

**TOTAL**

# Environmental Social and Health Impact Assessment for Block ST – 1 – Draft Report

3D Seismic Acquisition Survey Offshore Block ST-1. Executive Summary and Conclusions

January 2021

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*The present draft version of the ESHIA report will require the update of select report elements (mainly information related to Project features; disclosure activities; underwater noise modelling study and results) which will be added as an addendum after the public disclosure meetings.*

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## Acronyms and Abbreviations

Name	Description
2D	Two Dimension
3D	Three Dimension
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area
ANP	Agência Nacional do Petróleo
EEZ	Economic Exclusive Zone
EIA	Environmental Impact Assessment
ERM	Environmental Resource Management
ESHIA	Environmental Social Health Impact Assessment
ESMP	Environmental and Social Management Plan
E&P	Exploration and Production
HSES	Health Safety and Environment

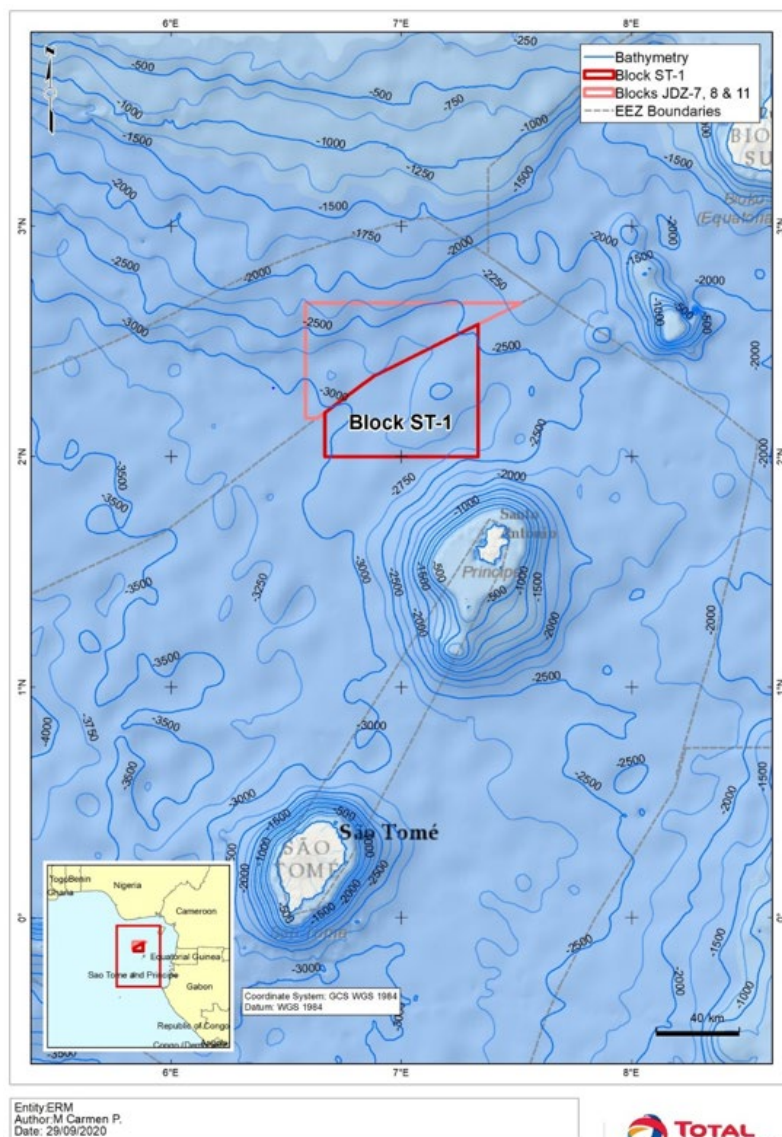
<b>Name</b>	<b>Description</b>
IAGC	International Association of Geophysical Contractors
ICTZ	Inter-Tropical Convergence Zone
IMO	International Maritime Organization
IOGP	The International Association of Oil and Gas Producers
JDA	Joint Development Authority
JDZ	Joint Development Zone
JNCC	Joint Nature Conservation Committee
MARPOL	International Convention for the Prevention of Pollution from Ships
NGO	non-governmental organization
PAM	Passive Acoustic Monitoring
SOPEP	Shipboard Oil Pollution Emergency Plan
ST	Sao Tome
STP	Sao Tome e Principe

## 0. EXECUTIVE SUMMARY AND CONCLUSION

This document presents the results of the Environmental, Social and Health Impact Assessment ("ESHIA") undertaken for the 3-dimensional ("3D") marine seismic survey program proposed by Total E&P Sao Tome & Principe B.V. (hereafter referred to as "Total") in Block ST-1 in São Tomé e Príncipe (also referred to in the text as STP). This document has been prepared jointly by Environmental Resources Management Iberia S.A.U. ("ERM") and the Santomean environmental consultancy L&R Nazare.

The proposed seismic survey activities will take place within an area located 30 km to the northwest of Príncipe Island, 176 km north of São Tomé Island and approximately 150 km northeast from Malabo Island and 296 km northwest of Libreville (Gabon), in water depths varying between 2,680 m and 3,200 m.

**Figure 0.1 Location of Block ST-1**



Source: ERM, 2020

## 0.1 Legal and institutional framework

In São Tomé e Príncipe, the main environmental institution is the Secretary of Public Works, Environment and Planning the Territory. It is the competent body responsible for aspects related to natural resources management, conservation and environment, including environmental management of in-country resources and approval of all sector Environmental Impact Assessments (EIA).

The Project is compliant with key relevant Santomean regulations and legislation (e.g. related to environmental, hydrocarbons, emissions and health and safety), as well as international conventions signed by the São Tomé e Príncipe government authorities and Total' internal standards referring to further international guidelines relevant to the Project (e.g. the global oil and gas industry association for environmental and social issues "IPIECA", the International Association of Oil and Gas Producers "IOGP" and the International Association of Geophysical Contractors "IAGC").

The key regulations, standards and guidelines used for the Project and for this ESHIA are summarized in *Table 0.1*.

**Table 0.1 Key Santomean regulations and international framework applicable to the Project**

Thematic	Reference	
<b>National Framework</b>	Environment	Law No. 10/1999 Environmental Law
		Decree No. 37/1999 relative to Environmental Impact Assessments.
		Decree No. 51/04 establishing the Organization of Public disclosure process for EIA.
		ANP-STP Guideline on the Evaluation of the Environmental Impact Assessment for Offshore Seismic Survey in the Economic Exclusive Zone (2015).
	Petroleum	Law No. 16/2009 Petroleum Operation Law.
		São Tomé and Príncipe Petroleum Operations Regulations (2010 - 28° Supl., DR n.º114).
		Decree- law No. 57/09. On the exploration zones and petroleum Blocks.
		Treaty between the Federal Republic of Nigeria and The Democratic Republic of São Tomé e Príncipe on the joint development of petroleum and other resources, in respect of Areas of the Exclusive Economic Zone of the two states (2001)
	Air, Effluents and Waste	Law No. 13/2007 relative to the regulation of safe seas and preventing marine pollution.
		Decree No. 36/1999 relative to waste management and disposal.
Labor, Health and Safety	Law No. 06/2019 Safety, hygiene and health Law.	
	Health, Safety and Environment Regulation in Petroleum Activities based on Fundamental Law of Petroleum Operations Applicable within the Economic Exclusive Zone (EEZ)	
Fisheries	Law No. 9/2001 on Fisheries	
Water and Maritime Protection	Law N° 1/98 establishing the limits of the exclusive economic zone	
	Decree-law No. 2/2018 establishing the framework for maritime security	
<b>Key International Conventions</b>	Marine Resources	Convention on Cooperation for the Protection, Management and Development of Marine and Coastal Environment (Abidjan Convention, 1984).
		United Nations Convention on the Law of the Sea (UNCLOS, 1982).

Thematic	Reference
	Convention on the International Maritime Organization (IMO; 1948).
Prevention of marine pollution	International Convention for the prevention of Pollution from Ships - MARPOL (1973/1978). International Convention on Civil Liability for Oil Pollution Damage (CLC, 1992).
Flora, Fauna and Protected Areas	The Convention on Biological Diversity (Rio, 1992) Convention on the Conservation of Migratory Species (Bonn Convention, 1979). International Convention for the Conservation of Atlantic Tunas (ICCAT, 1969). African Convention for the Conservation of Nature and Natural Resources (Algeria, 1968). Convention on Wetlands of International Importance (Ramsar Convention, 1971).
Chemicals and Waste	Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991). Convention on the control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, 1989).
<b>Total Standards and Corporate Policies</b>	Health, Safety, Environmental and Security Policy and Commitments Environmental Requirements for Projects Design and E&P Activities (GS EP ENV 001) Environmental Impact Assessment of E&P Activities (GS EP ENV 120) Social Baseline Study (GS EP SDV 101) Social Impact Assessment (GS EP SDV 102) Human Rights Impact Assessment (GS EP SDV 103)
<b>International guidelines</b>	Environment, health and safety IPIECA, "The global oil and gas industry association for environmental and social issues" Guidelines IOGP, "The International Association of Oil and Gas Producers" Guidelines IAGC, "The International Association of Geophysical Contractors" Guidelines Marine fauna (complementary guidelines of relevance - partly applicable) Joint Nature Conservation Committee (JNCC) guidelines for minimizing the risk of injury to marine mammals from geophysical surveys (2017). International Union for the Conservation of Nature (IUCN) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS).

Source: ERM, 2020.

## 0.2 Project description

### 0.2.1 Principles of 3-D seismic survey

The proposed offshore seismic survey uses a vessel towing underwater acoustic energy sources to generate a low-frequency acoustic signal into the water column, by releasing compressed air bubbles into the water. This acoustic signal, also known as a "seismic wave" or "pulse", spreads through the

water down to the seabed. The acoustic signal emitted in the column of water penetrates the seabed and is then reflected by the rocky layers in the sub-surface. On its return, it can be recorded using submarine microphones, known as hydrophones, distributed along a set of cable lines towed from the vessel, known as streamers.

The 3-D acquisition technique requires at least two seismic sources and several streamers, placed in parallel and separated one from another by up to 150 metres. Given the length of the towed equipment and the needs for acquiring seismic data along pre-defined lines, the vessel towing this equipment must travel at a regular speed, along predefined navigation lines. To make towed equipment visible to other marine users, each streamer is equipped with a tail buoy and navigation lights. The main survey vessel is supported by two chase vessels, in charge of liaising with other vessels to reduce the potential for interference between the seismic survey and other activities that may occur along the survey area.

The base case design for the seismic survey in Block ST-1 is a joint seismic survey with the neighbouring Block JDZ 7, 8 & 11, located along the Joint Development Zone (JDZ) border. In this case, the overall coverage of the project area is expected to be of 6,120 km<sup>2</sup> (i.e. ST-1 block 3,594 km<sup>2</sup> + JDZ 7, 8 & 11 block 2,526 km<sup>2</sup>). Should critical regulatory, technical or financial constraint related to border crossings happen, a standalone ST-1 alternative has been developed to conduct the seismic survey over the Block ST-1 only (i.e. no operation within JDZ block unless disjoint in time); in this case the 3-D surface would be of 3,594 km<sup>2</sup>.

### 0.2.2 Schedule

The 3-D seismic survey has been planned to start by Q1/Q2 2021 in alignment to an “optimal” environmental window (i.e. period of time which would avoid as much as possible the (most) sensitive receptors to be impacted, such as marine mammals and turtles), running an uninterrupted schedule of 24 hours a day and 7 days per week. Depending on the equipment configuration and the weather conditions, the expected duration of the seismic survey is approximately:

- 20 days for the mobilization/demobilization and
- 120 days for the base case ST-1 + JDZ 7, 8 & 11 blocks joint survey', or
- 70 days for the survey over the Block ST-1 only (i.e. no operation within JDZ block or disjoint in time).

Thus, overall duration of the survey will range between 90 to 140 days. Base case design duration (e.g. 140 day) is used for the discussions of the potential Project impacts.

### 0.2.3 Operational details on the 3-D seismic survey proposed by Total

The seismic survey is expected to include the following main activities:

- Mobilisation of the seismic and support/chase/security vessels (approx. 15 days);
- Deployment of the seismic survey equipment;
- Data acquisition (which will comprise the bulk of the seismic survey programme, up to 120/70 days for joint/standalone survey scenarios); and
- Retrieval of equipment and demobilisation (approx. 5 days).

The seismic vessel will navigate at a speed ranging from 4 to 5 knots (4.5 knots average), towing seismic sources at a depth of approximately 7-8 m. The hydrophones will be placed along 10 to 12 streamers, 7,5 kilometres in length, also towed by the seismic vessel.



Before the start of the survey, the seismic vessel and chase/support/security vessels will berth in a yet-to-be-determined port where crew members and supplies will be taken on-board, and where they will be supplied with fuel, before sailing to the area where the seismic survey will take place.

### **0.2.4 Alternatives to the Project**

Seismic surveying is a specialized field, so alternative options are restricted by technological development and the specifications required. Alternatives may be relevant to survey type (e.g. 2D versus 3D seismic); sound sources (e.g. explosives, water guns, vapour guns and airguns); and detectors technology (e.g., streamers, and ocean bottom cables). The present seismic being a 3D type, employing airguns and streamers.

The need for the survey is ultimately to effectively identify potential reservoir areas that may be drilled during subsequent exploration phases, as well as to optimize prospective drilling performance by reducing geological risk, and maximizing reservoir performance by efficiently reaching the hydrocarbon reserves.

## **0.3 Description of the natural and social baseline environment**

### **0.3.1 Approach to data collection and review**

The baseline description is drawn from a number of primary and secondary sources that include: previous ESHIA studies undertaken in STP in the recent years, published national reports on biodiversity developed by institutions of São Tomé e Príncipe and technical reports from NGO's on relevant themes (e.g. biodiversity, sea turtles and fisheries), over 200 international peer reviewed and published scientific papers; and primary data undertaken from specific field surveys undertaken in both São Tomé and Príncipe islands, conducted from October 06<sup>th</sup> to 23<sup>rd</sup> 2020 and led by local Santomean consultancy Grupo L&R Nazaré to collect specific socioeconomic, health, and human rights data of the local fishing communities through structured meetings and interviews.

### **0.3.2 Climate**

In the Gulf of Guinea, where São Tomé e Príncipe islands are located, the climate is typically equatorial and therefore sees little variation throughout the year with typically persistent high temperatures and frequent spells of high humidity. The regional climate of São Tomé e Príncipe is driven by the northward and southward migrations of the Inter-Tropical Convergence Zone (ITCZ) associated with the south west monsoon and the Northeast Trade Winds.

In the STP area, the main wet season lasts from October to May, with recorded average rainfall of 200 millimetres per month. In Príncipe Island, the period between 1985-2015 shows a maximum average rainfall of 164 mm in November. This wet season is punctuated by a brief and slightly drier spell between January and February, followed by a very dry season from June to September when rainfall is lowest. Average annual temperatures range from a maximum of 30 to 33°C to a minimum of 18 to 21°C, with little seasonal variation and high humidity all year.

### **0.3.3 Oceanographic conditions**

Water circulation in the Gulf of Guinea is dominated by the Guinea Current that runs parallel to the coast from Senegal to Nigeria and the South Equatorial or Benguela Current that flows northwards along the coasts of Gabon and then turns westward along the equator. The Guinea Current experiences a minimum intensity period during the winter (November through February) and a maximum during the summer (May through September).

The continental shelf off the coast of northwest Africa is narrow (<50 km in most places) with the 200m isobaths located at distances between 40 and 60 km offshore. This effect is even more pronounced in the case of STP, where the continental shelf is limited to less than 5 km for São Tomé Island and around 10 km for the eastern coast of Príncipe island.

### 0.3.4 Marine ecological sensitivity

The proposed seismic survey area in Block ST-1 is located within the Guinea Current Large Marine Ecosystem (GCLME), characterized by a water column overlying the West African continental shelf which is fed by seasonal upwelling of nutrient rich water, particularly during the rainy seasons as a result of offshore winds. This phenomenon supports high phytoplankton productivity that in turn supports a diverse marine ecosystem and associated fisheries.

The main fish groups encountered in the waters of São Tomé e Príncipe are pelagic and demersal fishes, many of them of commercial interest, as well as 27 species considered to be threatened according to the IUCN red list. The Project area is also important for many migratory species, especially marine mammals, marine turtles and birds.

The waters of São Tomé e Príncipe host up to 29 cetacean species; 22 species of toothed whales (Odontocetes) and seven species of baleen whales (Mysticetes). The species most likely to be seen in STP waters include: the fin whale (*Balaenoptera physalus*), Bryde's whale (*Balaenoptera edeni*), Humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), killer whale (*Orcinus orca*), short-finned pilot whale (*Globicephala macrorhynchus*), common bottlenose dolphin (*Tursiops truncatus*) and the pantropical spotted dolphin (*Stenella attenuata*). The Humpback whale is known to use offshore areas of STP as part of their migration route, and nearshore areas of STP for calving. Recent studies suggest the presence of Humpback whales between late June/early July until early/mid November of each year.

The Gulf of Guinea serves also as an important migration route, feeding ground, and nesting site for sea turtles, where five species may be observed. Based on monitoring data from local Santomean NGOs, green (*Caretta caretta*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretmochelys imbricata*), and leatherback (*Dermochelys coriacea*) turtles are considered to nest regularly on Santomean beaches, mainly between October to February; with Green turtles representing the major portion of these seasonal visitors.

Seabirds are abundant over the continental shelf but several species can also be present further offshore, along the seismic survey, where they can be observed feeding.

### 0.3.5 Socioeconomical Context

São Tomé e Príncipe has an estimated population of 215,056 people (2019 est.), with 41.85% under the age of 14 years. According to the results of the 2011 census, the population of Príncipe Island was approximately 6,000 inhabitants. Population is predominantly concentrated in cities/towns, with urban inhabitants making up 72.8% of the total population.

The ethnic makeup in São Tomé e Príncipe is composed of Mestiços, Forros, Angolares, Serviçais, Tongas and few Europeans and Asians. The population groups in the surveyed fishing communities are a mixture of forros, angolares, tongas and mestiços. These were found to be among the most vulnerable groups, considering they are heavily reliant on fishing activities for income generation and household consumption.

Economic growth in Sao Tome and Principe has been driven by agriculture exports (mainly cocoa beans and its production), tourism and oil related foreign investment and especially external aid and government borrowing. Agriculture represents an average of 35% exports, followed by construction sector (21%) and fabrics (20%). Currently, STP aims to reduce its dependence on donors and cocoa exports by investing in exploring and exploiting offshore oil in its Exclusive Economic Zone (EEZ) and in the Joint Development Zone (JDZ).

### 0.3.6 Fisheries in the Project area

Fisheries in São Tomé and Príncipe are exploited through artisanal, semi-industrial and industrial fleets. In the region, the fisheries sector provides a major source of employment and foreign currency.

Fishing communities in the projects area of influence are small communities, especially in Príncipe. In São Tomé, population estimates range from 200 people (Praia Gamboa) to 3000 (Praia Luxinga). In Príncipe, communities are far less populated.

The area where the seismic survey is mostly used by semi-industrial / industrial fishing fleets. Industrial fisheries target small pelagics such as the round sardine (*Sardinella aurita*), european anchovy (*Engraulis encrasicolus*) and jacks (*Caranx spp.*) as well as large migratory pelagic fishes such as tuna (*Katsuwonus. pelamis*, *Thunnus albacores* and *T. obesus*). Other fisheries present with comparatively less fishing range are semi-industrial and artisanal fisheries that employ outboard motors and can travel up to 60 km offshore. They also capture a range of pelagic species, as well as various demersal fishes.

#### 0.4 Assessment of potential impacts findings

The assessment methodology employed in the present ESHIA is in line with the ANP-STP 2015 guidelines on “Evaluation of the Environmental Impact Assessment for Offshore Seismic Surveys in the Economic Exclusive Zone (EEZ)” where potential impacts are evaluated in accordance with internationally accepted assessment criteria.

The evaluation of impacts presented in the ESHIA is based on the judgement of the ESHIA team, informed by legal standards, national and regional government policy, current industry good practice and the views of stakeholders (the latter, after public consultation of the report is undertaken). Where specific standards are either not available or provide insufficient information on their own to allow grading of significance, the evaluation of significance has taken into account the magnitude of the impact and the quality, importance or sensitivity of the affected resource or receptor.

Magnitude and receptor sensitivity are looked at in combination to evaluate whether an impact is, or is not, significant and if so its degree of significance (defined in terms of Positive, Negligible, Minor, Moderate or Severe).

The ESHIA process undertake the assessment of potential impacts over both: a pre-mitigated scenario (i.e. without the inclusion of mitigation measures) and a post-mitigated scenario (i.e. including mitigation measures). The final remaining “mitigated” impacts are termed “residual” impacts. Where significant residual impacts remain, additional measures may be then necessary to investigate the effectiveness of the mitigation measures.

The components of the Project taken into account in the assessment are:

- Base case scenario of Block ST-1 and JDZ 7, 8 & 11 (i.e. conservative case compared to the ST- 1 standalone case);
- The seismic acquisition vessel and its operations;
- The chase/supply/security vessels and associated operations;
- The helicopter associated with operations; and
- Any non-routine or accidental events.

The main sources of impacts and receptors are summarized in **Error! Reference source not found..**

**Table 0.2 Summary of potential sources of impact and potential receptors**

	Receptors	Physical		Biological							Socio-economical and Health								
		Air Quality and Climate Change	Sea water Quality	Marine Flora/Plankton	Benthic communities	Pelagic Fish and Invertebrates	Marine Mammals	Turtles	Seabirds	Protected Areas	Procurement of goods and services	Fisheries	Community H&S	Workers H&S	Workers' rights	Child & Forced labour supply chain	Infrastructure, Tourism and Cultural heritage	Ecosystem Services	
<b>Sources of Potential impact</b>	<b>Routine activities</b>																		
	Labour contracts														WR1	CF1			
	Atmospheric emissions from Project vessels/helicopter	A1/A2												WHS1				ES1	
	Liquid discharges from project vessels		W1	P1		FA1	FA1	FA1	FA1	PA1			CHS1	WHS1			IT1	ES1	
	Solid discharges from project vessels		W1	P1		FA1	FA1	FA1	FA1	PA1			CHS1	WHS1			IT1	ES1	
	Underwater noise emissions			P2	B1	F1	M1	T1	SB1			FS2	CHS1	WHS1			IT1	ES1	
	Physical presence of Project vessels/helicopter and equipment (mobilization, survey, demobilization)						FA2	FA2	SB2	PA1	PGS1	FS1	CHS1	WHS1			IT1	ES1	
	Artificial light illumination			IL1		IL1	IL1	IL1	IL1	IL1									ES1
	<b>Accidental events</b>																		
	Hydrocarbon spillage		AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1	AE1

<b>A1/A2</b>	Impacts on air quality and climate change due to the release of air pollutants	<b>SB1</b>	Impacts on seabirds due to the generation of underwater noise emissions
<b>W1</b>	Impacts on seawater quality due to the discharge of effluents and waste to the sea	<b>SB2</b>	Impacts on seabirds due to helicopter operations
<b>P1</b>	Impacts on plankton due to change of seawater quality due to effluents and waste to the sea	<b>PA1</b>	Impacts on protected areas due to the Project activities
<b>P2</b>	Impacts on plankton due to the generation of underwater noise emissions	<b>NT1</b>	Impacts on Navigation and Traffic / Sea users
<b>B1</b>	Impacts on benthic communities derived from the generation of underwater noise emissions	<b>FS1</b>	Impacts on Fisheries due to presence of the vessels and seismic acquisition equipment
<b>FA1</b>	Impacts on fauna due to the change of seawater quality due to effluents and waste to the sea	<b>FS2</b>	Impacts on Fisheries due to the generation of underwater noise emissions
<b>F1</b>	Impacts on fish due to the generation of underwater noise emissions	<b>IT1</b>	Impacts on coastal infrastructure, tourism and cultural heritage
<b>IL1</b>	Impacts on fauna due to artificial lighting	<b>ES1</b>	Impacts on Ecosystem Services due to the Project activities
<b>M1</b>	Impacts on marine mammals due to the generation of underwater noise emissions	<b>AE1</b>	Impacts due to potential accidental events (hydrocarbon spills)
<b>T1</b>	Impacts on turtles due to the generation of underwater noise emissions	<b>PGS</b>	Impacts on Procurement of Goods and services
<b>FA2ab</b>	Potential impacts on marine fauna due to presence of a) the vessels and b) seismic acquisition equipment	<b>WHS</b>	Impacts on Workers' health and safety
<b>CHS1</b>	Impacts on community health and safety	<b>CF1</b>	Impacts on Child and forced labour in the supply chain
<b>WR1</b>	Impacts on workers' rights		

Source: ERM, 2020

Table 0.3 presents a summary of the significance of impacts without mitigation (i.e. without implementation of mitigation measures, or “pre-mitigation”) and residual impacts (i.e. after implementation of mitigation measures, or “post-mitigation”) resulting from the 3D seismic acquisition survey planned by Total in São Tomé e Príncipe Block ST-1.

**Table 0.3 Summary of Residual Impacts**

Receptor	Potential Impact	Impact Significance (pre-mitigation)	Residual Impact (post-mitigation)
<b>Impacts from Routine Activities</b>			
<b>Air Quality</b>	Potential reduction in localized air quality and contribution to greenhouse gases.	Negligible	Negligible
<b>Seawater Quality</b>	Potential localized reduction in water quality, including increased turbidity and biological oxygen demand (BOD).	Minor	Negligible
	Potential introduction of alien invasive species from ballast water discharges.		
<b>Marine Flora</b>	Potential localized increase in organic matter.	Negligible	Negligible
<b>Marine Fauna</b>	Potential disturbance to Marine wildlife due to sound emissions (behavior effects, physical impacts from temporary threshold shift (TTS) and potentially permanent threshold shift (PTS).	<i>Marine mammals and Turtles</i>	
		Moderate to Severe	Negligible to Moderate
		<i>Seabirds, fish, benthos and plankton</i>	
		Negligible to Minor	Negligible
	Potential disturbance to marine wildlife due to secondary effects from liquid and solid waste discharges on the water column.	Negligible	Negligible
	Potential disturbance to marine wildlife due to collisions with Project vessels/helicopter or with towed array equipment.	<i>Marine mammals and Turtles</i>	
		Moderate	Negligible to Minor
		<i>Seabirds</i>	
		Negligible	Negligible
	Potential disturbance to marine wildlife due to entanglement with towed array equipment	Moderate	Negligible to Minor
Potential impacts derived from the use of artificial lighting.	Negligible	Negligible	
<b>Protected Areas</b>	Potential impacts to biodiversity features of coastal protected areas.	Negligible	Negligible
<b>Artisanal and Commercial Fishing</b>	Temporary disruption or cessation of access to fishing grounds, interference of fishing boats or temporary fishery stock displacement.	Minor	Negligible to Minor
<b>Marine Traffic and Navigation</b>	Project vessel's movements may disrupt maritime traffic in the area.	Negligible	Negligible
<b>Local Economy and Employment</b>	Procurement of goods and services	Positive	Positive
<b>Local Population</b>	Potential impacts on Community Health & Safety from worker-community interaction	Minor	Negligible
	Workers management H&S	Minor	Negligible
	Workers' Rights	Moderate	Minor

Receptor	Potential Impact	Impact Significance (pre-mitigation)	Residual Impact (post-mitigation)
	Child and Forced Labour in the supply chain	Moderate	Negligible
Coastal Infrastructure, Cultural Heritage and Tourism	Potential impacts and or interference with coastal resources.	Negligible	Negligible
Ecosystem Services	Potential impacts on provisioning, regulating and cultural ecosystem services.	Negligible	Negligible
<b>Event-related impacts</b>			
Impact on water quality	Refueling operations at sea, collisions or vessel maintenance activities leading to accidental oil spills.	Negligible to Moderate	Negligible
Impact on marine fauna			
Coastal area impact			

Source: ERM, 2020.

The majority of the impacts from the Project, considering the implementation of mitigation measures were assessed as being Negligible or Minor (or ranging between these two), with limited positive impacts on socioeconomic aspects; with the exception of impacts derived from underwater noise emissions on whales; especially in regards to potential behavioural disturbance; which was assessed under a conservative perspective. Conclusions on key identified impacts and associated mitigation are summarized as follows:

- **Potential disturbance from i) noise emissions and ii) presence of survey equipment on marine mammals and sea turtles (Negligible to Moderate significance)**

The seismic survey has been planned for Q1/Q2 2021, partially overlapping with the period when breeding / mother-calf Humpback whales are present coastal/offshore São Tomé e Príncipe waters; considering the temporal overlap between seismic operations and known seasonal sensitivities, additional mitigation will be implemented.

The presence of Marine Mammal Observer of Passive Acoustic Monitoring (PAM) operatives on-board the seismic vessel will allow the proper application of the ESHIA mitigation requirements, such as adherence with the JNCC guidelines (*Guidelines for minimising the risk of injury to marine mammals from geophysical surveys, 2017*) and complementary good practices selected among guidelines used internationally and/or in other geographies (e.g. IUCN, IAGC, ACCOBAMS). This provide a robust mitigation set towards the potential impacts from underwater noise emissions, that includes a series of design considerations and operational practices that avoid or minimize the impacts on wildlife, in particular marine mammals, sea turtles and fish.

Likewise, the reduction in the vessel's speed during transits to/from port together with the presence of fauna observers will reduce the risk of collision between vessels and marine mammals. Similarly, the use of turtle exclusion devices will also reduce potential risks from entanglement.

- **Potential disturbance from the presence and movements of Project vessels on i) fisheries and ii) maritime traffic and navigation (Negligible to Minor significance)**

The Project will notify Naval, Transport and Port authorities about the development plans, timing and location of activities, that together with the direct information to other ships through Notice to Mariners and by periodic broadcasts on appropriate communication channels will ensure other marine users

are aware of the activities and location of Project vessels. Prior to the start of the survey a Fishery information campaign will be undertaken, with continuous engagement with affected stakeholders throughout the survey. In addition, the presence of chase vessels and a Fisheries Liaison Officer will allow that the exclusion area around the seismic vessel/equipment is properly maintained and any incident is avoided. Given the presence of two chase vessels, together with the presence of marine mammal observers, and the mobile nature of the exclusion zone as the seismic vessel advances, the reduction in the risk of residual impacts derived from the physical presence of the seismic vessel and the presence of the exclusion zone on sea users is considered to be significantly lowered.

- **Potential impacts on worker rights (Minor significance)**

Labour laws in São Tomé e Príncipe are aligned with international labour laws, having the local government ratified the eight core ILO conventions. Nonetheless effective enforcement of these remains a key issue; with an underlying risk that Project contractors/suppliers may not be operating in full alignment with national and/or international best practices. Total will verify that all contracts will abide by STP law, international standards as well as Total internal standards in relation to labour and human resources; being able to audit such contracts should it be needed. Furthermore, all contractors/subcontractors will be required to put in place a grievance mechanism in addition to Company grievance procedure.

- **Accidental Hydrocarbon Spill (Negligible Significance)**

Total will verify that all vessels involved in the seismic survey meet international requirements through contract requirements, and will audit the vessels prior to the beginning of the seismic survey. Thus, all vessels involved shall have a plan and procedures to implement in case of any accidental spillage of hydrocarbons (or other pollutants) at sea (also known as the SOPEP - Shipboard Oil Pollution and Emergency Plan), that meets the demands of the International Marine Organisation. This plan will be supported by the patrolling of chase vessels which will reduce the possibility of a collision.

Considering the implementation of mitigation measures, the likelihood of a large fuel spill would be significantly reduced, and should it occur its spatial and temporal consequences limited. The potential impacts on the marine environment of a spill of fuel as a consequence of an unforeseen loss of part of a vessel's fuel inventory are predicted to be negligible, considering that the loss of the complete inventory would be highly unlikely.

## 0.5 Environmental and Social Management Plan

All impacts identified in this ESHIA are deemed to have been minimised to acceptable levels through the application of the proposed mitigation measures detailed in the impact assessment chapter and further described in the project's Environmental and Social Management Plan (ESMP). The ESMP will make possible that all the mitigation measures provided in the ESHIA are implemented while the Project is carried out, in accordance with the commitments made by Total. The ESMP shall be considered as a dynamic document that may be continuously revised and updated as part of an ongoing environmental management and improvement process.

The objectives of the ESMP are:

- To provide the mechanism to allow compliance with STP legislation, Total HSES policies, management system and procedures, international law and standards, and Oil & Gas industry good practices;
- To make possible that all the mitigation measures and all the commitments made by Total and identified in the ESHIA report are taken into account during the survey planning and operation phases;
- To provide a framework for mitigating impacts that may be unforeseen or unidentified;

- To establish an environmental surveillance and monitoring programme so that the ESMP can be updated and improved as the survey progresses.

Based on the key identified impacts, specific operational controls and mitigation procedures have been considered for the following environmental and social aspects:

- Sensitive marine fauna protection: the project will adopt the Joint Nature Conservation Committee (JNCC, 2017) *Guidelines for minimising the risk of injury to marine mammals from geophysical surveys*; as well as further mitigations selected among more stringent or complementary international guidelines such as the International Union for the Conservation of Nature (IUCN); International Association of Oil and Gas Producers IOGP/ International Association of Geophysical Contractors IAGC and the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS). Together, all these guidelines address the protection of marine mega fauna such as marine mammals, turtles and fish through the use of marine mammal observers (MMO), visual monitoring and seismic source operation protocols (e.g. soft start, restart procedures) and Passive Acoustic Monitoring (PAM – effective for marine mammals only).
- Oil pollution emergency procedures: in order to allow effective management of refueling operations a Shipboard Oil Pollution Emergency Plan (SOPEP) and Bunkering Procedures will be in place before commencement of operations.
- Waste management procedures: the development of a Waste Management Plan (WMP) in accordance with MARPOL 73/78 (Annex V) and other relevant guidelines for the storage, collection and disposal of all identified waste streams, and especially with regards to hazardous substances.
- Liaison with ships and fisheries: through an effective communications plan, Seismic Contractor and Total will implement proposed protocols at the pre-survey stage (e.g. information to Fishing and Port authorities and associations) and Fisheries Liaison Officers (FLO) will implement mitigation during operational stages (e.g. chase vessel investigation and warning actions).
- The ESMP further establishes the procedures set forth to effectively implement all proposed actions, relevant information to be communicated and change management procedures when modifications of the ESMP may be warranted.

## 0.6 Conclusions of the ESHIA Report

A systematic impact assessment process was applied to assess the impact of the proposed activities; with major part of the identified residual impacts on environmental and socioeconomic receptors ranging between negligible and/to minor after the implementation of appropriate mitigation measures to avoid or minimize any potential adverse effects and enhance potential benefits.

The Project under a conservative perspective, has identified that moderate impacts may remain for behavioural reactions on marine mammals from underwater noise; and thus will implement a series of procedures aligned with good international practice, used in many other geographies around the world to mitigate the effects of underwater noise.

The Project's activities will operate following Total's HSES management system, procedures and the Project's Environmental and Social Management Plan, safeguarding against any potentially significant environmental and social impacts.



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