PROJECT SUMMARY
YELLOWTAIL DEVELOPMENT PROJECT
STABROEK LICENCE AREA, OFFSHORE GUYANA

Esso Exploration and Production Guyana Limited

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Table of Content

List of Tables

List of Figures

1 INTRODUCTION

Esso Exploration and Production Guyana Limited (EEPGL) is the designated Operator of the Stabroek Block under a Petroleum Agreement signed by EEPGL and its co-venturers, Hess Guyana Exploration Limited and CNOOC Petroleum Guyana Limited, with the Government of the Cooperative Republic of Guyana. The Petroleum Agreement covers approximately 26,806 km^2 (10,350 square miles) and was executed together with a Petroleum Prospecting Licence for the Stabroek Block. Pursuant to the Petroleum Agreement, EEPGL has previously planned and obtained approval from the Government of Guyana for three development projects in the Stabroek Block – Liza Phase 1, Liza Phase 2, and Payara (collectively, the Stabroek Projects). The subject of this current application for Environmental Authorisation is the Yellowtail Development Project, which will be the fourth deep water petroleum development project in Guyana. The project will develop the Yellowtail and Redtail Fields, and potentially additional resources if determined to be feasible and competitive. Yellowtail will be designed to add up to 39 747 m^3 (250,000 barrels) of oil a day to existing daily production volumes in Guyana with the associated additional revenues to the Government of Guyana while continuing a steady expansion of opportunities for Guyanese to participate in the petroleum industry.

Like the Stabroek Projects, the Yellowtail Development Project (Yellowtail or Yellowtail Project) will involve drilling of production wells; installation, commissioning and operations of Subsurface Umblicals, Risers and Flowlines (SURF); a Floating Production and Storage Offloading vessel (FPSO); and handling and offloading of produced hydrocarbons. The Project will utilize marine support vessels as well as onshore infrastructure, including but not limited to shorebases, warehouses, storage and pipe yards, fabrication facilities, fuel supply facilities, and waste management facilities in Guyana. Such infrastructure will be used to support the drilling, installation, production operations, and decommissioning stages of Yellowtail.

EEPGL is committed to conducting business in a manner that is compatible with the environmental and economic needs of the communities in which it operates and that protects the safety, security, and health of its employees, those involved with its operations, its customers, and the public.

Building on the previous Stabroek Projects, Yellowtail will be designed to demonstrate continuous improvement in environmental performance. EEPGL routinely strives to make improvements in environmental performance through emissions controls, technology enhancements and process improvements. In 2020, the FPSO Liza Destiny experienced unanticipated technical challenges and unplanned gas flaring during its startup and commissioning process. EEPGL has conducted comprehensive root cause analyses of these issues, and evaluated potential improvements to gas handling systems, sparing philosophy, and execution procedures. EEPGL plans to take significant steps to incorporate the lessons learned from the commissioning of the Liza Destiny into future projects, including Yellowtail.

EEPGL also recognizes and respects that the Government and people of Guyana expect EEPGL to operate in a manner that minimizes environmental impacts to air, water, and land and protects the health of people and animals. EEPGL continues to apply the learnings of Liza Phase 1 and has undertaken additional studies to obtain an even more comprehensive understanding of potential impacts of effluent discharges to water; the feasibility of alternative handling of produced water; and cradle to grave waste management in Guyana, including the application of certain international standards and best practices. Additional studies are ongoing or planned with regard to flare minimization, emergency response, and environmental compliance monitoring and verification. The learnings from these and other environmental studies will inform the design and implementation of the Yellowtail Project, increasing environmental performance and economic value.

The Yellowtail Project, along with the Stabroek Projects, will contribute positively, directly and indirectly to economic growth in Guyana, including increased national revenues, which will result in increased government investments in public services and infrastructure; local procurement of select goods and services; increased direct and indirect local employment opportunities; and increased Project and worker spending with beneficial "multiplier" impacts throughout the Project life.

2 DESCRIPTION OF THE PROJECT

EEPGL is progressing plans for the Yellowtail Project, located within Stabroek Block on Guyana's Continental Shelf. Yellowtail will be located in the eastern portion of the Stabroek Block, approximately 200 km from Georgetown and southeast of the Stabroek Projects (see Figure 1). Current plans include drilling via floating drillship to produce oil, from approximately 45-55 wells. Production is expected to begin at year end 2025 with an expected field life of at least twenty years.

The production facilities to be installed include subsea equipment attached to the seafloor as well as processing equipment on the ocean's surface known as a Floating, Production, Storage, and Offloading (FPSO) vessel (see Figure 11). The subsurface equipment is installed at approximately 1,700 – 1,950 m of water depth (see Figure 3). The main pieces of kit in the subsurface include the following: production tree, production manifold, flowlines, risers, and umbilicals. The subsurface umbilicals, risers, and flowlines are commonly referred to as SURF. The oil, gas, and water flows from the well into the production tree. The fluids are then gathered into the manifold which then connects to the flowlines before the risers take the fluids up to the FPSO for further processing. The umbilical lines support production by providing real time control of the subsea installation from the surface by delivering fluids to facilitate the flow of hydrocarbons.

The FPSO is an industrial floating complex that continuously separates produced water and associated gas from the oil. The anticipated production rate for the FPSO ranges between approximately 34 977 m^3 (220,000 barrels) and 39 747 m^3 (250,000 barrels) of oil per day. The

vessel will be capable of storing approximately 317 974 m^3 (2 million barrels) of oil. Oil tankers will be scheduled to offload the oil from the FPSO, making the oil available for export to the international market. The FPSO will also process, dehydrate, compress, and reinject associated gas produced from the reservoir. As the Yellowtail and Redtail reservoir pressures deplete over time, this gas reinjection will help maintain the reservoir pressure and allow the most optimum production of hydrocarbons to continue over time. In addition, some of the gas will be used as fuel on the FPSO. Under very unique operational circumnstances, some gas may need to be temporarily flared on a non-routine basis. The FPSO will treat produced water. In addition, FPSO will use treated sea water for cooling and injection into the reservoir for additional pressure maintenance. The treated produced water and cooling water will be discharged overboard as per industry best practices. In addition to the processing equipment, the vessel will also have living quarters and associated utilities to support operations personnel on the FPSO.

Table 1: Yellowtail Key Technical Parameters

Oil Rate, m^3 /day (kBD (thousand barrels per day))	34 977 - 39 747 (220 – 250)
Gas Production Rate, Million m^3 /day (MscfD million standard cubic feet per day)	11.3 – 17.5 (400 - 620)
Produced Water Rate, m^3 /day (kBD (thousand barrels per day))	225 (35 772 3m3/day)

The major components of the proposed Yellowtail Development Project are highlighted in

Table 2.

Table 2: Major Components of the Yellowtail Development Project

Major Component	
Surface Production Facility	A single Floating Production, Storage, and Offloading (FPSO) vessel
Distance from Shore	FPSO is approx. 200 km from Georgetown
FPSO Mooring System	FPSO uses a spread mooring system with mooring lines connected to anchor piles embedded in seafloor
FPSO Oil Storage Capacity	Approx. 317 974 m^3 (2.0 million barrels)
Offloading Frequency by Export Tankers	Every 4 - 6 days

Major Component	
Subsea Production Facility Design	Subsea production trees and gas/water injection trees clustered around subsea manifolds
Wells	Approx. 45 - 55 wells
Drill Ships	Each development well may use multiple dynamically-positioned drill ships
Onshore Support including Shorebase	Onshore infrastructure includes shorebases, pipe yards, fabrication facilities, fuel supply facilities, and waste management facilities; potential sharing among developments
Logistics Support	Marine vessels and helicopters throughout all stages; potential sharing among developments

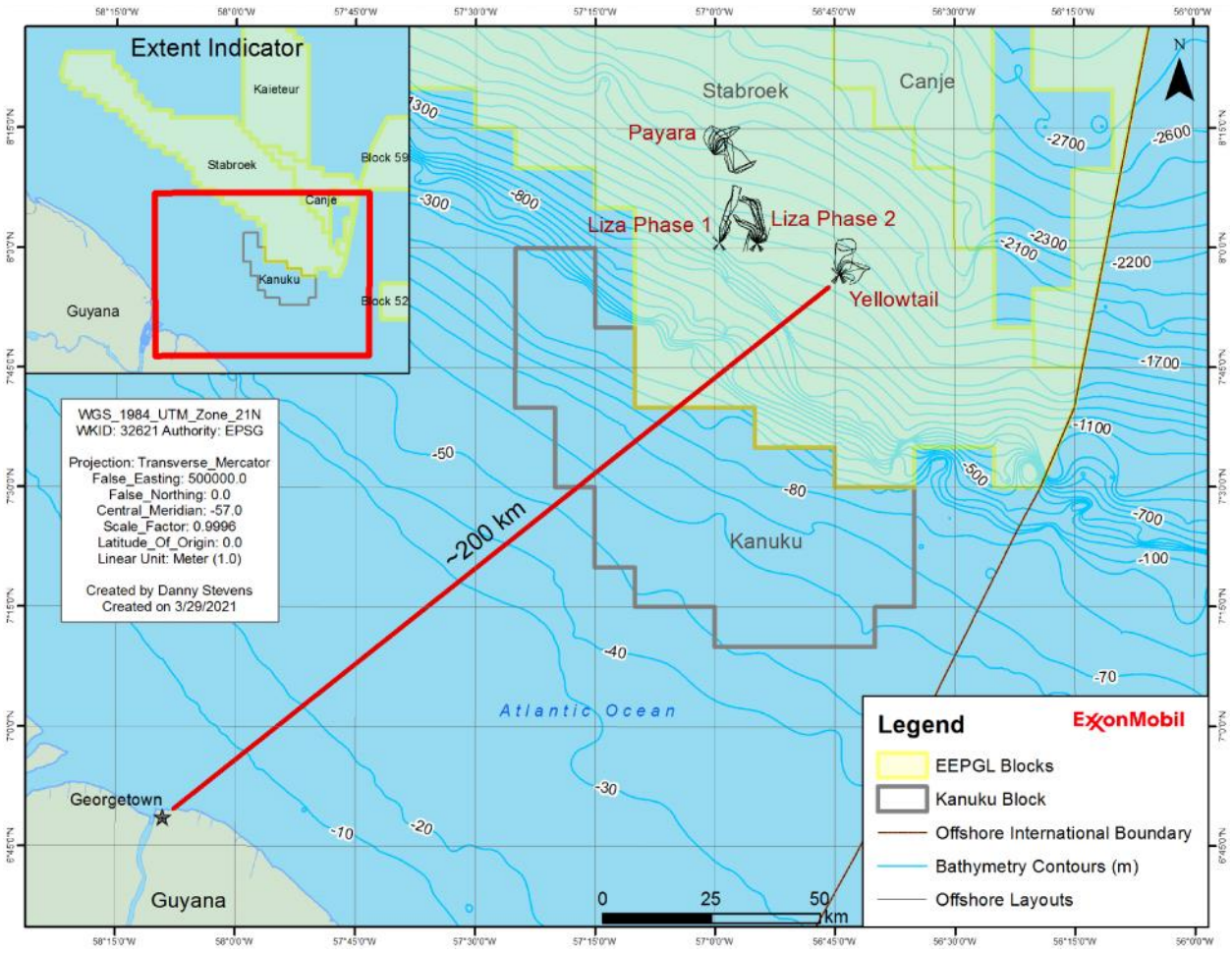
While much of the construction installation activity will be offshore, the Project will also utilize onshore infrastructure, including but not limited to shorebases, warehouses, storage and pipe yards, fabrication facilities, fuel supply facilities, and waste management facilities in Guyana. Such infrastructure will be used to support the drilling, installation, production operations, and decommissioning stages. Additional logistical support may be provided by others outside of Guyana, as determined by the Project. Helicopters required for crew changes are planned to be operated out of the Eugene F. Correia International Airport as is currently being done for exploration drilling and for the Liza Development. In some cases, crew transfers may occur by marine vessel.

3 SITE, DESIGN, AND SIZE OF PROJECT

3.1 SITE

Figure 1: Location of the Yellowtail FPSO within the Stabroek Block shows the proposed location of the Yellowtail FPSO within the Stabroek Block, approximately 200 km from Georgetown, Guyana.

Figure 1: Location of the Yellowtail FPSO within the Stabroek Block



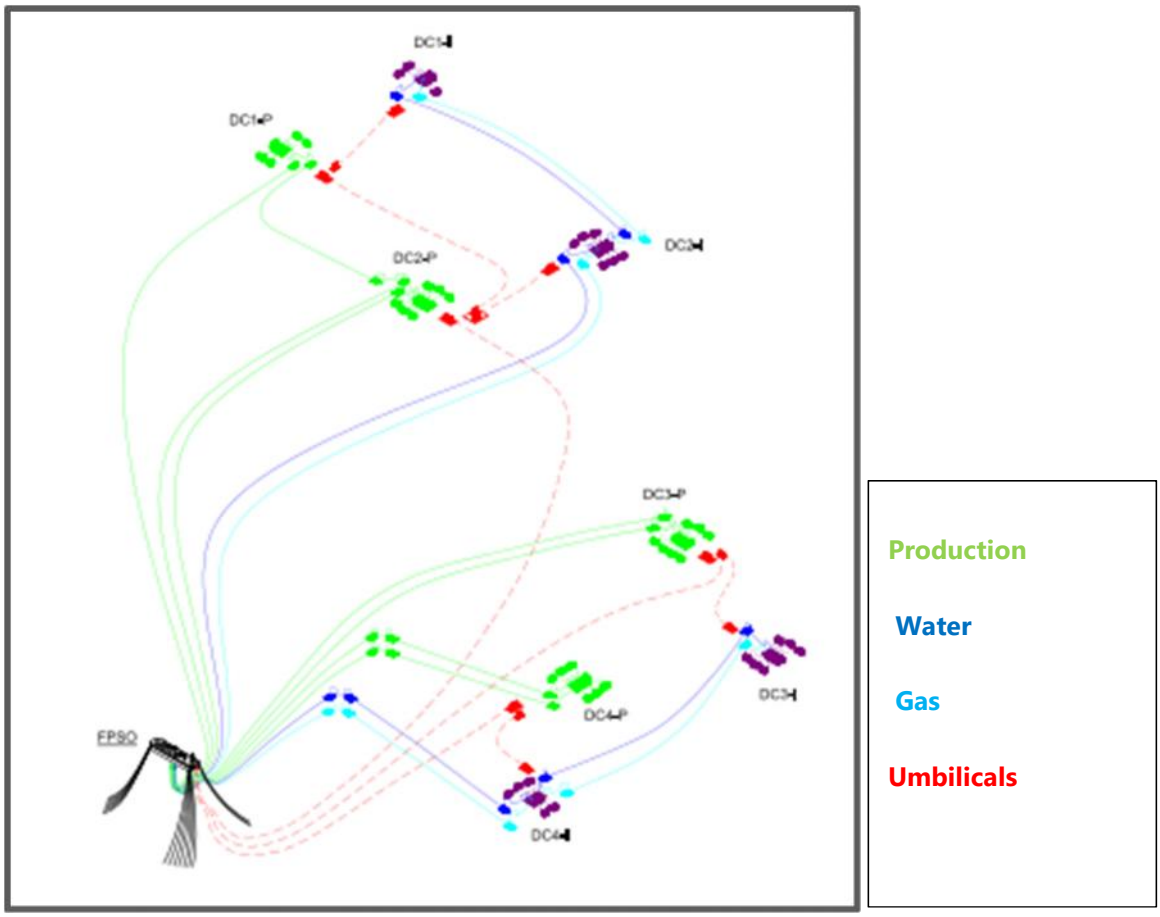
The development plan for the Project will use an FPSO and subsea umbilicals, risers, and flowlines (SURF) production system similar to those of Liza Phase 1, Liza Phase 2 and Payara development projects. Although similar, the Yellowtail development project is independent.

The FPSO and subsea production system is a proven approach for deepwater oil developments and would leverage both operator and industry proven technologies and industry best practices.

The FPSO for Yellowtail Development Project will be located approximately 28 km from the FPSO for Liza Phase 1; 20 km from Liza Phase 2 and approximately 40 km from the FPSO for Payara. (Figure 1).

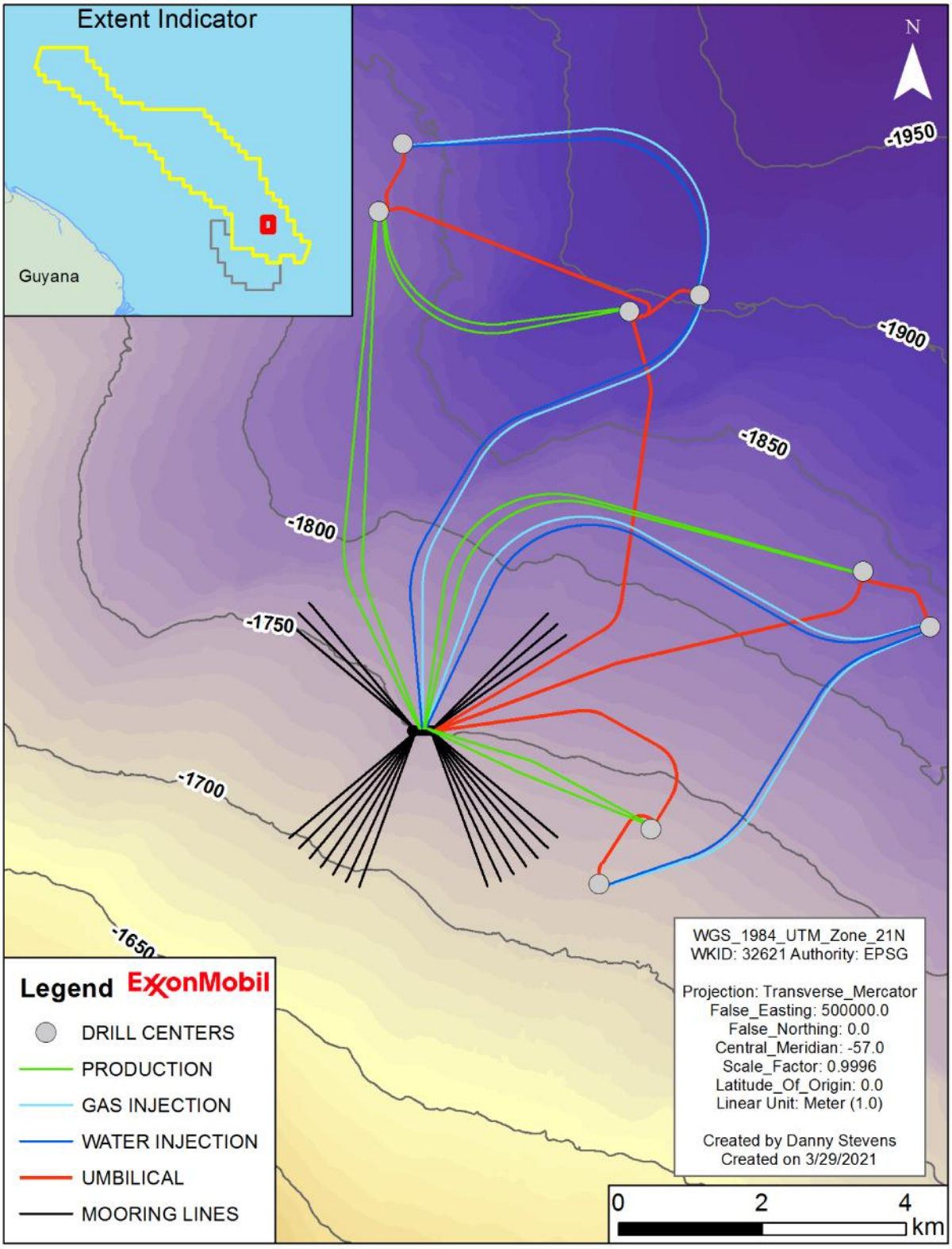
Figure 2 illustrates the preliminary conceptual layout of the production system, as the Yellowtail Development is in the preliminary design phase and Figure 3 illustrates the preliminary bathymetry layout of the Yellowtail Development Project.

Figure 2: Preliminary FPSO and SURF System Layout for Yellowtail



NOTE: Locations in figure subject to change

Figure 3: Preliminary Areal Layout for Yellowtail Development



NOTE: Locations in figure subject to change

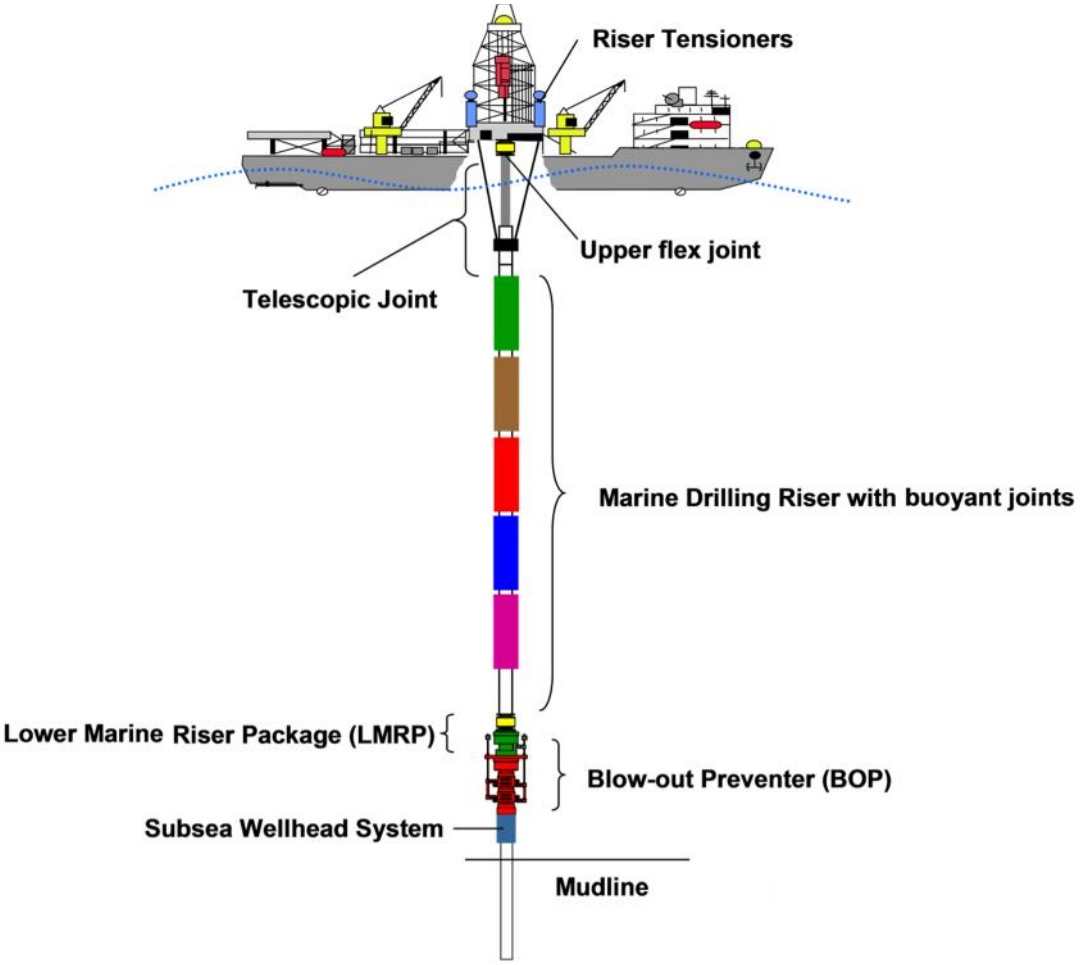
3.2 DESIGN AND SIZE OF PROJECT

3.2.1 Drilling

Based on the water depths in the Yellowtail Development area, multiple dynamically-positioned drill ships, as shown on Figure 4, would be used to drill the wells and typical subsea drilling systems is shown on Figure 5 The process of drilling the wells for Yellowtail will be similar to the process followed during exploration/appraisal well campaigns as well as the Liza Phase 1 and Liza Phase 2 and Payara Development drilling programs. After drilling to total depth, the wells will be completed and the subsea production equipment will be installed.

Figure 4: **Example of Drill Ship**

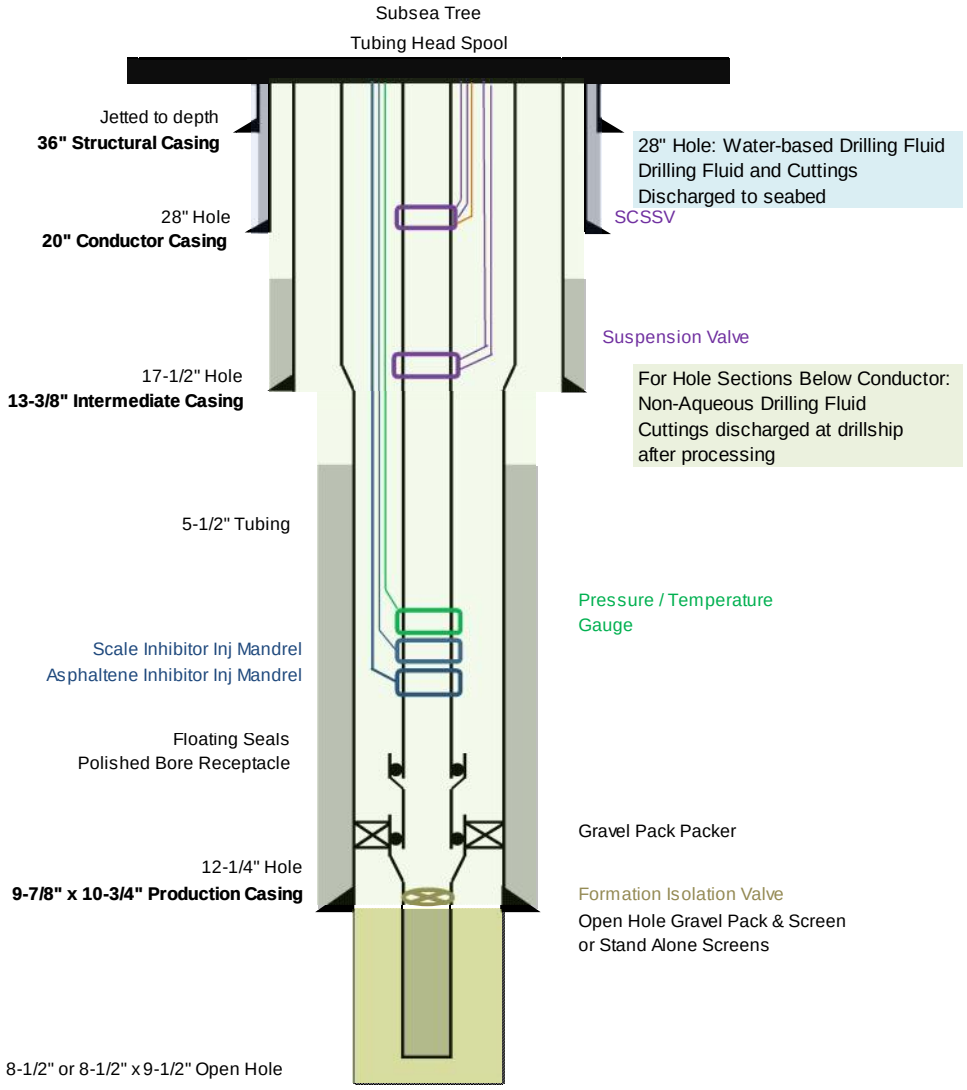
Figure 5: Typical Subsea Drilling System



The following information describes development wells for the purposes of the Project.

Once the borehole is started for a well, pipe (also known as casing) is inserted into the borehole and cemented in place to keep the well from collapsing and to seal the casing to the formation. Various-sized casings are progressively set as the well is drilled deeper. After each casing (for the conductor casing and deeper casings) is installed, pressure and integrity testing is performed according to standard industry practices. A provisional well program and design for the Yellowtail development-drilling program, including preliminary casing types and sizes, setting depths, drilling fluid types, and discharge locations, is shown on Figure 6.

Figure 6: Provisional Casing Program for Development Drilling



SCSSV = surface-controlled subsurface safety valve

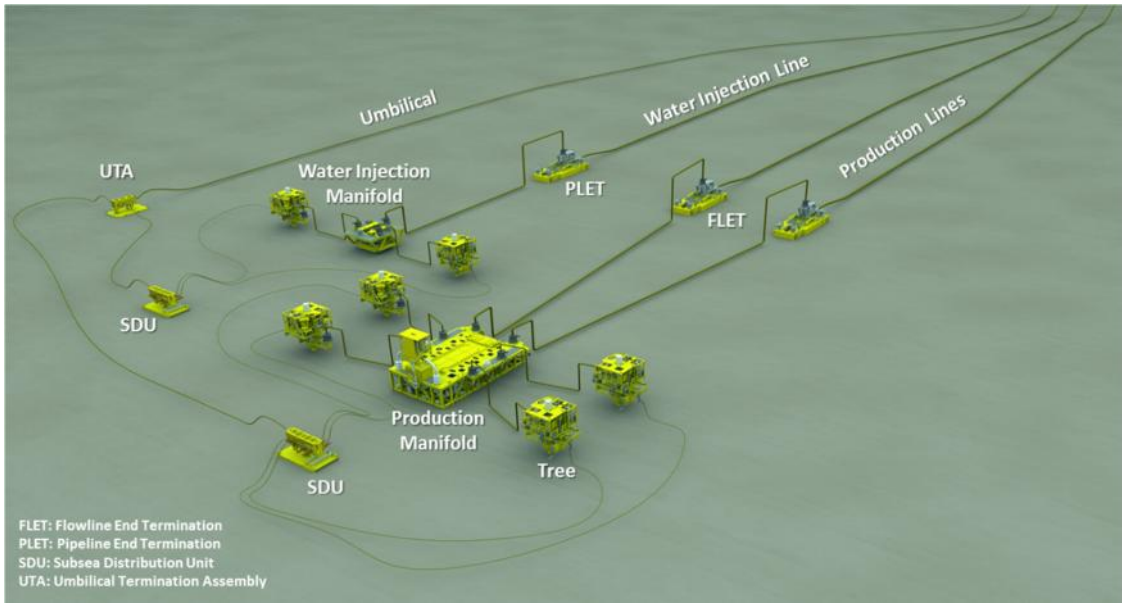
During the drilling process, drill ships will require various materials, instruments, and devices to connect the drill bit to the drill ship. Various size casings will be set as the well is drilled deeper. The drilling process will also require circulating drilling fluid to remove cuttings and control formation pressures, and cement to support the casing and to isolate reservoir formations. Completion equipment and completion fluids will be also be required. The raw materials above are in addition to the basic supplies required to operate the production equipment and support vessels such as fuel, food for the crews, fresh water, and industrial consumables.

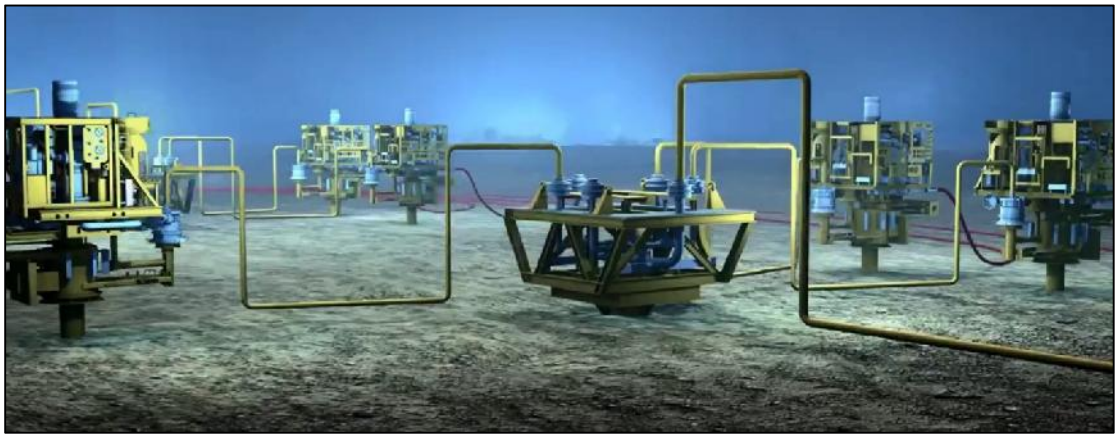
3.2.2 SURF

The proposed SURF facilities for Yellowtail Development Project are composed of subsea production and injection wells clustered around subsea manifolds. Approximately 45-55 wells could be drilled consisting of a combination of producers and injectors (i.e., for the injection of sea water and reinjection of associated gas to maintain reservoir pressure). Produced well stream fluids which include associated gas will be transported through subsea flowlines to the FPSO at the surface. The risers and umbilicals will connect the equipment on the sea floor to the FPSO. The subsea system will be monitored and controlled using a control system connected to the FPSO through a control umbilical which also supplies chemicals to the subsea facilities. The hydraulic fluid for operating the subsea control system will be water-based. Figure 7 represents an example of subsea facilities on the sea floor.

Most of the major SURF equipment will be preassembled, pre-tested, and shipped directly to the offshore Yellowtail Development area from their points of origin. Other minor equipment, supplies, and materials may be temporarily staged at a shorebase and associated laydown yards and warehouses until transferred offshore for installation or use.

Figure 7: Example Subsea Facilities (SURF)





Below is the description of SURF components:

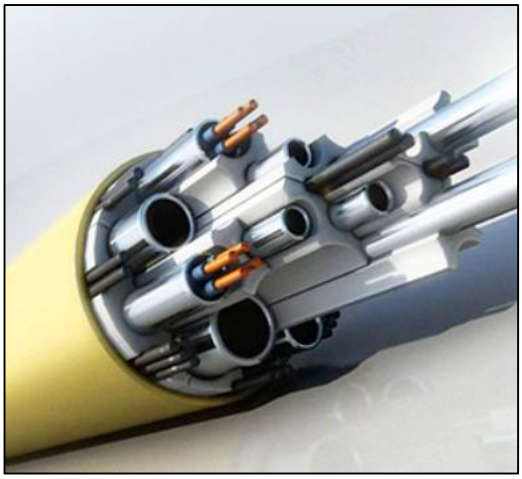
Risers and Flowlines

The Project will incorporate production (oil, gas, and water), sea water injection, and gas injection flowlines and risers, as shown on Figure 8. Flowline and umbilical lengths will range from approximately 1 to 9 kilometers (approximately 1 to 6 miles), excluding risers, in water depths of approximately 2,000 meters (6,560 feet). The current design lengths are based on preliminary shallow hazard surveys and current field layout, and may be adjusted slightly during detailed design.

Umbilicals

Umbilicals will be designed as an integrated bundle of tubes and cables to serve multiple functions (see Figure 8). Three dynamic umbilicals connected to the FPSO will service the entire Project. The remaining drill center components, composed of the subsea trees, manifolds, flying leads, and jumpers, will be connected via seven in-field/static umbilicals.

Figure 8: Representative Dynamic Umbilical



Manifolds

Manifolds are gathering points or central connections made up of valves, hubs, piping, sensors, and control modules. Manifolds (see Figure 9) include a protective structural framework that rests on a foundation on the seabed where multiple trees, jumpers, and flowlines gather to consolidate flows before they are transported either to the surface as part of production or back downhole as part of injection into the reservoir.

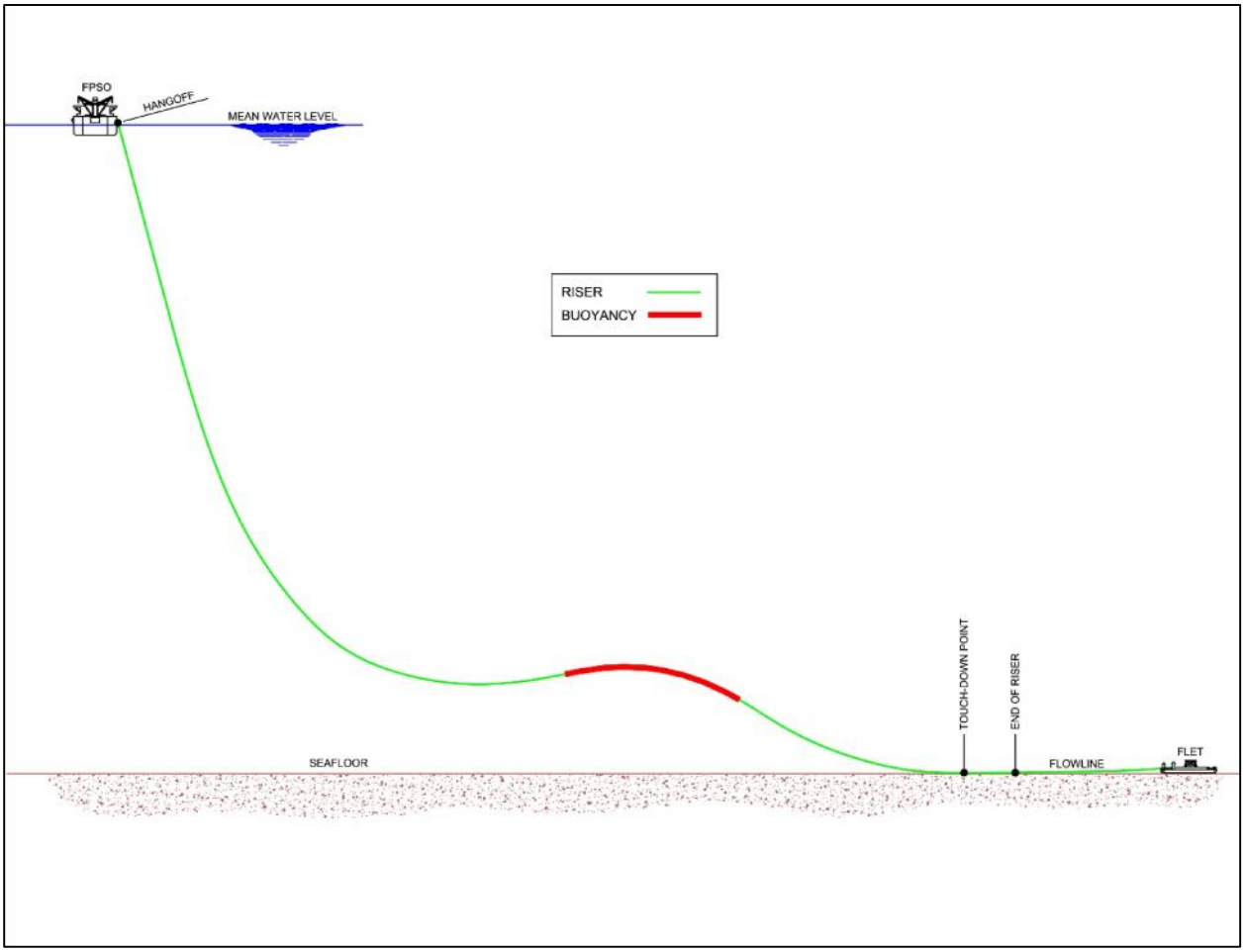
Figure 9: Representative Subsea Manifold

Gas-Lift System

The FPSO riser support system will be designed for gas-lift capability. The gas-lift system is not required for initial startup and may be installed at some future time during the Yellowtail service life based on the production characteristics of the field. This system will include gas-lift flowlines with connections to the production flowline FLETs.

The risers transition from the seabed to the FPSO in a “lazy wave” configuration as shown on Figure 10.

Figure 10: Representative Lazy Wave Riser



3.2.3 FPSO

The proposed FPSO will be a Very Large Crude Carrier (VLCC) size floating facility with double hull protection, with approximate dimensions of 340 m long by 60 m wide by 33 m deep (1,115 ft. long by 197 ft. wide by 108 ft. deep), and will be moored on location, approximately 200 km offshore similar to Liza Destiny FPSO shown (Figure 11).

The FPSO will have a production capacity of approximately 34 977 m^3 (220,000 barrels) and 39 747 m^3 (250,000 barrels) of oil per day. During the early stage of production operations, the project is anticipated to produce an average of approximately 1 049 316 m^3 - 1 192 404 m^3 (6,600,000 - 7,500,000 barrels) of crude oil per month. These estimates are preliminary and are subject to change. The FPSO will have an oil storage capacity of approximately 317 974 m^3 (2.0 million barrels) of oil within its hull. Its mooring system will be designed to keep the FPSO on station continuously for at least 20 years. At peak production during Yellowtail operations, the FPSO will offload oil to conventional tankers approximately every 4 – 6 days. The conventional tanker will be held in position with the assistance of tug(s) to maintain a safe separation distance from the FPSO. Figure 12 shows an example of FPSO offloading configuration. Produced oil will be stored in the FPSO tanks prior to export to market via conventional tankers owned/operated by other third partie.

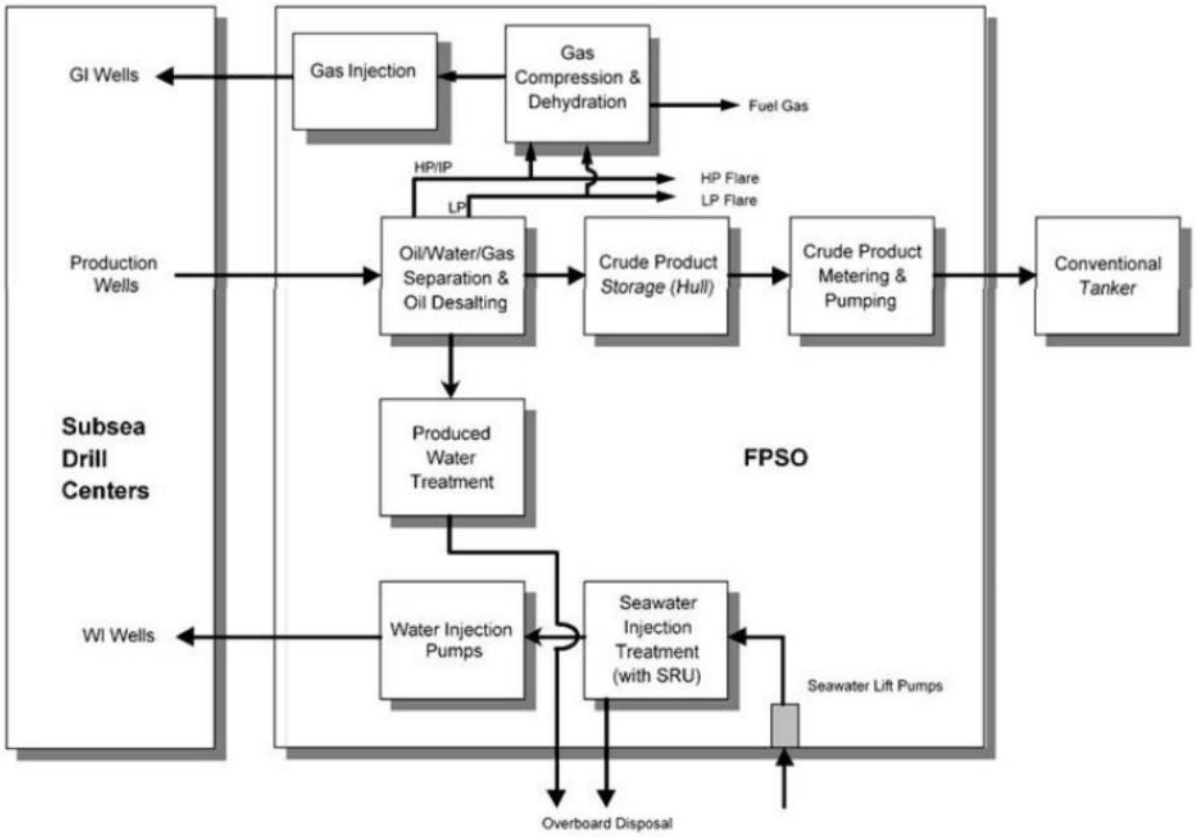
Figure 11: Liza Destiny FPSO

Figure 12:Typical FPSO Offloading Configuration

Figure 13:Liza Phase 1 Developement Project FPSO Destiny Offloading Drilling

Operating processes during production operations will include flowing the reservoir hydrocarbons from the wells to the FPSO, where further processing, storage, and management occurs prior to offloading the oil to conventional tankers (see Figure 14). General maintenance of the production equipment will also be required. Some industry standard chemicals will be required as part of the processing of the oil. The production facilities will also require the use of industry standard additives to prevent corrosion, scale, and hydrate formation. The preliminary chemical requirements and estimated quantities will be defined as part of the ongoing facility design work and will be addressed in more detail during environmental authorisation.

Figure 14: FPSO Process Flow Diagram



GI = gas [re]injection; HP = high pressure; IP = intermediate pressure; LP = low pressure; SRU = Sulfate Removal Unit; WI = water injection

Examples of FPSO tanks arrangements and FPSO equipment layouts are shown on Figure 15 and Figure 16.
Example of Project layouts and FPSO Equipment Overall Layout are show in Appendix 1.

Figure 15: Example of FPSO Tank Arrangements

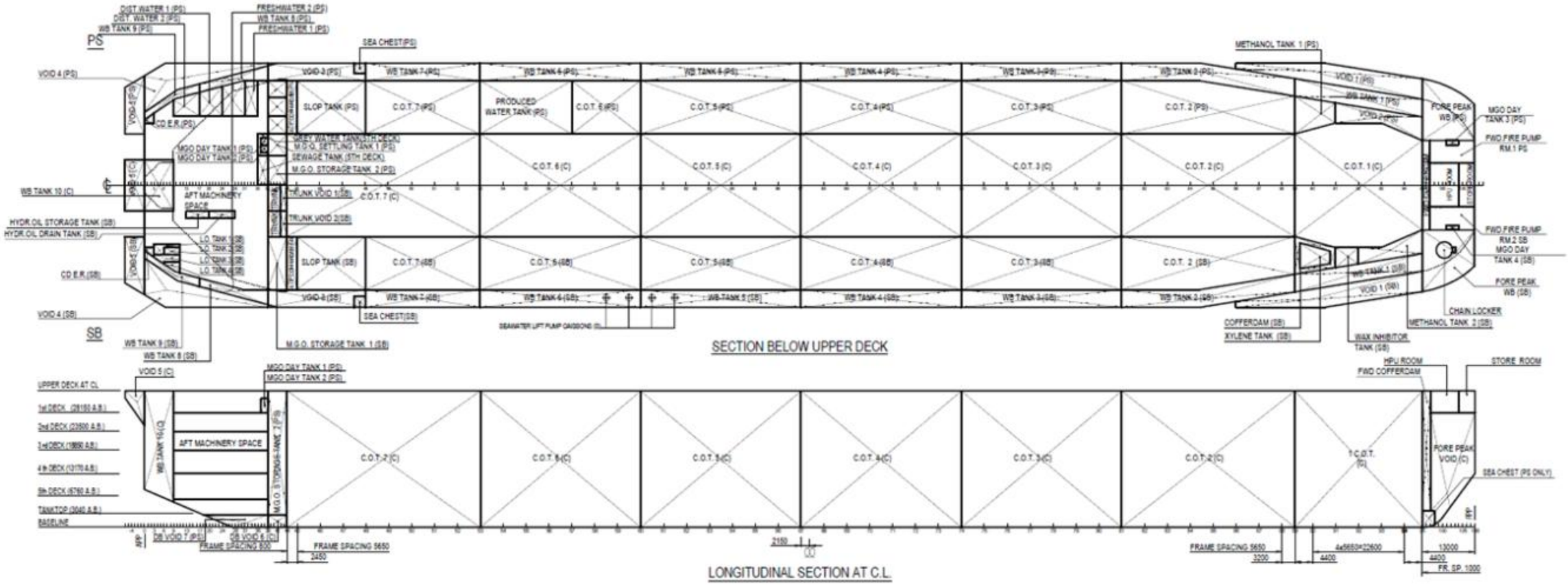
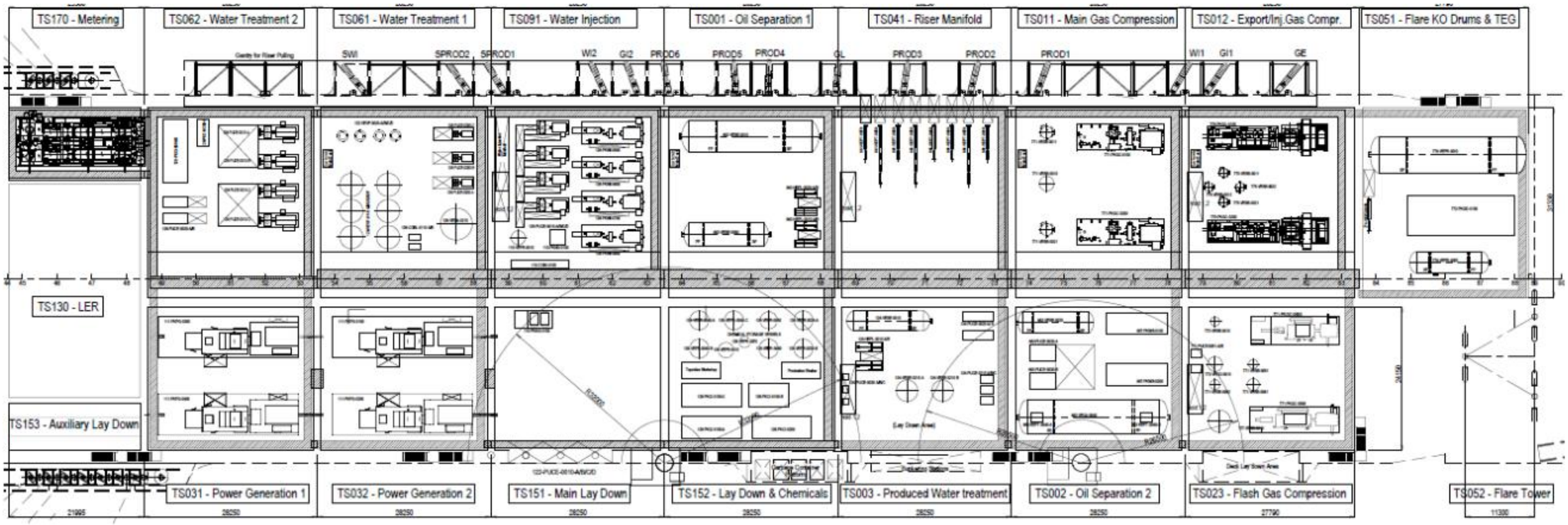


Figure 16: Example of FPSO Topside Layout



3.2.4 Work Forces

The Project is in the initial stages of planning and design, and detailed estimates of workforce requirements have not yet been developed. Preliminary workforce estimates are provided below. These estimates will be refined following selection and contracting for the drill ships, FPSO, SURF installation vessels, and support vessels. The following workforce levels in Table 3 are preliminary projections for the offshore components during each stage of Yellowtail; some stages may occur concurrently.

Table 3: Preliminary Workforce Levels

Well Drilling	Approximately 600 persons at peak utilizing at least two Drill Ships (approx. 300 persons per Drill Ship). Estimate is dependent upon final drill ships and support vessels selected.
FPSO and SURF Mobilization/ Installation/Hookup	Approximately 600 persons at peak. Estimate is dependent upon final construction/installation and support vessels selected.
Production Operations, including FPSO and conventional tanker	Approximately 100 - 140 persons at peak
Decommissioning	Approximately 60 persons at peak.

In addition to the offshore components, there will be a comparatively smaller number of personnel providing shorebase and logistical support onshore, in addition to personnel already engaged in supporting other EEPGL projects. The onshore staff will be expected to ramp up gradually through the mobilization and installation stage, and return to the same level or slightly higher after the end of Yellowtail installation and drilling campaigns. The onshore workforce is expected to increase again briefly during decommissioning. Logistical support may be shared among the Liza Phases 1 and 2, Payara, and Yellowtail Development Projects.

3.2.5 Decommissioning

A decommissioning program for Yellowtail will be submitted for approval by the government, in accordance with the Petroleum Agreement. The final decommissioning strategy is expected to include a comparative assessment, which is designed to evaluate the potential safety, environmental, technical, and economic impacts and associated mitigation measures in order to finalize the decommissioning program.

Subject to future comparative assessment, the expectation is that the SURF components would be detached from the FPSO and abandoned-in-place on the sea floor, consistent with industry best practices at the time of decommissioning. The FPSO is expected to be towed away, and the

FPSO mooring system would be disconnected and abandoned on the sea floor, consistent with standard industry practice.

4 POSSIBLE IMPACTS ON ENVIRONMENT

EEPGL's environmental consultants have identified potential impacts from the Project which are related to physical, biological, and socioeconomic (inclusive of community health) values. Potential impacts could potentially be related to:

- Air quality and climate
- Sound
- Marine geology and sediments
- Marine water quality
- Coastal habitats
- Coastal wildlife
- Protected areas and special status species
- Seabirds
- Marine mammals
- Riverine mammals
- Marine turtles
- Marine fish
- Marine benthos
- Ecological balance and ecosystems
- Cultural heritage
- Community health and wellbeing
- Employment and livelihoods
- Marine use and transportation
- Social infrastructure and services
- Land use
- Ecosystem services
- Indigenous people and traditional use of resources and land
- Economy/economic conditions
- Waste management infrastructure capacity
- Cumulative impacts

The potential impacts, which are expected to be similar to those identified in the Stabroek Development EIAs, could be directly and/or indirectly generated by Yellowtail during drilling and installation, hook-up and commissioning, production operations, and/or decommissioning, and such impacts could be adverse or positive in nature. The potential for cumulative impacts exists where impacts from Yellowtail overlap with those of Stabroek Projects (or other existing or planned future activities) in space or time. As such, a robust cumulative impact assessment will be performed as part of the Yellowtail assessment of impacts. Additional information on potential impacts is included in Appendix 2.

Should an Environmental Impact Assessment (EIA) be required by the Guyana Environmental Protection Agency (EPA) as part of the environmental authorisation process, EEPGL will scope, study, and assess potential impacts from the Yellowtail Development Project in an EIA per the laws of Guyana, in particular the Environmental Protection Act 1996. Through an EIA, EEPGL and those qualified independent environmental consultants chosen and approved to conduct the EIA would study and assess the significance of potential impacts generated by the Project, and would identify mitigation measures and monitoring programs to address any identified adverse impacts of significance. Potential mitigation measures to minimize or eliminate potential impacts are included in Appendix 3.

5 NON-TECHNICAL EXPLANATION OF PROPOSED PROJECT

EEPGL is proposing to develop an oil production facility in the offshore waters of Guyana. The Yellowtail Development Project (Yellowtail) will be located in the eastern portion of the Stabroek Block, approximately 200 km from Georgetown. See Figure 1.

Oil production from Yellowtail Development Project is expected to last at least 20 years.

EEPGL will drill approximately 45-55 wells offshore to support extraction of the oil from below the sea floor. Each well will be drilled using a floating drill ship (see Figure 4).

EEPGL will install some of the oil production facilities on the sea floor at approximately 1,700 – 1,950 m water depth. These subsea facilities include various types of pipes and hardware. The subsea facilities allow the oil from the wells to be gathered and moved to the surface of the ocean for further processing (see Figure 7).

EEPGL will install other oil production facilities on a vessel which floats on the surface of the ocean. The vessel is called a Floating Production, Storage, and Offloading vessel (FPSO). See Figure 11 the FPSO will be moored on location in approximately 1,750 m (5,100 ft.) of water depth and will remain on location throughout the production operations stage. Oil production facilities on the FPSO will further process the oil extracted from below the sea floor.

The FPSO will have the capacity to produce up to approximately 34 977 m^3 (220,000 barrels) and 39 747 m^3 (250,000 barrels) of oil per day. During the early stage of production operations, the FPSO is anticipated to produce up to an average of approximately 1 049 316 m^3 - 1 192 404 m^3 (6,600,000 - 7,500,000 barrels) of crude oil per month. These estimates are preliminary and are subject to change.

Processed oil will be stored in tanks in the FPSO hull which have the capacity to hold approximately 317 974 m^3 (2.0 million barrels)of oil. Approximately every 4 - 6 days, the oil will be pumped from the FPSO to a conventional oil tanker which is owned/operated by others. The tanker will then export the oil to buyers. Figure 12 shows an example of an FPSO and a tanker while oil is being offloaded.

EEPGL will utilize onshore support facilities to support drilling the wells, installing the offshore production facilities, and operating the offshore production facilities. This may including but not limited to shorebases, warehouses, storage and pipe yards, fabrication facilities, fuel supply facilities, and waste management facilities in Guyana. Helicopters and supply boats will also be needed to support the Project.

At peak, EEPGL will utilize approximately 1,200 personnel offshore during the stage where the wells are being drilled and the offshore oil production facilities are being installed. This number

will decrease to less than 200 personnel during the production operations phase. A smaller number of personnel will be utilized at the onshore support facilities.

At the end of the life of the Project (at least 20 years), EEPGL would decommission the offshore production facilities in accordance with the abandonment plan approved by the government.

Yellowtail Key Design Details:

- Oil Production Rates:
  - Yellowtail Development Project production rate will be approximately 34 977 m^3 (220,000 barrels) and 39 747 m^3 (250,000 barrels)of oil per day.

- FPSO Oil Storage Volume:
  Yellowtail Project storage volume will be approximately 317 974 m^3 (2.0 million barrels).

- Number of Wells:
  - Yellowtail Development Project will have approximately 45 to 55 wells.

- Oil Offloading Frequency:
  - Oil will be offloaded from the Yellowtail FPSO approximately every 4 to 6 days.

The Project activities may have the following impacts on People, Wildlife, and the Environment:

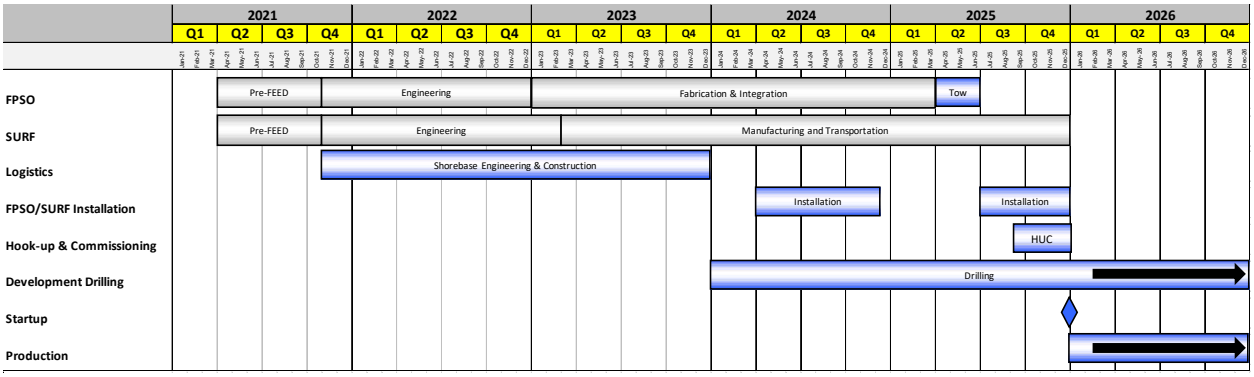
- Changes in quality of air
- Changes in noise and light levels
- Disturbance of seabed
- Changes in quality of ocean water
- Impacts to whales, dolphins, sea turtles, fish, marine birds, and marine protected species
- Impacts to coastal wildlife and/or coastal habitat
- Changes in food sources for fish and wildlife
- Increase in number of available local jobs
- Increase in government revenue
- Increase in foreign workers
- Increased demand for local goods and services
- Increased demand for local accommodations
- Increased road and vessel traffic and use of local shorebases
- Restriction on fishing around drill ships (temporary) and FPSO
- In the unlikely event of an oil spill, impacts to the environment (e.g., marine waters, coastline, protected areas), indigenous communities, and livelihoods of farmers and fishermen
- Cumulative impacts

6 DURATION OF PROJECT

The lifecycle for Yellowtail Development Project will include engineering, construction, installation, commissioning, start-up, operations and maintenance, and decommissioning. The engineering phase will include conceptual design, Front-End Engineering and Design (FEED), and detailed engineering. The construction phase will include procurement, fabrication and construction, drilling, installation, and hook-up. Operations and maintenance will follow commissioning and start-up and will be the longest phase of the Project with a duration of at least 20 years. Subject to applicable regulatory approvals and Project sanction, startup of the facilities is expected to occur in approximately year end 2025.

Figure 17 provides a preliminary sequence of major scheduling milestones for the construction, installation, and commissioning of the SURF and FPSO for the Yellowtail Development Project; however, this schedule is still being refined and is subject to change.

Figure 17: Preliminary Project Schedule



APPENDIX 1: PLANNED PROJECT LOCATION AND EXAMPLE OF FPSO OVERALL EQUIPMENT LAYOUT

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APPENDIX 2: POSSIBLE EFFECTS OF THE YELLOWTAIL DEVELOPMENT

Resource or Receptor	Potential Impact	Primary Sources of Potential Impacts	How Potential Impacts Could Impact Human Life and Environment
Physical Resources			
Air Quality and Climate	Air emissions resulting from the Project have the potential to affect ambient air quality in the Project area on a localized basis and to contribute to greenhouse gas (GHG) emissions.	) Emissions from construction equipment and back-up diesel-fired power generation) Emissions from operational point sources) Non-routine, temporary flaring) Pilot flare) Plant emissions) Fugitive emissions from construction or operations) Non-routine, unplanned events	Localized, increased concentrations of criteria pollutants in ambient air could contribute to health concerns in exposed humans and wildlife. Combustion of hydrocarbons from Project activities would contribute to GHG emissions.
Sound	Subsea sound could cause impacts to sensitive marine fauna (e.g., marine mammals, turtles, and fish) in the Project Development Area (PDA).	) Drilling of development wells) Vertical seismic profiling) Offshore pile driving operations) Installation of FPSO and SURF components) FPSO operations	Exposure of humans and wildlife to increased sound has the potential to affect potential auditory injury/behavioral changes or nuisance.
Marine Geology and Sediments	The Project has the potential to affect marine geology and sediments along in the Project Development area.	) Drilling of development wells) Installation of FPSO and SURF components	Disturbance of the seabed during offshore drilling and installation activities has the potential to affect benthic habitat and cause death/injury of benthic fauna.
Marine Water Quality	The development could have localized impacts to marine water quality in the Project development area from discharge of drill cuttings and from routine operational and hydrotesting discharges. The development could potentially impact marine water quality in the Project AOI as a result of non-routine, unplanned events (e.g. spill or release).	) Drilling of development wells (cuttings and fluid discharge)) Cooling water discharges) Sulfate removal and potable water processing brines) Installation of FPSO and SURF components) Wastewater discharges) Produced water discharges) Hydrotesting discharges) Ballast water discharges) Non-routine, unplanned event (e.g., spill or release)	Increased total suspended solids concentrations, chemical concentrations, or temperature in water column has a potential to affect marine water quality and marine habitat quality and affect wildlife.
Biological Resources			

Resource or Receptor	Potential Impact	Primary Sources of Potential Impacts	How Potential Impacts Could Impact Human Life and Environment
Coastal Habitats	The development is not expected to impact beaches, mangroves, or wetlands in the Project AOI during routine, planned operations and activities. The development could potentially impact beaches, mangroves, and wetland habitats in Project AOI as a result of non-routine, unplanned events (e.g. spill or release).	) Non-routine, unplanned event (e.g., spill or release)	An unplanned event could potentially impact beaches, mangroves, and wetlands as wildlife habitat, or could result in declines in fisheries productivity, and/or affect other ecosystem services (e.g., flood control).
Coastal Wildlife	The development is not expected to impact coastal wildlife during routine, planned operations and activities in the Project AOI. The development could impact coastal wildlife in the Project AOI as a result of non-routine, unplanned events (e.g. spill or release).	) Non-routine, unplanned event (e.g., spill or release)	An unplanned event could potentially impact coastal wildlife including chronic sub-lethal effects such as decreased vigor or reproductive impacts from direct exposure or ingestion of contaminated prey items.
Protected Areas and Special Status Species	The Project is not expected to impact Protected Areas. The development could potentially impact some special status species (e.g., endangered or listed species) within the Project area.	) Underwater sound generated by marine component operations and activities) Lighting on offshore facilities (e.g., FPSO, drill ships)) Seawater intake by FPSO) Wastewater discharges) Drilling of development wells (cuttings and fluid discharge)) Cooling water discharges) Produced water discharges) Hydrotesting discharges) Ballast water discharges) Vessel movements) Non-routine, unplanned event (e.g., spill or release)	Reduction in wildlife habitat quality and disturbance, injury, or mortality of wildlife. Potential declines in local abundance of some species within the Project area caused by decreased water quality and entrainment of early life stages of special status fish species, auditory impacts on noise-sensitive species, injury/death from vessel collisions, and habitat degradation and loss.
Seabirds	The Project has the potential to affect seabirds within the Project area.	) Lighting on offshore facilities (e.g., FPSO, drill ships)) Non-routine, temporary flaring) Non-routine, unplanned event (e.g., spill or release)) Indirect effects on prey availability due to changes in distribution of fish in vicinity of FPSO	Possible direct mortality and injury of seabirds related to attraction to offshore light sources and possible direct mortality and injury related to vessel (ship or air) strikes may occur.
Marine Mammals	The Project has the potential to affect marine mammals within the Project area.	) Underwater sound generated by marine component operations and activities) Changes in forage availability) Lighting on offshore facilities (e.g., FPSO, drill ships)) Seawater intake by FPSO) Wastewater discharges) Drilling of development wells (cuttings and fluid discharge)) Cooling water discharges	Potential auditory injury to or disturbance of marine organisms from Project-related noise could occur. Potential injury/mortality of marine mammals or marine turtles from collisions with Project-related vessel traffic may occur. Minor potential impacts from decreased water quality on all taxa could occur from changes in water quality in the AOI. Entrainment of early life stages of fish, and potential trophic
Marine Turtles	The Project has the potential to affect some marine turtles within the Project area.		

Resource or Receptor	Potential Impact	Primary Sources of Potential Impacts	How Potential Impacts Could Impact Human Life and Environment
Marine Fish	The Project has the potential to affect some marine fish in the Project area.	• Produced water discharges • Hydrotesting discharges • Ballast water discharges • Non-routine, unplanned event (e.g., spill or release, vessel strikes)	effects associated with concentration of prey species around artificial lights could occur. Non-routine/unplanned events (e.g. spill or release) could potentially cause a range of effects from acute and/or chronic sub-lethal toxic effects to mortality throughout the indirect AOI depending on the magnitude of the event.
Riverine Mammals	The development is not expected to impact riverine mammals in the Project AOI as a result of routine, planned activities. The Project could potentially impact riverine mammals in the Project AOI as a result of non-routine, unplanned events (i.e., diesel fuel release, vessel strikes).	• Non-routine, unplanned event (e.g., diesel fuel release, vessel strike)	Potential disturbance of riverine mammals from Project-related vessel movements near shorebases could occur. Potential injury/mortality of riverine mammals from collisions with Project-related vessel traffic may occur.
Marine Benthos	The Project has the potential to affect some benthic habitat and organisms within the Project area.	• Drilling of development wells (cuttings discharge and deposition) • Installation of FPSO (mooring structures) and SURF components • Non-routine, unplanned event	Disturbance of benthic habitat in the Project area and potential smothering of benthos within footprint of SURF and sediment deposition zones
Ecological Balance and Ecosystems	The Project has the potential to affect localized changes in marine and riverine nutrient cycles, gene flow, and biodiversity.	• Indirect impacts on the base of the marine foodweb (phytoplankton) due to localized changes in water quality • Indirect physiochemical barriers to migration, breeding, or dispersal/colonization occur due to localized changes in water quality, acoustic impacts, or general human activity • Introduction of invasive species • Non-routine, unplanned event (e.g., spill or release)	Ecological impacts to marine resources could potentially have ramifications for commercial and/or subsistence fisheries.
Socioeconomic Resources			
Cultural Heritage	The Project has the potential to impact cultural heritage through localized disturbance of archaeological or historical sites related to Project development.	• Drilling of development wells • Installation of FPSO and SURF components • Non-routine, unplanned event (e.g., spill or release)	Disturbance of the seabed could potentially affect submerged archaeological resources (e.g., shipwrecks).

Resource or Receptor	Potential Impact	Primary Sources of Potential Impacts	How Potential Impacts Could Impact Human Life and Environment
Community Health and Wellbeing	Most Project activities will be located offshore in the Project area and would have no direct impacts on communities in Guyana. Introduction of limited levels of foreign specialized labor could potentially have community health and wellbeing impacts. The development could potentially impact community health and wellbeing in the Project AOI due to onshore traffic, social interaction, or as a result of non-routine, unplanned events (e.g. spill or release).	• Increased traffic as a result of Project activities at the Guyana shorebase locations • Social interaction between Project workers and residents • Pressure on wages from introduction of foreign workers and increased competition for skilled labor • Noise and light near shore by Project marine and aviation operations • Non-routine, unplanned event (e.g., spill or release)	Increased demand for limited emergency and health services in Guyana, and a slight increased risk of communicable disease transmission could potentially result from Project activities and influence community health and wellbeing.

Employment and Livelihoods	The development is expected to build capacity in the local labor force, increase demand for skilled labor, and increase demand for service industries (beneficial impact). There is also the potential for limited adverse impacts to fishing activities.	• Local employment for:
		  o Drill ships
		  o Installation vessels
		  o FPSO operations
		  o Marine support and supply vessels
		  o Aviation operations
		  o Other related service industries
		• Marine safety exclusion zones
		• Project-related marine traffic
		• Drilling; FPSO/SURF installation, hookup and commissioning; and FPSO and support vessel operations (aspects relating to occupational health and safety for Project workforce)
		• Non-routine, unplanned event (e.g., spill or release)
			Direct and indirect employment for the Project would enhance livelihoods and family incomes, but could result in some competition with other businesses for skilled workers. Marine safety exclusion zones for the FPSO, drill ship, and major installation vessels, and Project-related vessel traffic could potentially interfere with fishing activities in certain areas.

Marine Use and Transportation	The development may result in increased marine-related traffic, which could potentially contribute to marine vessel congestion in nearshore or port areas.	• Marine vessel operations • Non-routine, unplanned event	Increased vessel traffic could result in localized potential congestion near shorebase and marine safety exclusion zones around the FPSO, drill ship, and major installation vessels would restrict access by unauthorised vessels.
Social Infrastructure and Services	The development will use public infrastructure and services and thus could potentially compete with other existing businesses and consumers across a range of services (e.g., roads, accommodation, and utilities). The development may result in increased vehicular traffic in Georgetown, which could potentially contribute to vehicular congestion in certain areas.	• Project demand requirements for selected infrastructure and services which could overburden existing capacity and supply • Shorebase operations • Ground transportation operations	Increased demand for public infrastructure, services, and housing by the Project workforce could influence the availability of these services; and increased Project-related traffic could result in localized traffic congestion.
Land Use	No new Project-dedicated land disturbance is planned. There is the potential that third-party onshore facilities may elect to expand or impact adjacent land as a result of supporting Project-related needs; however, these impacts are outside the scope of the Project.	• Shorebase operations • Pipe yards • Warehouses • Fabrication facilities • Bulk fuel storage and transfers • Onshore recycling of materials, waste treatment, and disposal facilities	Potential development or expansion of shorebases by third-parties could affect nearby properties. Some Project solid wastes will be treated/disposed at permitted third-party facilities onshore.

Resource or Receptor	Potential Impact	Primary Sources of Potential Impacts	How Potential Impacts Could Impact Human Life and Environment
Ecosystem Services	The development will not have measurable impacts on ecosystem services during its planned, routine activities. The development could potentially impact ecosystem services in the coastal areas of Guyana as a result of non-routine, unplanned events (e.g. spill or release).	) Operational effluent discharges) Non-routine, unplanned event (e.g. spill or release)	If resources affected by the Project provide ecosystem services, this could result in indirect effects to these services. As an example, such effects to resources could potentially affect provisioning services particularly for communities that rely on fishing, hunting, and harvesting activities for subsistence and livelihoods. In addition, coastal flood protection services offered by mangrove forests could be affected. Cultural services could also be affected for some communities that make use of the seashore in traditional and/or religious ceremonies.
Indigenous People and Traditional Use of Resources and Land	The Project is not expected to directly cause any changes to population and demographics in indigenous communities. The development could potentially impact indigenous peoples in the Project AOI as a result of non-routine, unplanned events (e.g. spill or release).	) Non-routine, unplanned event (e.g. spill or release)	If resources affected by the Project are used by indigenous peoples, this could result in indirect effects to these individuals or populations.
Economy/ Economic Conditions	The development is generally anticipated to have a positive impact on the economy of Guyana as a result of government revenue sharing, as well as employment and local procurement opportunities. Potential adverse impacts may include potential shorter-term increases in the cost of living as a result of increased demand for specific goods and services. Potential adverse impacts on income from agriculture and fisheries could also occur as a result of non-routine, unplanned events (i.e., oil spill or release) and also occur as a result of presence of Project working spreads during installation and.	) Government revenue sharing) Local purchases of select materials, goods and services) Limited local employment (direct and indirect)) Increased spending on select materials, goods and services (indirect multiplier impacts for local/regional population)	Positive economic impacts throughout the country, which could potentially affect all segments of the population. Positive effects related to local purchasing and employment could potentially affect all segments of the population.
Waste Management Infrastructure Capacity	The Project could potentially stress the capacity to manage wastes in Guyana.	) Project-generated wastes requiring off-site treatment, storage, or disposal	If the capacity in Guyana to properly treat, store, or dispose of waste is overburdened by Project demands, this could affect the ability to properly accommodate treatment, storage, or disposal needs by other parties.

APPENDIX 3 POTENTIAL EMBEDDED CONTROLS (MITIGATIONS)

A 3.1 Development Well Drilling and Subsea, Umbilicals, Risers, and Flowlines (SURF)/FPSO Installation and Commissioning

Potential Embedded Controls	Resources/Receptors Benefited
Use water-based drilling fluids to the extent reasonably practicable (upper sections of the wells). For well sections requiring non-aqueous drill fluid (NADF), use only low-toxicity International Oil and Gas Producers Group III base fluid.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, seabirds, marine benthos
When NADF is used, use a solids control and cuttings dryer system to treat drill cuttings such that end-of-well maximum weighted mass ratio averaged over all well sections drilled using NADF does not exceed 6.9 percent wet weight base fluid retained on cuttings.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, seabirds, marine benthos
Install a blowout preventer (BOP) system that can be closed rapidly in the event of an uncontrolled influx of formation fluids and that allows the well to be circulated to safety by venting the gas at surface and routing oil so that it may be contained.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, seabirds, marine benthos
Test BOP equipment at installation, after disconnection or repair of any pressure containment seal, and at regular intervals (at least every 14 days or as operations allow).	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, seabirds, marine benthos
Visually check and take appropriate measures to mitigate occurrence of free oil resulting from discharge of NADF drill cuttings.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, seabirds, marine benthos
Employ trained Marine Mammal Observers during the conduct of seismic-related activities.	Marine mammals, marine turtles
Conduct a continuous observation of a mitigation zone (500 meters [1,640 feet] around the sound source) to verify whether it is clear of marine mammals and marine turtles before commencing sound producing seismic operations. Do not commence sound-producing seismic operations (including soft starts) if marine mammals or turtles are sighted within the mitigation zone during the 30 minutes prior to commencing sound-producing operations in water depths less than 200 meters [656 feet], or 60 minutes prior to commencing sound-producing operations in water depths greater than 200 meters [656 feet].	Marine mammals, marine turtles
Where reasonably practicable, ensure that sound-making devices or equipment are equipped with silencers or mufflers and are enclosed, and/or use soft-start procedures (e.g., for pile driving, vertical seismic profiling, etc.) to reduce noise to levels that do not cause material harm or injury to marine species.	Marine mammals, marine fish, marine turtles
Adhere to the Joint Nature Conservation Committee guidelines (JNCC 2017) during the conduct of seismic-related activities.	Marine mammals, marine turtles

Potential Embedded Controls	Resources/Receptors Benefited
If well testing[1] is performed, implement the following measures: J Flow only the minimum volume of hydrocarbons required for the test and reduce the test duration to the extent practical; J Use an efficient test-flare burner head equipped with an appropriate combustion enhancement system to minimize incomplete combustion, black smoke, and hydrocarbon fallout[2] to the sea; J Record volumes of hydrocarbons flared and make available to the EPA upon request; J Provide adequate gas sensors that are appropriately located during testing operations, to ensure all sources of gas can be detected; J Monitor pipes and joints on a daily basis for leakages and fugitive emissions. Burn all collected gaseous streams in high-efficiency flares, and implement and maintain a leak detection and repair program; J Keep the well test to the minimum practical time, in keeping with a pre-approved schedule with the EPA. Notify the EPA immediately in case of any deviation/variation to the well test; and J Provide sufficient compressed air to the oil burner for efficient flaring assignment.	Air quality and climate
With respect to prevention of spills of hydrocarbons and chemicals during the drilling stage: J Change liquid hydrocarbon transfer hoses periodically; J Use dry-break connections on liquid hydrocarbon bulk transfer hoses; J Use a liquid hydrocarbon checklist before every bulk transfer; J Perform required inspections and testing of all equipment prior to deployment/installation; J Use overbalanced drilling fluids to control wells while drilling; J Perform operational training certification (including well-control training) for drill ship supervisors and engineers; J Regularly audit field operations on the drill ships to ensure application of designed safeguards; and J Use controls for mitigating a failure of the Dynamic Positioning (DP) system on the drill ships and maintaining station-keeping, which include: Z Use of a Class 3 DP system, which includes numerous redundancies; Z Rigorous personnel qualifications and training; Z Sea trials and acceptance criteria; Z DP proving trials;	Marine geology and sediments, marine water quality, protected areas and special status species, coastal habitats, coastal wildlife, marine mammals, marine turtles, marine fish, marine benthos, ecological balance and ecosystems

Potential Embedded Controls	Resources/Receptors Benefited
Z System Failure Mode and Effects Analysis; Z DP failure consequence analysis; and Z Establishment of well-specific operations guidelines.	
During pile-driving activities, gradually increase the intensity of hammer energy to allow sensitive marine organisms to vacate the area before injury occurs (i.e., soft starts).	Marine mammals, marine turtles, marine fish
Maintain marine safety exclusion zones to be issued through the Maritime Administration Department with a 500-meter radius around drill ships and major installation vessels, to prevent unauthorized vessels from entering areas with an elevated risk of collision.	Marine use and transportation
Ensure all vessel wastewater discharges (e.g., storage displacement water, ballast water, bilge water, deck drainage) comply with International Maritime Organization (IMO)/International Convention for the Prevention of Pollution by Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78) requirements.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Ensure leak detection systems are in place for equipment, treatment, and storage facilities (fuel, chemical, etc.) on drill ships in accordance with international offshore petroleum industry standards.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use leak detection controls during installation and operation of SURF equipment (e.g., pigging and pressure testing of lines, periodic remotely operated vehicle surveys of subsea trees, manifolds, flowlines, and risers).	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds

A3.2 Production Operations

Potential Embedded Controls	Resources/Receptors Benefited
Use aero-derivative turbines instead of industrial turbines on the FPSO.	Air quality and climate
Install waste heat recovery units (WHRUs) on turbine generators to reduce the demand of more power generation or fired heaters, thus decreasing fuel gas consumption. Two WHRUs provide sufficient heat for the entire FPSO, but the Project is designed to use WHRUs on three of the four turbine generators, which adds spare capacity to ensure achieving maximum uptime and reducing flaring.	Air quality and climate
Use a crude–crude exchanger to recover heat from the dead crude to heat up live crude, instead of using a fired heater.	Air quality and climate
Use a large power plant and maximize the use of mechanical driven equipment that is more energy efficient. Use a gas turbine to drive the compressor directly, allowing savings in fuel versus using a gas turbine to generate electricity, and then	Air quality and climate

Potential Embedded Controls	Resources/Receptors Benefited
using an electric motor to drive the compressor - reducing motor losses and power generation losses.	
Use large, high-voltage motors, which are more efficient than industry standard machines.	Air quality and climate
Use the same gas turbines for the main generators, designed slightly larger than the need for the compressor such that when one compressor trips, the second unit still can meet at least 50% of production and thus reduce flaring.	Air quality and climate
Implement an FPSO topsides leak detection and repair program to reduce fugitive emissions.	Air quality and climate
Implement a flare minimization plan	Air quality and climate
Instead of continuous flaring, re-inject produced gas that is not used as fuel gas on the FPSO into the reservoir, to avoid routine flaring.	Air quality and climate
Adopt highly efficient combustion equipment using recovery heat systems as part of the heat and will help to reduce power demand.	Air quality and climate
With respect to non-routine flaring, the following measures will be implemented: - Ensure flare equipment is properly inspected, well maintained, monitored, certified, and function-tested prior to and throughout operations; - Install the flare at a safe distance from storage tanks containing flammable liquids or vapors and accommodation units; - Ensure combustion equipment is designed and built to appropriate engineering codes and standards; - Do not operate the flare outside design operating ranges; - Use efficient flare tips and optimize the size and number of burning nozzles; - Minimize risk of pilot blowout by ensuring sufficient exit velocity and provision of wind guards; - Use a reliable pilot ignition system; - Install instrumented pressure protection systems, as appropriate, to reduce overpressure events and avoid or reduce flaring situations; - Operate the flare to control odor and visible smoke emissions; - Record volumes of hydrocarbons flared and submit a copy of the record to the EPA annually; - Maximize efficiency of flaring through flare tip design to ensure correct ratio of fuel and air are present to support efficient combustion - Implement burner maintenance and replacement programs to ensure continuous maximum flare efficiency; - Minimize liquid carryover and entrainment in the gas flare stream with a suitable liquid separation system, with sufficient holding capacity for liquids that may accumulate, and which is designed in accordance with good engineering practice;	Air quality and climate

Potential Embedded Controls	Resources/Receptors Benefited
• Equip liquid separation system (e.g., knockout drum) with high-level facility shutdown or high-level alarms and empty as needed to increase flare combustion efficiency; • Implement source gas reduction measures (i.e., gas re-injection into reservoir) to the extent possible to avoid or reduce flaring from FPSO; • Minimize flaring from purges and pilots without compromising safety through measures such as installation of purge gas reduction devices, vapor recovery units, inert purge gas, and soft seat-valve technology where appropriate, and installation of pilot flares; and • Minimize flame lift off and/or flame lick.	
Develop equipment strategies and execute a maintenance program to minimize equipment breakdowns and plant upsets that could result in flaring, and make provisions for equipment sparing and plant turn-down protocols where practical.	Air quality and climate
Implement inspection, maintenance, and surveillance programs to identify and prevent unplanned emissions to atmosphere onboard the FPSO.	Air quality and climate
In the event of an emergency or equipment breakdown on the FPSO, or when facility upset conditions arise, excess gas should not be vented but rather should be sent to an efficient flare gas system, where practical and operationally safe.	Air quality and climate
Notify the EPA via email, correspondence, and/or telephone within 24 hours after process upset events or unplanned maintenance occur that result in a flaring event on the FPSO sustaining a volume of at least 283,168.5 m^3 (10 million standard cubic feet) per day. Capture volumes from minor flaring events not requiring notification in aggregate in annual emissions reporting.	Air quality and climate
Avoid routine venting (excludes tank flashing emissions, standing/ working/breathing losses) except during safety and emergency conditions.	Air quality and climate

Potential Embedded Controls	Resources/Receptors Benefited
Treat produced water onboard the FPSO to an acceptable specification prior to discharging. Limit oil content of discharged produced water to 42 milligrams per liter (mg/L) on a daily basis or 29 mg/L on a monthly average. If oil content of produced water is observed to exceed these limits, route it to an appropriate storage tank on the FPSO until the treatment system is restored and the discharge meets the noted specification.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Design cooling water discharges from FPSO to avoid increases in ambient water temperature of more than 3˚C at 100 meters (approximately 328 feet) from discharge point.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Evaluate available alternatives for antifouling chemical dosing to prevent marine fouling of offshore facility cooling water systems. Where practical, optimize seawater intake depth to reduce the need for use of chemicals.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Measure residual chlorine concentration of sewage discharges from the FPSO monthly to ensure it is below 0.5 mg/L in accordance with MARPOL 73/78 regulations.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Perform daily visual inspections on the FPSO of discharge points to ensure that there are no floating solids or discoloration of the surrounding waters.	Marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds, ecological balance and ecosystems
Maintain marine safety exclusion zones to be issued through the Maritime Administration Department with a 2-nautical-mile (approximately 12,150-foot) radius around FPSO during offloading operations, to prevent unauthorized vessels from entering areas with an elevated risk of collision.	Marine use and transportation, marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Ensure offloading activities are supervised by a designated Mooring Master, according to the conditions of the sea. The conditions and characteristics of the export tankers will be assessed by the Mooring Master and reported to the Offshore Field Manager prior to commencing offloading operations. Use only properly registered and well-maintained double-hull vessels.	Marine use and transportation, marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use support tugs to aid tankers in maintaining station during approach/departure from FPSO and during offloading operations.	Marine use and transportation, marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use a hawser with a quick release mechanism to moor the FPSO to the tanker at a safe separation distance during offloading operations.	Marine use and transportation, marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Ensure FPSO offloading to tankers occurs within an environmental operating limit that is established to ensure safe operations. In the event that adverse weather occurs during offloading operations that is beyond the environmental operating	Marine use and transportation, marine geology and sediments, marine water quality, marine

Potential Embedded Controls	Resources/Receptors Benefited
limit, the tanker will cease offloading operations, and may disconnect and safely maneuver away from the FPSO as appropriate.	mammals, marine turtles, marine fish, marine benthos, seabirds
Use a certified marine-bonded, double-carcass floating hose system that complies with the recommendations of Oil Companies International Marine Forum Guide to Manufacturing and Purchasing Hoses for Offshore Moorings 2009 Edition (OCIMF 2009) or later.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use breakaway couplers on offloading hose that would stop the flow of oil from FPSO during an emergency disconnect scenario.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use a load-monitoring system in the FPSO control room to support FPSO offloading.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use leak detection controls during FPSO offloading (e.g., for breach of floating hose, instrumentation/procedures to perform volumetric checks).	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Inspect and maintain onboard equipment (engines, compressors, generators, sewage treatment plant, and oil-water separators) in accordance with manufacturers' guidelines, in order to maximize efficiency and minimize malfunctions, and unnecessary discharges into the environment.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Use low-sulfur fuels for major Project vessels.	Air quality and climate
Use dust-suppression measures at the shorebases to reduce impacts on air quality.	Air quality and climate
Abide with IMO (2004) guidelines including the International Convention for the Control and Management of Ship's Ballast Water and Sediments, with the exception of Regulation D-2 (Ballast Water Performance Standard) while the FPSO is on station, and abide with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).	Ecological balance and ecosystems

A3.3 General Measures

Potential Embedded Controls	Resources/Receptors Benefited
Regularly maintain equipment, marine vessels, vehicles, and helicopters and operate them in accordance with manufacturers' specifications and at their optimal levels to minimize atmospheric emissions and sound levels to the extent reasonably practicable.	Air quality and climate, sound, marine water quality, marine mammals, marine turtles, riverine mammals
Adhere to operational controls regarding material storage, wash-downs, and drainage systems.	Marine water quality, marine mammals, marine turtles, marine

Potential Embedded Controls	Resources/Receptors Benefited
	fish, marine benthos, seabirds, ecological balance and ecosystems
Equip Project vessels with radar systems and communication mechanisms to communicate with third-party mariners.	Marine use and transportation
Regularly inspect and service shorebase cranes and construction equipment to mitigate the potential for spills and to reduce air emissions to the extent reasonably practicable.	Air quality and climate, marine water quality
Shut down (or throttle down) sources of combustion equipment in intermittent use where reasonably practicable in order to reduce air emissions.	Air quality and climate

Implement chemical selection processes and principles that exhibit recognized industry safety, health, and environmental standards. Use low-hazard substances and consider the Offshore Chemical Notification Scheme as a resource for chemical selection in Project production operations. The chemical selection process is aligned with applicable Guyanese laws and regulations and includes;
• Review of Safety Data Sheets;
• Evaluation of alternate chemicals;
• Consideration of hazard properties, while balancing operational effectiveness and meeting performance criteria, including:
  – Using the minimum effective dose of required chemicals; and
  – Minimum safety risk relative to flammability and volatility;
• Risk evaluation of residual chemical releases into the environment;
	Air quality and climate, marine water quality, marine geology and sediments, marine mammals, marine turtles, riverine mammals, marine fish, marine benthos, seabirds

Use secondary containment for storage of bulk fuel, drilling fluids, and hazardous materials, where reasonably practicable.	Marine water quality
Regularly (e.g., monthly) check pipes, storage tanks, and other equipment associated with storage or transfer of hydrocarbons/chemicals for leaks.	Marine water quality
Ensure wastewater released from the onboard sewage treatment plant complies with aquatic discharge standards in accordance with MARPOL 73/78 regulations.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Treat food waste in accordance with MARPOL 73/78 (e.g., food comminuted to 25-millimeter-diameter particle size or less) prior to discharge.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
For transport of hazardous wastes offsite for treatment or disposal, ensure the waste is accompanied by a manifest signed by the hazardous waste generator and transporter.	Waste management infrastructure capacity
Provide for adequate onshore waste-management equipment and facilities for the proper management of waste in accordance with local regulation and good international oil field practice	Waste management infrastructure capacity
For wastes that cannot be reused, treated, or discharged/disposed on the drill ships or FPSO, ensure they are	Waste management infrastructure capacity

Potential Embedded Controls	Resources/Receptors Benefited
manifested and safely transferred to appropriate onshore facilities for management.	
Periodically audit waste contractors to verify appropriate waste management practices are being used.	Waste management infrastructure capacity
Avoid, reduce, and reuse/recycle wastes preferentially prior to disposal in accordance with waste management hierarchy.	Waste management infrastructure capacity
Perform onshore waste treatment for certain categories of waste, thereby reducing demand on landfill capacity.	Waste management infrastructure capacity
Operate incinerators in accordance with the manufacturers' operating manuals and Waste Management Plan. Ensure that the incinerators are operated only by trained personnel.	Waste management infrastructure capacity, air quality and climate
Ensure there is no visible oil sheen from commissioning-related discharges (i.e., flowlines/risers commissioning fluids, including hydrotesting waters) or FPSO cooling water discharge.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Treat bilge water in accordance with MARPOL 73/78 to ensure compliance with an oil-in-water content of less than 15 parts per million, as applicable.	Marine geology and sediments, marine water quality, marine mammals, marine turtles, marine fish, marine benthos, seabirds
Provide awareness training to Project-dedicated marine personnel to recognize signs of marine mammals and riverine mammals at the sea surface. Provide standing instruction to Project-dedicated vessel masters to avoid marine mammals, riverine mammals, and marine turtles while underway and reduce speed or deviate from course, when possible, to reduce probability of collisions.	Marine mammals, marine turtles, riverine mammals
Provide standing instruction to Project-dedicated vessel masters to avoid any identified rafting seabirds when transiting to and from Project Development Area.	Seabirds
Provide standing instructions to Project-dedicated vessel masters to reduce their speed within 300 meters (984 feet) of observed marine mammals and marine turtles, and to not approach the animals closer than 100 meters (328 feet).	Marine turtles
Observe standard international and local navigation procedures in and around the Georgetown Harbour and Demerara River, as well as best ship-keeping and navigation practices while at sea.	Marine use and transportation
Provide health screening procedures to Project workers to reduce risks of transmitting communicable diseases.	Community health and wellbeing
Employ Guyanese citizens having the appropriate qualifications and experience where reasonably practicable. Partner with select local institutions and agencies to support workforce development programs and proactively message Project-related employment opportunities.	Socioeconomic conditions, employment and livelihoods
Procure Project goods and services locally when available on a timely basis and when they meet minimum standards and are commercially competitive.	Socioeconomic conditions, employment and livelihoods
Develop and implement a Stakeholder Engagement Plan.	Community health and wellbeing
Implement a transparent, accessible, and consistent Community Grievance Mechanism (CGM) early on, prior to onset of Project	Community health and wellbeing

Potential Embedded Controls	Resources/Receptors Benefited
activities. Ensure CGM is well publicized and understood by the public.	
Monitor grievances received and resolved by the CGM; adjust CGM and other management measures, as appropriate	Community health and wellbeing
Implement a community safety program for potentially impacted schools and neighborhoods to increase awareness and minimize potential for community impacts due to vehicle incidents.	Social infrastructure and services, community health and wellbeing
Implement a Road Safety Management Procedure to mitigate increased risk of vehicular accidents associated with Project-related ground transportation activities. The Road Safety Management Procedure has been implemented as of the writing of this EIA, and the procedure includes the following components: • Definition of typical, primary travel routes for ground transportation in Georgetown area; • Development of an onshore logistics/journey management plan to reduce potential conflicts with local road traffic when transporting goods to/from onshore support facilities; • Definition of required driver training for Project-dedicated drivers, including (but not limited to) defensive driving, loading/unloading procedures, and safe transport of passengers, as applicable; • Designation and enforcement of speed limits through speed governors, global positioning system, or other monitoring systems for Project-dedicated vehicles; • Avoidance of deliveries during typical peak-traffic hours as well as scheduled openings of the Demerara Harbour Bridge, to the extent reasonably practicable; • Monitoring and management of driver fatigue; • Definition of vehicle inspection and maintenance protocols that include all applicable safety equipment for Project-dedicated vehicles; and • Community outreach to communicate information relating to major delivery events or periods.	Social infrastructure and services, community health and wellbeing
Coordinate with relevant aviation authorities and stakeholders to understand peak Project-related utilization rates.	Social infrastructure and services
Use an established Safety, Security, Health, and Environment program to which all Project workers and contractors will be required to adhere to mitigate against risk of occupational hazards. Ensure all workers and contractors receive training on implementation of these principles and are required to adhere to them in the daily execution of their duties.	Occupational health and safety
Maintain an OSRP to ensure an effective response to an oil spill, including maintaining the equipment and other resources specified in the OSRP and conducting periodic training and drills.	All resources and receptors potentially impacted by an oil spill
Where reasonably practicable, direct lighting on FPSO and major Project vessels to required operational areas rather than	Seabirds, marine turtles

Potential Embedded Controls	Resources/Receptors Benefited
at the sea surface or skyward. Ensure lighting on vessels adheres to maritime safety regulations/standards.	
Provide screening for seawater intakes to avoid entrainment and impingement of marine flora and fauna.	Marine fish