



Devil Creek Development Project Offshore Environmental Management Environment Plan: Summary September 2010

This summary of the DCDP Offshore EP has been submitted to comply with Regulation 11(7)(8) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.

Introduction

The Devil Creek Development Project (DCDP) is a new “green field” domestic gas development which will process gas from the offshore Reindeer gas field, located within Exploration Permit WA-209-P in Commonwealth waters. The gas field is approximately 80 km northwest of the Port of Dampier in 59 m water depth, and once the gas is processed in the onshore gas plant it will be fed into the Dampier Bunbury Natural Gas Pipeline (DBNGP).

This EP covers all activities associated with the installation and stabilisation of the offshore supply gas pipeline (KP91 to KP2.5 – **Figure 1**) and the installation of the jacket and topsides for the offshore platform. It also includes hook-up and commissioning activities of the pipeline and platform.

Project Description

The installation activities associated with the offshore scope of the DCDP are anticipated to take approximately 5 months to complete. These activities and their estimated duration can be summarised as:

- Pipelay in shallow water (5 to 22 m water depth) using the Leighton Stealth barge ~ 22 days.
- Stabilisation of the pipeline in shallow water for 2 km from the HDD exit location using diver installed rock bolts and stabilisation over the Pluto pipeline crossing using gravity anchors ~ 7 days.
- Pipelay in deeper waters (22 to 58 m water depth) using the Sapura 3000 ~ 25 days.
- Jacket and topside installation using the Sapura 3000 ~ 27 days.
- Tie-ins (installation of the subsea spool, topside spool, umbilical and gravity blocks and mattresses) and pre-commissioning (flooding, cleaning, gauging and hydrotesting completed pipeline) ~ 10 days.
- Hook-up and commissioning ~ 30 days.

The start point for the pipelay is at 432 590 m E, 7 697 118 m N and the pipeline will terminate at the platform location at 427 800 m E, 7 785 700m N.

The footprint of the offshore platform will be approximately 1,200 m² or 0.12 ha (includes jacket base of 30.9 m x 30.9 m) and the offshore pipeline will be approximately 89,000 m² or 8.9 ha (based on pipeline length on seabed of 89 km and width of 1 m to include stabilisation rock bolts).

The offshore programme is scheduled to commence with mobilisation of the Leighton Stealth to the HDD exit location in early October 2010. With the exception of the hook-up and commissioning works, the majority of the offshore activities are 24-hour/day operations.

Pipelay in Shallow Water

The first phase for pipeline installation is in shallow water of 5 to 22 m water depth and is 23 km long, defined as the section from the HDD exit location to KP25 *i.e.* approximately 25 km from the mainland. The single 16" raw gas pipeline will be installed, applying industry standard pipe-laying techniques using the pipelay barge, Leighton Stealth.

The following sequence of activities will occur:

- Leighton Stealth will set up adjacent to the HDD pipeline tail using 8 anchors. Anchor positions will be pre-determined to avoid direct contact with raised seabed features. Anchors and anchor wire movements will be controlled by anchor handling tugs (AHT) and managed through the barge management system.
- The section of pipeline installed for the shoreline crossing using HDD will be dewatered from the HDD tail pipeline push head which contains a pre-installed pig. The water will be disposed of to the evaporation ponds adjacent to the gas plant site.
- The HDD pipeline tail will be recovered via the HDD pipeline push head into the tensioner on the Leighton Stealth and the pipeline push head will be removed.
- Pipelay will then commence to ~KP 25 including welding, NDT (non-destructive testing, HSS (heat shrink sleeve) and foam infill of the pipeline field joints.
- During pipelay the barge moves ahead on its anchors one pipe joint at a time.
- The pipelay process is continually checked using regular stinger and pipeline profile inspections via air divers, buckle detectors, pipe tension control, roller load cells and stinger subsea cameras.
- Once completed, the pipeline will have a laydown head connected. The laydown head is connected by wire to the winch allowing the pipeline to be abandoned on the seabed at ~KP25.
- Leighton Stealth will then be demobilised.

The Leighton Stealth and the anchor handling tug for the transit to Australia will be mobilised from Singapore after being dry-docked for hull inspection and cleaning. The crew will be mobilised from Dampier once the Leighton Stealth has arrived in Australian waters with the exception of a small riding crew which would have accompanied the tow from Singapore. The Leighton Stealth will be supported by 2 to 3 anchor handling tugs including the one used for transit and 1 or 2 local anchor handling tugs mobilised from Dampier. In addition there are likely to be up to 3 supply and crew vessels that will also be mobilised from Dampier. Pipe will be transported from Batam using a commercial bulk carrier that will anchor in Mallus Straight off Dampier. Pipe will then be transferred onto various pipehaul barges and delivered to the Leighton Stealth on location. These tugs and barges will be sourced from local suppliers.

Stabilisation of the Pipeline in Shallow Water

Stabilisation of the pipeline along a 2 km section of the pipeline (~KP2.5 to KP4) in shallow water (4 – 7 m LAT) will be achieved using conventional rock bolting carried out by air divers. Rock bolting will be 12 hour operations only. The vessels nominated are the Samson Explorer as the air diving support vessel (draft 2.5m with fuel tank capacity of 40 m³) and Grace as the anchor handling tug (draft 3 m with fuel tank capacity of 150 m³). The air diving support vessel will have a 4 point mooring arrangement.

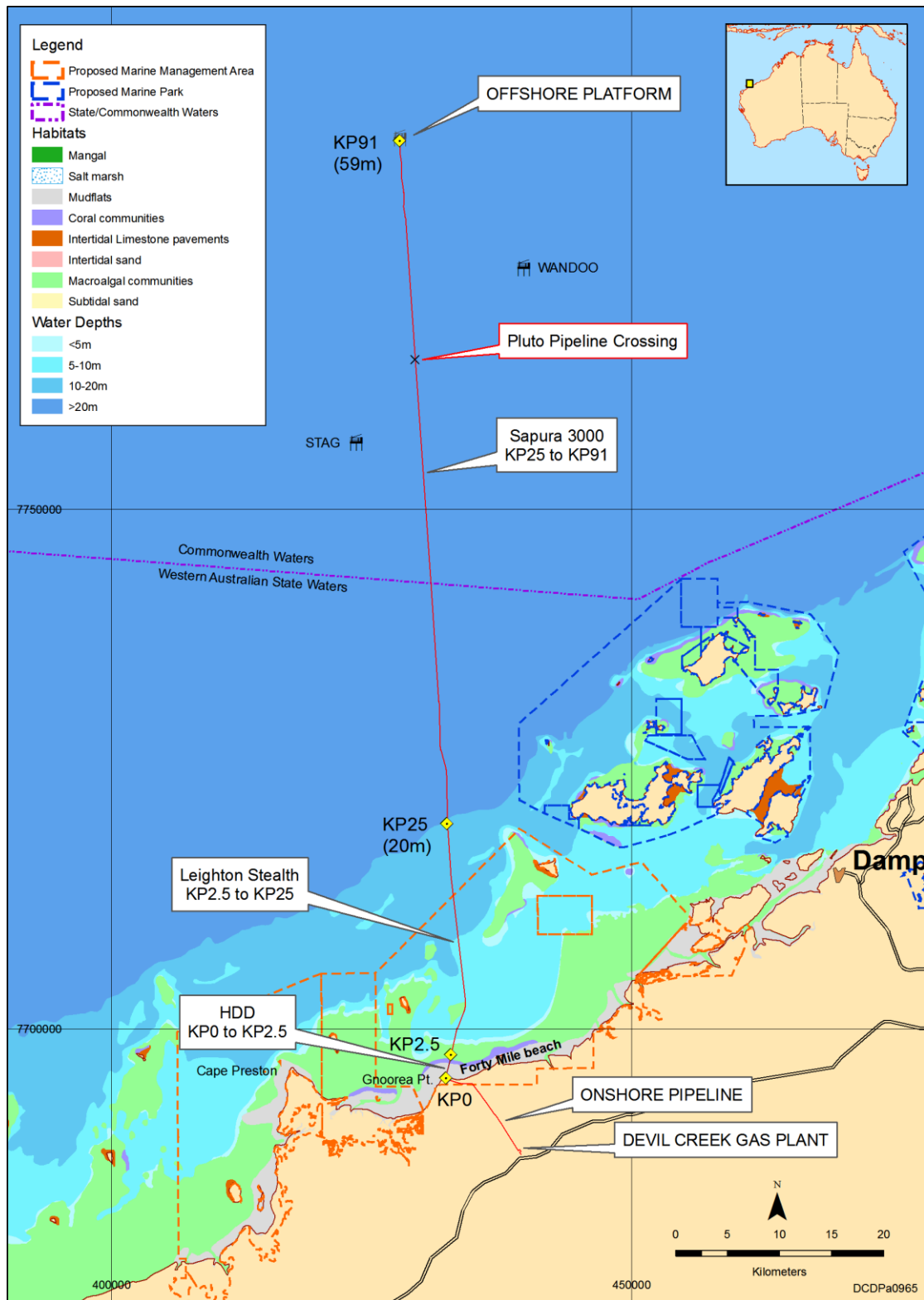


Figure 1: Location of the DCDP offshore platform and pipeline.

Up to 45 rock bolts will be installed using a small hydraulically operated drilling rig, which will be lowered to the seabed and piles will be drilled each side of the pipeline. These will then be grouted in place and a securing chain placed between the two piles to secure the pipeline to the seabed. The remainder of the pipeline will not require rock bolting as it has a concrete weight coating applied to the pipeline, which provides enough weight to stabilise the pipeline. The methods and equipment have been used extensively throughout Australian offshore pipeline construction, including by Apache most recently at the John Brookes natural gas field development.

Pipelay in Deeper Water

The heavy lift and pipelay vessel, Sapura 3000, will lay the remainder of the pipeline from KP25 to the Reindeer offshore platform.

The Sapura 3000 is a Class 2 dynamically positioned vessel, recently constructed in 2008. The Sapura 3000 will be mobilised from Singapore after being dry-docked for hull inspection and cleaning. The vessel workforce will be mobilised from Dampier once the Sapura 3000 is anchored in Mallus Straight off Dampier. The Sapura 3000 will be supported by a supply vessel, up to 2 crew vessels and a hyperbaric rescue vessel that will also be mobilised from within Australia, most likely Dampier. Pipe will be transported from Batam, Indonesia, using 3 commercial bulk carriers that will anchor in Mallus Straight off Dampier. Pipe will then be transferred onto various pipehaul barges and delivered to the Sapura 3000 on location. The bulk carriers will be from overseas with the last port of call in Batam to pick up pipe prior to arrival in Australia. The tugs and barges will be sourced from within Australia.

Jacket and Topside Installation

The wellhead platform structure will be installed in two sections: the jacket substructure with piles will be installed first followed by the topside deck which is landed on top of the jacket substructure. Both structures will be installed using the Sapura 3000, with the structures themselves transported from the fabrication facility in Shenzhen, China on towed transportation barges to the Reindeer platform location.

Tie-ins and Pre-commissioning

Once the entire offshore pipeline has been installed, the pipeline from the laydown head at KP91 to the gas plant pig receiver will be flooded, cleaned and gauged using the Sapura 3000. The pipeline will be flooded with seawater treated with a biocide (Champion B170 at 500 ppm) and oxygen scavenger (Champion OS2 at 120 ppm).

Tie-ins include the installation of the topside and subsea spools, umbilical, anode gravity blocks and mattresses will occur once the jacket and topsides installation has been completed by the Sapura 3000. In addition, 4 gravity anchors will be installed over the Reindeer pipeline at the Pluto pipeline crossing. Each gravity anchor weighs approximately 24 tonnes. Four concrete mattresses will be placed around the perimeter of each gravity anchor as scour protection.

Once all tie-ins and pre-commissioning activities are completed, the Sapura 3000 will be demobilised and the wellhead platform (WHP) will be mothballed until the arrival of a drilling rig for the well completion phase.

Well completion activities will be undertaken using the Ensco 109 or similar jack-up drill rig. Information is included here for completeness of the description of offshore activities for DCDP, however, the environmental risks and management measures for well completion activities will be covered in a separate bridging document to the

North West Shelf Drilling Programme 2007 to 2011 Environment Plan (EA-00-RI-164) to the DMP at a later date.

Hook up and Commissioning Activities

Hook up and commissioning activities will include:

- Connecting the flowlines on the WHP from the X-tree to the production manifolds.
- Connecting the X-tree control lines to the well control panel.
- Gross leak testing and nitrogen purge of process piping.
- Function testing and cause and effects testing.
- Reinstating of the microturbines, batteries and exhaust ducting.
- Removing solar panels and temporary wiring for the navigation aids.
- Removing mothballing desiccant bags.

Following the completion of a successful hydrotest, the pipeline will have been depressurised and contain treated seawater. The treated water will reside in the pipeline for between 3 and 12 months until commissioning. At this time, the treated water within the pipeline will be pushed through to the offshore platform, where it will be discharged to the marine environment.

The WHP will be mothballed once hook-up and commissioning is completed in readiness for the completion of the gas plant.

Receiving Environment

Physical Environment

The NWS lies in the arid tropics region of Australia, which experiences high summer temperatures and periodic cyclones (with associated rainfall). Rainfall is generally low, with evaporation exceeding rainfall. Mean ocean temperatures range from a minimum of 11°C in winter to a maximum of 37°C in summer. Shelf waters are usually thermally stratified at a depth of about 20 m.

Wind patterns are monsoonal with a marked seasonal pattern. From October to March, the prevailing non-storm winds are from the south-west, west and north-west at an average speed of less than 10 knots. From June to August, winds are generally lighter and more variable in direction than in spring and summer.

Non-storm winds prevail from north-east through to south-east at average speeds of 5-6 knots. Transitional wind periods, during which either pattern may predominate, can be experienced in April, May and September each year.

Biological Environment

Seabed

Apache commissioned detailed marine survey of the seabed along the pipeline alignment and at the platform location, using a towed video and side scan sonar bathymetry survey. In shallower waters, divers visually inspected the seabed focussing on any features of significance.

The intertidal and nearshore subtidal habitats were typical of the region and all are widely represented along the coastline. Marine benthic primary producer habitats comprised coral reefs, limestone pavement with macroalgae, seagrass, mud and

sandflats and mangroves. The benthic habitat along the pipeline route ranged from isolated coral bombores and coral patch reef dominated by macroalgae close to shore, to bare coarse sandy substrate at the seaward end of the pipeline route. Patches of seagrass and limestone pavement, with macroalgae and minor filter feeding communities, were also identified at several locations along the pipeline route amongst the predominantly bare sandy substrate.

Sea Turtles

Four species of sea turtle nest on sandy shore sites of Dampier Archipelago, Montebello Islands, Lowendal Islands, Barrow Island and other islands on the North West Shelf. These are the green turtle (*Chelonia mydas*), the flatback turtle (*Natator depressus*), the hawksbill turtle (*Eretmochelys imbricata*), and the loggerhead turtle (*Caretta caretta*). The leatherback turtle (*Dermochelys coriacea*) may also visit the open waters. These 5 species are on the National List of Threatened Species as either endangered or vulnerable under the EPBC Act. For all species, hatchling emergence occurs 6 to 8 weeks after the females have nested.

The across shelf distribution of sea turtles is not well known, but does vary among the species. All species are migratory and may transit through the waters in the vicinity of the offshore works for the DCDP. Surveys commissioned by Apache of the shorelines in the vicinity of the offshore works for DCDP suggest that Forty Mile Beach hosts limited and sporadic turtle nesting activity which is consistent with other findings to date from regional mainland beaches between Dampier Archipelago and Onslow.

Sea turtles are likely to occur in the vicinity of the DCDP offshore works as foraging turtles and/or breeding migrants swimming through the area on their way to remote nesting grounds.

Marine Mammals

A range of marine mammals occur in the waters of this region, some being seasonal visitors while others occur at low densities all year round. The most common species include the humpback whale, false killer whale, southern bottle-nosed whale, bottle-nosed dolphin, Indo-pacific humpbacked dolphin and Risso's Dolphin (BBG 1994).

The following mammal species are listed as either threatened and/or migratory under the EPBC Act as possibly occurring within the DCDP offshore works area.

- Blue whale (listed threatened and migratory)
- Humpback whale (listed threatened and migratory)
- Bryde's whale (listed migratory)
- Dugong (listed migratory)
- Orca (listed migratory)
- Indo-pacific humpback dolphin (listed migratory)
- Spotted bottlenose dolphin (listed migratory)

These species may transit through the area of the DCDP offshore works. The most commonly sighted whale is the humpback whale. This species migrates between the Antarctic waters and the Kimberly region of Western Australia. In the region of the DCDP offshore works the peak of the northerly migration occurs around June – July, while the southerly return migration peaks around September – October.

Socio-Economic Environment

Figure 1 shows the location of the proposed Dampier Archipelago and Regnard Marine Conservation Reserve.

In terms of recreational use, the open waters of the North West Shelf do not support significant recreational or tourist activity. The offshore pipeline and platform falls with Area 3 of the Onslow Prawn Managed Fishery, which is open from 1 March to 15 November. The prawn fishery is predominantly a coastal fishery with most activity confined to 5 nautical miles from the Western Australian coastline.

There are no known sites or likely to be sites of aboriginal or non-aboriginal significance in the vicinity of the offshore works for DCDP.

Table 1 summarises the timing of key ecological factors, recreational activity and proposed DCDP offshore activities.

Major Environmental Hazards

The potential hazards and environmental impacts resulting from offshore works for DCDP are summarised in **Table 1**.

Environmental Management

Extensive environmental management measures and controls outlined in the EP will be implemented to ensure that impacts to the environment are minimised and negligible.

Apache management documents used to guide the implementation of environmental management measures are listed below:

- Environmental Management Policy
- DCDP Part C- Offshore Environmental Management (DC-00-RI-005)
- Environmental Requirements for Offshore Marine Vessels (AE-91-IQ-202)
- Refuelling and Chemical Transfer Management Procedure (AE-91-IQ-098)
- OSCP Volume 1 – Operations (NWS) (AE-OO-EF-008/1).
- OSCP Volume 2 – Resource Atlas (NWS) (AE-OO-EF-008/2).
- Hazard Reporting, Incident Notification and Investigation Procedure (AE-91-IF-002).
- Quarantine Procedure (AE-91-IQ-189).
- Vermin Management Plan (EA-60-RI-131).
- Waste Management Plan (EA-60-RI-167).

All current and relevant state, commonwealth and international legislation will be complied with.

Table 1: Summary of timing of key ecological factors, recreational activity and proposed DCDP activities.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ecological Activity												
Dugong breeding on North West Shelf	Peak	Peak	Peak	Peak	Low	Low	Low	Low	Peak	Peak	Peak	Peak
Turtle nesting on North West Shelf & Pilbara Coastline	Peak	Peak	Low	Low				Low	Low	Peak	Peak	Peak
Turtle hatchling emergence on North West Shelf & Pilbara Coastline	Peak	Peak	Peak	Low	Low					Low	Low	Peak
Migratory Birds	Peak	Peak	Peak	Peak					Peak	Peak	Peak	Peak
Mass coral spawning (few nights within month)			Peak							Low		
DCDP Activity (Indicative timing)												
Offshore pipelay – Leighton Stealth Pipelay Barge: nearshore to 22m water depth (2010)									DCDP	DCDP		
Offshore pipelay – nearshore stabilisation (2010)									DCDP	DCDP		
Offshore pipelay – Sapura 3000 22m water depth to platform (2010)											DCDP	
Offshore Platform – Sapura 3000: installation (2010)												DCDP
Offshore Platform: tie-in and pre-commissioning (2011)	DCDP											
Recreational Activity – Nearshore												
Camping				Recreational	Recreational	Recreational	Recreational	Recreational	Recreational			
Boating/Fishing	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational	Recreational
Commercial Activity												
Onslow Prawn Managed Fishery			Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	
Other Fisheries	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial	Commercial

Key to activity

- Peak of ecological activity, presence reliable and predictable
- Low level of abundance/activity/presence
- Activity not occurring
- DCDP activity – proposed timing
- Recreational activities
- Commercial activities

Table 1: Summary of potential environmental impacts from DCDP offshore activities.

Hazard	Potential environmental impact and risk ranking
Artificial Lights from vessels	Potential disorientation of fauna by lights at night, especially turtle hatchlings. Risk considered negligible – timing of proposed activities coincides with the sea turtle nesting season, however, the location is distant from beaches with high densities of nesting turtles.
Underwater Noise	Potential short-term physiological effects or disruption to behaviour patterns of cetaceans, birds, turtles, fish and other marine life. Risk considered negligible – activities primarily outside of humpback whale migration and of short duration.
Disturbance to seabed	Localised disturbance to seabed flora and fauna assemblages. Risk considered acceptable – surveys indicate no unique or sensitive seabed habitats and footprint is small compared to surrounding habitat. Additional measures taken to minimise disturbance from anchoring vessels.
Sewage, putrescible and solid domestic wastes	Potential localised reduction in water quality and nutrient enrichment. Risk considered negligible – food scraps macerated prior to discharge, solid wastes disposed to onshore waste facilities and sewage treated to MARPOL and State Waters specifications. Project specific waste management procedures.
Liquid wastes and oil contaminated drainage water	Potential localised reduction in water quality. Risk considered negligible – vessel decks kept clean, oily water separator collects any spilled liquids. Liquid wastes stored appropriately in enclosed containers with secondary containment and disposed to onshore waste facilities. Project specific waste management procedures.
Handling and storage of diesel, oil and chemicals	Potential localised reduction in water quality and shoreline contamination. Risk considered acceptable – compliance with legislative requirements, refuelling procedures and anchoring procedures. Vessel SOPEP and AEL Oil Spill Contingency Plan.
Vessel movements and presence	Potential for interaction or collision between vessels and marine fauna. Risk considered acceptable – activities predominantly outside of humpback whale migration period. Vessels on location move slowly and adhere to Part 8, EPBC Regulations (2000). Cetacean sightings reported to DEWHA.
Discharge of hydrotest water	Potential localised reduction in water quality. Risk considered acceptable – numerical modelling of the concentration and dispersal of hydrotest chemicals indicates rapid dilution and dispersion. Chemicals selected for best environmental rating and optimised concentrations used.
Invasive Marine Pest Species	Potential for introduction of invasive marine pest species that may outcompete and displace native species. Risk considered acceptable – all vessels from overseas undergo an invasive marine species risk assessment taking into consideration trading and port history, anti-fouling coatings and inspections. Leighton Stealth, Miclyn Venture and Sapura 3000 will be drydocked prior to mobilisation to Australian waters.
Disturbance to Recreational Users and Commercial Fishers	Potential for disturbance to existing marine users. Risk considered negligible – little overlap with the project area and existing marine users.

Consultation

Apache maintains a DCDP website (www.apachedcdp.com.au) with information and updates on the DCDP.

The following fishing groups have been consulted with regard to DCDP offshore activities:

- Commonwealth Fisheries Association
- Western Australian Fishing Industry Council
- Northern Fishing Companies Association
- A Raptis & Son
- Western Australian Northern Trawl Owners Association

Recreational users of Forty Mile Beach, Gnoorea Point and nearshore waters have also been consulted with regard to DCDP. DCDP activities have been communicated via the website, newsletters, bulletins and notifications on local radio.

Apache will maintain ongoing consultation with relevant stakeholders, including standard notifications to AMSA and mariners on the location of vessels throughout the proposed activities.

Further Details

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