kts	knot/knots
m	metre
mm	millimetre
m/s	metres per second
Nm	nautical mile
TC/TCs	Tropical cyclones
Tcf	Trillion Cubic Feet
%	percentage

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1. INTRODUCTION

SundaGas Banda Unipessoal, Lda (SundaGas; SGBU) and TIMOR GAP Chuditch Unipessoal, Lda (TIMOR GAP) were awarded a Production Sharing Contract (PSC) by Autoridade Nacional do Petróleo (ANP) in 2019 to conduct petroleum activities offshore Timor-Leste. The Contract Area defined by PSC TL-SO-19-16 covers approximately 3571 km^2, which includes the Chuditch-1 gas discovery drilled by Shell in 1998 (Figure 1-Location of PSC TL-SO-19-16). The contract area is located in the Timor-Sea approximately 185km south of Timor-Leste and about 380km northwest of Darwin.

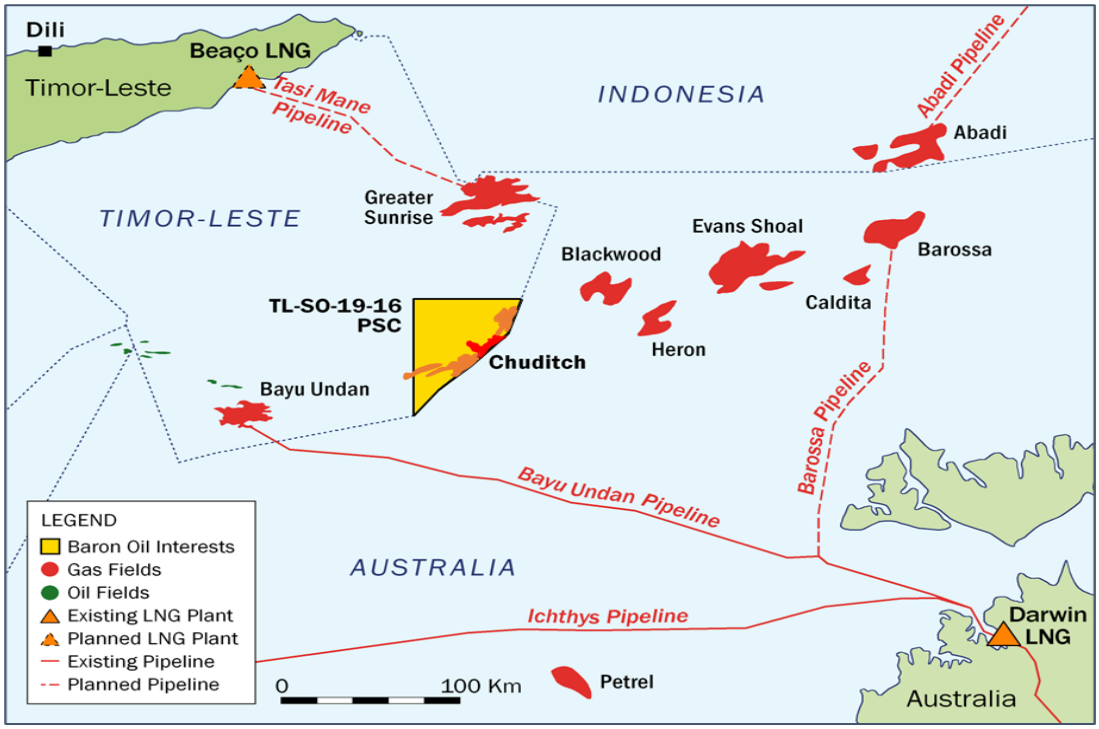

Figure 1. Location of PPSC TL-SO-19-16 and nearby fields

SGBU is planning on drilling an appraisal well, Chuditch-2, using a suitably designed and capable self-elevating Jack-Up Rig. The objective of the appraisal drilling is to validate the resources identified in a gas field discovered by Shell with the Chuditch-1 well, based on interpretation of reprocessed 3D 'Kyranis' seismic data (TGS, 2021 & 2022).

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Following completion of a site survey for Chuditch-2, the appraisal well is expected to be drilled in 68m water depth and to a target depth of approximately 3,000m in the Plover Formation.

Prior to and during drilling operations, SGBU will conduct multiple major project components, namely: Project description and environmental classification (completed), Geophysical and Geotechnical site surveys (completed April 2024); Environmental permitting and approvals process; Well and Casing designs including relief well locations; Mud System Design; Well Test design; planned Rig Move to location; Well construction; plug and permanent well abandonment design; and demobilisation of the Rig from Timor-Leste waters. The details of these components will be provided in Section 7 (Description of the proposed project).

2. Determination of Environmental Category

Autoridade Nacional do Petróleo (ANP), based on Article 5, Chapter III, under Decree Law No.5/2011 Environmental Licensing, determined that the proposed drilling activity in PSC TL-SO-19-16 falls within the requirements for a category A activity. Accordingly, an environmental A category licence was granted for PSC TL-SO-19-16 on November 15th, 2023.

As per ANP determination SGBU are required to follow:

- Article 5.4 (g) of Decree Law No.5/2011 – Submission of Term of Reference (TOR).
- Article 9.1(h) of Decree Law No.5/2011 – Submission of EIS including its non- technical summary, and
- Article 9.1(h) of Decree Law No.5/2011 – Submission of EMP.

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3. Terms of Reference Design (TOR)

TOR Structure

The content of this TOR follows the structure as set out in Annex III of Ministerial Diploma No.46/2017 of the 2nd of August, which defines the minimum requirements of the TOR for category A projects. The aim of the TOR is to outline the process and structure for conducting the Environmental Impact Assessment (EIA). The TOR sets the objectives, defines the scope of study, methodology, consultation, and schedule for EIA process.

3.1 Scoping Phase

The scoping phase for the TOR shall establish the framework of activities and impacts which require further investigation during the environmental impact assessment study for the proposed project.

The scoping phase will take into account environmental data obtained during the Geophysical and Geotechnical site surveys conducted in March/April 2024, in combination with publicly available peer reviewed and publicised environmental base line data.

For drilling activities taking place in PSC TL-SO-19-16, the following list represents the scoping phases SGBU expects to address prior to and during project execution.

1. SGBU will conduct various quality control and risk assessment exercise in the course of the project design. These will include a peer review of the well design and engineering and risk assessments such as a 'Drill Well on Paper' (DWOP), Test Well on Paper (TWOP) and project HAZID studies in parallel to a number of risk studies comprising the Formal Safety Analysis (FSA) related to the facility safety case and the drilling safety case revision.

   Note: All technical assumptions, conceptual well planning, fluid and drilling programs referenced in this TOR cannot at current time be presented as finalized aspects of the project. They are all subject to review and adjustment as a result of the DWOP assessment, which will be a critical technical gate process of the project.
2. The DWOP and TWOP exercises require participation, input and feedback from the major proponent / principal contractor (SGBU) and the drilling contractor respectively, as well as third-party services (MWD, Mud Logging, Drilling Fluids, Cementing, Open

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Hole Logging, Drill string Test, etc.) whose specific equipment and service processes need to be factored into final well plans and drilling programs. The selected Rig Contractor will also be a major participant of the SGBU-led risk assessment processes. Due to ongoing evaluation and risk assessments periodically conducted, environmental aspects, impacts and issues may be identified that require time focus and/or action at various phases of the project.

3.2 Objective

The TOR seeks to:

i) Define the study area within PSC TL-SO-19-16;
ii) Define the area which may be affected by the project activities;
iii) Define the project phases, including; preparations to drill, well construction and associated activities; permanent abandonment and rig move;
iv) Provide guidance of what baseline data and information will be required based upon the project phases identified;
v) Identify the policies and legislation, including that from other line ministries, with which the proposed project must comply;
vi) Identify national and international standards and good environmental practices with which the proposed project shall comply;
vii) Identify the likely key environmental impacts, including biological, physical, social, and economic impacts, that require detailed assessment;
viii) Identify the methodologies that will be used for the impact assessments;
ix) Identify the issues to be focused upon when discussing mitigation and abatement measures.

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3.3 Key Assumptions

The key assumptions for the design are:

- The Appraisal Well will be constructed according to Decree-Law No.32/2016 Offshore Petroleum Operations and follow "Good Oil Field Practice" as stipulated under the Law.
- The spud date for the proposed project is projected to be first quarter 2025, based on the latest rig drilling schedule. Note: this estimate may change due to rig schedule and availability.
- The appraisal well will be drilled with a suitably specified and equipped Jack-Up rig to efficiently and safely drill to the target depths.
- Pore and fracture pressures, chemical composition of produced fluids and thermal gradients for the proposed appraisal well design will not substantially deviate from the offset well data provided by SGBU.
- SGBU in accordance with good engineering practice have elected to use Saraline 185V Synthetic Base oil in the 12 ¼" section of the well. SGBU will provide an application and justification to ANP for consideration and approval under separate cover and timing.
- A standard evaluation programme to confirm the Chuditch-2 well is planned. If the Chuditch-2 Well is deemed to be a commercial proposition, an accelerated transition to a production phase is anticipated.
- The Well Summary Information is presented in Table 1 below.

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Table 1 Well Summary Information

Well Name	**Chuditch 2**	
Operator	SundaGas	
Partnership	SundaGas 60%, TIMOR GAP 40%	
Project	Chuditch-2	
Well Type	Appraisal	
Well Trajectory	Vertical Profile	
State/Country	Timor-Leste	
Anticipated Hydrocarbon	Gas/Condensate	
Block	TL-SO-19-16 PSC	
Basin	North Bonaparte Basin	
Surface Location (Chuditch-2)	Lat: 10° 32’ 56.832” S	X: 406,436
	Long: 128° 8’ 41.402” E	Y: 8,833,746
Bottom hole Target (Chuditch-2)	Lat: 10° 32’ 56.832” S	X: 406,436
	Long: 128° 8’ 41.402” E	Y: 8,833,746
Geodetic Information	WGS84, UTM Zone 52S, CM 129°E	
Target Objective	Plover Formation	
Drilling Rig	Jack-up Rig (Base case)	
Depth Reference	Mean Sea Level (MSL)	
Water Depth (MSL)	+/- 68m	
Well TD	+/- 3065 m TVD-MSL	
Formation Temperature (Max)	~139°C (~282.2 °F) at TD	
Formation Pressure	+/- 4400psi - Formations are predicted to be normally pressured from seabed down to Plover Formation	
Target tolerance	50m at the Plover Formation target area	
Hole Section	- 26” hole for 20” casing, planned setting depth at 197m (depth reference to Rotar table) – This is contingency. Drilling fluid will be Seawater with High Vis. Return to seabed. - 17 ½” hole for 13 3/8” casing, plant setting at 1650m RT. This is firm. Drilling fluid will be Seawater and Hi-vis. If 20” casing not run, return to seabed. - 12 ½” hole for 9 5/8” casing, planned setting depth at 3065m RT. This is firm. Drilling fluid will be SBM. Return to shale shaker.	

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3.4 Target/Reservoir Information

The primary target for Chuditch-2 is the Plover Formation. The estimated target formation tops are 2,813m TVD-MSL (Chuditch-2), as shown in table 2 below. 18% CO2 and 2.4% N2 are recorded in nearby offset well Chuditch-1.

Table 2.Target Reservoir Information

	Chuditch-2 Depth TVD-MSL (m)	Uncertainty (m) (TBC)
Sea Bed Carbonates	67	+/- 5
Hibernia Fm (Green horizon) Calcarenites & calcilutites grading to calcareous clay stones	688	+/-20
Johnson Fm (Pink horizon) Argillaceous calcilutites to calcareous clay stones	1088	+/-20
Wangarlu Fm (Purple horizon) Claystone with minor calcareous claystone	2000	+/-20
Darwin Fm (Pink horizon) "radiolarite" Claystone & marl	2799	+/-30
Plover Fm – reservoir target Sandstones & clay stones	2813	+/-30
Gas-water-contact	2920	+/-3
Total Depth	3020	+/-30

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4. Details of Proponents

Operator: SundaGas Banda Unipessoal, Lda.

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Joint Venture Partner: TIMORGAP Chuditch Unipessoal, Lda.

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4.1 Company organizational Structure

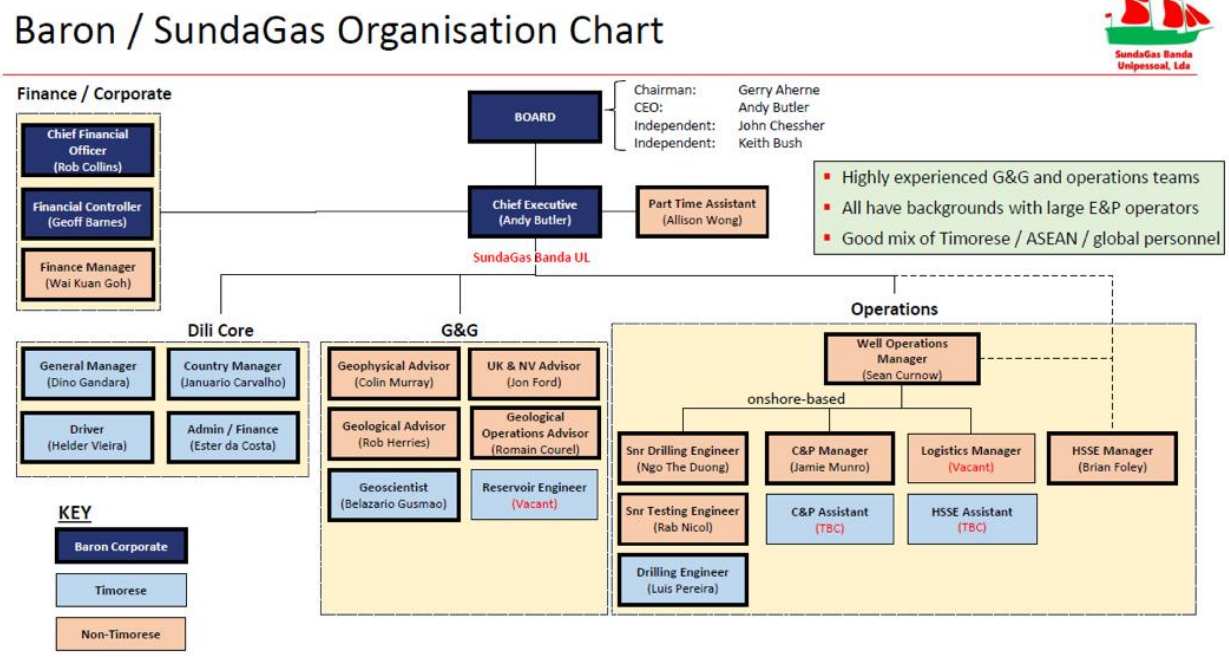

Figure 2. SundaGas and PSC Organization Structure

4.2 Contact Person

Dr. Andy Butler
Title : Managing Director
Email : andy.butler@sundagas.com
Mobile : +65 93845820

Sean Curnow
Title : Well Operations Manager
Email : sean.curnow@sundagas.com
Mobile : WhatsApp +44 7384 513212

Brian Foley
Title : HSE Manager
Email : brian.foley@sundagas.com
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Dino Gandara
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4.3 Details of Consultants

SundaGas Unipessoal Lda has engaged Halona Serena Lda, a Timor-Leste registered national consulting company, to carry out the EIA study to produce the EIS and EMP for the proposed project. Halona Serena has been providing services to domestic projects in Timor Leste for approximately 3 years prior to commencing the subject EIA study. Halona Serena Lda has a number of key and highly qualified personnel. The following is the list of the proposed key personnel to be involved in this project:

Bertanizo Guro da Costa (Team Leader & Environmental Scientist)

Bertanizo has about 10 years of experience in conducting Research in various sectors, including environmental science, conservation, security and defence, legal pluralism, impartiality of formal justice system, education, domestic violence etc. He also has 5 years of experience in leadership role (e.g., Research coordinator, General coordinator of association etc.). He also has some expertise in Monitoring and Evaluation, research methods, statistics, data analysis, media and communications.

Maria Do Ceu Rosales

Maria is a graduate from the University of Western Australia, majoring in Environmental Science and Business Law. She is an Environmental Scientist with more than 7 years' experience predominantly in environmental assessment, management, and public procurement. She has led environmental studies on variety of environmental assessments and feasibility studies specifically for water resources management and has worked on a variety of projects from small-scale to large projects such as from established more than five water and sanitation projects to the rural communities and successfully completed marine environmental monitoring project for Tibar Port mega project.

Mario Marques Cabral

Has more than 20 years' experience as a marine biologist specialist. He has been working under Indonesian and Timor - Leste governments for marine departments. Also, Mario a candidate for Blue Planet Prize in 2022 (af:011785). The 31st Blue Planet Prize nomination process was organized by The Asahi Glass Foundation since the early of August 2021 under the supervision of Director, Commendation "Blue Planet Prize" (Toshihiro TANUMA, Ph.D.) in Tokyo-Japan. The Blue Planet Prize is an award presented to individuals or organizations from around the world in recognition of outstanding achievements in scientific research and its application that have helped provide solutions to global environmental problems.

Eurico Ediana da Costa

An experienced sociologist consultant with a demonstrated history of working around private sector development, research, decentralization, public policy, social-economic,

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community development, local government development, monitoring and evaluation, and gender mainstreaming. He possesses skills in M&E design, data analysis, research report, project management, policy analysis, business analysis, project management, negotiation, problem-solving, capacity building, community consultation, and basic NVivo operation.

Pascoela Sequeira

Process Engineer experience for 8 years in evaluating the LNG process plant design for future Timor Leste LNG plant and its supporting activities. She possesses a M.Sc. in Natural Gas Engineering and Management and B.Sc. in Chemical Engineering from University of Oklahoma.

Tiago Gamboa

Geographer and HSE - Consultant with more than 25 years of experience in Environmental Management and Awareness, Environmental Impact Assessment, Environmental and Social Management Plan, Climate Change and Infrastructure Resilience, Water Resources, Urban Cleaning and Public Health, in the Public and Private Sectors, including international development cooperation in Timor-Leste.

5. Legal Requirements

Government licensing (or approval) of the Drilling Campaign is required under Timor-Leste Decree-Law 5/2011 Environmental Licensing prior to the commencement of project operations on location. In accordance with Decree-Law 5/2011, the Drilling Campaign by SGBU is classified as a Category A project as it may have significant environmental impacts, and as such it is subject to the preparation of an EIS and an EMP.

The EIA required under national law is equivalent to an Environmental and Social Impact Assessment (ESIA) required for IFC Category A projects. This TOR has been prepared to meet the GoTL requirements and IFC Performance Standards, to guide the preparation of the EIA in accordance with the project approval conditions. The EIA will be prepared by the PSC Block, TL-SO-19-16 Operator, deemed to be the "Project Proponent". The EIA shall identify and assess the environmental and social risks and impacts of the Drilling Campaign, and design and incorporate appropriate impact avoidance and mitigation measures into Project design, construction and operation. This shall be done in accordance with:

i) National legislation and regulations;
ii) International Standards and Guidelines, &
iii) International Conventions and Agreements

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The details of these laws, regulations, guidelines, action plans, agreements and conventions including their brief description and relevance to the purpose project are shown in Table 3.

5.1 Environmental Assessment and Approval Process

Regulatory approval of oil and gas development projects is undertaken by ANP under Decree-Law No.5/2011 Environmental Licensing that defines the environmental licensing system for public and private projects which are likely to produce environmental and social impacts.

The licensing system sets out the process, procedures, roles and responsibilities of the "Project Proponent". The "Project Proponent" is defined as "a person, including a legal person, both public and private, who requires a license to carry out a project" in the Decree.

The PSC Block proponent will be the private sector entity awarded the concession by GoTL to conduct exploration and production activities. If the production is commercially viable then the project proponent can operate the Block in an environmentally responsible manner in accordance with Timor-Leste Law and good oilfield practice. The EIA process as shown in Figure 3, commences when the project proponent prepares a Project Document (PD) and submits this to ANP for determination of the project category.

The PD identifies the proponent, describes the project, outlines the major likely impacts, provides layout drawings and site maps. Additionally, the PD provides copies of any permits or government support already obtained. This has been completed by the ANP as of November 15th, 2023. In accordance with Decree-Law 5/2011, the planned drilling campaign by SGBU on PSC TL-SO-19-16 is classified as a Category A development as it has "the potential to cause significant adverse impacts", and therefore requires a detailed EIA.

For Category A projects, the proponent must prepare a Scoping Report and Draft TOR for the EIA to be reviewed by GoTL. The GoTL has a maximum of 15 Business Days to review the TOR and provide comments to the proponent. The proponent (SGBU) then prepares the Draft EIS and Non-Technical Summary (NTS) in compliance with the approved TOR, including an Environmental Management Plan (EMP). The EMP will detail the environmental monitoring arrangements proposed for the project activity and submits this to ANP for the assessment. ANP establishes an Evaluation Committee (EC) consisting of representatives of relevant

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agencies and institutions to review the Draft EIS, and the report is made available for public review.

The maximum Draft EIS review period, including technical review and consultation, is 50 days. The Final EIS is prepared by the proponent considering the comments received from the Evaluation Committee's technical review and public consultation. The final EIS is then submitted to ANP for approval. If the project is approved, an Environmental Permit is issued and may contain conditions of consent, including the requirement to implement the mitigation and monitoring measures set out in the EIS, EMP and other Project management plans. Figure 3 below provides a flow diagram of the EIA process for a category A project such as the Chuditch-2 appraisal well project.

Furthermore, Table 3 below provides a list of applicable legislation with a summary of the relevant law to Chuditch-2 project.

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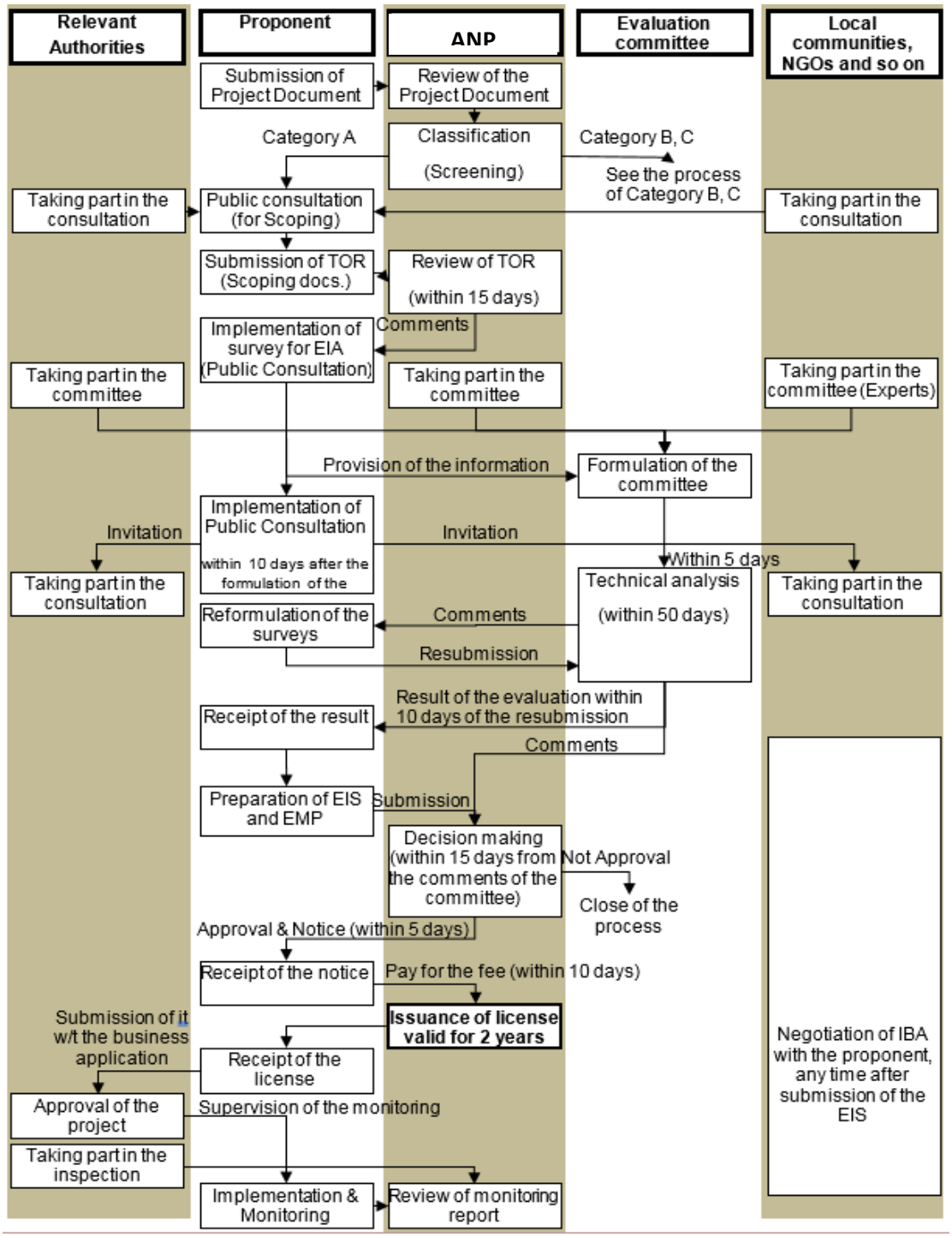

Figure 3. EIA Process for Category A Project

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Table 3. Applicable Timor Law, Regulations and International Guidelines & Standards

Title	Descriptions	Relevance to the Project
Timor-Leste Legislation and Regulations		
Constitutions of the Republic Democratic of Timor-Leste Article 61 (Environment	The article specifies provisions for state including the proponent shall undertake to defend, and safeguard the environment recognizes the right of all citizens to a humane, health and ecologically balances environment while also specifying the duty of everyone to preserve and protect the environment for the benefit of future generation	Provide the basis for environmental protection and safeguarding in the Country
Decree Law No.5/2011 - the Environmental Licensing; **Decree Law No. 39/2022 - the first alteration of the Decree Law no. 5/2011 about the Environmental Licensing.**	The procedure for directing the environmental assessment, the review of application for environmental license, issuance and renewal of license. • Categorization of the project according to severity of the environmental impacts. • Procedures and information requirement for Category A project • Organization and composition of the review committee and its duties and responsibilities. • Specific provisions for public consultation and the protection of the traditional customs and cultural practices. • The issuance of the decision by the Environment Authority on the review of the application and the rights of the project owner to appeal the decision.	Provides the Environmental Licensing procedure to regulate actions to encourage and protect the nature as an important instrument for sustainable development of economy of Timor-Leste
Decree Law No. 5/2016 – National System of Protected Areas (Appendix 1 – List	This Decree Law defines the norms and principles for the creation of the national system of terrestrial and marine protected areas, for the classification of protected areas and for the approval of the applicable management instruments,	Provide the basis for the protection of the terrestrial and marine protected areas without putting aside the important role

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Title	Descriptions	Relevance to the Project
of Timor-Leste Protected Areas)	according to the international best practices, in the matter, duly adapted the national reality, without forgetting the important role of community authorities and existing customs.	communities, authorities and existing customs
Decree Law No. 26/2012 on Basic Environmental Law	The Decree Law identifies the protection of the environmental life and wildlife protection, including the basic principles for the conservation, preservation and sustainable use of natural resources in order to improve the quality of life of the local populations.	Communicate to the communities by providing information on the basis for the protection of environment and wildlife protection and sustainable use of natural resources through public consultation
Decree Law No. 6/2020 Legal Regime for protection and the conservation of biodiversity	This decree law sets a legal regime for the conservation of biodiversity, and the sustainable use of its component.	Provide the basis to protect and conserve the biodiversity, including marine species and their habitat around the drilling project.
Diploma Ministerial No.45/2017 – Rules and Procedures of the Evaluation Committee for Project with Category A	The article specifies the importance of establishing rules and procedures for the evaluation committee for the management of the environmental evaluation process for projects in category A	Establishment of a committee in order to review the project that categorize into category A.
Diploma Ministerial No.47/2017 – Public Consultation Procedure and Requirement during Environmental Baseline Process	This Diploma Ministerial specifies the procedures and requirement of involvement of public and communities into different stages of the environmental assessment process through public consultation.	Provides information and communicate to the communities by providing information on the basis for the protection of environment and wildlife protection and sustainable use of natural resources through public consultation

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Title	Descriptions	Relevance to the Project
Decree Law No. 59/2023 about the organic structure of the Ministry of Petroleum and Mining	Constitutional Article 33 (c) (Minister of Petroleum and Minerals) responsibilities item (o) Considering the complexity and technical expertise of the oil and mineral resources sector, conduct the respective environmental licensing procedures and approve the corresponding environmental licenses in that sector.	Provides a description of legal framework that empower Ministry of Petroleum and Minerals to issue environmental license.
Decree-Law No.32/2016 Offshore Petroleum Operations	This decree law applies to all offshore petroleum operations, which is carried out in accordance with the law on petroleum activities, including the transport and storage of crude oil and natural gas, with a direct impact on any deposits. This decree law also sets the requirements, including the Environmental impact statement, Environmental Management Plan, Environmental monitoring, and also Oil Spill Contingency Plan.	Provides the fundamental legal framework for all oil and gas operations offshore Timor Leste.
Labour Legislation Law No. 4/2012 – Timor Leste Labour Code	This law describes the rights between employers and workers in regard to the working hours, leaves, remunerations, compensations and health and safety welfares	Provide basis for the project proponent to set up a working condition and contracts between employer and employee, and used during the project activities.
Government Resolution No. 27/2023 about the Ocean National Policy of Timor Leste	This national policy intends to address the national marine issues, including pollution and climate change.	The drilling activity will take place in the Timorese ocean, and to find integrated approach based on the national policy to mitigate the drilling impact to the ocean.
Waste Management: Decree Law No.33/2008 – Hygiene and Public Order. Decree Law	These laws provide legal framework to manage the urban solid waste and to ensure promoting the hygiene in the workplace	As the legal basis for the project proponent to manage solid waste produced during any project phase. This to be set as the minimum

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Title	Descriptions	Relevance to the Project
No. 3/2024 - The first alteration of the Decree Law no. 33/2008 about the Hygiene and public order. Decree Law No. 2/2007 – Urban Residual Waste Management		criteria for the SundaGas to establish its own waste management system. The Waste Management company is TBA.
International Industry and Guidelines Documents		
IFC EHS General Guidelines 2007	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice.	Provide general guidance on the application of good environmental practice.
IFC EHS (June 2015) guidelines for offshore oil and gas development.	The guidelines are industry specific for offshore oil and gas development and are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors	Provide guidance on the application of good environmental practice for offshore oil and gas development.
United Nations Convention on Biological Diversity (UNCBD)	The Convention on Biological Diversity (CBD) entered into force on 29 December 1993. It has 3 main objectives: 1. The conservation of biological diversity 2. The sustainable use of the components of biological diversity 3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources	Timor Leste is rich of the biodiversity with significant ecosystem and endemic species. The country signed the convention in 2001. As the project could have impacts on the flora and fauna or risk to the loss of the biodiversity, it is fundamental principle for the project proponent to prevent or minimize the risk of biodiversity loss during the project implementation

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Title	Descriptions	Relevance to the Project
United Nations Framework for Climate Change Convention (UNFCCC)	The United Nations Framework Convention on Climate Change (UNFCCC) provides a framework for intergovernmental efforts to reduce greenhouse gas emissions and adapt to the expected impacts of climate change. It also provides guidance to member states on developing and implementing national climate change strategies, incorporating both adaptation and mitigation actions. Timor-Leste became a signatory to the UNFCC in October 2006.	The project activities release GHG emissions which could be one of the contributing factors to the country's climate change issue. Minimization climate change risks by reducing the GHG emissions are an essential part of the project environmental objective and target. This convention is the principal guidance for the project proponent to prevent the air pollutions and reduce the GHG emissions as much as possible
IPIECA Guideline	Social responsibility, application of good environmental practice. IPIECA Guideline. IPIECA is a not-for-profit association that provides a forum for encouraging continuous improvement in industry performance. IPIECA is the only global association involving both the upstream and downstream oil and gas industry. It is also the industry's principal channel of communication with the United Nations. IPIECA develops, shares and promotes good practice and knowledge to help the industry and improve its environmental and social performance. We do this with the understanding that the issues that dominate the sustainable development agenda – climate and energy, environmental and social issues – are too big for individual companies to tackle alone. The industry must work together to achieve improvements that have real	Provide oil and gas industry specific guidance on the application of good environmental practice.

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Title	Descriptions	Relevance to the Project
	impact. IPIECA helps to achieve this goal.	
International Union for Convention of Nature (IUCN)	This international convention is an international organization focus on the nature conservation and sustainable of utilizing the natural resources. The IUCN works in the field to promote ecological conservation in order to ensure the sustainable development concepts.	Timor Leste is a signatory member of the IUCN convention which has responsibility to protect its ecological components to ensure the economic sustainable development. Therefore, this project will identify all species categories listed under the IUCN red list which can be impacted by the project activities
UNESCO Convention on Natural and Cultural Heritage	The convention mandates each signatory party to identify, protect, conserve, transmit and present to the future generations of the cultural and natural heritage	As the Timor Leste is a signatory member of this convention therefore this project activities ensure the protection and conservation of any cultural and natural heritage around the project locations
WHO Air Quality Guidelines (AQG)	WHO Air Quality Guidelines (AQG) offer guidance on threshold limits for key air pollutants that pose health risks and provide a reference for setting air pollution targets at regional and national levels to improve air quality? Air quality guidelines have been published by WHO in 1987 and they were revised in 1997. The 2005 update represents the most current assessment of air pollution health effects, based on an expert evaluation of the scientific evidence. The guidelines offer recommended exposure levels for particulate matter (PM10 and PM2.5), ozone, nitrogen dioxide and	The air quality benchmark is used as reference by the project proponent is the WHO air quality guidelines.

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Title	Descriptions	Relevance to the Project
	sulphur dioxide, as well as a set of interim targets to encourage a progressive improvement in air quality	
Climate Change Kyoto Protocols. Government Resolution of National Action Plan for Climate Change	Kyoto Protocol is an international treaty which extends the UNFCCC parties commitment to reduce the greenhouse gas according to the scientific consensus. The protocol implements the objective of reducing the global warming potential gas in the atmospheres. The government resolution of national action plan for climate change (NAPA) is the first national document that identifies urgent and immediate climate change adaptation needs of the most vulnerable groups. It provides a starting point from which climate change adaptation can be mainstreamed into development plans as a key strategy for attaining sustainable development and poverty reduction (MDG, 2010)	Timor Leste is the signatory party of the Kyoto Protocol which shall ensure the implementation of the protocol in order to reduce the GHG emissions.

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6. Study Area

6.1 Geographical Area

The proposed well is known as Chuditch-2 and will be located within PSC TL-SO-19-16 in Timor Sea, in the northern Bonaparte Basin, Sahul Shelf area. The well will be located approximately 80km south of Greater Sunrise, 140km east-northeast of Bayu-Undan, and 5km east of the Chuditch-1 discovery well. The location of Chuditch-2 and the nearby fields are shown in Figure 1.

Moreover, the Chuditch-2 well will be located about 380km northwest of Darwin and 185km to the south of Timor-Leste, in shallow water. The proposed surface location for Chudith-2 well is 5.1 km east of Chuditch-1 well in 68m of water. The Chuditch-2 location was finalised using the results of the site survey conducted in Q1 2024. Figure 4 illustrates bathymetry from multibeam data showing the final selected location of Chuditch-2 (offset from an initial location shown as 'Chuditch-2B').

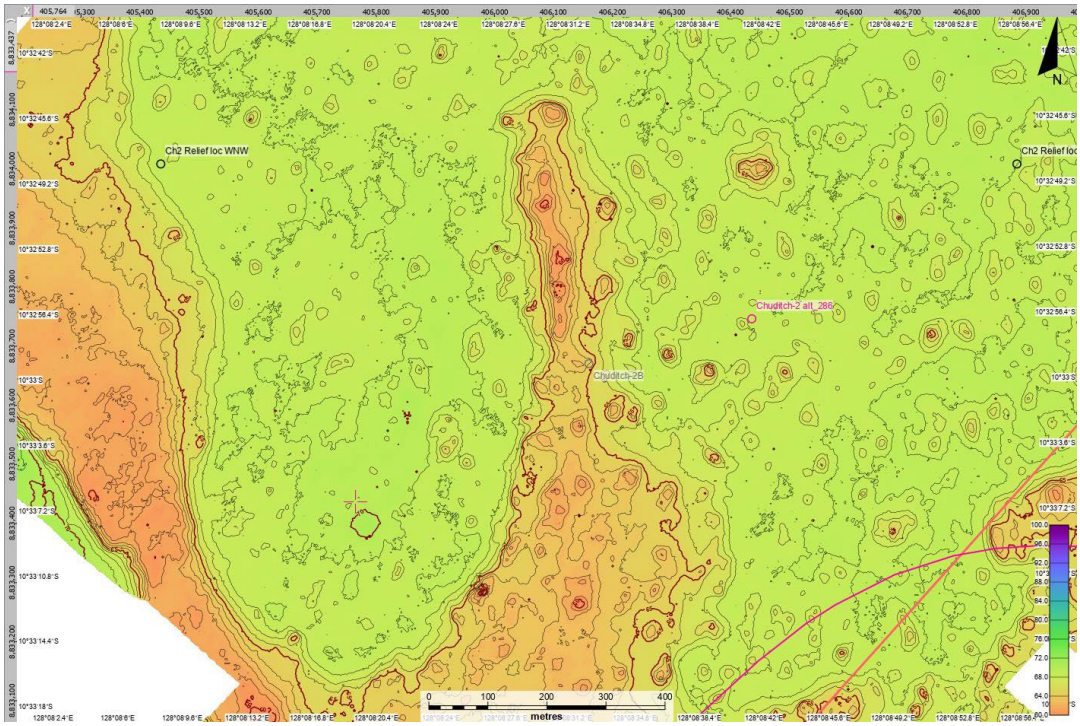

Figure 4. Chuditch-2 Geophysical Site Survey: Bathymetry from multibeam data (Contour Interval 1m)

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A depth map on the Plover reservoir formation is shown in Figure 5, indicating the locations of the Chuditch-1 and planned Chuditch-2 wells. Colours indicate height above the gas water contract encountered in Chuditch-1 well.

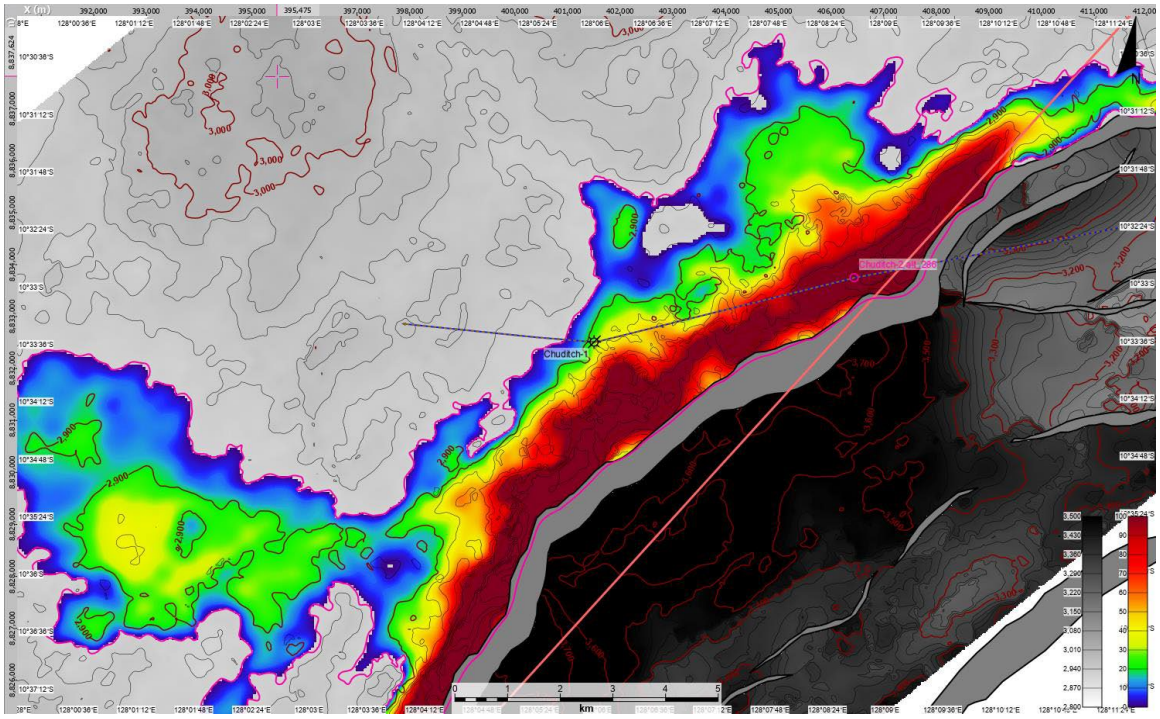

Figure 5.Chuditch-2 Well location on Top Plover Depth Map

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6.2 TimeLine

Table 4. Propose EIA Timeline for PSC TL SO-19-16

EIS TIMELINE/PROCESS FOR PSC TL-SO-19-16	
ENVIRONMENTAL LICENCE DOCUMENT FOR SGBU	
Task	No. of days
TOR DEVELOPMENT AND PUBLIC NOTICE ON BOARD	
Submission of the TOR	1
Public Notice on Board	10
Review of the TOR	15
Approval of the TOR	1
FIELD SURVEY & INITIAL PUBLIC ENGAGEMENT TO COLLECT THE DATA FOR THE PREPARATION OF EIS & EMP	
Preparation of EIS and EMP	20 days
EIS AND EMP PRESENTED TO ANP	
Task	No. of days
Submission of EIS and EMP draft to ANP	1
Preliminary Comments on the Draft of EIS and EMP by ANP if any	11
Final Submission of the EIS and EMP	
Formulation of Evaluation Committee	10
Stakeholder Consultation on EIS and EMP	2
Technical Analysis	50
SundaGas Received Evaluation Committee Comments	1
Resubmission of EIS and EMP after Reformulation	1
SundaGas Received Results of Evaluation Committee of Resubmission	10
Final Submission of the EIS and EMP	1
Decision making from the comments of the Committee	15
Approval & Notice	5
Receipt of the Notice (Pay for the Fee)	1

6.3 Previous Studies

The current PSC TL-SO-19-16 was signed on 8 November 2019. Previously the area covering the Chuditch discovery was licenced by other operators who carried out various exploration activities (Figure 6). These earlier works were conducted during the Indonesian period and within the former JPDA.

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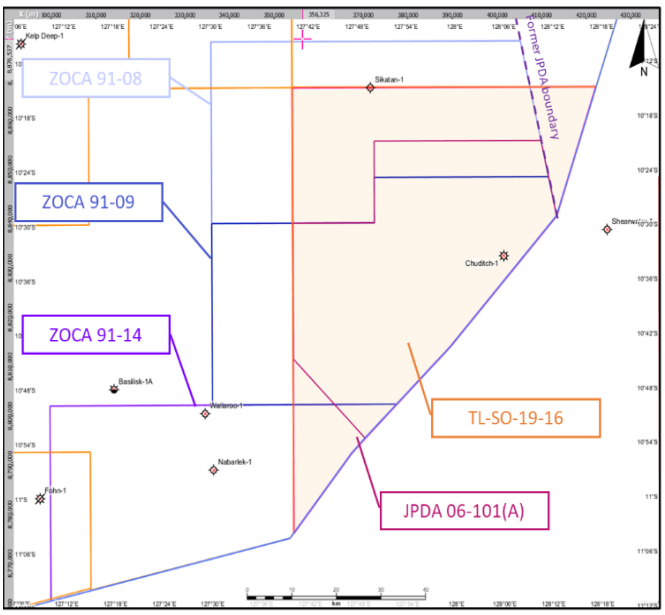

- Northern Area: ZOCA 91-08 – Sagasco / Petroz
  - 2D seismic acquired 1992 and 1993
  - Sikatan-1, 1994, P&A dry
  - Block relinquished 1997
- Southern Area: ZOCA 91-14 – Enterprise / Nippon
  - 2D seismic acquired 1992 and 1993
  - Nabarlek-1, 1994, P&A dry, Wallaroo-1, 1996, P&A dry
  - Block relinquished 1997
- Central Area: ZOCA 91-09 – Enterprise
  - 2D seismic acquired 1993,1994 and 1997
  - Farm-in 1996, Shell (operator) and Mitsubishi
  - Chuditch-1, 1998, P&A Gas Discovery
  - Block Relinquished 2001
- JPDA 06-101(A) Oct 2006 – Minza Oil & Gas
  - 2D seismic acquired 2009, 3D seismic acquired 2012
  - Block Relinquished 2013

Figure 6. Location and Summary of previous activities in Chuditch and nearby area

6.3.1 ZOCA 9109 PSC

Exploration in the Chuditch area commenced in earnest under the jurisdiction of the Timor Gap Zone of Cooperation (A) Joint Authority. The ZOCA 91-09 PSC was signed in 1991 by Enterprise Oil Timor Gap Pty Ltd (Enterprise Oil) who conducted several phases of 2D seismic acquisition and initial evaluations. In 1996, Enterprise Oil farmed out an interest to Shell Development (Australia) Pty Ltd (Shell), who became operator of the PSC. Shell acquired additional 2D seismic data in 1997 and drilled the Chuditch-1 in 1998, in joint venture partnership with Southern Diamond Resources Pty Ltd and Enterprise Oil.

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Following the Chuditch discovery, Shell conducted various studies to understand the size of the accumulation and the adjacent prospectivity. This in particular included attempts at PSDM reprocessing of selected 2D seismic lines in order to resolve the issue of imaging around the discovery and its bounding fault. Shell relinquished the asset in 2001. Their final assessment of the block resources is shown in Figure 7.

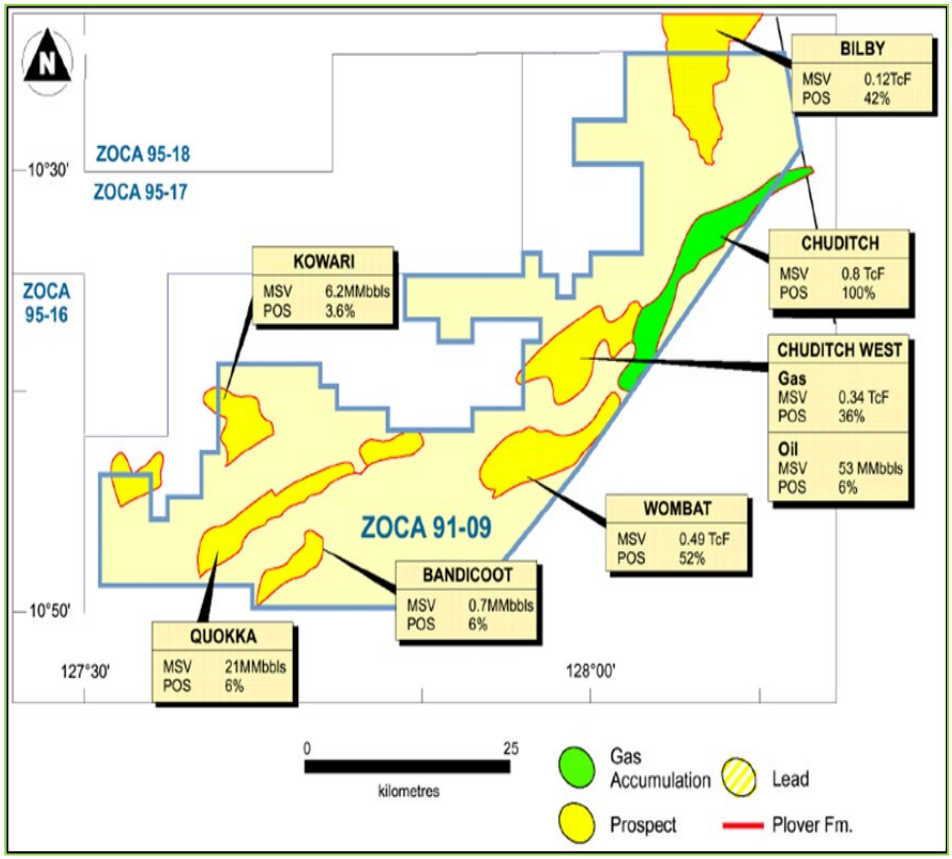

Figure 7. Final Summary of Chuditch discovery and adjacent prospects and leads (Shell. 2001)

6.3.2 JPDA 06-101(A) PSC

Following independence for Timor-Leste and the establishment of the Joint Petroleum Development Area (JPDA) shared between Timor-Leste and Australia, a licence round was held in 2005 and PSC JPDA 06-101 (A) was signed in 2006 by Minza Oil and Gas Limited (Minza). The block was held 100% by Minza.

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In 2009, Minza acquired 937km of additional 2D seismic data, focused on the Chuditch discovery area. In 2012, the large Kyranis 3D survey (around 9,000km2) was acquired, covering the southern areas of the JPDA and Australian waters to the south and west. Although this was a regional multiclient survey, an area of 880km2 was licenced by Minza on a proprietary basis over the JPDA 06-101 (A) PSC. Owing to delays with the processing of these 3D, and Minza subsequently running into financial issues, only a fast-track version of the 3D was available to Minza at the time. These data were used to refine the structural mapping over Chuditch and its nearby prospects. A summary of the Minza prospectivity in comparison with that of Shell is shown in Figure 8. Minza relinquished the PSC in 2013.

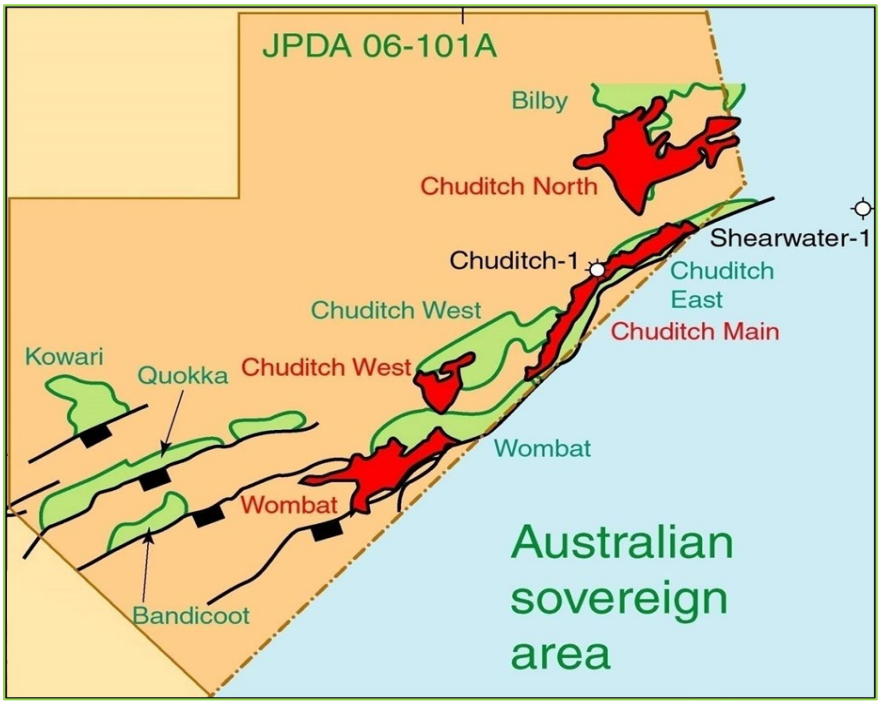

Figure 8. Minza identified prospect in comparison with those of Shell

6.3.3 PSC TL-SO 19-16 – SundaGas Banda Unipessoal, Lda.

With the ratification of a maritime boundary agreement between Australia and Timor-Leste in August 2019, the JPDA ceased to exist. SGBU, who had been negotiating with ANPM (in 2023 ANPM was separated into ANP and ANM) for a new block over the Chuditch discovery, signed the TL-SO-19-16 PSC in November 2019.

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SGBU technical studies and data evaluation included the reprocessing of the Kyranis 3D seismic survey over the Chuditch gas field and Chuditch Prospects (Figure 9). As part of the PSC commitment, SGBU reprocessed 1,270 km^2 of Kyranis 3D seismic to Pre-Stack Depth Migration (PSDM). The reprocessing work was carried out by TGS in Woking (UK), commencing in April 2021 and completed in July 2022. Figure 9 below shows the area of 3D Seismic reprocessing undertaken by TGS.

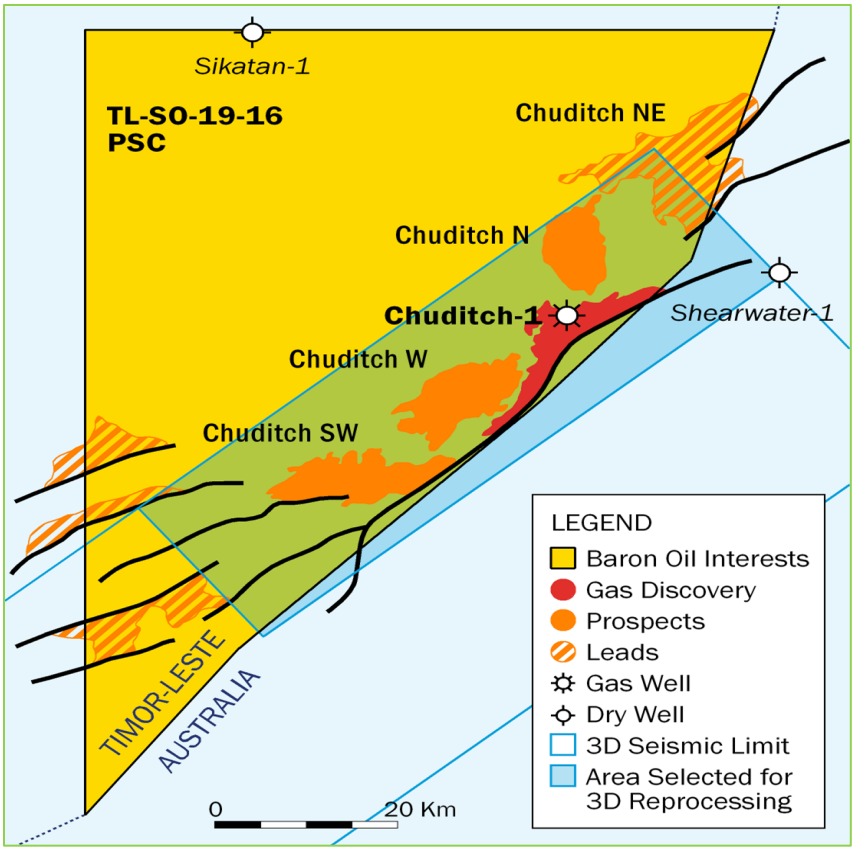

Figure 9. Area selected for 3D seismic reprocessing with 2D based prospect and lead outlines

6.4 Previous Studies and Information

A Basis of Well Design (BOD) was prepared to identify operational requirements and common risk factors as determined by offset well data and prognosed geological formations to be drilled. The BOD is the result of work completed by SGBU. SGBU has conducted a detailed analysis of all available offset Geological and Engineering data and used this information to construct the elements of the BOD. The detailed Well design will be included in the drilling

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programme and relevant Standard Operating Practice (SOP) and instructions to drillers during operations.

7. Scope of Work to Be Carried Out During the Study Phase

7.1 Description of the Proposed Project

The Contract area is located on the Sahul Shelf area of the northern Bonaparte Basin, offshore Timor-Leste, about 380km northwest of Darwin and 185km south of Timor-Leste. Waters depths range from approximately 50 to 180m. The proposed project will encompass the following aspects or major components:

1. **Site Construction and Timing**: SundaGas propose to drill the Chuditch-2 appraisal well in Q1 2025 using a jack-up drilling rig. In preparation for drilling expected to start in Q1 2025, geotechnical and geophysical site surveys were completed in Q1 2024. The geotechnical and geophysical site survey confirmed a suitable primary well location and an additional two well locations should construction of a relief well be required. A temporary safety exclusion zone of 500m radius will be established around the rig location during the drilling operations.

   Note: Detailed information on the estimated size of area of access and drilling site will be covered in the EIS.
2. **Mobilization**: The project logistics plan has not been finalised at this time. SGBU are considering options for mobilising equipment and personnel via Darwin Australia versus any efficiency gained by conducting logistics operations from a Timor-Leste location. Once the project logistical arrangements have been determined by SGBU, suitable advice will be provided. Offshore supply vessels will be source by international competitive tender. Helicopters required for personnel transfer and Medivac will be source from existing aviation contractors licenced to operate in Timor-Leste airspace.
3. **Rig Move**: In Q1 2025, based on the current rig drilling timetable, the rig will be towed to location and positioned over the programmed well centre. Following soft pinning and ballasting operations, the rig will jack up to the agreed air gap of approximately 15-18 m above mean sea level and begin to take on extra personnel, equipment, fluids and chemicals in preparation for spudding the well.

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4. **Pre-Spud Meeting:** A pre spud meeting will be conducted by SGBU which will involve SBGU operational, engineering, well site geologists, HSE, SGBU contracted 3rd party contractor and Valaris Rig personnel to ensure that a review of the preparations has been conducted including pre spud checks prior to commencing drilling operations.
5. **Drilling**: The Chuditch-2 well will target the Plover Formation, to appraise the gas discovery encountered by Shell on Chuditch-1 well. Its main goals include confirming thicker gas pay in an upward direction from the original well toward its bounding fault and conducting a Drill Stem Test (DST) to assess the field's production potential.
6. **Well Testing**: SundaGas intends to perform a Drill Stem Test (DST) on the expected gas-charged Plover reservoir interval in the Chuditch-2 appraisal well. The DST is currently being designed and will be integrated into the overall well design by the SGBU well test engineer.
7. At the end of the campaign the results will be assessed, and the forward programme agreed in accordance with GoTL requirements.

A comprehensive Drilling Programme will be developed, outlining each stage of the operation based on the engineered Well Design. It will provide essential details to ensure safe and efficient conduct, with due regard for the environment and GoTL requirements.

The Chuditch-2 appraisal well Drilling Programme will encompass several key components:

1. **Well Design**: Detailed engineering plans for the construction and operation of the well, including casing and cementing strategies, drilling fluid selection, and well control measures.

2. **Safety Procedures**: Comprehensive safety protocols to mitigate risks associated with offshore drilling activities, including emergency response plans, well control procedures, Tropical rotating storm planning, personnel training, and equipment maintenance schedules.

3. **Environmental Considerations**: Strategies to minimize the environmental impact of drilling operations, such as management procedures for pollutants compliant with Marpol annexures I, II, III, IV & V on oil pollution, pollution by noxious liquid substances in bulk form, harmful substances in packaged form, sewage or garbage, respectively. Strategies will comply with local law and best oil field practice.

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4. **Logistics and Supply Chain Management**: Plans for the procurement and transportation of equipment, materials, and personnel to and from the offshore drilling site are in planning and are not finalised. SGBU will plan to ensure smooth and efficient operations.

5. **Weather Monitoring and Contingency Plans**: Monitoring systems to track weather conditions and develop contingency plans for adverse weather events, such as Cyclones or tropical lows to ensure the safety of personnel and equipment. SGBU will contract with an appropriate weather forecasting company to provide metocean data for the project. Contingency planning for weather events will be in accordance with drilling rig procedures.

6. **Community Engagement**: Initiatives to engage with local communities and stakeholders, addressing concerns, and providing information about the location, intended drilling activities, duration and their potential impacts.

7. **Regulatory Compliance**: Adherence to regulatory frameworks and obtaining necessary permits and approvals for offshore drilling activities, ensuring compliance with legal and environmental standards from the GoTL.

8. **Drilling Schedule and Milestones**: A timeline outlining the sequence of drilling operations, including key milestones and targets for completion of each stage of the drilling programme.

9. **Quality Assurance and Quality Control**: Procedures to maintain the quality and integrity of drilling operations, including regular inspections, testing, and monitoring of equipment and processes.

10. **Risk Management**: Identification and assessment of potential risks associated with offshore drilling activities, along with strategies to mitigate these risks and ensure the safety and success of the operation in an environmentally responsible manner.

7.2 Description of the Environmental Conditions

The description of the environment in the Environmental Impact Statement (EIS) will follow the requirements specified in Ministerial Decree No. 46/2017 Part 6. SGBU proposes to

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conduct the environmental measurement baseline immediately prior to the drilling activities (please refer to section 7.3 for details on methodology and approach).

7.2.1 Geology

The primary hydrocarbon reservoir in the Bonaparte Basin is sandstone of the Plover Formation, ranging from Early Jurassic to Callovian age. The Chuditch-2 well, based on offset data is prognosed to encounter 'near-dry' gas in the Plover Formation. Hydrocarbons in this basin are sourced from several formations including the Plover Formation itself, Elang and Cleia Formations, Flamingo Formation, and the Echuca Shoals Formation. The basin has experienced three major phases of rifting. The oldest, dating back to the Palaeozoic era, exhibits a north-westerly trend, evident in structures like the Sahul Syncline, Flamingo Syncline, and proto-Sikatan Trough. Overlapping this is a Permo-Carboniferous rift episode, creating a north-easterly structural pattern. A later phase of rifting, linked to "break-up," began as early as the Late Triassic but is most prominent in the Kimmeridgian period, reactivating the Permo-Carboniferous structural pattern and forming the Malita Graben.

The regional stratigraphy in the area includes various formations spanning different geological periods:

1. **Plover Formation (Pliensbachian to Callovian)**: Primary reservoir target, comprising fluvio-deltaic sandstone, mudstone, coals, and marginal marine sandstone. At Chuditch-1, it underlies shales of the Jurassic Flamingo Formation.
2. **Flamingo Formation**: Deep marine shales and turbiditic sandstone sourced from the south, displaying different depositional facies on the Sahul Platform, including marginal marine sandstone equivalent to the Sandpiper Sandstone south of the Malita Graben.
3. **Bathurst Island Group**: Comprising several sequences:
    - **Echuca Shoals Formation**: Glauconitic claystone and siltstone overlying the Intra-Valanginian Disconformity.
    - **Darwin Formation (Aptian to Early Albian)**: Condensed radiolarian claystone/calcilutite unit deposited during the Cretaceous transgression.

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- **Wangarlu and Vee Formation**: Claystone, marls, and calcilutites deposited in a marine shelf to slope environment.

4. **Johnson Formation (Palaeocene)** and **Hibernia Formation (Eocene)**: Mainly calcilutites with dolomites, cherts, and claystone streaks.
5. **Cartier Formation (Oligocene)**: Calcareous claystone and marls.
6. **Oliver Formation (Miocene)**: Continuous carbonate deposition with an unconformity at the top due to the collision of the Australian and southeast Asian plates.
7. **Barracouta Formation (Pliocene to Recent)**: Active margin carbonates overlying the Miocene unconformably.

The primary objective of the Chuditch-2 well is to target Plover Formation reservoirs and confirm the quality of the gas reservoir encountered in Chuditch-1. It aims to confirm thicker gas pay in an up-dip direction from the original well toward its bounding fault and conducting a Drill Stem Test (DST) to assess the potential commercial viability of the field.

7.2.2 Noise and Vibration

During drilling operations, assessments to identify potential impacts will be conducted, focussing on noise and vibration generated by drilling activities including the rig and attending offshore supply vessels. Periodically, helicopters will take off and land on the Rig Helideck which is located approximately ~50-60 m above mean sea level. Prior to drilling activities, the only source of non-natural noise will be transient vessel traffic via propeller cavitation and engine noise and vibration.

The baseline assessment for these aspects will be conducted just before the drilling commences and periodic measurements will be taken for analysis during the project. SGBU note noise generation will be transient and localised during operations, potentially causing normal avoidance behaviours of marine species.

7.2.3 Air Quality

There is currently no recorded air quality data in the locality surrounding the well location, nor is there any structure or facility in the vicinity which might affect air quality. SGBU intends to conduct the baseline measurement for this aspect immediately prior to commencing the drilling activities so as to obtain the most accurate data relevant to the time period during

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which the drilling activities will take place. Due to the distance from land and predominantly monsoonal air flow, air quality is anticipated to be good. Potential sources of air pollution, such as emissions from shipping, are expected to be transient and localized compared to the regional context.

7.2.4 Rainfall

Rainfall data collected at Fawcett Point indicates mean monthly rainfall ranging from 0.1 mm during the dry/winter season to 459.8 mm during the wet/summer season, with peak rainfall occurring between December and March. Heaviest rainfall is typically associated with tropical cyclones, which mainly form south of the equator in the eastern Indian Ocean and Arafura and Timor Seas during the wet season. In the Timor Sea, most storms are tropical lows or early-stage tropical cyclones. For example, Tropical Cyclone 26s in April 2021 tracked west-north-westwards from Darwin, Australia. The Bonaparte Basin is prone to tropical cyclones, mostly during the wet (summer) season from December to March. Under extreme cyclone conditions, winds can reach 300 km/h. Note: Severe cyclones can occur anytime between September and May, but severe cyclones may develop in the latter part of the season between January and April.

7.2.5 Oceanography

The data presented in this section is derived from the final report of The International Nusantara Stratification and Transport Program (INSTANT), a comprehensive Indonesian observation program conducted over a three-year period from late 2003 to early 2007. The Arafura - Timor Sea (ATS) region is a semi-enclosed ocean with depths ranging from 30-90m in the Arafura Sea and 50-120m in much of the Timor Sea, reaching depths of over 3000m in the northern Timor Trough area. ATS waters are significant in global ocean circulation, influenced by the Indonesian Throughflow (ITF) Current, which carries water from the Pacific Ocean to the Indian Ocean. The ITF plays a crucial role in transmitting heat and contributes to the Indian Pacific Warm Pool, with its dynamics affected by phenomena such as the El Niño-Southern Oscillation (ENSO). Additionally, Indonesian waters feature a monsoon current system influenced by northeast and southeast monsoon winds, impacting ocean circulation in the ATS region. Beyond currents, changes in oceanographic parameters like density, salinity, temperature, and chemical tracers also influence ocean circulation patterns.

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a. Current and Tides:

Water primarily flows from the Pacific to the Indian Ocean through the Makassar Strait, the Flores Sea, and the Banda Sea, before turning to the Timor Sea and the Ombai Strait. A portion of this current also moves through the Lombok Strait to the Indian Ocean. The Timor Sea serves as the main route for Pacific water entering the Indian Ocean. During the western monsoon, more water flows into the Banda Sea than out of it into surrounding seas. This leads to surges in the Banda Sea during this period, gradually subsiding during the eastern monsoon. Upwelling brings water masses from depths of 125m to 300m to the surface. In June-August, the current reverses direction due to the east monsoon, moving from the Australian continent towards the Asian continent. Surface currents from the Banda Sea, influenced by monsoon winds, flow partially northward towards the Arafura Sea and then southwest through the Timor Sea towards the Indian Ocean. Current velocities during these periods range from 0.1 to 1.7 m/s. Upwelling occurs in the Arafura and Banda Seas during the east monsoon (May-September), with surface water pushed out of the Banda Sea by east winds, causing upwelling. This current collides with the Indonesian Throughflow (ITF) water mass, diverting it southward into the Ombai Strait before continuing into the Java Sea. During September-November, a transition period to the northwest monsoon occurs, affecting surface currents due to west monsoon winds. This leads to lower surface current velocities as wind speeds decrease. Surface currents from the Arafura Sea and Timor Sea move westward, with some entering the Banda Sea and turning southward towards the Indian Ocean. Currents from the north pass through the waters of Papua and Maluku Island, bending southwards. In the northeast monsoon (December-February), influenced by west monsoon winds from the Asian continent to the Australian continent, currents move northeast from the Banda Sea towards the Pacific Ocean, Arafura Sea, and Timor Sea. Some currents traverse Papua and PNG waters to the Torres Strait. Current speeds from the Banda Sea, influenced by the ITF water mass, range from 0.1-0.8 m/s, relatively high compared to other seasons. Deep ocean currents are influenced by the ITF, serving as a transport route for warm water masses from the Pacific Ocean to the Indian Ocean via Indonesian waters.

Tidal currents in the region rotate anticlockwise, with flood towards the NE and ebb towards the SW. Speeds vary from about 0.02m/s on neap tides to 0.1m/s on springs. Surface currents align with seasonal wind patterns, with local wind-driven currents reaching speeds of up to

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0.7m/s during extreme surges, and typically ranging from 0.2m/s to 0.4m/s. Tides follow a semidiurnal pattern with a slight diurnal inequality, featuring a well-defined spring-neap lunar cycle, with spring tides occurring two days after the new and full moon.

b. Sea Surface Temperature (SST)

Surface temperature distribution tends to cluster according to latitude, with warmer waters near the equator and colder waters near the poles. However, temperature deviations between latitudes are relatively small. In Indonesian seas, surface temperatures typically range between 28-31°C with minor annual variations. From 2007-2016, sea surface temperatures (SST) in Indonesian waters varied from 27.91-30.46°C. In the Arafura and Timor Seas (ATS) region, SSTs during transitional periods (March-May 2019) ranged from 25.9°C to 37.3°C, with cooler temperatures recorded at the Gulf of Carpentaria and Torres Strait, and warmer temperatures along the coast of northwest Australia. During the east monsoon (June-August), temperatures ranged from 19.01°C to 34.4°C, with the Gulf of Carpentaria exhibiting cooler conditions than other seasons. In the transitional period towards the west monsoon (September-November), ATS waters were warmer than the previous season, ranging from 23.17°C to 39.15°C. Sea surface temperatures during the west monsoon (December-February) hovered around 30°C, with coastal areas being the warmest and the Timor Sea exhibiting cooler temperatures compared to the previous season. *Project activities are not expected to influence localised surface or subsurface temperatures.*

7.2.6 Water Quality

Currently there is no recorded water quality data in the vicinity of the Chuditch 2 well location; however, existing regional information on Sea Surface Salinity (SSS) suggests a clustered distribution similar to that observed for Sea Surface Temperature (SST). The saltiest waters are found in mid-latitudes with high evaporation rates, while low-salinity waters are mainly located in equatorial areas with high rainfall, along with some areas in high latitudes due to ice melting. Salinity is best described as evaporation minus precipitation plus river input. Satellite data for SSS over four seasons, acquired from HYCOM Imagery from March 2019 to February 2020, show varying salinity values. During the first transition season (March-May 2019), salinity ranges from 33-36 ppm, with the Gulf of Carpentaria exhibiting higher salinity due to water masses from the Pacific Ocean passing through the Torres Strait. During the

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southeast monsoon, salinity in the ATS region increases slightly due to increased evaporation. The second transition season (September-November) sees a gradual decrease in salinity until the arrival of the northeast monsoon, as precipitation increases and evaporation decreases. A peculiar phenomenon is observed in the Gulf of Carpentaria, where salinity tends to be higher throughout the year compared to southern coastal areas of Papua New Guinea (PNG), attributed to greater freshwater input from rivers on the southern coast of PNG.
Results from baseline water quality surveys in the Timor Sea, (Ross et al. 2017) indicated potential contaminants, such as metals and hydrocarbons, were low and often below the laboratory detection limits. Nutrient and turbidity levels in the water column were also low compared to nearshore waters, which is typical for offshore waters and is consistent with other surveys in the region, (Ross et all. 2017).

Proposed drilling activities are not expected to influence salinity levels. Drill cuttings discharged overboard to the water column are expected to disperse in the water column causing minor transient turbidity with no overall effect to the quality of water in the region.

7.2.7 Seabed Environment and Sediment Quality

Sediment supply in the Joseph Bonaparte Gulf is primarily influenced by fluvial input, supplemented by biogenic carbonate sedimentation and carbonate bank erosion. Nearshore, Holocene siliciclastic deposition is prominent in the south, where several rivers discharge into a shallow embayment, and tidal currents transport sediment into deeper waters. The nearshore environment is characterized by muddy sediment in the southwest and west, while sandy sediments dominate the central and eastern basin, with evidence of recent large-scale sediment movement. In Cambridge Gulf, sediment composition varies from gravels to muds, with increasing depth in a shallow inner-shelf and estuarine environment. Large bedforms such as sand waves are not documented in deeper parts of the gulf. Cheniers and coastal sediment formations, exist between the Ord and Keep rivers.

Based upon available information, including the bathymetry and seabed topography data obtained from seismic surveys conducted by Shell and Minza in 2009 and 2012, the seabed at the proposed well location is generally flat. In the vicinity of the planned well location, occasional outcropping mounds were identified during the Geophysical survey conducted in

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Q1 2024 by SGBU. The geotechnical survey findings highlighted the stability of the sediments, which are adequate to support the jack-up rig for the drilling operations.

Examination of seabed sediment quality in the contract area was conducted during the site survey. Studies showed that the seabed sediments primarily consist of fine to medium-grained sands with occasional occurrences of silty and clayish sediments. The physical properties of these sediments indicate a relatively stable seabed suitable for drilling operations. Chemical analysis of the sediment samples revealed low levels of contaminants.

The grab samples from the G&G site survey were consistently similar across the area, and no live bivalves nor bryozoans were recovered. Only one live sponge and one brittle star were recovered from the samples. The high degree of easily suspended sediment, combined with the lack of light suggests that sponge growth is low. Additionally, the drop camera work over the area showed a high degree of similarity with single sponges present in 3 of 10 images and covering less than 5% of the field of view.

Overall, the drop camera showed that at least 95% of the field of view is barren seabed. This information provides a good baseline for monitoring potential future impacts from drilling activities. Due to the barren seabed, deposit of drill cuttings, including oil contaminated cuttings is expected to have negligible effect on the local benthic biota.

7.2.8 Marine Protected Areas

The Coral Triangle, in general, is a highly significant region globally, renowned as the central hub of tropical marine biodiversity. Encompassing only three percent of the Earth's surface, it hosts an extraordinary array of marine life, including 75% of all known coral species, over 3,000 species of reef fish, six of the seven turtle species, whale sharks, manta rays, and a diverse range of marine mammals, including a third of all known whale and dolphin species. The origins of this remarkable biodiversity are attributed to the complex tectonics, evolution, and geological history of the region, including climate fluctuations and changing sea levels. Timor-Leste, situated within the Coral Triangle in the Banda Sea, falls within the biogeographic region known as the Lesser Sunda Eco-region. This area serves as a crucial transition zone between Pacific and Indian Ocean marine biota. Recognized as one of 18 'global marine hotspots,' it is prioritized for tropical coral reef conservation due to its exceptional species

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diversity, high levels of endemicity (particularly among corals and fish), and diverse range of marine habitats.

The area includes the Australian Oceanic Marine Park (adjacent to the contract area), Jaco Island (part of the Nino Konis Santana National Marine Park) located approximately 210km northeast of Timor-Leste, and Vernon Island approximately 280km southeast. The coastal waters surrounding Timor-Leste are within the Coral Triangle, a region comprising tropical marine waters of several countries, including Timor-Leste. This area, according to the World Wildlife Fund, boasts 75% of all known coral species, over half of the world's reefs, 40% of coral reef fish species, and six of the world's seven marine turtle species.

Evaluation of potential impacts of drilling activities on the Australian Oceanic Marine Park, as the closest environmentally sensitive locality will be provided in the Environmental Impact Statement (EIS) and Environmental Management Plan (EMP). Due to the distance from the PSC contact area to protected areas, they are deemed unlikely to be affected by drilling activities.

Table 5. List of Marine protected areas and marine natural reserves

No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch2	Brief Description
1	Nino Konis Santana	Timor-Leste	210Km North	The Nino Konis Santana National Park is East Timor's first national park. It covers 1,236 square kilometres. It links important bird areas such as Lore, Mount Paitchau, Lake Ira Lalaro, and Jaco Island. The park also includes 556 square kilometres of the Coral Triangle, an underwater area which supposedly contains the world's greatest diversity of both coral and coral reef fish. Some of the rare birds protected by this park are the critically endangered yellow-crested cockatoo, the endemic Timor green-pigeon, the endangered Timor imperial-pigeon, and the vulnerable Timor sparrow *(Department of Protected Areas and National Parks, East Timor)*

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch 2	Brief Description
2	Teluk Kupang	Indonesia	455Km North -West	Teluk Kupang is in Indonesia, has been designated as Taman Wisata Alam at National level. It covers 645.1 km2 and it is managed by Balai Besar Konservasi Sumber Daya Alam Nusa Tenggara Timur. This is an important area as a feeding site for migratory shorebirds. Also important for waterbird colonies. (*https://dopa-explorer.jrc.ec.europa.eu/wdpa/101803*)
3	Oceanic Shoals Marine Park	Australia	15 Km South	Marine Park area: 71,743 kilometres2 Depth range: less than 15 – 500 metres Average depth: 87 metres Oceanic Shoals Marine Park is located west of the Tiwi Islands, about 155 kilometres north-west of Darwin. It is the largest of the marine parks in the North Network and directly abuts the TL-SO-19-16 PSC contract area. Oceanic Shoals Marine Park represents an important habitat for threatened marine turtles such as the flatback, olive ridley, and loggerhead turtles, and contains four Key Ecological Features that contribute to the enhanced productivity and high biodiversity observed in this area. This includes the Pinnacles of the Bonaparte Basin, an area that contains the largest concentration of pinnacles along the Australian margin where local upwelling's of nutrient rich water attract aggregations of fish and seabirds. Within this Marine Park, there is also a National Park zone ('no take' zone), which is approximately 184km from the Chuditch-2 Well location. *Australian Marine Park - https://parksaustralia.gov.au/marine/)*

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch 2	Brief Description
4	Arafura Marine Park	Australia	520Km East	Network: North Marine Park area: 22,924 kilometres^2 Depth range: less than 15 – 500 metres Average depth: 120 metres Arafura Marine Park is located about 256 kilometres north-west of Darwin. Within its boundaries lie multiple tributary canyons of the Arafura Depression, which are recognised as a unique seafloor feature. These steep-walled canyons create a diversity of substrate types, and channel nutrient-rich waters from the deep ocean which enhance productivity and support complex ecosystems, including populations of large predatory fish, whale sharks, deep sea sponges, seabirds and marine turtles.
5	Ashmore Reef	Australia	590 Km West	An Australian marine park that covers the Ashmore Reef, which is located about 630 km north of Broome and 110 km south of the
				Indonesian island of Rote. The marine park covers an area of 583 km2 and is assigned IUCN category Ia. It is one of 13 parks managed under the North-west Marine Parks Network. The nature reserve was recognised as a wetland of international importance due to the importance of its islands providing a resting place for migratory shorebirds and supporting large seabird breeding colonies. Ashmore Reef Marine Park is a sanctuary for seabirds, shorebirds, marine turtles, dugongs, and many other marine species. *(Australian Marine Park - https://parksaustralia.gov.au/marine/)*
6	Garig Gunak Barlu/Cobourg	Australia	460Km Southeast	Garig Gunak Barlu is a protected area in the Northern Territory of Australia on the Cobourg Peninsula and some adjoining waters about 216km north-east of the territory capital of Darwin. Garig Gunak Barlu National Park includes the entire Cobourg Peninsula, the surrounding waters of the Arafura Sea and Van Diemen Gulf, and some of the neighbouring islands. It covers about 4,500 km^2. It is one of only two parks in the Northern Territory that contains adjoining land and marine parks. The Park consists of a mosaic of sandy beaches, dunes and coastal grasslands, mangroves, rainforest patches, swamps, lagoons, coral reefs, sea

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch2	Brief Description
				grass meadows and rich marine life. It protects rare species, including Dugongs and six marine turtle species (Green, Loggerhead, Hawksbill, Olive Ridley, Leatherback and Flatback Turtles). Garig Gunak Barlu is also home to the world's largest wild herd of Banteng, a species of cattle native to Southeast Asia. Banteng areendangered in their native habitat. The area has an interesting ancient and contemporary history and the Park protects sites of national archaeological significance. Aboriginal people have lived in the area for more than 40,000 years, and have helped to maintain its natural and cultural values. *(Northern Territory Government information and services - https://nt.gov.au/parks/find-a-park/garig-gunak-barlu-national-park)*
7	Vernon Island	Australia	280Km Southeast	Vernon Islands Conservation Reserve is a protected area in the Northern Territory of Australia located in the locality of Vernon Islands about 50 kilometres north-east of the territory capital of Darwin. The conservation reserve consists of the Vernon Islands, an island group consisting of three islands - East Vernon Island, Northwest Vernon Island and Southwest Vernon Island, and a nearby reef known as Knight Reef which is exposed at low tide. East Vernon Island and North West Vernon Island are covered with mangroves while South West Vernon Island has terrestrial trees on its centre and mangroves to its coastline. The tree cover on all islands is reported as reaching heightsin range of 18 to 21m Intertidal flora consists of seagrass and "algal beds." The intertidal zone around the Vernon Islands is described in one source as "an important coral reef locality" and as a site for turtles and dugongs. The Islands are of cultural and spiritual significance to the following Australian aboriginal peoples – the Tiwi Islanders, the Larrakia and the Wulna. In particular, Tiwi Islanders believe that the Tiwi Islands and adjoining waters including the Clarence Strait were created by their ancestor, Mudunkala. Historically, Tiwi Islanders used the island group for the hunting of dugong and turtles, and as a staging post for journeys to the mainland to "capture mainland women". (*Northern Territory*

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch 2	Brief Description
				Government information and services https://nt.gov.au/search?query=Vernon+Island)
8	East Point Reserve	Australia	337Km South-Southeast	East Point Reserve is a special place for the people of Darwin and is one of the most popular recreation areas for both locals and visitors. Rich in history and biodiversity, East Point Reserve is one of the largest reserves in the Darwin municipality boasting 200 hectares of green space and recreation spaces with ecological, cultural and historic values whilst providing recreational areas. *(City of Darwin* https://www.darwin.nt.gov.au/community/community-facilities/east-point-reserve)
9	Channel Point Costal Reserve	Australia	340Km South-Southeast	Channel Point Coastal Reserve is a protected area in the Northern Territory of Australia. It is situated approximately 240 kilometres south west of Darwin opposite the Peron Islands and between the mouth of the Daly River and Channel Point. The reserve overlaps with the Anson Bay, Daly and Reynolds River Floodplains, an Important Bird and Biodiversity Area. Facilities in the area include a boat ramp, camping area and a small internal road to the boat ramp. The infrastructure development was commenced in 2006 and completed shortly afterward. The area contains habitat for many species of birds including royal spoonbills, magpie geese, plumed whistling-duck, grey teal and glossy ibis. *Northern Territory Government information and services* - *https://nt.gov.au/parks/find-a-park/garig-gunak-barlu-national-park*
10	Joseph Bonaparte Gulf	Australia	500Km South-Southeast	Network: North Marine Park area: 8,597 kilometres^2 Depth range: less than 15 – 100 metres Average depth: 22 metres Joseph Bonaparte Gulf Marine Park is located about 15 kilometres west of Wadeye, Northern Territory, and 90 kilometres north of Wyndham, Western Australia. It is among the shallowest of the marine parks in

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch 2	Brief Description
				Australia. It consists of broad shelf terraces, channels, valleys and extensive banks which make up part of the Shaul Shelf system - the single most extensive system of banks and shoals in the Australian Exclusive Economic Zone. These carbonate banks are host to highly productive reef ecosystems supporting dense sponge gardens, soft coral communities and foraging areas for threatened marine turtles and the Australian snubfin dolphin. *(Australian Marine Park https://atlas.parksaustralia.gov.au/amps?featureId=AMP_N_JBG)*
11	Arnhem Marine Park	Australia	575 Km East-Southeast	Network: North Marine Park area: 7,125 kilometres2 Depth range: less than 15 – 70 metres Average depth: 36 metres Arnhem Marine Park is lies off the coast of west Arnhem Land, about 100 kilometres south-east of Croker Island. The gently sloping shelf within Arnhem Marine Park is topped with a number of pinnacles, and the dynamic habitats this geomorphology creates are of high commercial and conservation value. In addition to providing inter-nesting habitat for the threatened flatback turtle, this marine park is important for breeding species of seabirds such as the bridled tern and roseate tern. *(Australian Marine Park. https://atlas.parksaustralia.gov.au/amps?featureId=AMP_N_JBG)*
12	Kimberley Marine Park		715Km South-Southwest	Network: North-west Marine Park area: 74,469 kilometres2 Depth range: less than 15 – 800 metres Average depth: 75 metres Kimberley Marine Park is located about 100 kilometres north of Broome, and includes continental shelf, slope and deep-water habitats. Kimberley Marine Park includes a variety of different soft sediment and rocky reef habitats, which attract a diverse mix of marine life. It boasts a diversity of slope demersal fish assemblages that is amongst the highest in the country, and also protects important habitat for marine turtles and

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No	Marine Protected areas/ Marine Natural Reserve	Sovereignty	Distance from Chuditch2	Brief Description
				humpback whales, as well as breeding and foraging habitat for inshore dolphins which can be found within the shallower regions of the marine park. *(Australian Marine Park.* *https://atlas.parksaustralia.gov.au/amps?featureId=AMP_N_JBG*

7.2.10 Mangroves

Mangrove forests in Timor-Leste cover a relatively small area of 1,300 hectares, consisting mainly of fringing stands of 19 true mangrove species. These mangroves are situated in sand-dominated deposits within small lagoons along the south coast and sheltered embayment along the north coast. Despite their limited distribution, they are heavily utilized as a source of food and wood for housing and fuel. Additionally, they have served as burial sites during periods of violence in the country's history. The relationship between mangroves and offshore fisheries is uncertain, but their net canopy production is relatively low compared to mangrove forests in other dry tropical zones. Timorese mangroves face an uncertain future due to their small, fragmented distribution, extensive human encroachment, and projected sea level rise. The distribution of mangroves along the Timor-Leste coast indicates small patches of fringing mangrove forests along the north coast near river mouths or small inlets, while along the south coast, mangroves are fewer and typically located in small channels or lagoons behind sandbars, mainly east of river mouths. In total, Timor-Leste is home to 19 true mangrove species and 13 mangrove-associated species.

SGBU anticipate EIA studies will find no impact to coastal areas due to drilling activities.

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Table 6. List of Mangroves and its associates

True Mangroves	Mangrove Associates
Acanthus ilicifolius	*Barrintonia Asiatica*
Acrostichum aureaum	*Callophyllum inophyllum*
Aegiceras corniculatum	*Cerbera manghas*
Avicennia marina	*Derris scandens*
Bruguiera cylindrica	*Derris trifoliate*
Bruguiera gymnorrhiza	*Hibiscus tiliaceus*
Bruguiera parviflora	*Ipomoea pes-caprae*
Ceriops australis	*Pemphis acidula*
Ceriops tagal	*Premna serratifolia*
Excoecaria agallocha	*Scaevola taccada*
Heritiera littoralis	*Suriana maritima*
Lumnitzera racemosa	*Terminalia catappa*
Rhizophora apiculata	*Ryssopterys timoriensis*
Rhizophora mucronata	
Rhizosphora stylosa	
Sonneratia alba	
Sonneratia caseolaris	
Sonneratia urama	
Xylocarpus granatum	

7.2.11 Intertidal

In a survey conducted by Wyatt (2004) in a small area of the near-shore coastal marine environment on the south coast of Timor-Leste, various organisms were identified. This included brittle stars (ophiuroids) and other mobile organisms, along with a total of 27 taxa of sessile organisms inhabiting the reef platform. Among the sessile organisms, there were 18 taxa of algae (including a brown alga *Ascidium sp.* and a green alga *Caulerpa sp.*), three sponges (poriferans), two hard corals (*scleractinians*), two ascidians, one anemone (cnidarian), and one foraminifer. *No impact to tidal zones is expected from drilling activities.*

7.2.12 Coral Reefs

Fringing reefs are one of the most visible type of corals in Timor-Leste. These reefs are exposed to strong coastal currents and are found even in river mouths. They contribute to high fragment levels deposited at the upper reef slope. The shallow coral reefs on the northern

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coast occupy an estimated area of 3,000 hectares, with potential coral habitat of over 60,000 hectares in deeper waters. Whilst coral species occur in shallow coastal waters to open ocean depths of 6000 m, reef building corals occur in waters of less than 46 m depth.

Corals on the northern coast include Acropora, Porites, Heliopora, Millepora, Xenia, and Briarium species. In contrast, the southern coast reefs have higher sponge, hydroid, algal, ascidian, and Montipora coral cover. Montipora colonies with black line disease and some damaged by Drupella grazing are recorded on the southern coast.

The southern coast's climatic variation, including high rainfall and lower water salinity, may affect coral distribution. However, there's limited knowledge about coral reefs in this area. Shallow waters support coral filter-feeders, while deep-water continental shelf communities lack habitat diversity but may host filter-feeding heterotrophs where hard substrate is available.

The eastern side of Timor Island exhibits a higher percentage of coral reefs in good or excellent condition, with 45%, compared to only 23% on the western side, as indicated by the Timor-Leste coral reefs risk assessment map by Burke et al. (2002). Burke et al. also identified several coral reefs along the Timor-Leste coast, including five distinct communities along the south coast, considered to be at medium to high risk of impact from coastal development, marine-based pollution, sedimentation, overfishing, and destructive fishing. These reefs include coral filter-feeders in shallow waters and continental shelf communities in deep waters. In areas with minimal sea floor topography and hard substrate, habitat diversity is limited, predominantly hosting detritus-feeding crustaceans, holothurians, and echinoderms. However, where hard substrate is available, filter-feeding heterotrophs such as sponges, soft corals, and gorgonians may occur.

The G&G site survey in early 2024 indicates that at the depth of approximately 68 meters for the well location, there is an absence of live coral reefs, which typically thrive in shallower, sunlit waters. Thus, there is minimal risk of direct impact on these sensitive marine ecosystems from drilling operations.

7.2.13 Seismicity and Tsunamis

The Timor Sea has experienced tectonic activity for at least the past six million years due to the convergence of the Australian and Eurasian continental plates. Since the mid-1970s, the region has recorded hundreds of earthquakes, many of which occur in the Australian sector

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of the Timor Sea along the edges of the Cartier and Timor Troughs. The dominant earthquakes in this area are subduction earthquakes, caused by one crustal plate being forced below another, with the Timor Trough being a focal point. Earthquake activity within the central Timor Trough and on the island of Timor tends to be more intense, frequent, and of greater magnitude, often exceeding seven on the Richter scale. The Contract area lies in the southern part of the Timor Trough on the Australian continental plate, which subducts northward under Timor. The subduction zone is steeply dipping, with higher activity rates observed to the east toward the Banda Sea compared to the west toward Sumbawa. While seismic activity is absent to the northwest currently, this may not be a long-term feature. Subduction-zone earthquakes in the Timor Trough are shallow at the offshore trench and deepest to the north, with most occurring at depths up to approximately 200 km. Events deeper than 300km are unlikely to cause surface damage to major engineered structures.

7.2.14 Marine Mammals

A variety of whale, dolphin, and porpoise species have broad distributions, including in the Timor Sea, with some considered endangered or vulnerable due to their migratory habits. While species like humpback, sei, Bryde's, and fin whales may occasionally appear in the contract area, it does not offer unique or significant habitat for them. Humpback whales' migration, calving, and resting areas are over 400 km southwest of the contract area, so only occasional individuals might travel toward the Joseph Bonaparte Gulf and NT offshore waters. Blue whales, particularly the pygmy blue whale sub-species, are unlikely to be found in the contract area as they migrate far from its known distribution. Omura's whales may occur in the contract area based on limited data indicating sightings across north-western Australia and off north-east Queensland. Coastal waters of the Joseph Bonaparte Gulf and Darwin Harbour are significant areas for coastal dolphin species, such as the Indo-Pacific humpback dolphin, Australian snubfin dolphin, and spotted bottlenose dolphin, although they are less likely to be found in the deep offshore waters of the contract area but may occasionally venture into the Bonaparte Basin waters.

The Indo-Pacific humpback dolphin, found along the northern coast of Australia, prefers warm waters shallower than 25m and feeds on coastal-estuarine fish. Breeding occurs yearly, with births usually in spring and summer. While not known for large-scale migrations, seasonal shifts in abundance have been observed. Spotted bottlenose dolphins inhabit tropical and

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subtropical coastal waters, typically near shores or in shallow waters less than 30m deep. Their presence in the contract area, located offshore at greater depths, is likely limited due to their preference for shallower waters.

Omura's whales, a recently described species, are distributed in tropical and warm-temperate regions globally. They have been detected year-round in the Timor Sea, with more common sightings between April and September. While some populations may be non-migratory, their movements across north-western Australia are still not fully understood. Given their year-round detection in the Joseph Bonaparte Gulf and across north-western Australia, Omura's whales may be encountered within the contract area and Bonaparte Basin.

In 2009, during the 2D seismic survey in the JPDA 06-101A, the Marine Mammal Observer Field Report cited that there was no cetacean sighted during the survey. However, in 2012, during the Marine Fauna Observation conducted by Minza, there were a total of 11 cetacean sightings in the block JPDA 06-101A. The G & G survey conducted in 2024 did not record any sighting of marine mammals. This could mean that the cetaceans sighted in 2012, were mainly migratory species, and their habitat was far from the contract area. The cetacean sighting between the months of September and December were within a migration period, whereas proposed appraisal drilling in Q1 2025 is understood to be outside of the implied migration period.

Due to the above factors, cetacean and mammalian observations are not expected on a frequent basis, if at all during the drilling period.

7.2.15 Benthic communities Banks and shoals

Several banks, shoals, and reefs are present within the Bonaparte Basin, but none are located within the PSC area. The nearest features to the proposed well location include Oceanic Shoals about 70km southeast, Echo Shoals approximately 230km west-northwest, and Martin Bank about 120km northeast. Other important features within the Bonaparte Basin include Scott Reef, Sandy Islet, Seringapatam Reef, Cartier Island, Ashmore Reef, Hibernia Reef, Oceanic Marine Shoals, Shepparton Shoal, Goodrich Shoal, Lyndoch Bank, Tassie Shoal, and Evans Shoal.

These features are characterized by steep bathymetry, rising sharply from the surrounding shelf to horizontal plateau areas typically 20–30m deep. They support diverse tropical

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ecosystems, including phototrophic benthos typical of tropical coral reefs, algae, reef-building corals, hard corals, and filter-feeders. These shoals and banks may act as 'stepping stones' for enhanced biological connectivity between reef systems in the region, providing additional habitat for marine fauna such as sharks and sea snakes.

The community structure of these features is influenced by various processes, including disturbance from storms and cyclones and localized recruitment due to limited larval dispersal of some invertebrate species. However, the extent of connectivity between individual banks and shoals regarding larval recruitment remains unknown.

- **Seagrasses**

The contract area appears almost devoid of seagrasses due to its water depth (approximately 65 m to 115 m) and unsuitable habitat conditions. Seagrass meadows are crucial for stabilizing coastlines, providing shelter for marine organisms, and serving as critical habitat for endangered species like dugongs and green turtles.

Timor-Leste hosts various seagrass genera, including Enhalus, Cymodocea, Halodule, Halophila, Syringodium, Thalassia, and Thalassodendron. Extensive seagrass meadows, totalling 2,200 hectares, are found along the northern coast, often associated with fringing reefs. These meadows typically peak in density in shallow-water environments like reef flats and lagoons.

Although relatively small, seagrass surveys in Nino Konis Santana National Park confirmed the presence of species such as *Syringodium isoetifolium*, *Cymodocea rotundata*, *Halophila ovalis*, and *Halodule uninervis*, underscoring the ecological importance of these habitats in the region.

Seagrass meadows were not observed during the conduct of the Geophysical and Geotechnical surveys and are not considered to be present in the area of the proposed well location.

7.2.16 Marine Reptiles

Turtles

The Timor Sea, as part of the Arafura and Timor Sea (ATS) region, provides favourable biophysical and oceanographic conditions that support foraging, nesting, and migratory activities for marine species, including sea turtles. Timor-Leste, located within this region, is home to five recorded species of marine turtles: hawksbill turtle, leatherback turtle, green

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turtle, loggerhead turtle, and olive ridley turtle. Additionally, six of the world's seven species of sea turtles can be found in the ATS region, highlighting its significance as a habitat for these endangered marine creatures.

Table 7. Sea turtles in ATS region

Common Name	Scientific Name	Found in ATS	Found in Timor- Leste	IUCN Red List
Loggerhead	*Caretta*	Yes	Yes	Vulnerable
Olive Ridley	*Epidochelys olivacea*	Yes		Vulnerable
Leatherback	*Dermochelys coriacea*	Yes	Yes	Vulnerable
Green	*Chelonia mydas*	Yes	Yes	Endangered
Flatback	*Natator depressus*	Yes		Data Deficient
Hawksbill	*Eretmochelys imbricata*	Yes	Yes	Critically
Kemp's Ridley	*Lepidochelys kempii*	No	Yes	Critically

Sea turtles, including leatherback and olive Ridley turtles, rely on a cohesive network connected by migratory pathways influenced by oceanographic currents. While some species like green and leatherback turtles travel globally across multiple oceans, complete tracking data for all species is lacking. Sea turtles exhibit fidelity to their breeding sites, returning annually, which ensures the continuity of genetic stock and evolutionary lineage. Marine Protected Areas (MPAs) within the Arafura and Timor Sea (ATS) region are crucial for sea turtle conservation. While no nesting sites are identified within the PSC area, Jaco Island and Tutuala beach are known nesting sites, and other potential breeding sites may exist along the south coast of Timor-Leste or in the Northern Territories of Australia. Australia leads conservation efforts with its Recovery Plan for Marine Turtles. However, sea turtle preservation requires connectivity among multiple locations through migratory pathways and nesting beaches. Challenges include human activities like shipping lanes, but solutions such as cautionary protocols for passing vessels and anchor use can mitigate impacts. Further study is needed to understand these impacts and integrate appropriate measures into regulations. In 2009, during the Minza 2D seismic survey in the block JPDA 06-101A, the Marine Mammals Observer reported three sightings of unidentified grey turtles. In 2012, during the Marine Fauna Observation in the block JPDA 06-101A, there were three sightings of turtles: two sightings of Olive Ridley Turtles (*Epidochelys olivacea*), and one sighting of an

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unidentified turtle. During the G&G survey, two adults green turtles (*Chelonia mydas*) were sighted.

Due to the nature of the Chuditch location, observed to be devoid of seagrass meadows, other taxa and at a measured depth of ~ 68m, observation of sea turtles in the area will be limited to transitory or migratory behaviour.

Saltwater Crocodiles

The saltwater crocodile (*Crocodylus porosus*) is the largest and one of the most aggressive crocodilian species, with a distribution that includes Timor-Leste and the islands and coasts surrounding the Timor Sea. Its habitat is limited to a narrow plain between the coast and mountain ridges, including mangroves along the northern coast and various other wetland habitats, especially in the southern part due to higher precipitation patterns. Core crocodile habitats were identified based on local knowledge holders, such as village headmen and traditional elders.

Despite being listed as low risk, least concern by the International Union for Conservation of Nature (IUCN), saltwater crocodiles are very unlikely to occur in the contract area.

Sea Snakes

Sea snakes are common in subtropical and tropical waters, occupying a wide range of habitats and water depths from the coast to offshore reefs and banks. In the Timor Sea region, up to 15 species are known to occur in northern Australian waters. One such species, *Aipysurus fuscus*, commonly known as the dusky sea snake or Timor Reef snake, inhabits reefs in shallow marine habitats and has been recorded at depths of up to 30 meters. *Aipysurus fuscus* has been classified as endangered. While this species may not be encountered in the contract area, unidentified sea snakes were observed during previous seismic surveys in the vicinity. In 2009, during the 2D seismic survey, there were two sightings of unidentified sea snakes (Ecoral Technology, 2009). Additionally, one sighting of unidentified sea snake was recorded in 2012 (Scope Resources, 2012).

Sharks

Sharks, belonging to the elasmobranch fish group, are characterized by a cartilaginous skeleton, visible gill slits, and pectoral fins. Species like the whale shark (*Rhincodon typus*),

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white shark (*Carcharodon carcharias*), and grey nurse shark (*Carcharias taurus*) are typical in saltwater habitats. The whale shark being prevalent in Timor-Leste waters and considered threatened (Fish Base, 2006). The Great White Shark (*Carcharodon carcharias*) may transit the region and is considered vulnerable (Environment Australia 2002). At least 49 species of sharks, including whalers, are identified within the Timor Sea region (Last & Stevens 1994), with whale sharks occasionally transiting through the contract area, although their movements are not well understood. In 2012, one sighting of a hammerhead shark (*Sphyrna sp.*) was recorded in the contract area during the Marine Fauna Observation (Scope Resources, 2012).

Birds

Birds, while primarily land animals, rely on the ocean for their life cycles, particularly during migration. Coastal areas are crucial for roosting, nesting, and foraging, with mangrove trees providing safe roosting spots and easy access to food sources. Birdlife International has identified several Important Bird Areas (IBAs) in the ATS region, including small islands and mangrove habitats that serve as sanctuaries for seabird species.

Table 8. Important Bird Areas (IBAs) in ATS region

SITRECID	INTNAME	23449	Sandy Island and Low Rock (Gulf of Carpentaria)
24819	Kakadu Savanna	23450	Port McArthur Tidal Wetlands System
15990	Pegunungan Daab - Boo	23451	Pearce, Urquhart and Hervey Islands (Sir Edward Pellew Group)
15792	Jaco Island	23452	Tiwi Islands
15791	Mount Paitchau and Lake Ira-Lalaro	23453	Legune (Joseph Bonaparte Bay)
15790	Lore	23455	Bountiful Islands
15991	Pulau Kobroor	23459	Manowar and Rocky Islands
15992	Pulau Baun	23871	Gulf Plains
22105	Seagull Island (Tiwi Islands)	23915	Adele Island
22522	Cadell and Blyth Floodplains	23917	Booby Island (Kimberley)
22523	Milingimbi Islands	23921	Low Rocks and Sterna Island (Kimberley)
23408	Buckingham Bay	23948	Ashmore Reef
23409	Blue Mud Bay	24834	Prince Regent and Mitchell River
23410	Haul Round Island	15796	Areia Branca no Dolok Oan

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SITRECID	INTNAME	23449	Sandy Island and Low Rock (Gulf of Carpentaria)
23411	Higginson Island	16256	Be Malae
23412	Three Hummocks Island	15797	Irabere – Iliomar
23413	Arafura Swamp	15794	Maubara
23426	Hyland Bay and Moyle Floodplain	16257	Subaun
23427	Anson Bay, Daly, and Reynolds River Floodplains	15830	Sungai Klere
23428	Fog Bay and Finniss River Floodplains	15795	Tasitolu
23429	Shoal Bay (Darwin)	15825	Tilomar
23430	Adelaide and Mary River Floodplains	15964	Kateri – Maubesi
23434	Alligator Rivers Floodplains	15959	Manipo
23447	Limmen Bight	15993	Pulau Larat
23448	Islet off NE Grooyte Eylandt	15999	Kepulauan Lemola

In Timor-Leste, approximately 224 bird species exist, with 23 endemics to the Timor Island group. Among these, two are critically endangered and three are endangered according to the IUCN Red List. The Christmas Island Frigate bird is the only seabird among them. Seabirds that may occur in the general area include various tern species, the silver gull, the lesser frigate bird, the common noddy, and the streaked shearwater. During the Minza 2D seismic survey in the contract area in 2009, the MMO reported that there was a total of 10 seabirds in 6 sightings. The species recorded were Shearwaters sp., Petrel Sp. (*Pterodroma Sp.*), Crested tern (*Sterna Bergii*), Frigatebird sp., and one sighting of an unidentified seabird. In 2012, during the Marine Fauna Observation, there was one sighting of an Eastern Reef Egret (*Egretta sacra*). G & G Survey does not provide specific names of bird species that might transit the area of the Chuditch-2 drilling project.

Noise and light generated by drilling activities will be of short duration and not expected to influence migratory bird behaviour.

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7.3 Socio-Economic Environment

7.3.1 Fisheries, Fishing and Shipping Activity.

Coastal communities in Timor-Leste rely heavily on fishing for sustenance and income, with various fish species, including tuna, flying fish, coral reef fish, and deep-water snapper, being essential for their livelihoods. Over half of the country's 20,000 fishermen depend on fishing as their primary source of food and income. Most of these fishermen operate on a small scale, using small boats to catch a variety of fish, particularly sardines. In 2005, approximately 2,889 tonnes of fish, valued at around US$5.8 million, were landed in Timor-Leste, with Dili being the main fishing district. Despite limited growth in fishing activities since then, there have been reports of illegal fishing operations involving larger boats from outside Timor-Leste waters.

Timor-Leste boasts a rich diversity of reef fish, with 739 species recorded across various sites. It is anticipated that the total number of coral fish species will reach 921. Site diversity varied between 64 and 293 species per site, with an average of 210 species per site. Notable sites with high fish diversity include Atauro Island with barrier reefs, Loikere, Ete Asa Lepek, west Jaco Island, and Tenu in Lautem. Additionally, several new fish species were discovered during the study, such as *Chrysiptera caesifrons* and *Eviota santani*.

The Timor Sea region, including Timor-Leste, hosts significant commercial species like tunas, mackerels, and snappers, albeit with some species listed as threatened. *Fish densities in the contract area are anticipated to be low, with occasional pelagic species passing through. Higher fish abundance is expected in shallow coastal areas, reefs, and shoals along the continental shelf's edge, distant from the Rig location. Pelagic fish species, crucial for traditional and commercial fisheries, are found in the deeper offshore regions of the broader Timor Sea area. The expected impact of drilling activities will be considered in the EIA but expected to be minimal.*

7.3.2 Marine Tourism and Marine Heritage

Marine tourism holds promise for economic growth in Timor-Leste, particularly along its northern and eastern coasts, offering employment opportunities and social benefits. Existing ecotourism activities, including cultural tours, wildlife interactions, fishing competitions, and

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diving, demonstrate potential for further development pending improvements in infrastructure and services. In northern Australia, commercial marine tourism is already significant, encompassing activities like charter fishing, diving, snorkelling, and whale watching, particularly around the Kimberley archipelago and Northern Territory coast. This industry is expected to expand in the future, with recreational fishing ventures projected to increase in effort and numbers. Additionally, the cruise shipping sector, particularly in Darwin, has experienced notable growth. There are no significant heritage or archaeological sites in the vicinity of the survey or drilling area.

Due to the distance offshore in an open ocean environment without any tourism and heritage listed attractions, the impact of the drilling activity on cultural heritage issues and tourism is considered remote.

7.3.3 Oil and Gas Industry

Oil and gas exploration, development, and production activities are widespread throughout the Arafura and Timor Sea (ATS) region. In Australia, these activities are concentrated along the Bonaparte Coast, the Arnhem Coast, and the Gulf of Carpentaria, with significant contributions from Northern and Western Australia. Indonesia also has oil and gas concessions, primarily focused on exploration in Nusa Tenggara, Maluku, and West Papua, including areas like Bintuni Bay. Timor-Leste has the Bayu-Undan production facilities but is not as extensively developed as other areas in the region.

7.3.3.1 Existing Marine Infrastructure

The only operational petroleum asset within a 150 km radius of the SundaGas' Contract area is the Bayu-Undan gas field. Chuditch-2 is located about 140km east-northeast of Bayu Undan production facilities, which has been in production since April 2004. The Bayu-Undan field comprises drilling, production, and processing platforms and subsea infrastructure including active flowlines, as well as a floating storage and offloading facility. Initially, the field was commissioned to separate condensate, propane, and butane for export while reinjecting dry gas into the reservoir. Subsequently, the field transitioned to LNG production, supplying gas to the Darwin LNG facility via a 502km-long pipeline. The Darwin LNG plant has been in operation since February 2006 and is located at Wickham Point, Australia, approximately

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350km from the SundaGas Contract area. The Bayu-Undan field is expected to cease production in ~2024, with plans for conversion into a Carbon Capture and Storage project.

7.3.3.2 Offset wells

The Bonaparte Basin is a well-established hydrocarbon province with numerous discoveries fields. In proximity to the PSC TL-SO-19-16 contract area and proposed appraisal well location (Chudicth-2), there are 18 offset wells (Table 9). The nearest well to Chuditch-2 is Chuditch-1, situated 5 km to the east. Other offset wells in the vicinity of the proposed well location are Shearwater-1, Sikatan-1, Heron-1 and 2, Sunrise-1 and 3, and others as shown in Figure 10.

Table 9. Chuditch-2 Offset well

	Well	**Year TD**	**Operator**	**Distance**
Offset Wells	Chuditch-1	1998	Shell	5 km
	Shearwater-1	1974	Arco	19 km
	Sikatan-1	1995	Boral Energy	48 km
	Blackwood-1ST1	2008	MEO	79 km
	Blackwood-2	2013	Eni	87 km
	Heron-1 ST1	1972	Arco	89 km
	Heron-2	2008	Eni	88 km
	Heron South-1	2012	Eni	94 km
	Jura-1ST1	1999	Woodside	98 km
	Bard-1	1998	Woodside	89 km
	Loxton Shoals-1	1995	Woodside	117 km
	Sunset-1	1997	Woodside	103 km
	Sunset West-1	1998	Woodside	105 km
	Sunrise-1	1975	Burmah/Woodside	107 km
	Sunrise-3	2008	Woodside	119 km
	Wallaroo-1/ST1	1996	Enterprise	79 km
	Nabarlek-1	1994	Enterprise	83 km
	Basilisk-1/1A	1993	Marathon	97 km

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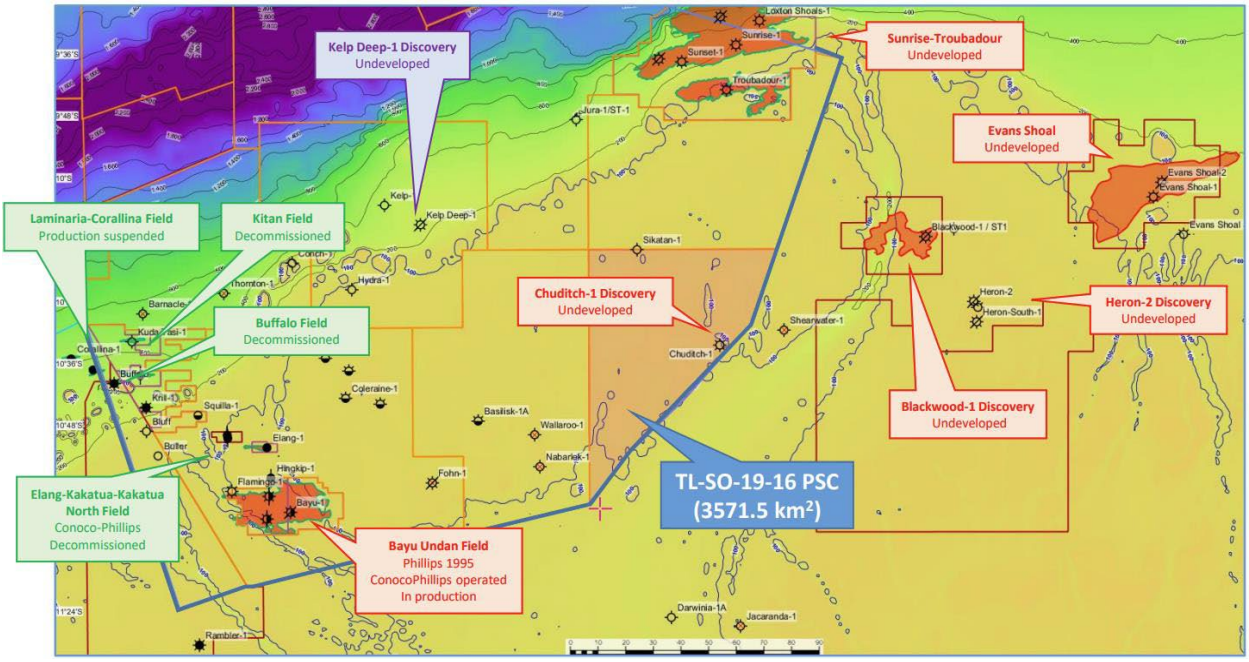
Figure 10. Timor Sea Bathymetry, Oil and Gas Fields



7.3.3.3 Under Water Telecommunications Cable

In May 31, 2022, the Government of Timor Leste signed an agreement with Alcatel Submarine Network (ASN) for the implementation of TL's South Submarine Cable project. This project aims to connect Darwin Port across the Timor Sea to Dili. While the preliminary planning route suggests that the cable will likely pass through the eastern part of the contract area from Darwin, the exact final route from Darwin has yet to be determined. In the ATS region, there is a network of marine underwater cables extending in various directions. These cables, which can be coaxial or fibre-optic, are typically buried in the ocean floor at depths of around 1,500m. They are most densely distributed in Indonesian waters, especially around the Banda Sea and Arafura Sea, but are also common along the Bonaparte Coast of Australia. The total length of these marine cables is estimated to be around 5,735 km. In Indonesia, the cable route begins from Nusa Tenggara (Rote) and extends to Maluku (Aru and Kei), then proceeds to West Papua and across from Merauke to the seas surrounding PNG.

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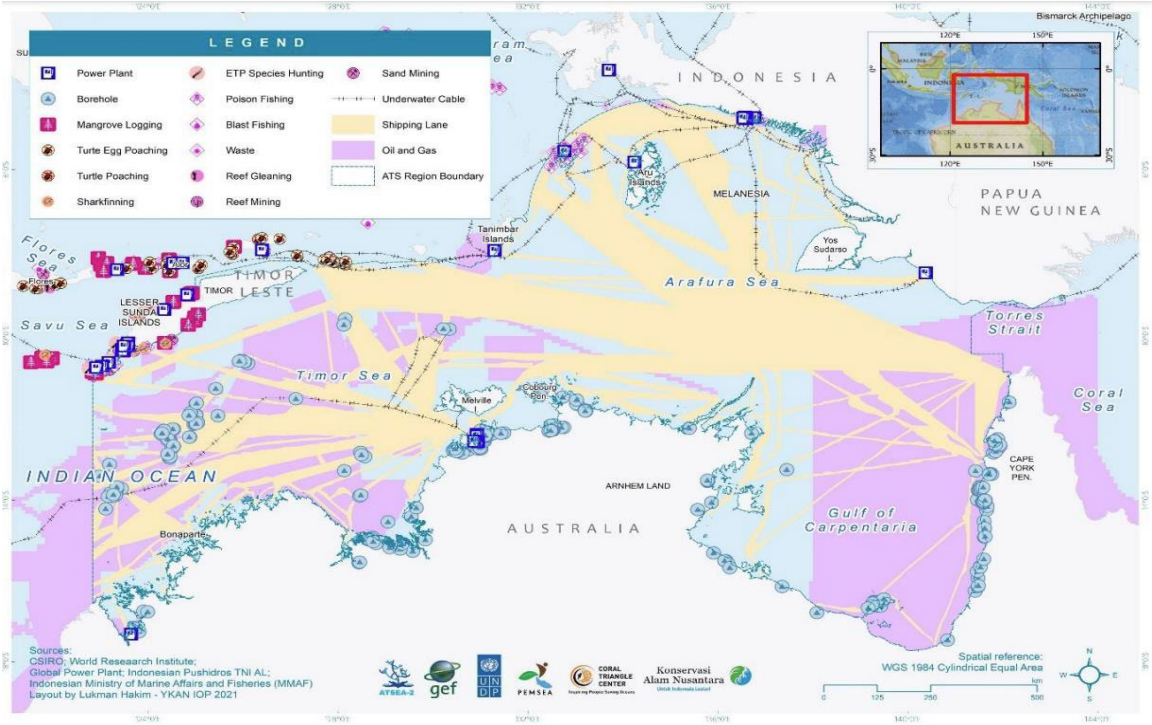

Figure 11. Key features of activity in ATS ATSE-2 2021, Adjust - SG 2023

7.3. Methodology and Approach

The identification and assessment of potential impacts associated with the project will adhere to Timor-Leste legislative requirements outlined in Environmental Licensing Decree Law 5/2011 and Ministerial Diploma 46, specifically Annex IV EIA Template. The approach will also align with Sunda Operating Management System (OMS) and the agreed drilling program.

Internationally accepted methodologies and best practices will be followed, including guidelines from the International Finance Corporation (IFC), such as the EHS General Guidelines, Environmental Health and Safety Guidelines for Offshore Oil and Gas Development (June 2015), and IFC Performance Standard 1 (PS 1) for Assessment and Management of Environmental and Social Risks.

Additionally, industry best practices, as outlined in the environmental management standard "Environmental Management in Oil and Gas Exploration and Production" (UNEP Technical Report 37, 1997; IOGP Report No. 254), will be applied.

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Ministerial Diploma 46, Annex IV, provides further guidance on the approach required by the proponent to identify project impacts for each phase: construction, operation, and decommissioning. The assessment will address various aspects, including direct and indirect impacts, cumulative impacts, impacts of climate change, short-term, medium-term, and long-term impacts, as well as temporary and permanent impacts, and both positive and negative impacts.

In terms of approach, SGBU considers that the data obtained from the G&G site survey, which confirmed that the area of the proposed well site is a shelf area of ~68m depth with no evidence of live corals, only an occasional Brittle starfish or sponge and minimal benthic infauna observed in grab samples. This data combined with publicly available data is considered sufficient for the purpose of compiling the TOR and designing the EIS and EMP. *SGBU proposes to obtain the environmental baseline measurement immediately prior to the drilling activities (on day 1 of the 40-day appraisal drilling period), as it will provide a more accurate measurement of the environment at the commencement of drilling as opposed to data obtained in a dynamic environment several months before commencement of activities.* Please refer to table 11 below for further information.

Table 10. Types of Data and their justifications

Category	Description	Information collected	Observation
1. Environmental Data Gathering	Data collected during the G&G survey	- Three samples grab of seabed sediment during G&G - Only one live sponge and one brittle star recovered from the samples. - No live bivalves nor bryozoans recovered. - Drop camera work over the area showed a high degree of similarity with single sponges present in 3 of 10 images and covering less than 5% of the field of view. - Overall, the drop camera showed that at least 95% of the field of view is barren seabed. - Observed two green turtles during G&G	

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Category	Description	Information collected	Observation
		- No marine mammals observed.	
	Marine Mammal Observer (Field Report) from 2D seismic Survey in 2009.	- Three sightings of unidentified turtles. - Two sightings of one unidentified sea snakes - Six sightings of seabirds (total 10 seabirds) - No sight of marine mammal	
	Marine Fauna Observation in 2012 in the contract areas.	- Three sightings of turtle: two olive riddle and one unidentified. - One sighting of a hammerhead shark - One sighting of unidentified sea snake. - 11 sightings of marine mammals	
2. Environmental baseline measurement (EBM) which will be carried out just before the drilling commence (on day 1)	Air quality baseline measurement	Use anemometer to test the GHG emission level.	
	Noise and vibration	Using the decibel meter to test the noise, and the vibration meter/analyser to test the vibration.	
	Water quality baseline measurement	Water quality test will be limited to using the water profiler, to check salinity, turbidity, conductivity, pH, temperature, and compared it to the normal threshold based on the WHO standard.	There will be no water samples to be brought to the lab due to time limit and logistics issues. SGBU considers that water sampling prior to commencement of drilling activities will be unlikely to provide any relevant and meaningful data. The area is subject to large tidal and current fluctuations. Water column salinity is not stable and fluctuates in the monsoonal phases. Water sampling during the active drilling phase may provide meaningful data, but the effect will be transient.
3. Environmental monitoring	Synthetic Based Mud (SBM)	Approximately on day 7, SBM will start to be discharged (please note that	This monitoring will be done by using Remotely Operated Vehicle (ROV).

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Category	Description	Information collected	Observation
		the first week of the drilling will use the WBM on the top-hole section). First monitoring will be on commencement of employing SBM downhole to to check the SBM discharge coverage on the seabed, second monitoring on day 21, and third/last monitoring on day 40 to check the biodegradation of SBM.	SBM contaminated cuttings (<10% by volume) will be discharged from a mud discharge line about 3 meters below surface depth. The discharged cuttings will then descend through the water column of ~ 65m. The cuttings will disperse to an extent due to gravity and water movement. before reaching the seabed. The shape of the cuttings heap will depend upon weight of individual cuttings, water column depth. SGBU will consider cuttings modelling and a study for SBM and biodegradation in the EIS.
	Air quality	Fortnight monitoring on GHG emission by using the anemometer. Emission could also be calculated through combustion.	It is the position of SGBU that there is little environmental value in obtaining air quality data prior to commencement of project related activities. The area is subject to trade wind activity of variable strength. Any pollutants produced by rig or vessel activity will rapidly disperse in the air column. Measurable readings will likely only be available in the immediate vicinity of rig and vessels.
	Noise and vibration	Fortnight monitoring using the decibel meter to test the noise, and the vibration meter/analyser to test the vibration.	Minor, highly localised causing normal avoidance behaviours and of a transitory nature as the well is programmed for a total of 40 days.
	Water quality	Will use water profiler to monitor the data every two weeks.	Due to the logistics, and time limit on viability of samples, SGBU will use the water profiler to monitor the water quality,

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Category	Description	Information collected	Observation
			without taking any water samples to be tested at the laboratory. (Also refer to the explanation about baseline above)
	Marine mammals and reptiles	Periodic visual observation within practical visual range	Observe from the rig and from the bridge of supply vessels on station.

Types of Impacts and Definitions

An impact refers to any alteration to a resource or receptor resulting from a project component or related activity. Baseline data evaluation is vital as it offers essential information for assessing and describing the potential effects of the project on the biophysical and socio-economic environment.

Table 11. Impact Nature and Type

Nature or Type	Definition
Positive	Impact that is of benefit to the receiving environment
Neutral	Impact that has No Cost or benefit to the receiving environment
Negative	Impact that is a considered to represent an adverse change or introduces a new undesirable factor; A cost to the receiving environment
Direct	Impact that results from a direct interaction between a planned project activity and the receiving environment
Indirect	Impact that results from other activities that are encouraged to happen as a consequence of the project activity

Characterization of Impacts

Predicting impacts involves subjective assessments based on qualitative or semi-quantitative methods to anticipate the environmental consequences of the drilling project. To determine the significance of these impacts, it's crucial to first describe their character, nature, and type comprehensively.

The criteria used to describe impact characteristics are detailed in the Table 11 and 12 below, and are summarised as follows:

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- **Extent:** The spatial scale of the impact (i.e., site-specific, local, regional, national and or international).
- **Duration:** the temporal scale of the impact, the time period over which the effect will last (i.e. short-term, medium-term, long-term, permanent).
- **Intensity - environment:** sensitivity, resilience and/or ability to function.
- **Intensity – social and economic:** number of people affected by the project.
- **Likelihood:** the frequency/probability of impact or how often it might occur (i.e., not probable, probable, highly probable, definite).

Table 12. Characterisation of impact, its criteria, and ranking

CHARACTERI-SATION OF IMPACT	EVALUATION CRITERIA	RANKING
EXTENT	**Site-Specific:** Impact that are limited to the boundaries of the project site	1
	Local: Impacts that extends beyond the site boundary; affects the immediate surrounding environment (i.e. up to 5km from Project Site Boundary)	2
	Regional: Impact that extends far beyond the site boundary; widespread effect (i.e. 5km and more from the Project Site Boundary)	3
	National and/or international: Impact that extends far beyond the site boundary; widespread effect	4
DURATION	**Short-term:** Impact that is quickly reversible; 0-5 years	1
	Medium term: Impact that is reversible over time; 5-15 years	2
	Long-term: Impact that lasts 16-30 years	3
	Permanent: Impacts that last over 30 years and resulting in a permanent and lasting change that will remain	4
INTENSITY - ENVIRONMENT	**None:** The impact on the environment is not detectable	1
	Low: Low value. The impact affects the environment in such a way that natural functions and processes are not affected	2
	Medium: Moderate value. Where the affected environment is altered but natural functions and processes continue, albeit in a modified way	3
	High: High value. Where natural functions or processes are altered to the extent that they will temporary or permanently cease. Where the affected environment is permanently altered	4
	None: Affecting a small number of Individuals/households, or communities.	1

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CHARACTERI-SATION OF IMPACT	EVALUATION CRITERIA	RANKING
INTENSITY OR NUMBER OF ELEMENTS - SOCIAL, AND ECONOMIC	**Low:** Affecting a small number of Individuals/households, or communities.	**2**
	Medium: Affecting more Individuals/households, or communities.	**3**
	High: Affecting a large number of Individuals/households, communities	**4**

Table 13. The time scale of impact and its likelihood

IMPACT	TIME SCALE OF IMPACT - LIKELIHOOD	RANKING
LIKELIHOOD	**Improbable:** Possibility of the impact materializing is negligible; chance of occurrence <10%	**1**
	Probable: Possibility that the impact will materialize is likely; chance of occurrence 10-49%	**2**
	Highly Probable: It is expected that the impact will occur, chance of occurrence 50-90%	**3**
	Definite: Impact will occur regardless of any prevention measures, chance of occurrence >90%	**4**

Impact Significance.

The impact significance refers to the severity or magnitude of the impact which will be assessed by using significance rating matrix (Table 13) and significance ranking (Table 14).

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Table 14. Risk Matrix

Ranking	Extension	Duration	Intensity-Environment	Health and Safety		Social and Economic	Likelihood			
				Health	Safety		1	2	3	4
1	Site-Specific	Short	None	None	None	None	1	2	3	4
2	Local	Medium	Low	Low	Low	Low	2	4	6	8
3	Regional	Long	Medium	Medium	Medium	Medium	3	6	9	12
4	National/International	Permanent	High	High	High	High	4	8	12	16

Table 15. Significance Ranking

SIGNIFICANCE RANKING	**IMPACT LEVEL**
13 - 16	Major
9 - 12	Moderate
5 - 8	Minor
1 - 4	Negligible
Positive impact	Beneficial

7.4. Mitigation Measures and Residual Impacts

The process of measuring impact and assessing significance typically leads to the identification of harmful effects that need mitigation. Mitigation measures will be formulated based on international guidelines such as those from the World Health Organization (WHO) and the

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International Finance Corporation (IFC), as well as insights gained from fieldwork and stakeholder engagement exercises. These measures may include specifying equipment performance standards, developing policies and procedures, exploring alternative technologies or sites, considering the use of alternative chemicals or materials, implementing waste recovery systems, and developing contingency plans. The hierarchy of environmental impact mitigation controls, which prioritize avoidance or prevention, minimization, rehabilitation, and offsetting, will guide the selection and implementation of these measures (refer to the examples in Table 9).

7.5. Environmental Impact Statement and Environmental Management Plan

An Environmental Impact statement will summarise all environmental effects. Then Non-Technical Summary of the EIS will be appended to the EIS but will be a 'standalone' document.

The Environmental Management Plan (EMP) inclusive of the monitoring program will outline the actions needed to implement mitigation measures and monitor the implementation and effectiveness of the same from the start of drilling process until the programmed well abandonment. The EMP will cover monitoring, auditing, compliance, contingency and planning.

The Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) serve several critical purposes:

1. **Coverage across project phases:** Both documents span from the project's inception through its operational phase to the permanent abandonment of the well per appropriate engineering procedures, ensuring that environmental considerations are addressed comprehensively throughout the project's lifecycle.
2. **Assessment of multiple factors:** In addition to environmental aspects, the EIS and EMP also assess social, cultural, and economic factors, recognizing the interconnectedness of these elements with the environment.
3. **Identification and mitigation of impacts:** The EIA considers and the EIS lists the potential environmental impacts of the project, assesses the significance of each impact, and proposes mitigation measures to eliminate, reduce, minimize, or compensate for these impacts.

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4. **Monitoring requirements:** The documents outline the methodology, locations, frequencies, and responsibilities for monitoring environmental parameters to ensure compliance with regulations and the effectiveness of mitigation measures.
5. **Estimated costs:** They provide estimates of the costs associated with implementing the proposed mitigation measures, aiding in budgeting and financial planning for the project.
6. **Reporting mechanisms:** They specify the types of reports to be generated and designate the individuals or entities responsible for preparing and submitting these reports, ensuring transparency and accountability.
7. **Continuous improvement:** They emphasize the importance of continuous improvement in environmental management actions, acknowledging the evolving nature of environmental challenges and the need for adaptive management strategies.

SGBU will conduct ongoing monitoring program during the active drilling phase. The monitoring will be conducted every two weeks, and their methods are described in the table below.

NO	ASPECT	Methods	Comments/Observation
1	**Synthetic Based Mud (SBM)**	Approximately on day 7, SBM will start to be discharged (please note that the first week of the drilling will use WBM on the top-hole section). First monitoring will be on commencement of employing SBM downhole to check the SBM discharge coverage on the seabed, second monitoring on day 21, and third/last monitoring on day 40 to check the biodegradation of SBM.	This monitoring will be done by using Remotely Operated Vehicle (ROV). SBM will be dropped from a height of 68m which will result in a velocity before reaching the seabed. The shape of the cuttings and the current will create dispersion. We will provide cutting modelling, its calculation and biodegradation chart.
2	**Air quality**	Using the anemometer to monitor the GHG emission every two weeks.	Emission could also be calculated through combustion. The area is subject to trade wind activity of variable strength. Any pollutants produced by rig or vessel activity will rapidly disperse in the air column. Measurable readings will likely be available in the immediate vicinity of rig and vessels.

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NO	ASPECT	Methods	Comments/Observation
3	**Noise**	Using the decibel meter to measure the noise level at different distance every two weeks, from the immediate vicinity, up to about 500m away.	
4	**Vibration**	Using vibration meter/analyser to test the vibration	
5	**Water quality**	Will use water profiler to monitor the water quality every fortnightly to measure salinity, turbidity, conductivity, pH, temperature, and compared it to the normal threshold based on the WHO standard.	Please refer to the table 10 to see the justifications of why we will only use the water profiler, without taking any water sampling.
6	**Marine mammals and reptiles**	Periodic visual observation within practical visual range from the rig and from the bridge of supply vessels on station.	

Table 16. EMP Considerations

NO	ASPECT	POTENTIAL IMPACT	MITIGATION MEASURES / ENVIRONMENTAL MANAGEMEN PLAN
POSITIVE IMPACTS			
1	**Employment opportunities**	Potential job opportunities in the future, once the Chuditch field reaches the development and production stage.	• Maximise the number of local people to be recruited where possible.
NEGATIVE IMPACTS			
2	**The use of Synthetic Based Mud (SBM)**	SBM takes longer to biodegrade and have a potential negative impact to the marine environment.	• The drilling will use Water Based Mud (WBM) in the top-hole section. • The drilling will use Saraline 185V, which is rated "E" for having the lowest environmental hazard (Shell, n.d.) in the 12 1/4" section of the well. • Saraline has very little to no toxicity to mammalian and other marine species • Saraline 185V is readily biodegradable in

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NO	ASPECT	POTENTIAL IMPACT	MITIGATION MEASURES / ENVIRONMENTAL MANAGEMEN PLAN
			seawater, soil and sediments with more than >60% biodegradation, under anaerobic conditions, within a 28-day period. • SundaGas will apply for a permit to use the Saraline 185V, with justifications that it has no significant impact to marine environment.
3	**Biofouling**	Vessel could bring marine pests or invasive species, which could harm the native marine species.	• Valaris Biofouling Management Plan • Valaris Biofouling Inspection Report
4	**Air Quality**	Vessel and rig powerplants and electrical/Hydraulic power generation units will emit Green House Gases (GHG) which could have negative impact on the atmosphere composition and marine avifauna, also on human health.	• Vessel will comply with the air emission requirements based on international standards. • During well testing, the volume of the hydrocarbons flared during testing will be reduced to the practical amount. • Appropriate combustion enhancement system will be selected to minimize incomplete combustion, black smoke, and hydrocarbon fallout to the sea.
5	**Water quality**	Drilling operation, drilling waste (wastewater, muds, cuttings, cement), well testing	• Use nontoxic & friendly chemical. • Cuttings would be treated before disposal. • Implement drilling waste management by waste segregation, reuse & recycle as per plan.
6	**Operational Leaks and Spills**	Potential increased contamination to the sea, atmosphere, and marine flora and fauna	• Proper storage for chemicals • Spill Contingency Plan and appropriate training and readiness drills. • Fit for purpose and adequately maintained fluids transfer systems. • Rig floor bunding system
7	**Diesel leaks from the supply vessel.**	Polluted the sea and could harm the marine flora and fauna.	• Supply vessels is fitted with double skinned fuel bunkers which are collision resistant and buffered bulwarks and topsides. Vessels are equipped with pumps to routinely transfer fuel within the vessel tankage to trim the vessel and may be used to evacuate fuel from a ruptured bunker to limit any loss to the environment.

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NO	ASPECT	POTENTIAL IMPACT	MITIGATION MEASURES / ENVIRONMENTAL MANAGEMEN PLAN
8	**Worst Case Oil Spill**	Well blow out, fire, personnel evacuation, and another emergency	• The Chuditch well is expected to be a dry gas well, with condensate levels, based upon offset well data, The gas will dissipate rapidly in the atmosphere due to wind activity. The short ends (condensates) will evaporate rapidly given the high ambient air and water temperatures prevalent in the area and monsoonal winds. • Implement drilling safety (equipment, personnel & procedures) such BOP, well integrity, inspection and maintenance • Implement best practices • Emergency Response Plan • Conduct drill & table top exercise
9	**Solid Wastes**	Waste could harm the marine environment.	• Waste management plan
10	**Liquid Effluent**	The drilling activity will generate grey and black water streams. WBM will be discharged to the environment after use, and also the potential impact of liquid discharge from vessel to the sea.	• Grey and black water generated during drilling activities will be treated to Marpol requirement. • WBM having zero environmental effect will be discharged overboard after use. Synthetic base oil will not be discharged overboard except as oil contaminated cuttings • Treatment processes shall be employed to reduce oil on cuttings to approximately 10% by wet weight.
11	**Noise**	Noise from the drilling activity and vessel may harm the marine species, particularly marine mammals.	Marine fauna exhibits a natural aversion and avoidance of high sound and vibration levels in the short term and may exhibit transient changes in behaviour, with the noted exception of some pelagic shark species.
12	**Vibration**	Potential impact of vibrations on the surrounding marine ecosystem, particularly on sensitive species.	SGBU/Valaris will employ certified and fit for purpose equipment
13	**Light**	Light pollution from the flare, rig, and vessel lighting could affect birdlife and their migratory patterns.	• The flaring will be minimised to 3-4 days max. • The light from the rig and vessel has minor and transitory impact, within the 40 days of the drilling period.
14	**Salinity**	The drilling activity could potentially increase the salinity	• Rig is equipped with desalination equipment. • The rig will be supplied with potable water from the offshore service vessels, so there should be little to no concentrated brine from potable water generation.

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NO	ASPECT	POTENTIAL IMPACT	MITIGATION MEASURES / ENVIRONMENTAL MANAGEMEN PLAN
15	**Community**	Cultural Concern, Public Complaint	Consultation with communities, local authorities, and traditional/cultural elders.

7.6. Public Consultation

Stakeholders

Public consultation with stakeholders will occur when SundaGas applies for drilling approval following the authorization of the Environmental category's Term of Reference (ToR). The purpose of the public consultation is to inform stakeholders about the survey/drilling location of the planned well construction, ensuring stakeholders receive sufficient information before the drilling activity commences, addressing any questions or concerns they may have.

The stakeholder of this public consultation include:

1. *Autoridade Nacional do Petróleo* (ANP)
2. Ministry of Petroleum and Mineral Resource
3. Ministry of Tourism and Environment
4. *Unidade Policia Marítima* (UPF-PNTL)
5. *Unidade Policia Esplosivo*
6. *Autoridade Maritima Nacional*
7. *Direcção Nacional Transporte Maritima*
8. *Gabinete das Fronteira Tereste no Maritima*
9. *Asosiasaun Peskas no Mariña Timor Lorosa'e* (APM-TL)
10. Port Custom (Ministry of Finance)
11. Port Authority (APORTIL)
12. Ministry of Agriculture and Fisheries
13. *Força Mariña de Falintil Forsa Defesa de Timor-Leste* (F-FDTL)
14. Ministry of Health
15. Australian Embassy
16. Civil Society Organizations – CSOs (e.g., Lao Hamutuk)
17. Coastal communities, mariners, and fishermen

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18. *Prezidente Autoridade Municipio*, *Administrador Postu*, *Xefe do Suku*, *Lia Nain*, etc
19. Ministry of Foreign Affairs
20. Quarantine

Key Comments and Concern

Overall, the exploration program is expected to have minimal environmental impact in the PSC area. However, should any impact be identified, SundaGas and its subcontractors are obligated to inform stakeholders. Furthermore, additional consultation will be conducted to address any concerns that may arise.

During the Environmental Impact Assessment (EIA) process, public consultations will be conducted involving various stakeholder groups like government agencies, local residents, businesses and CSOs. Key topics discussed will be integrated into the Environmental Impact Statement (EIS), ensuring coordination with pertinent authorities and addressing project impacts on local communities and their interests throughout all project stages. Additionally, project announcements will be made in both local and national newspapers.

Ongoing Proposed Stakeholder Consultations

Consultation with identified stakeholders will persist throughout the entirety of the drilling operation.

Proposed Stakeholder Consultations Strategy

1. One day townhall consultation involving listed stakeholders is necessary to gather feedback and ensure informed awareness of the benefits and impacts of the drilling process, fostering transparency and community engagement in the project. This approach allows for a democratic process where local voices are heard, concerns are addressed, and stakeholders can contribute to decision-making. It also helps in building trust between the project developers and the community, mitigating potential conflicts and resistance. Additionally, such consultations can uncover local knowledge and insights that can improve project design and implementation, ensuring that the project not only minimizes negative impacts but also maximizes local benefits. By actively involving stakeholders, the project can better align with community needs and expectations, enhancing social license to operate and contributing to sustainable development goals.

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2. Sharing information through the development of frequently asked questions in flyers and posting them in *sucos* and *aldeias* around coastal areas from Suai, Viqueque, Manatuto, Lospalos, Baucau, and Dili will help disseminate crucial details to the local populations, ensuring they are well-informed and can participate meaningfully in the consultation process.

   Additionally, utilizing community radios, television, and a dedicated Facebook page during the drilling process will expand the reach of this information. These platforms are effective in reaching different segments of the population:

   - Community Radios: Local radio stations can broadcast information making it accessible to those who may not be literate or have access to written materials.
   - Television: Broadcasting information through local TV channels can visually present project details, benefits, and potential impacts, which can be particularly effective in conveying complex information.
   - Facebook Page: A dedicated Facebook page can serve as a dynamic platform for disseminating information, engaging with the community, and gathering feedback. It allows for interactive communication where community members can ask questions, share their thoughts, and stay updated on project developments. Social media also helps in reaching younger demographics and urban populations who are more likely to use digital platforms.

This multi-faceted communication strategy ensures comprehensive coverage and inclusivity, addressing the informational needs of diverse community members. It reinforces the project's commitment to transparency and community engagement, building a strong foundation of trust and support. By using various media, the project can effectively mitigate misinformation, address concerns promptly, and demonstrate responsiveness to community feedback, ultimately fostering a collaborative and informed environment for project implementation.

Other Consultation with Other Jurisdiction

The only institution or authority involved in petroleum activities in Timor-Leste, both onshore and offshore, is the *Autoridade Nacional do Petróleo* (ANP). Previously, operators of Production Sharing Contracts (PSCs) in the former Joint Petroleum Development Area (JPDA)

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would notify the Australian government, the Northern Territory government, and the Australian Maritime Safety Authority (AMSA) of any offshore exploration activities, such as seismic surveys and drilling operations. Given the proximity of the Chuditch project to the maritime boundary, SundaGas may also, as a courtesy, include the Federal Government of Australia and the Northern Territory State Government, especially if Darwin is considered as a base for supply during drilling operations, including emergency response.

Consultation with Other Authorities

Consultation will be conducted with the *Autoridade Nacional do Petróleo* (ANP), which operates under the Ministry of Petroleum and Mineral Resources.

Timor-Leste's environment and its valuable natural resources are seen as potential sources of wealth that can support economic growth and community development. This perspective is reflected in the Strategic Development Plan 2011–2030, endorsed by the Timor-Leste government, which emphasizes the importance of exploration and appraisal for the development of oil and gas resources. SundaGas is collaborating with the government in the national interest, as evidenced by the signing of the PSC. The government recognizes the necessity of developing these resources sustainably and in accordance with best oil field practices.

8. Flexibility

During the Environmental Impact Assessment (EIA) process, the study area, project alternatives, and impact issues may change as new information emerges. In such cases, the Terms of Reference (TOR) of the Environmental Impact Statement (EIS) and the Environmental Management Plan (EMP) will be adjusted in consultation with ANP to ensure that these new issues are thoroughly considered and addressed.

REFERENCES

Alongi, D.M., K. Edyvane, do Ceu Guterres, W.S. Pranowo, S. Wirasantosa, and R. Wasson (2011) Biophysical profile of the Arafura and Timor Seas. Report prepared for the Arafura Timor Seas Ecosystem Action (ATSEA) Program. 32p.

Apache Energy (2001). Simpson Development: Public Environmental Report, Report Number: EA60-RI-I 10. Apache Energy Limited, Perth, Australia.

APPEA (1996). Code of Environmental Practice. Australian Petroleum Production & Exploration Association Limited, Canberra, Australia.

Australian Hydrographic Services (2003). Australian national tide tables. Australian Hydrographic Publication.

Beasley, I, Kelly, M and Roberston, PA (2005). Description of a new dolphin, the Australian snubfin dolphin, Orcaella heinsohni, sp. n. (Cetacea, Delphinidae). Marine mammal Science 21 (3), 365-400.

Bird,ECF and Ongkosongo, OSR (I 980). Environmental changes on the coasts of InTSDAia. The United Nations University.

BirdLife International (2005). BirdLife's online World Bird Database: the site for bird conservation. Version 2. 0. Cambridge, UK: BirdLife International. Available: http://www.birdlife.org.

BOM (2006). Australian Climate Extremes — Cyclone. Bureau of Meteorology, Commonwealth of Australia. ~

Boyle, M., FitzSimmons, N., and Merwe J. (2017) Recovery plan for marine turtles in Australia 2017 – 2027. Australian Government Department of the Environmental and Energy

Burke, L, Selig, L and Spalding, M (2002). Reefs at Risk in Southeast Asia. World Resources Institute.

Chatto, R (2001). The distribution and status of colonial breeding seabirds in the Northern Territory. NT Parks and Wildlife Commission, Palmerston, Technical Report No. 70.

Cl (2007). Biodiversity Hotspots. Centre for Applied Biodiversity Science, Conservation International.

CSIRO (1999). Survey and Stock Size Estimates of the Shallow Reef (0-15 m deep) and Shoal Area (15-50 m deep) Marine Resources and Habitat Mapping within the Timor Sea M0U74 Box Volume 3: Seabirds and Shorebirds of Ashmore Reef. Canberra, Australia.

DEH (2001). Management Guidelines for Seismic Vessels Operating in Australian Waters so as to Avoid or Minimise Interference with Whales and Certain Other Larger Cetaceans. Department of the Environment and Heritage, Australia.

DEW (2007). Ashmore Reef National Nature Reserve, Timor Sea, EXT. Australian Heritage Database, Department of the Environment and Water Resources, Australia (tittp.://www.environment.Qovau/heritaqe/ahdb/)

DEW (2007a). EPBC Act Protected Matters Report, 31/01/2007, Area of Interest, TL-7.9°S, 124.48°E, BR-13.02°S, 132.62°E, Department of the Environment and Water Resources,Australia (httD://www.environmentgovau/erin/eWeDbc/imaD/maD html).

Minza Oil & Gas Limited (2007) Environment Management Plan, Minza Oil & Gas Limited Australia, Perth, Australia.

Rua Presidente Nicolau Lobato
Timor Plaza, Level 3, Suite 337
Comoro, Dom Aleixo, Dili
Timor-Leste
Tel: +670 331 0847

Environment Australia (2002). White Shark (Carcharodon carcharias) Recovery Plan. Environment Australia (now DEW).

FishBase (2006). FishBase. World Wide Web electronic publication. Froese, R. and D. Pauly. Eds., www.fishbase.org, version (10/2006).

Hakim, L., Prananda A.R.A., Pratama, D.R., Fajariyanto, Y, (2020). Regional Profile of Coastal and Marine Ecosystems: Their Connectivity, Ecological Importance, and Socio-Cultural Impact on the Arafura and Timor Seas Region. Report to the Arafura and Timor Seas Ecosystem Action Phase 2 (ATSEA-2) Project, Yayasan Konservasi Alam Nusantara and Coral Triangle Centre, Indonesia. 48pp.

Herpetological Review September 2018 - Herpetological Review, 2018, 49(3), 439–441. © 2018 by Society for the Study of Amphibians and Reptiles

Heyward, A Pinceratto, E and Smith, L (eds). (1997). Big Bank Shoals of the Timor Sea. An environmental resource atlas. eBook, Australian Institute of Marine Science, Townsville.

Jasarevic, T (2002). Reviving fisheries in East Timor — Casting nets for development. UN Volunteers, UNV News, #93, August 2002.

Jones, HE (I 986). Marine Resources Map of Western Australia. Part I, The Resources; and Part 2, The Influence of Oil on the Marine Resources and Associated Activities with an Emphasis on Those Found in Western Australia. Western Australian Department of Fisheries Report No. 74, Fisheries Department, Perth, Australia.

Kagi, RI, Fisher, SJ & Alexander, R (1988). Behaviour of Petroleum in Northern Australian Waters. In: Purcell, RG & Purcell, RR (eds), The North West Sheff Australia Proceeding, North West Shelf Symposium. Petroleum Exploration Society of Australia Limited, Perth, Australia.

Kyranis, N (2005). Technical Overview — JPDA. Timor Sea Designated Authority, Offshore Acreage Release Presentation, Oil, Gas & Energy Directorate, Government of the Democratic Republic of Timor-Leste.

Last, PR & Stevens, JD (I 994). Sharks and rays of Australia. CSIRO, Canberra, Australia.

LDM (1997). Bayu-Undan Field Development Preliminary Environmental Report (PER), prepared by LeProvost Dames and Moore for Phillips Petroleum Company and BHP Petroleum.

Lloyd, J (2003). Timor Reef trap and line fishery. Deep Sea 2003: Conference on the Governance and Management of Deep-sea Fisheries. Part 2: Conference poster papers and workshop papers.

Queenstown, New Zealand, 1—5 December 2003, Dunedin, New Zealand, 27—29 November 2003. Ed. R Shotton, Food and Agriculture Organization of the United Nations, Rome.

Marsh, H (2006). Dugong dugon. In: IUCN 2006. 2006 IUCN Red List of Threatened Species.

McCauley RD (1994). The environmental implications of offshore oil and gas development in Australia — seismic surveys. In Swan, JM, Neff, JM and Young, PC (eds.), "Environmental Implications of Offshore Oil and Gas Development in Australia - The Findings of an Independent Scientific Review", pp. 19-122. Australian Petroleum Exploration Association, Sydney, Australia.

Rua Presidente Nicolau Lobato
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Comoro, Dom Aleixo, Dili
Timor-Leste
Tel: +670 331 0847

McCauley RD, Jenner MN, Jenner, C, McCabe KA and Murdoch, J (1998). The response of humpback whales (Megaptera novaeangllae) to offshore seismic survey noise: preliminary results of observations about a working vessel and experimental exposures. APPEA Journal, 38 (1): 692-707.

Milliman, JD, Farnsworth, KL, & Albertin, CS (1999). Flux and fate of fluvial sediments leaving large islands in the East Indies. Journal of Sea Research, 41, 97-107.

Molcard, R, M Fieux, and AG Ilahude (1996) The Indo-Pacific throughflow in the Timor Passage. J. Geophys. Res., 101, 12,411-12,420

Mumby, PJ, Edwards, AJ, Arias-Gonzalez JE, Lindeman, KC, Blackwell, PG, Gall, A, Gorczynska, MI, Harborne, AR, Pescod, CL, Renken, H, Wabnitz, CCC, & Llewellyn, G (2004.) Mangroves enhance the biomass of coral reef fish communities in the Caribbean. Nature, 427, 533-536.

Nunes, MN (2001) The Natural Resources of East Timor. A physical, geographical and ecological review. Sustainable Development and the Environment in East Timor: Proceedings of the Conference on Sustainable Development in East Timor, 2001, Anderson, R & Deutsch, C Eds. Timor Aid, Dili, Timor-Leste.

OMV (2003) Timor Sea Regional Environment Plan for Drilling Operations. OMV Australia Pty Ltd, Perth, Australia.

Reef Base (2007). Reef Base: A Global Information System on Coral Reefs. The World Fish Centre. (http: llwww.reefbase.org)

Ross, JP (ed.). (1998). Crocodiles. Status Survey and Conservation Action Plan [Online 2nd Edition. IUCN/SSC Crocodile Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. (http://www.flmnh. ufl.edu/natsci/herDetoloqy/actDlan/Dlan I 998a. htrn).

Sandlund, OT, Bryceson, I, de Carvalho, D, Rio, N, da Silva, J, Silva, MI (2001). Assessing Environmental Needs and Priorities in East Timor. Final Report. UNDP Dili and Norwegian Institute for Nature Research, Trondheim, Norway.

5KM (2001) Sunrise Gas Project Draft Environmental Impact Statement for Woodside Energy Ltd, Sinclair Knight Merz, Perth, Australia.

Storr, GM, Smith, LA & Johnstone, RE (1 986). Snakes of Western Australia. WA Museum, Perth, Australia.

Timor-Leste (2006), Web portal of the Government of the Democratic Republic of Timor-Leste, IT Division, Ministry of Transport, Communication & Public Works (tift~: llwww.timor-IesteQovtI)

Timor NET (2007). East Timor, an Information Service on East Timor. University of Coimbra, Portugal. UNEP-WCMC (2003), World Atlas of Seagrasses, — Interactive Map Service, Marine Programme, UNEP World Conservation Monitoring Centre, Cambridge, UK.

UNEP-WCMC (2006), Marine Turtle Interactive Mapping system (IMAPS), — Interactive Map Service, ~ Marine Programme, UNEP World Conservation Monitoring Centre, Cambridge, UK.

US (2000). ASIA-PACIFIC ECONOMIC UPDATE, JANUARY 2000. U.S. Pacific Command's Strategic Planning and Policy Directorate. Regional Strategy and Policy Division, USCINCPAC J537, HI 96861-4015.

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URS (2002) Environment Plan for Jabiru Field. Prepared for Newfield Australia (Ashmore Cartier) Pty Ltd, Perth, Australia.

Veron, JEN And Stafford-Smith, M (2000). Corals of the World. AIMS, Cape Ferguson.

WesternGeco (2007). "Vessel "Shipboard" Oil Pollution Emergency Plan (SOPEP).

Wilson, BR & Allen, GR (1987). Major components and distribution of marine fauna. In: Fauna of Australia, Vol 1A - General articles. Australian Government Publishing Service, Canberra Australia.

World Bank (2005). World Bank Country assistance Strategy for Timor-Leste FYO6-O8. Report No.

32700-TP, 18-Aug-05. Timor-Leste Country Management Unit, World Bank. Wyatt, ASJ (2004). Preliminary survey of the nearshore coastal marine environment of the south coast of East Timor: a baseline for assessing the impacts of a developing nation. Bachelor of Engineering thesis, University of Western Australia (Nov 2004).