FIRST SCHEDULE

SARAWAK SHELL BERHAD

Environmental Impact Assessment (EIA) for Block SK408 Teja and Pepulut (TePu) Field Development, Offshore Sarawak

Final Report

CK/EV113-110(139)/25
February 2026

Submitted by:

CHEMSAIN KONSULTANT SDN BHD

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

PROJECT PROPONENT

Sarawak Shell Berhad

Address: One Shell Square Miri (OSSM), Miri Times Square, Jalan Bendahara, Marina Park City, 98000 Miri, Sarawak

Tel: 085-454545

Contact Person: Mr. Ivan Duraisingh (Project Manager) / Mr. Eulogius Justin (Senior Environment Advisor)

Email: Ivan.Duraisingh@shell.com / Eulogius.Justin@shell.com

QUALIFIED PERSON

Chemsain Konsultant Sdn Bhd

Address: 172, Rock Road, 93200 Kuching, Sarawak, Malaysia

Tel: 082-548366 **Fax:** 082-548388

Contact Person: Mr. Anthony Rentap Enchana (EIA Team Leader)

Email: anthony.enchana@chemsain.com

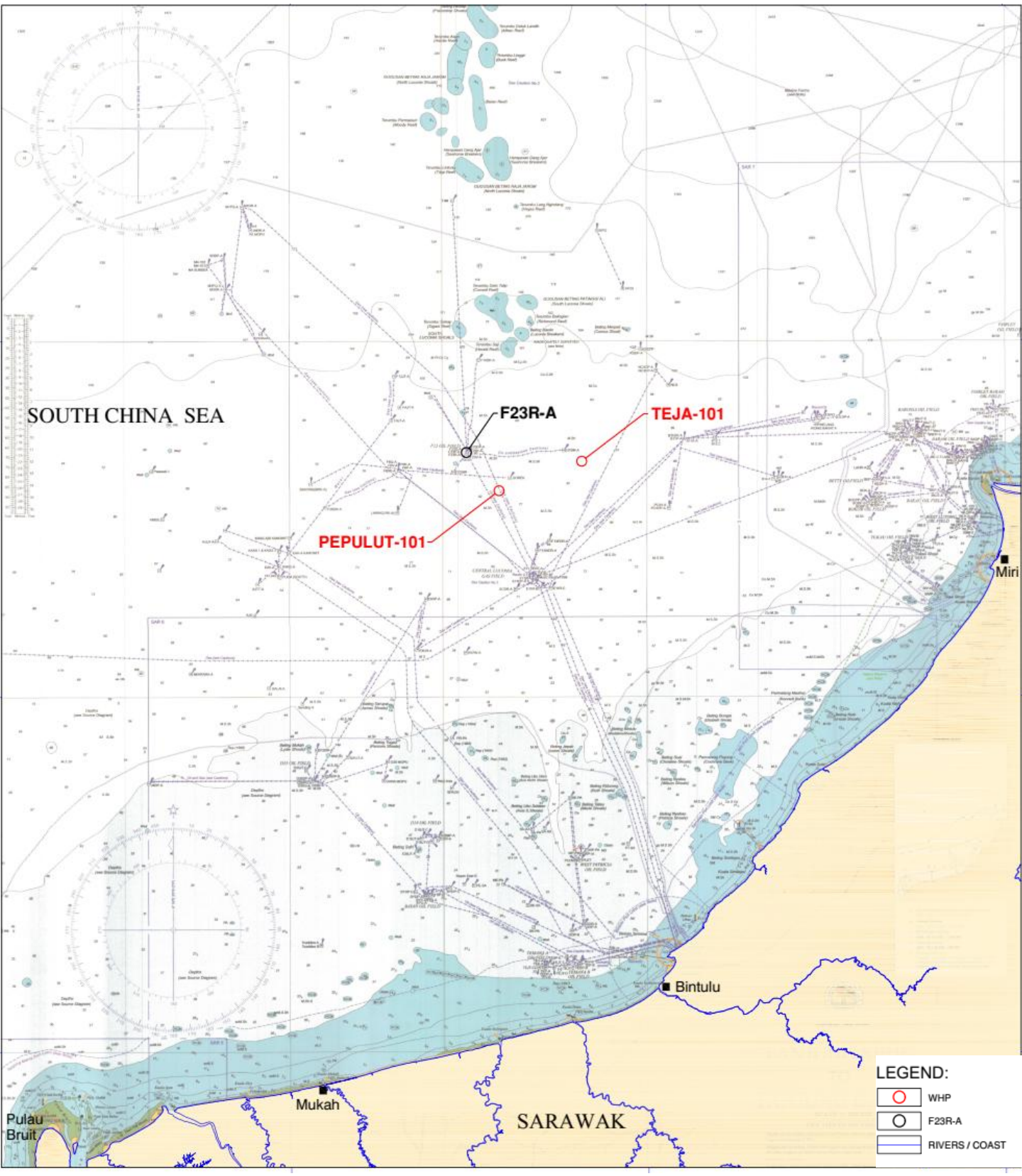
INTRODUCTION

- Teja and Pepulut are gas fields located offshore Sarawak in the Central Luconia province, Block SK408, situated approximately 132 km and 156 km northwest respectively from Miri, Sarawak, whereas about 165 km and 160 km north respectively of Bintulu, Sarawak.
- The water depths for both Teja and Pepulut gas fields ranged from 80 m – 90 m respectively.
- The Scope of this EIA cover the development of the following:
  - Two (2) Wellhead Platforms (WHPs), one for Teja WHP (Teja-101) and Pepulut WHP (Pepulut-101) respectively
  - A 12" x 28 km pipeline from Teja WHP to Pepulut WHP
  - A 16" x 16 km pipeline from Pepulut WHP to Cilipadi pipeline subsea expansion spool
  - Brownfield modifications at the existing F23 hub

Coordinates of WHPs and Platform

No.	WHP & Platform	Datum: WGS84		Datum: Timbalai 1948	
		Latitude	Longitude	Latitude	Longitude
1.	Teja-101	04°39'41.18"N	112° 49'06.70"E	04°39' 44.10"N	112°48'54.78"E
2.	Pepulut-101	04°34'44.08"N	112° 35'10.69"E	04°34' 46.97"N	112°34'58.66"E
3.	F23R-A	04°41'10.85"N	112°29'43.10"E	04°41'13.77"N	112°29'31.02"E

PROJECT LOCATION



LEGISLATIVE REQUIREMENT

Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015

Item 9 Petroleum

Sub-item

(a) Development of – (ii) gas field

(b) Construction of 30 kilometres or more in length of – (i) offshore pipelines

STATEMENT OF NEED

Demand for sustainable energy supply; benefiting :

(i) <u>Proponent</u>

Providing a supply of gas to the operation of MLNG Complex at Bintulu.

(ii) <u>Economy</u>

Creating revenues and job opportunities which is in line with the strategic vision of Sarawak Government.

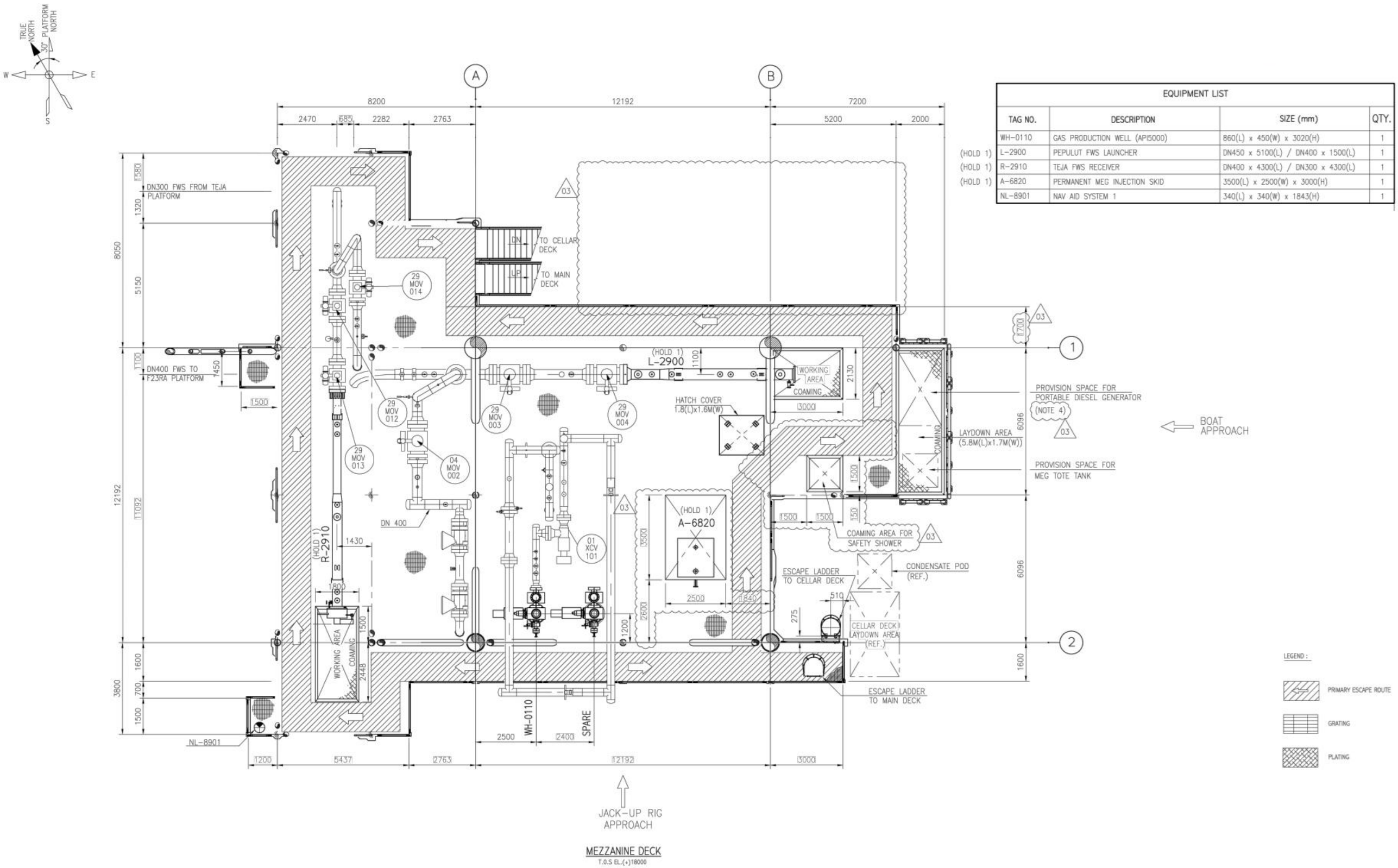
PROJECT DESCRIPTION

- **Well Head Platform (WHP)** – unmanned, 2 well slots with a maximum gas production of 150 MMscfd respectively (gas production for Teja will be capped at 100 MMscfd)
- **Pipelines** – (i) 12” x 28 km carbon steel (CS) pipeline from Teja to Pepulut and (ii) 16” x 16 km CS pipeline from Pepulut to F23R-A. There’ll be continuous corrosion inhibition (CI) injection into the pipeline.
- **Brownfield modifications at F23 Hub –** space and weight provision and tie-in for future gas and condensate Mercury Removal Unit (MRU) with potential deck extension, H2S scavenger skid, etc.

** The nearby Temu and Inai (TuNai) fields will commingle fluids with Teja via a new 12” pipeline and subsea piggable wye, with the combined flow routed to Pepulut WHP and onward to existing F23R-A facilities; these downstream facilities are excluded from the EIA scope.*

*** Similarly, the export of dehydrated gas and dewatered condensate from TePu and the F23 Hub to MLNG-1 and BSTAB-1 & 2 via existing trunklines and slug catcher is also outside the EIA scope.*

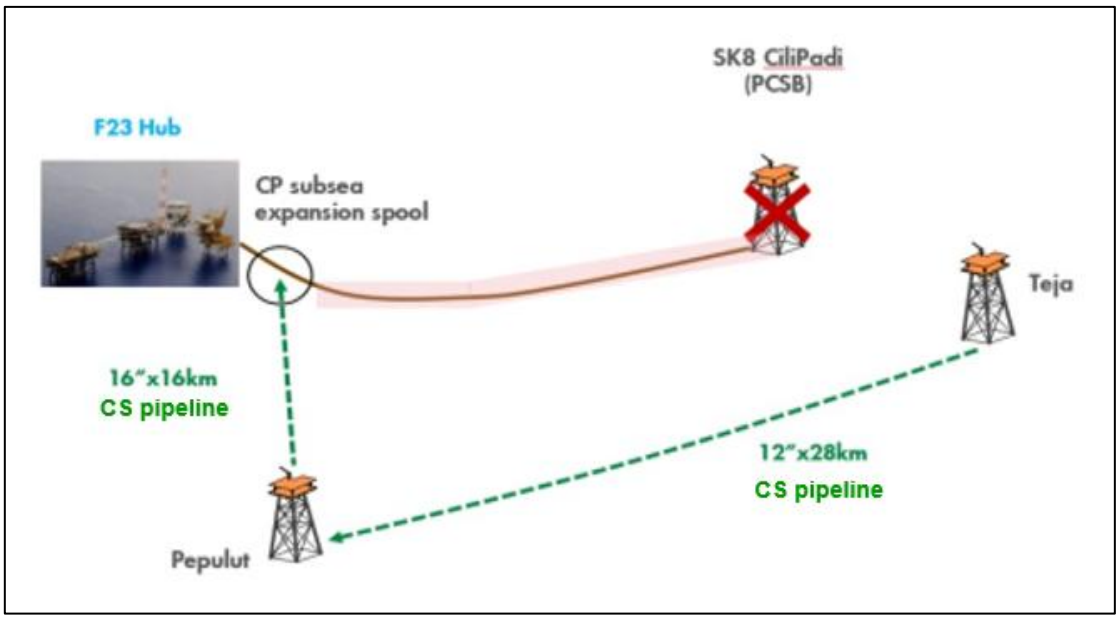
PEPULUT EQUIPMENT LAYOUT PLAN



EQUIPMENT LIST				
	TAG NO.	DESCRIPTION	SIZE (mm)	QTY.
(HOLD 1)	L-2900	PEPULUT FWS LAUNCHER	DN450 x 5100(L) / DN400 x 1500(L)	1
(HOLD 1)	R-2910	TEJA FWS RECEIVER	DN400 x 4300(L) / DN300 x 4300(L)	1
(HOLD 1)	A-6820	PERMANENT MEG INJECTION SKID	3500(L) x 2500(W) x 3000(H)	1
	NL-8901	NAV AID SYSTEM 1	340(L) x 340(W) x 1843(H)	1

Source: Sarawak Shell Berhad, 2026

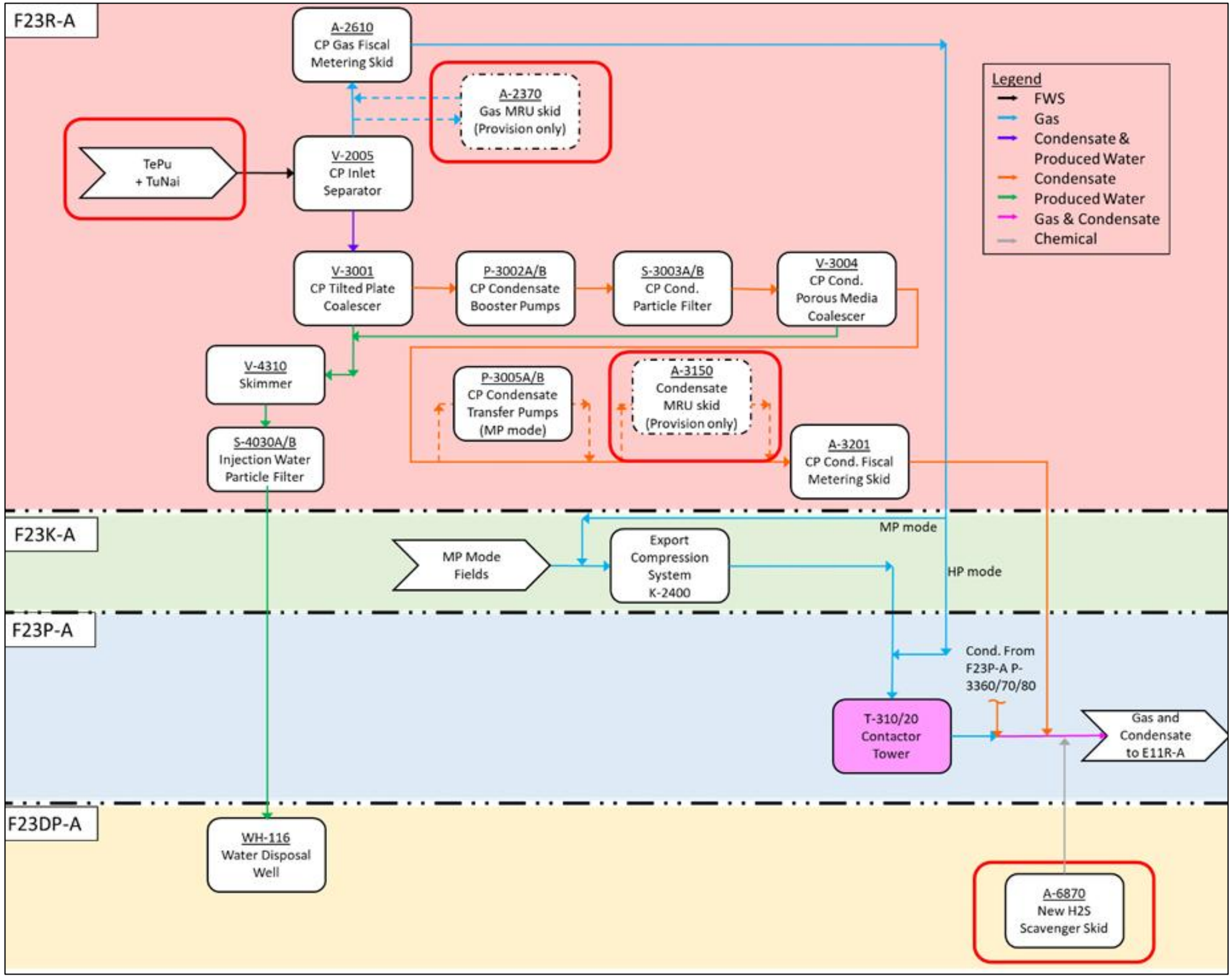
DEVELOPMENT CONCEPT



Source: TEPU-GN-000-AA-7180-0001 Concept Select Report, Rev.3, 15th January 2025

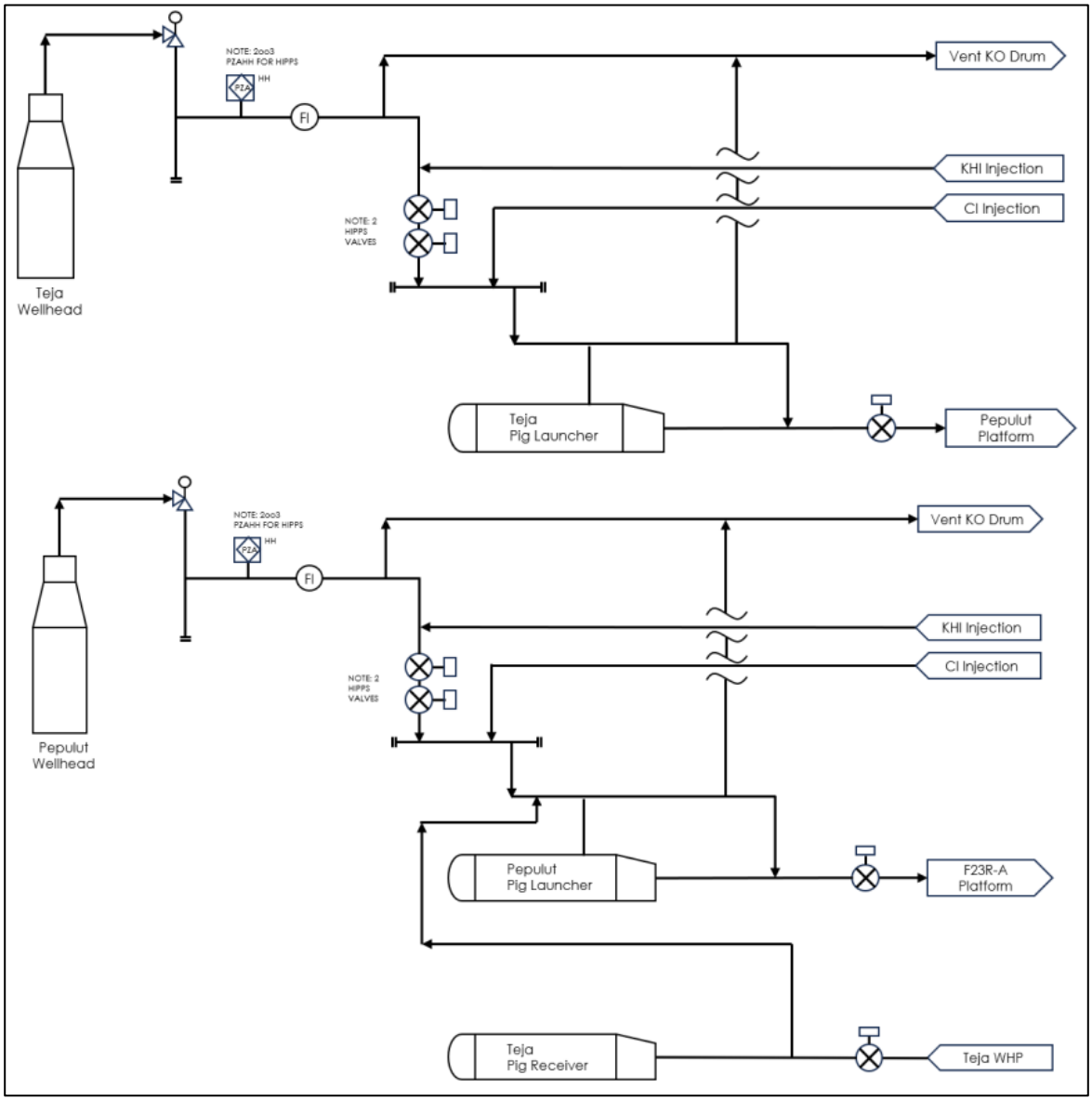
Development Concept for TePu

PROCESS FLOW DIAGRAM FOR TEPU FWS TO F23R-A



Source: F23-TS-200-P-7704-0001 F23 Process and Utility Design Basis (TePu and TuNai Facility) Rev.1, 29th October 2025

DEVELOPMENT CONCEPT



Source: TEPU-GN-000-AA-7704-0001 Offshore Facilities BfD Part 1: Project Background and Overview, Rev.3, 5th February 2025

Process Flow Diagram Illustration Teja FWS to Pepulut, and Pepulut FWS to F23

PROJECT ACTIVITIES

Transportation and Offshore Installation

Fabrication of topsides, jackets etc. shall be carried out onshore in Malaysia prior being transported by tugboats upon completion and loadout.

Transportation and offshore installation of TePu jackets etc. Installation of pipeline will be done using the S-lay technique.

Drilling and Well Clean-up (WCU)

Drilling and completion of a total of 2 developments wells (1 each for Teja and Pepulut) using a Jack-Up (JU) Rig.

Flowback package via the rig approach for TePu which involves fluid separation into condensate, water, and gas prior to flaring until the clean-up criteria is achieved.

Commissioning and Start-up

Pre-commissioning and commissioning of all non-hydrocarbon essential systems, as well as pre-commissioning of hydrocarbon-containing production systems, such as the process gas and condensate systems.

Start-up, endurance test and reliability test.

Operation and Maintenance

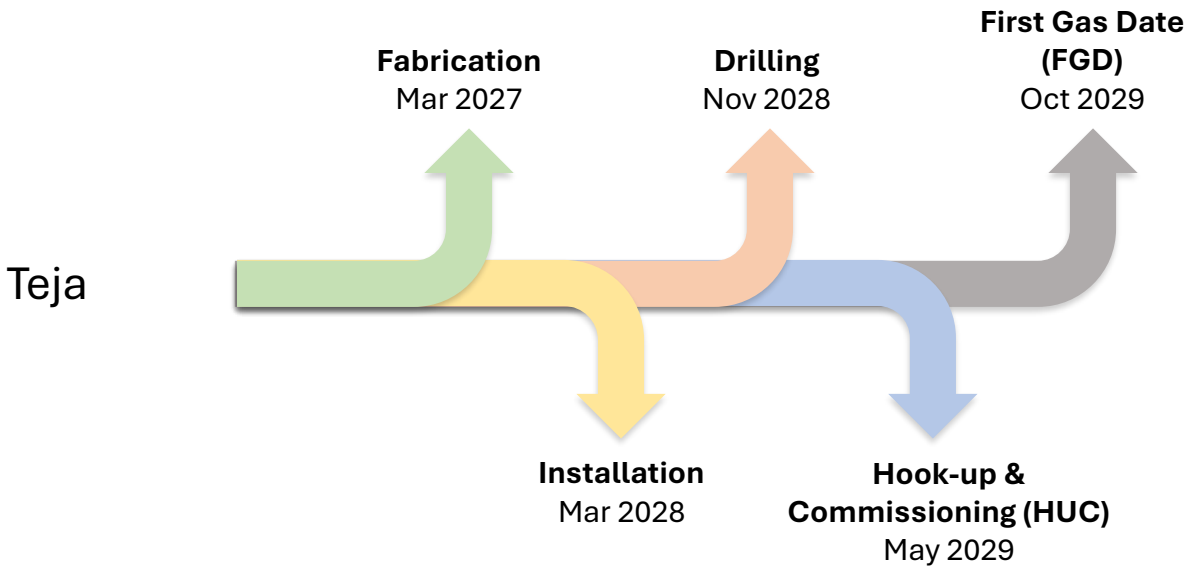
Monitoring and control of TePu via the Central Control Room (CCR) of F23 CCR.

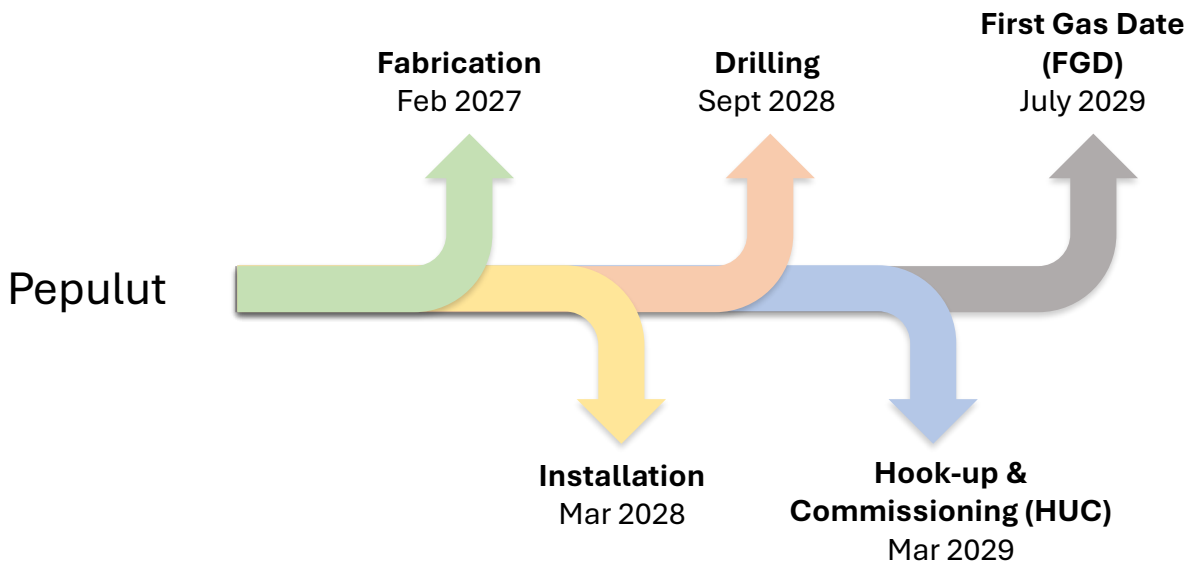
Maintenance shall be carried out every 4-weekly.

Decommissioning and Abandonment

Decommissioning and abandonment shall be carried out at the end of economic field life of the facility with DOE Guideline on Decommissioning of Oil and Gas Facilities in Malaysia and PETRONAS Governing Standards.

PROJECT IMPLEMENTATION SCHEDULE





Note for Brownfield HUC:

(i) Phase 1 – Aug 2027

(ii) Phase 2 – May 2028

EXISTING ENVIRONMENT

Physio-Chemical

Geological and Seabed Features:-

Teja – Gently northward-dipping seabed with generally low gradients, interrupted by localized irregularities such as pockmarks, jack-up footprints, pitted seabed, seabed scars, with steeper slopes (>10°) occurring only at isolated pockmarks.

Pepulut – gently dipping seabed toward End KP (near F23R-A) with generally low gradients (<1°), localized steeper slopes (>5°) at isolated pockmarks, and various existing seabed features including platforms, pipelines, cables, jack-up footprints, and minor seabed disturbances.

Meteorology

- Wind (NE Monsoon; 2 m/s – 7 m/s)
- Current (NE Monsoon; 0.1 m/s – 0.3 m/s

Environmental Baseline

Sampling Date: 29th May 2025 – 6th June 2025

Sampling Points: Eighteen (18)

Sampling Activities: Marine Water, Seabed Sediment, Planktons & Macrobenthos

Sampling Results;

Marine Water: non-compliance to Class 3 MMWQS for copper and mercury only

Seabed Sediment: all complied to ERL & ERM of NOAA

Phytoplankton: moderate diversity and distribution, with moderate species richness

Zooplankton: moderate diversity and distribution, with a moderate range of species richness

Macrobenthos: well diverse and well distributed, with a high species richness

Marine Ecology

Marine Mammals, Birds and Turtles

- Five (5) species of megafauna were sighted such as the Pantropical Spotted Dolphin (*Stenella attenuata*), Spinner Dolphin (*Stenella longirostris*), Green turtle (*Chelonia mydas*), Germas Swiftlet (*Aerodramus germani*) and Brown Booby (*Sula leucogaster*).

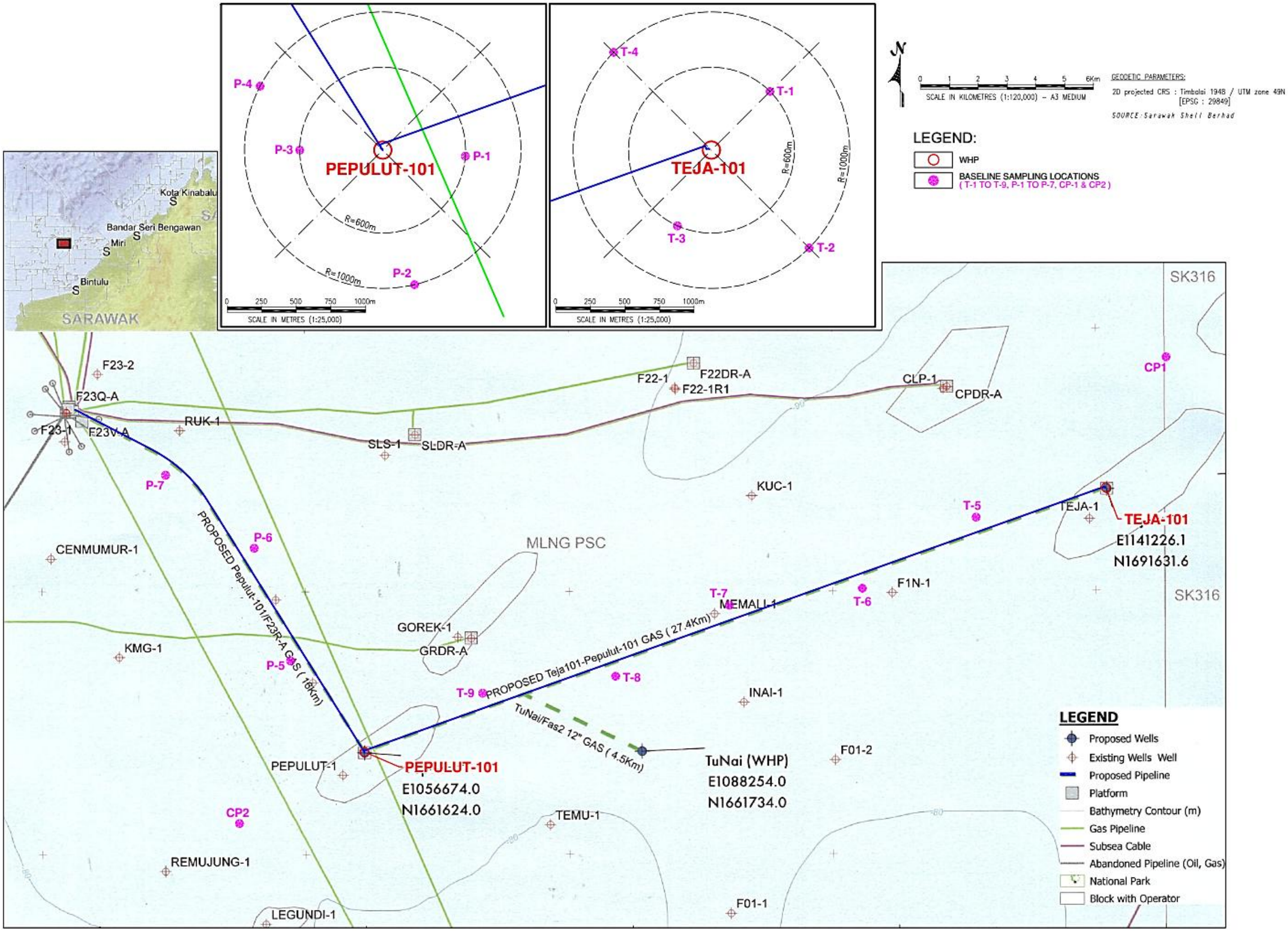
Fisheries

- Based on DOF (2020), the catch composition in Sarawak waters demonstrated a broad diversity of both pelagic (e.g. mackerel, tunas, anchovies) and demersal (stingrays, jellyfish, sharks, shrimps).

Coral Reefs

- TePu gas fields are located approximately 12.7 km – 19.8 km away from the nearest Luconia Shoals National Park boundary

ENVIRONMENTAL BASELINE SAMPLING LOCATIONS



POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Marine Water Quality during All Phases** • Food/kitchen wastes • Deck drainage water from deck areas, potentially containing small amount of oil, solvents etc. • Ballast water discharged or taken in to maintain stability during cargo loading and unloading • Bilge water from machinery spaces etc. • Indiscriminate discharge of solid wastes and hazardous/scheduled wastes • Indiscriminate wastewater discharge from support, supply and installation vessel operations • Resuspension of sediment during installation of seabed structure and pipelines	Low	• Establish and implement a waste management plan. • Sewage generated from ships, vessels and barges will be treated in a sewage treatment system that complies with MARPOL 73/78 requirements before being discharged into the sea. • Conduct preventive maintenance on bilge management systems to avoid bypass discharges. • Spent SBM will not be disposed of overboard. • Synthetic base oil retained in drilling cuttings is less than 6.9% wet weight (as per PETRONAS Guidelines on MES and the Shell Safety, Environment and Asset Management (SEAM)) prior discharging overboard. • All hazardous/scheduled wastes will be collected and retained onboard for disposal at licensed onshore reception facilities in accordance with the Environmental Quality (Scheduled Wastes) Regulations 2005. • All wastes transported onshore shall be recycled, reused, or disposed of at approved facilities in compliance with applicable requirements. • Kitchen or food wastes from rigs, vessels or barges shall be macerated and able to pass through a screen of mesh size of not bigger than 25 mm.	Section 7.3.1.1, pages C7-15 Section 7.3.2.1, Page C7-17 Section 8.2.1.2, pages C8-2 to C8-5

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Marine Water Quality during All Phases** • Food/kitchen wastes • Deck drainage water from deck areas, potentially containing small amount of oil, solvents etc. • Ballast water discharged or taken in to maintain stability during cargo loading and unloading • Bilge water from machinery spaces etc. • Indiscriminate discharge of solid wastes and hazardous/scheduled wastes • Indiscriminate wastewater discharge from support, supply and installation vessel operations • Resuspension of sediment during installation of seabed structure and pipelines	Low	• Ensure chemical additives are carefully selected based on appropriate dosage levels, toxicity profiles, biodegradability, and potential for bioaccumulation. • Implement spill prevention kits on all vessels, rigs and platforms, with trained crew ready for immediate deployment.	Section 7.3.1.1, pages C7-15 Section 7.3.2.1, Page C7-17 Section 8.2.1.2, pages C8-2 to C8-5

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Waste Impact during All Phases** • Improper handling, storage and disposal of non-hazardous wastes • Hazardous/scheduled wastes e.g. SBM used for drilling generated will be disposed to licensed onshore waste disposal facilities	Low	• Implement a comprehensive Waste Management Plan (WMP). • Compliance with Environmental Quality (Scheduled Wastes) Regulations 2005 for hazardous waste handling, storage, transport and disposal. • Adherence to MARPOL Annex V requirements for garbage management, including the maintenance of a Garbage Record Book and implementation of onboard Garbage Management Plan. • Segregation, containment, and controlled offloading of all waste streams to licensed onshore reception facilities. • Prohibition of any overboard discharge of plastics, hazardous wastes, or untreated food waste in accordance with regulatory restrictions.	Section 7.3.2.2, pages C7-17 to C7-18 Section 8.2.2.2, page C8-7
	**Ambient Air Quality during All Phase** • Exhaust gases emitted from support, supply and installation vessels' operation • Flaring during unloading materials/supplies process of the Drilling activity release these exhaust gases (Nox, CO, VOCs etc.)	Low	**<u>Operation, Installation and Drilling Phase</u>** • Air emissions will largely be controlled by optimising the installation schedule and supply and support operations / logistics which will minimise the time of the operations. • Regular engine servicing and tuning to maintain high combustion efficiency and reduce NOx, SOx, CO, and particulate matter emissions. • No environmental hazardous substance (EHS) shall be used. Refrigeration systems containing chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) gases shall not be used and refrigerant inventories with the least environmental impact shall be selected	Section 7.3.1.6, page C7-16 Section 7.3.4.6, page C7-24 Section 8.2.5.2 and Section 8.2.5.3, page C8-12 to C8-13

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Ambient Air Quality during All Phase** • Exhaust gases emitted from support, supply and installation vessels' operation • Flaring during unloading materials/supplies process of the Drilling activity release these exhaust gases (Nox, CO, VOCs etc.)	Low	**<u>Operation and Maintenance Phase</u>** • No flaring during normal operations. • Implement measures to minimise fugitive emissions such as high integrity compressor and pump seals for high-pressure systems. • Provide a closed drainage system for the hydrocarbon systems. All combustion and mechanical equipment are subjected to regular inspection and maintenance to ensure their efficiency is maintained. • Engines of vessels need to be regularly maintained to achieve high combustion efficiency and to use diesel with low sulphur content where possible.	Section 7.3.5.5, page C7-28 Section 8.2.8.2 and Section 8.2.8.3, page C8-13
	**Noise Impact during All Phases** • Drilling noise may cause behavioural disturbances, interfere with acoustic communication and in severe cases result in physical or sensory damage to the marine fauna.	Low	• Use low-noise equipment and noise dampening technologies where practicable, such as vibration-minimising piling sytems and acoustic attenuation devices. • Ensure all vessel engines, thrusters, and machinery are regularly maintained and serviced in accordance with manufacturer specifications to minimise mechanical noise emissions. • Implement a 500 m exclusion zone around high noise operations to limit non-essential vessel movement and personnel activity. • Maintain appropriate buffer distances from ecologically sensitive areas, including designated marine protected zones.	Section 7.3.2.7, pages C7-20 to C7-21 Section 8.2.5.2, page C8-9

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Impact to the Seabed during Installation, Commissioning and Drilling Phase** • Installation of pipelines and development wells can lead to sediment resuspension and seabed scarring • Physical disturbance to the seabed during drilling, anchoring and discharged of chemicals due to discharge of drilling fluids and cuttings	Low	**<u>Installation and Commissioning Phase</u>** • Optimise the installation schedule to shorten the duration of seabed disturbance and enable quicker re-establishment of marine communities. • Determine optimal placement during the design stage to reduce long term seabed occupation and impacts on benthic habitats. • Deploy anchors only at designated, pre-surveyed locations to reduce the likelihood of anchor dragging and the associated smothering of benthic organisms. • Use environmentally benign chemicals such as biocides and corrosion inhibitors, that are low in toxicity, highly biodegradable, and have minimal bioaccumulation potential for pipeline cleaning, conditioning, and hydrotesting. • Strategically plan the placement of concrete mattresses during the design phase to minimise seabed footprint and associated environmental impacts. **<u>Drilling Phase</u>** • Use Water Based Mud (WBM) where technically feasible. • Selection of Synthetic Based Mud (SBM) and additive chemicals with the least potential for environmental impact. • Discharge drill cuttings 3–5 m below the water surface to promote dispersion and minimise seabed accumulation. • Ensure Safety Data Sheets (SDS) for all drilling chemicals are always readily accessible on the rig. • Provide secondary containment for all chemical storage and transfer areas to prevent accidental releases to deck drains or the marine environment.	Section 7.3.2.4, page C7-21 Section 7.3.4.3, page C7-25 Section 8.2.3.2, page C8-8 Section 8.2.3.3, page C8-8 to C8-9

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Impact to the Seabed during Installation, Commissioning and Drilling Phase** • Installation of pipelines and development wells can lead to sediment resuspension and seabed scarring • Physical disturbance to the seabed during drilling, anchoring and discharged of chemicals due to discharge of drilling fluids and cuttings	Low	**<u>Drilling Phase</u>** • Maintain spill response kits at strategic locations onboard and ensure trained personnel are available to respond promptly to any spills. • Ensure all personnel handling drilling chemicals receive proper training in safe chemical handling procedures and the correct use of Personal Protective Equipment (PPE).	Section 7.3.4.3, page C7-25 Section 8.2.3.3, page C8-8 to C8-9
	**Impacts on Marine Ecology during all Phases** • Piling activities could lead to long-term habitat loss for benthic species • Indiscriminate disposal of plastic wastes, non-hazardous wastes etc. affects marine lives	Low	Besides those mitigation measures addressed for Marine Water Quality, others include: • Enforce all waste management practices, oily water discharge controls, and chemical handling procedures to prevent marine contamination. • Optimise pipeline routing to minimize direct seabed disturbance and habitat fragmentation. • Limit the footprint of seabed-disturbing activities to the smallest practicable area	Section 7.3.2.3, page C7-19 Section 7.3.4.5, page C7-25 to C7-26 Section 8.2.4.1, page C8-9

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	Impacts on Marine Navigation and Fishing Community during all Phases • The number of working vessels will temporarily increase during installation stage, leading to an increased in marine traffic.	Low	• The Project Proponent will ensure that the required consents and notifications are in place and will consult with relevant marine authorities such as the Marine Department and Malaysian Maritime Enforcement Agency (MMEA) on the locations of the drilling rig, new platforms and pipelines. • Notices should be issued by Lembaga Kemajuan Ikan Malaysia (LKIM) to local fishermen to prevent entry into the designated working areas. • The physical presence of new platforms and pipelines are to be registered and marked on the Admiralty Chart to ensure mariners are aware of the Project. • A Marine Risk Assessment (MRA) is also being carried out by the Proponent for submission to Jabatan Laut Sarawak. • In line with industry practices, a 500 m safety exclusion zone will be established around new platforms, drilling rigs, and pipeline-laying vessels during the operations. • Information on the drilling rig and pipelines will be communicated to other sea users through the standard communication channels including the Notices to Mariners. • Appropriate support vessels will be on standby at the Project site during selected Project activities such as installation of platforms, drilling rig and pipeline laying (during pipelaying). • Ensure all navigational and communication equipment is maintained in good working order and a supply vessel and a lookout on the bridge of the drilling rig is always on duty	Section 7.3.1.2 and 7.3.1.4, Page C7-16 Section 7.3.4.8 and 7.3.4.9, page C7-27 Section 8.2.7.2, page C8-11 to C8-12

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Impacts on Maritime Security during all Phases** • Temporary increase in number of working vessels and thus the traffic movement from onshore ports/wharves to TePu gas fields and back	Low	• The Project Proponent shall implement a comprehensive Communication Protocol Procedure for the rig, vessel, or barge, which all contractors are required to follow. • The rig, vessel, or barge shall maintain effective communications with relevant agencies, including the Royal Malaysian Navy (RMN), Malaysian Maritime Enforcement Agency (MMEA), and Majlis Keselamatan Negara (MKN).	Section 7.3.1.3, page C7-16 Section 8.2.6.1, page C8-10
	**Impacts on Health and Safety during all Phases** • Personnel involved in offshore activities face health and safety risks from environmental conditions and operational hazards.	Low	• SSB shall prevent workplace accidents and maintain stable operations through safety assessments and comprehensive risk analysis procedures applied in the design and operation of offshore production facilities and wells. • All personnel assigned to offshore facilities must pass medical examinations conducted by a PETRONAS Approved Medical Examiner (AME) and complete mandatory training programs, including BOSIET, to ensure they are qualified for their roles. • Daily operations are governed by rigorous safety management systems, such as Job Safety Analysis (JSA) and Permit to Work (PTW) procedures, to control and enhance workplace safety.	Section 7.3.1.6, page C7-17 Section 7.3.2.6, page C7-20 Section 7.3.4.7, page C7-26 to C7-27 Section 7.4.5.6, page C7-29 Section 8.2.9.2, page C8-14 to C8-15

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Impacts on Health and Safety during all Phases** • Personnel involved in offshore activities face health and safety risks from environmental conditions and operational hazards.	Low	• SSB maintains a comprehensive Health, Safety, Security, and Environment (HSSE) Policy, along with safe work guidelines, procedures, and regulations. This includes appointing Safety and Health Officers, providing emergency equipment and first-aid kits, and implementing stop-work procedures. Strict adherence by all personnel and contractors helps minimize health and safety hazards. • An Emergency Response Plan (ERP) will be developed for the TePu Project to ensure effective management of emergencies and crises. All employees and contractors are required to follow the ERP. • Only fully trained and competent personnel shall be employed on the facility. • Regular emergency response drills will be conducted, accompanied by feedback and review sessions to improve preparedness. • Routine maintenance of process equipment including tanks, piping, and pumps will be performed in accordance with manufacturers' guidance to maintain equipment integrity and reduce the risk of leaks or releases due to mechanical failure. • Fire safety equipment, including fire blankets, extinguishers, smoke detectors, sprinklers, emergency lighting, and fire-rated doors, will be regularly inspected to ensure functionality	Section 7.3.1.6, page C7-17 Section 7.3.2.6, page C7-20 Section 7.3.4.7, page C7-26 to C7-27 Section 7.4.5.6, page C7-29 Section 8.2.9.2, page C8-14 to C8-15

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	**Accidental/Emergency Events** Well Blowout • Surface well blowout from the uncontrolled flow of formation of fluids from reservoir to the surface, potentially leading to the release of hydrocarbons into the environment.	Medium	• Ensure the use of an appropriate Blowout Preventer (BOP) for selected drilling activities to verify control system operation and pressure integrity. The BOP stack's minimum pressure rating must exceed the TePu reservoir pressure. • In the event of a surface blowout, a relief well will be drilled using a Jack-Up (JU) rig, class-certified by a recognized authority. SSB will conduct pre-mobilization inspections, including the oil spill response system. • Define approach procedures and operational restrictions during poor weather for visiting vessels and personnel transfers prior to operations. • The drilling rig will comply with IMO codes for oil pollution prevention and maintain an onboard Ship Oil Pollution Emergency Plan (SOPEP). • An Oil Spill Contingency Plan (OSCP) will be established for the drilling phase, with all contractors required to adhere to it. • Conduct regular well control and spill response drills to ensure emergency teams are fully prepared for blowout scenarios and hydrocarbon release events. • Maintain oil spill kits, including absorbent materials, on board rigs and vessels to enable immediate clean-up of any deck spills or leaks	Section 7.3.7.1, page C7-32 Section 8.2.10.2, page C8-16
	Pipeline Rupture and Leakage • Pipeline rupture and leakage may be due to corrosion or damaged by impact (e.g. dropped object), causing to leakage of hydrocarbon into the environment.	Medium	• Apply corrosion inhibitors within the pipeline system to reduce internal corrosion risks, especially in areas prone to condensate or water accumulation. • Implement external corrosion protection measures, including coating systems and cathodic protection, and monitor their effectiveness regularly.	Section 7.3.7.2, page C7-32 Section 8.2.10.2, page C8-16 to C8-17

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	Pipeline Rupture and Leakage • Pipeline rupture and leakage may be due to corrosion or damaged by impact (e.g. dropped object), causing to leakage of hydrocarbon into the environment.	Medium	• Conduct routine integrity inspections at pipeline connection points, flanges, valves, and other high-risk areas where leaks are more likely to occur. • Install and operate pipeline monitoring systems capable of detecting abnormal pressure drops, flow rate changes, or temperature variations indicative of a leak. • Continuously monitor pressure profiles along the pipeline to identify any deviations from normal operating conditions. • Maintain a preventive maintenance program to ensure the pipeline system operates safely and reliably over its lifetime	Section 7.3.7.2, page C7-32 Section 8.2.10.2, page C8-16 to C8-17
	Hydrocarbon Spill (Vessel collision) • Hydrocarbon or diesel spills can happen due to equipment malfunctions or adverse weather conditions, releasing significant amount of these substances into the marine environment.	Medium	• All equipment installed / used is manufactured to meet industrial, PETRONAS and SSB's safety / engineering specifications and practices. • The installed equipment must be effectively maintained regularly with a risk-based inspection system. • An oil spill contingency plan (OSCP) will be developed in accordance with National Oil Spill Contingency Plan (NOSCP) and will be in place for TePu operations. • Maintain readiness to respond to Tier 1 spills using in-house resources and equipment, and to subscribe to Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG) and the NOSCP framework for coordinated Tier 2 and Tier 3 spill response involving regional, national, or international support. • Establish and enforce Standard Operating Procedures (SOPs) for fuel and bulk liquid transfers. • Store and secure all lubricating and hydraulic oils in properly labelled tanks or drums with secondary containment to prevent marine leaks.	Section 7.3.7.3, page C7-33 Section 8.2.10.2, page C8-12

POTENTIAL IMPACTS AND MITIGATION MEASURES

Significant Potential Impacts		Magnitude of Significant Potential Impacts	Mitigation Measures	Reference Page to EIA Report
	Hydrocarbon Spill (Vessel collision) • Hydrocarbon or diesel spills may occur due to equipment failure or adverse weather, leading to the release of these substances into the marine environment.	Medium	• Procedures shall be in place for bunker transfer and other bulk storage transfers to minimise the risk of spillage.	Section 7.3.7.3, page C7-33 Section 8.2.10.2, page C8-12
	Drilling Fluids / Chemical Spills • Accidental release of chemicals or drilling fluids during drilling could cause localized impact near the discharge point.	Medium	• A chemical management system will be implemented to track and control chemical storage, use, and disposal, supported by an auditable chemical assessment and selection process. • Chemical spill response equipment will be strategically placed around storage areas to enable prompt containment and clean-up. • All vessel personnel will receive training in chemical spill prevention, safe handling, and emergency response, and a formal spill reporting system with immediate notification and follow-up investigations will be enforced. • A centralised chemical injection area will be designated to consolidate injection skids and reduce the number of potential spill points across the Project site. • Bunding will be installed around identified spill-risk areas, including chemical injection pumps and tote tanks. Bunds will be designed to contain at least 110% of the largest container and drain boxes with removable plugs will allow safe collection of spillages for transfer to shore. • All spill residues and contaminated absorbents will be managed in accordance with the Environmental Quality (Scheduled Wastes) Regulations 2005 and transported to licensed onshore facilities by DOE-registered transporter.	Section 7.3.7.4, pages C7-33 Section 8.2.10.2, pages C8-14

PROPOSED MONITORING PROGRAMME

Performance Monitoring:

- **Plan:** Records of oily discharges should be maintained (Regulation 21b) and oil content in drainage from machinery spaces must not > 15 ppm (Regulation 21d) – MARPOL Annex I
- **Frequency:** Monitor validity of International Oil Pollution Certificate (OIPC)

- **Plan:** Monitor the usage of drilling fluids eg. Synthetic based mud (SBM) and drill cutting discharge meet the <6.9% oil content
- **Frequency:** End of well reporting

- **Plan:** Report and investigate all leaks and spills, including type & quantities of spilled substances
- **Frequency:** Ongoing throughout life of Project

- **Plan:** Monitor waste consignment notes & inventory of volume for both hazardous and non-hazardous waste streams generated
- **Frequency:** Ongoing throughout life of Project

PROPOSED MONITORING PROGRAMME

Compliance Monitoring:

- **Plan:** Report and investigate all leaks and spills, including type & quantities of spilled substances
- **Frequency:** Ongoing throughout life of Project

- **Plan:** Handling, storage and disposal of scheduled waste, garbage and food wastes & to keep an inventory of scheduled wastes
- **Frequency:** Ongoing throughout life of Project

Impact Monitoring:

- **Plan:** Monitor quality of marine water, seabed sediment and biological components around TePu
- **Frequency:** Half-yearly during installation and throughout operation and maintenance stage