Greater Western Flank Phase 1: Tidepole Development Wells Program - Top-hole and Intermediate-hole Sections Environment Plan Summary

Drilling and Completions

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TABLE OF CONTENTS

1. INTRODUCTION

Woodside Energy Ltd (Woodside) as operator will be drilling three development wells (TPA01, TPA02 and TPA03) located in the Carnarvon Basin in Commonwealth waters in Production License WA-5-L.

The Greater Western Flank Phase 1 (GWF-1) Tidepole Development Wells Program Environment Plan (EP) has been prepared in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Environment Regulations). The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

This EP summary has been prepared as per the requirements of Regulations 11(7) and (8) of the Environment Regulations.

2. LOCATION OF THE ACTIVITY

The GWF-1 Tidepole Development Wells Program location is in Commonwealth waters in Production License WA-5-L (Figure 2-1) in approximately 115 m (Lowest Astronomical Tide) water depth. This Production License is approximately 130 km northwest of Karratha. Table 2-1 summarises the well details including surface coordinates, water depth and permit area.

Table 2-1: Tidepole Development Wells Program Coordinates and Water Depth

Well	Water Depth (m LAT)	Longitude	Latitude	Permit Area
TPA01	115 m	115° 53’ 25.561"E	19° 45’ 44.605” S	WA-5-L
TPA02	115 m	115° 53’ 24.326"E	19° 45’ 44.894” S	WA-5-L
TPA03	115 m	115° 53’ 24.003"E	19° 45’ 43.655” S	WA-5-L

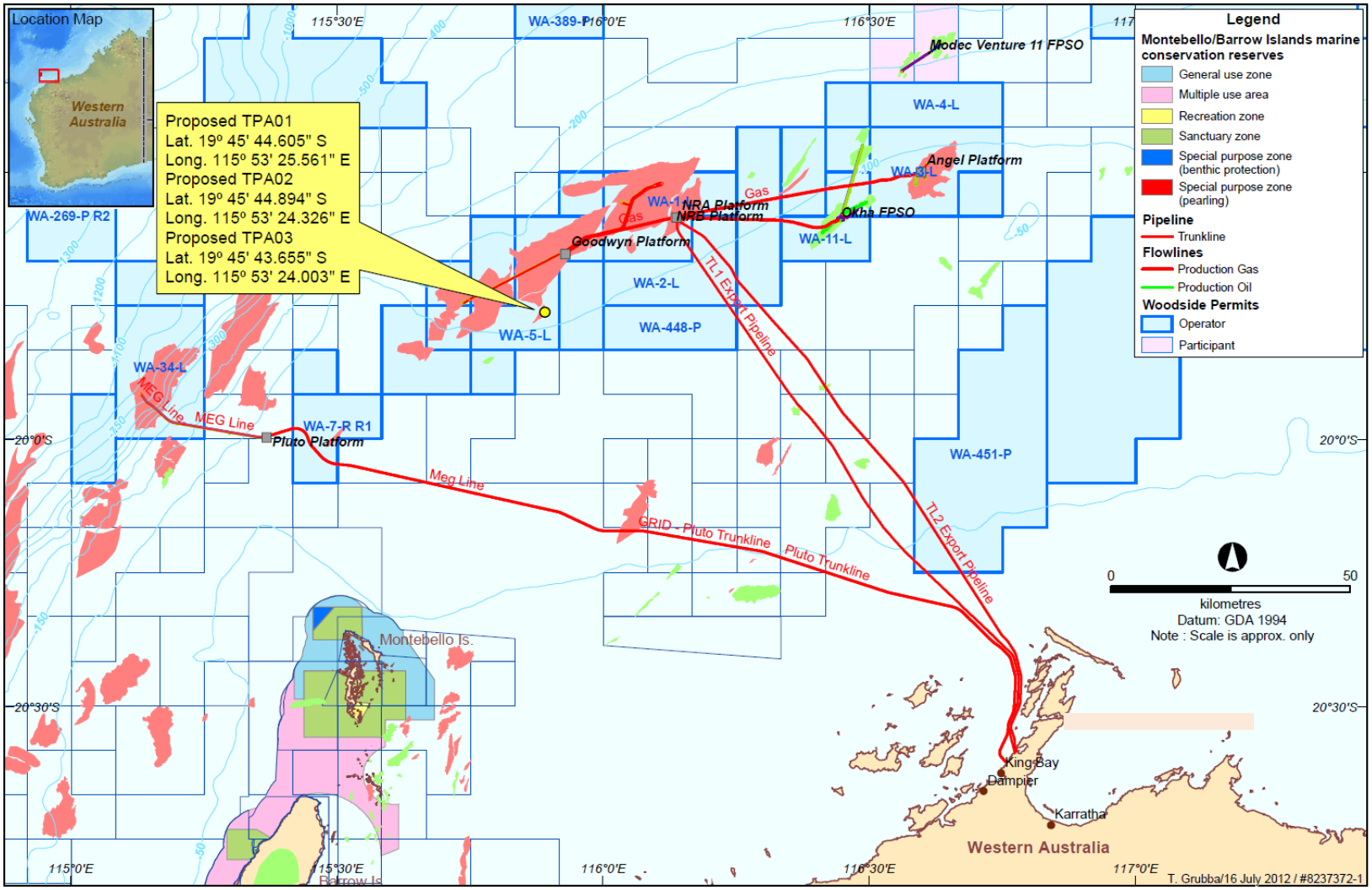

Figure 2-1: Drilling Location Map for Tidepole Development Wells

3. DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Physical Environment

The GWF-1 Tidepole Development Wells Program is located within the North West Marine Bioregion (NWMR) on the outer continental slope region in 115 m water depth. The Indonesian Throughflow is the dominant current through the majority of the NWMR, while the Leeuwin Current is dominant in the south of the NWMR.

3.2 Biological Environment

Regional studies on the North West Shelf indicate that the seabed material is likely to be predominantly flat and featureless and comprises thick, unconsolidated fine grained sands. The sediments support soft sediment benthic communities dominated by infauna (mobile burrowing species including molluscs, crustaceans and worms) and isolated larger fauna (free swimming cnidarian, demersal fish and benthic crustaceans). The large water depths at the site mean that benthic communities including seagrass, algae and scleractinian (reef building) corals are not present.

The Commonwealth Protected Matters database lists eight marine species as 'threatened' and 15 species as 'migratory' under Commonwealth legislation that may occur in low abundance within, or pass through the Tidepole Development Wells Program area. The area does not provide critical habitat for feeding, breeding or resting, or have constricted migratory pathways, for these species.

The GWF-1 Tidepole Development Wells Program area (see **Section 4** of this summary) is located within the humpback migration route. The timing of the Tidepole Development Wells Program does overlap with the south bound migration of humpback whales through this region between August and September. The known pygmy blue whale migration occurs between April and August; however, the well site lies within a broad migratory pathway (>100 km wide).

The abundance of threatened and migratory animals is expected to be low, and the presence of the operating drill rig may result in localised behavioural avoidance but this is not considered significant and will not impact the population of these whales or other species.

3.3 Socio-economic Environment

The Tidepole Development Wells Program area is located within the state fisheries management areas that cover the area out to the 200 m isobath, however none have significant catches beyond the 50 m isobath, with the exception of the trawl fishery.

The Tidepole Development Wells Program is located in management zone six of the Pilbara Trawl Fishery which lies between the 100 m and 200 m isobaths. It is one of two management areas in Zone 2 that are closed to the trawl fishery. As such the Tidepole Development Wells will not impact on the Pilbara Trawl Fishery. Consultation undertaken with the Pilbara Trawl Fishery through the Western Australian Fishing Industry Council (WAFIC) indicates that the Tidepole Development Wells Program will not preclude fishing operators from undertaking normal business activities.

There are no major commercial shipping routes in the vicinity of the Tidepole Development Wells Program location.

The Tidepole Development Wells Program area is located approximately 140 km northwest from Karratha and is rarely visited for tourism activities (recreational fishing and boating and charter boats operations) which tend to be centred around nearshore waters, islands and coastal areas.

There are a number of producing oil and gas fields in the North West Shelf region, with facilities including the Goodwyn, North Rankin and Angel Platforms, and the Okha floating production storage and offloading facility. These facilities are accessed regularly by tankers and support vessels that may be anchored or moving through the fields.

The Tidepole Development Wells Program area is located 70 km from the outer boundary of Montebello Islands Marine Park (State Waters) and approximately 93 km from Barrow Island Marine Park. There are no known areas of cultural heritage significance in this area.

4. DESCRIPTION OF THE ACTION

The GWF-1 Tidepole Development Wells will be drilled using a water based mud to a target depth of approximately 3 km below the seabed and will not penetrate the reservoir. Once the drilling is completed all development wells will be suspended (this involves installation of cased and cemented liner and installation of a suspension plug and cap on top of the wellhead) until well completion operations commence in 2015.

Two supply vessels will be supporting the drilling rig during the drilling operations. At least one vessel will be on standby in the vicinity of the rig at all times. A third vessel may be called to assist during specific operational periods.

The Tidepole Development Wells drilling program will take approximately 104 days and will be undertaken between September and December 2012.

Drilling of the three Tidepole Development Wells includes the following steps, these wells are likely to be batch drilled:

1. Drilling of the top-hole sections using seawater and pre-hydrated bentonite sweeps
2. Installation and cementing of the drill casing string
3. Testing and installation of the blow out protector on the conductor pipe
4. Installation of the marine riser
5. Displacement of the top-hole section with water based mud
6. Drilling of the intermediate-hole section to reach target depth of well
7. Plugging and suspend the well

5. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Woodside undertook an environmental risk assessment to understand the potential environmental risks associated with the Tidepole Development Wells Program (routine and non-routine operations) to ensure they are reduced to As Low As Reasonably Practicable (ALARP) and will be of an acceptable level using a method consistent with Woodside standards.

The key environmental hazards and control measures to be applied to the Tidepole Development Wells Program activities are shown in **Appendix A**. These are consistent with Woodside corporate and project-specific objectives, standards and criteria. All control measures associated with the hazards will be used to reduce environmental risk to ALARP and will be of an acceptable level.

6. MANAGEMENT APPROACH

The Tidpeole Development Wells Program drilling activity will be managed in compliance with the *Tidepole Development Wells Program; Top-hole and Intermediate-hole Sections, Environment Plan* accepted by NOPSEMA under the Environment Regulations, other relevant environmental legislation and Woodside's Management System (e.g. Woodside Environment Policy).

The objective of the EP is to ensure that potential adverse impacts on the environment associated with the Tidepole Development Wells Program drilling activities, during both routine and non-routine operations, are identified, and will be reduced to ALARP and will be of an acceptable level.

The EP details specific objectives and standards for each environmental aspect that was identified and assessed in the Environmental Risk Assessment (**Section 5 of the Environment Plan**). For each environmental aspect the range of controls to be implemented (consistent with the standards) to achieve the performance objectives are detailed. The EP then establishes the specific measurement criteria that will be used to demonstrate that the performance objectives are achieved.

The implementation strategy detailed in the EP identifies the roles/responsibilities and training/competency requirements for all personnel (Woodside and its contractors) in relation to implementing controls, managing non-compliance, emergency response (oil spills) and meeting monitoring, auditing, and reporting requirements during the activity. The EP details the types of monitoring and auditing that will be undertaken

and the reporting requirements for environmental incidents and reporting on overall compliance of the activity with the EP.

7. CONSULTATION

Woodside conducted a stakeholder assessment to identify potentially affected and interested stakeholders based on the well location, proposed activities and timing.

A consultation fact sheet was sent electronically to all identified stakeholders prior to lodgement of the EP to NOPSEMA for assessment and approval. This was supported by engagement with potentially affected stakeholders, relevant regulators and industry associations.

The stakeholder group identified to be potentially most affected was the Pilbara Trawl Fishery, given the proximity of the well to previous fishing effort. A representative from WAFIC confirmed that there would be no fishing operators in the location at the proposed time of drilling.

Woodside did not receive any material concerns from stakeholders prior to or after lodgement of the Environment Plan for assessment and approval. Woodside will continue to accept feedback from stakeholders during the drilling program.

8. CONTACT DETAILS

Further information about the Tidepole Development Wells Program activity can be obtained from:

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APPENDIX A: Summary of Key Environmental Hazards and Control Measures to be applied to the Tidepole Development Wells Program Drilling and Suspension Activities

Source of Risk (Hazard)	Potential Environmental Impact	Control/Mitigation Measures
Timing and location of drilling activity	Disturbance to marine fauna in critical habitat	• Planning/location of activity to avoid/minimise disturbance to marine fauna
	Displacement of fishing activities in the area	• Maintain a 500 m radius petroleum safety zone around the drill rig as required under the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (OPGGSA)
	Interference with other sea users	• Compliance with Australian Maritime Safety Authority administered marine safety regulations and marine notification requirements • Pre-drilling notification/consultation with stakeholders
Vessel/rig movement and noise	Acoustic disturbance to whales - behavioural	• The interaction of the support vessels and helicopters with cetaceans will be consistent with Part 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000*
	Injury/mortality of whales	
Atmospheric emissions from the use of rig, supply vessel and machinery engines	Reduced local air quality from atmospheric emissions	• Compliance with *International Convention for the Prevention of Pollution From Ships 1973 as modified by the protocol of 1978 (MARPOL 73/78) Annex VI* (as implemented in Commonwealth waters by the *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*) requirements for emissions.
Well site	Damage to benthic habitat	• Pipeline geophysical, geotechnical and environmental survey undertaken
Rig anchoring and transponder deployment operations	Damage to benthic habitat	• Anchoring analysis undertaken and implemented to minimise the potential for accidental anchor drag or the rig dragging off location • The interaction of the support vessels with cetaceans will be consistent with Part 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000*
Transport/introduction of invasive marine species (IMS) on hull, internal niches and in-water equipment	Introduction and establishment of invasive marine species and displacement of native marine species	• An Invasive Marine Species (IMS) risk assessment will be undertaken for all vessels, rigs and immersible equipment planning to enter and operate within nearshore waters around Australia (i.e. nearshore areas include all waters within 12 nautical miles of land and in all waters less than 50 metres deep (at Lowest Astronomical Tide)

		• Based on the outcomes of each IMS risk assessment, management measures commensurate with the risk will be implemented to minimise the likelihood of IMS being introduced and establishing • The Ocean America will not enter nearshore waters around Australia • Vessels in compliance with Australian Quarantine and Inspection Service (AQIS) requirements
Routine operational discharge of waste to marine environment	Toxic effects to marine biota	• All sewage and putrescible wastes will be handled and disposed of in accordance with *MARPOL 73/78 Annex IV* (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; and Marine Orders - Part 96: Marine Pollution Prevention - Sewage)
Accidental discharge of waste to marine environment	Toxic effects to marine biota	• All wastes (oil, packaged harmful substances and garbage (other wastes) will be handled and disposed of in accordance with *MARPOL 73/78 Annex IV* (as implemented in Commonwealth waters by the Protection of the Sea (Prevention of Pollution from Ships) Act 1983; and Marine Orders – Part 91: Marine Pollution Prevention – Oil; Part 94: Marine Pollution Prevention – Packaged Harmful Substances and Part 95: Marine Pollution Prevention – Garbage) • Compliance with Woodside Waste Management Plan
Routine operational discharges to marine environment	Toxic effect on marine biota Localised burial and smothering of benthic habitats from cuttings pile Localised reduction in water quality (turbidity increase)	• The management of drilling fluids, drill cuttings, cementing fluids and subsea control fluids will be consistent with applicable Woodside engineering and operating standards and procedures • All hazardous substances (as defined in NOHSC:1008 (2004) – Approved Criteria for Classifying Hazardous Substances) will have a Material Safety Data Sheet available on board • All potentially hazardous materials and chemicals will be reviewed and approved through relevant Woodside procedures • Check for marine mammals within the vicinity of the rig undertaken before bulk discharge of water based mud or cement • Operational discharges are managed under the rig and vessel/s permit to work system
Routine discharges from deck drainage to marine	Toxic effect on marine biota	• Compliance with *MARPOL 73/78 Annex I* (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*)

environment		• Management of deck drainage will be consistent with applicable Woodside engineering standards
Accidental discharge of hydrocarbons/chemicals to marine environment – Deck spill	Toxic effect on marine biota	• All hazardous substances (as defined in NOHSC:1008 (2004) – Approved Criteria for Classifying Hazardous Substances) will have a Material Safety Data Sheet available on board • All potentially hazardous materials and chemicals will be reviewed and approved through relevant Woodside procedures • Fuels, oils and chemicals will be stored with secondary containment • Spill response bins/kits will be well stocked, readily available and personnel trained in their use
Accidental discharge of hydrocarbons/chemicals to marine environment – Refuelling/breach of vessel tanks (vessel collision/grounding)	Toxic effect and oiling on marine biota	• Bulk transfers will commence during daylight hours and when sea conditions are appropriate as determined by the master of the supply vessel • Bulk transfer hoses for diesel will have adequate floatation and dry-break couplings • Bulk transfers of diesel will be undertaken in accordance with procedures which include constant visual monitoring of gauges, hoses, fittings and sea surface, and radio communication between rig and support vessel • Internal transfers of diesel will be undertaken in accordance with procedures, which include constant visual monitoring of gauges, hoses and fittings • Preventative maintenance system is in place and effective to ensure the integrity of hoses, dry break couplings and other equipment used for fluid transfers In the event of a loss of containment: • The rig and vessels will have a Shipboard Oil Pollution Emergency Plan (as per *MARPOL 73/78 Annex I*) for managing spills aboard • Spill kits will be well stocked and readily available with personnel trained in their use • Spills to sea will be managed as per Woodside's Corporate Oil Spill Response Plan and the Tidepole Development Wells Oil Spill Action Plan • Maintain a 500 m radius petroleum safety zone around the drill rig as required under the OPGGSA • Supply vessels to transit along pre-planned routes between the Tidepole Development Wells program site and port where possible to avoid navigation

		hazards • Vessels will use approved navigations systems and depth sounders • Adherence to Australian standard maritime safety/navigation procedures
Loss of hydrocarbon during drilling of top-hole and intermediate-hole sections due to shallow geological hazards	Toxic effect and oiling on marine biota.	Preventative • Use of a range of industry standard well barrier equipment, materials and procedures as part of the well design, construction and abandonment • Barriers and testing requirements will be consistent with applicable Woodside engineering standards and procedures Spill Response • Spills to sea will be managed as per Woodside's Corporate Oil Spill Response Plan and the Tidepole Development Wells Oil Spill Action Plan • Monitoring/observation of the spill to guide the spill response • Recovery and containment undertaken to minimise potential environmental impact