Macedon Development Project

Offshore Construction

Environment Plan Summary

Document No. : PMA-BHP-EN-EMP-0003

REV	DATE	Description	ORIGINATOR	CHECKER/REVIEWER	APPROVER
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1. INTRODUCTION

The Macedon Gas Development is a Western Australian domestic gas pipeline construction project to commercialise gas reserves in the offshore Macedon gas field located in graticular blocks which form part of the Pyrenees production licence WA-42-L. Production licence WA-42-L is located in Commonwealth waters.

The Operator for the Project is BHP Billiton Petroleum Pty Ltd operating on behalf of the Macedon Joint Venturers which comprises;

- BHP Billiton Petroleum (Australia) Pty Ltd; and
- Apache PVG Pty Ltd

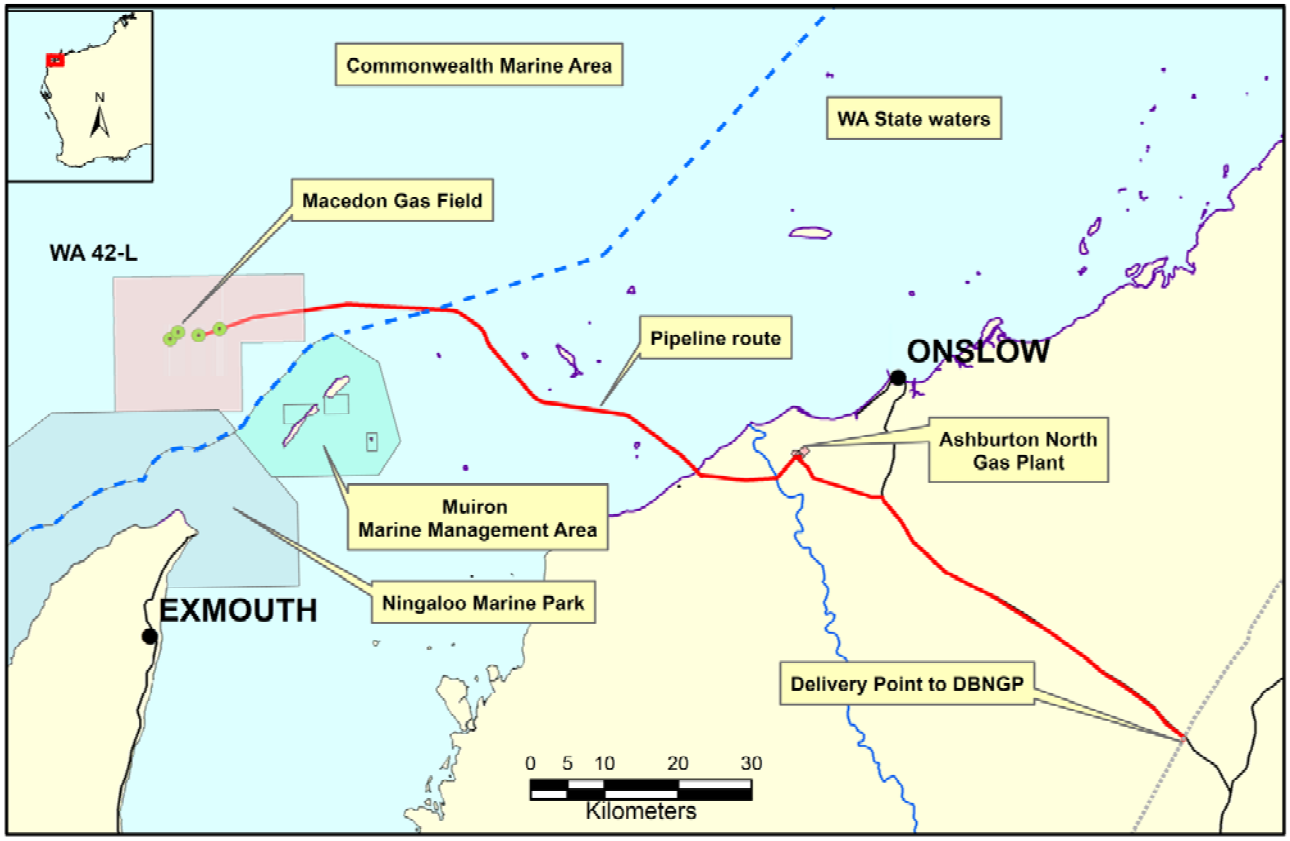

Figure 1. Project Overview

2. LOCATION OF THE ACTIVITY

The Macedon Offshore Pipeline is located in Commonwealth and State waters (see Figure 2). The gas field is located in Commonwealth Waters. The pipeline runs from Urala coast near Onslow through State Waters to the Macedon gas field.

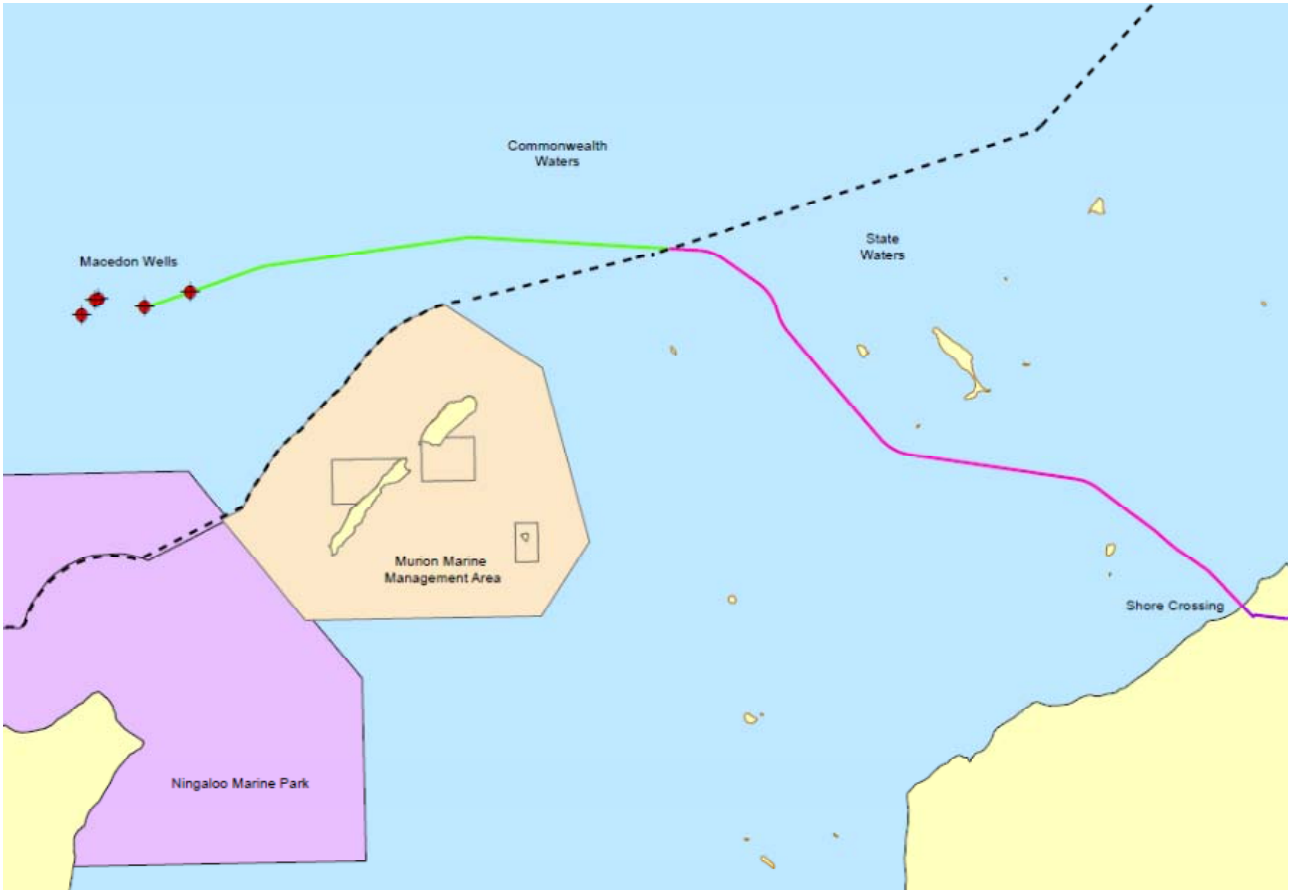

Figure 2 Offshore Pipeline Route

3. DESCRIPTION OF THE ENVIRONMENT

3.1 Physical environment

The Macedon Offshore Pipeline extends from the shore crossing at Urala Station (west of Onslow) some 80 km to the west northwest to the Macedon gas field location, some 20 km north of North West Cape. The marine environment in which the offshore project is situated therefore extends from the upper intertidal zone through to the outer margin of the continental shelf at depths of between 100 and 200m.

3.2 Biological Environment

The pipeline will be laid in water depths ranging from 0 m at shore crossing to approximately 180 m at the Macedon field. The seabed throughout is predominantly comprised of soft sediments with silt to gravel sized particles. No major reefs were encountered but some secondary features, such as areas of limestone pavement, raised pavement and low relief reef were crossed (in the vicinity of the shore crossing).

Larger mobile species of marine fauna which may be resident in or pass through the pipeline area include whales, whale sharks, dolphins, turtles, dugong, fish, sea snakes and jellyfish, while pelagic microscopic species include phytoplankton, zooplankton, and the pelagic larval stages of many benthic species. Pelagic fish species common to the area include turrum, trevally, tuna and Spanish mackerel. Many of the shallow water demersal (bottom dwelling) fishes that occur are to be found around the reefs and islands. These

include coral trout, and various species of parrotfish, clown fish, triggerfish, groper, wrasse, cod and angelfish, together with reef sharks.

The coral reefs off Onslow form part of the Passage Islands and are to the east of Onslow. The extensive chain of low sandy islands is situated between two other coral localities: the Ningaloo Reef to the southwest and Dampier Archipelago to the northeast. Ningaloo Reef fringes the west and north coast of the Exmouth Peninsula. The coral assemblages in the Passage Islands resembled the inshore assemblages at Dampier. From limited collecting in the Passage Islands, 39 species of 23 genera were recorded.

The Macedon shore crossing is adjacent to the existing Griffin Pipeline crossing within a 4km sandy beach. The tie in point with the onshore pipeline is located on the seaward side of the dune system. There are no listed Threatened Flora species under the *Environmental Protection and Biodiversity Conservation Act 1999*, or flora species which have been declared as Rare Flora, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950* located in the project area and no Priority species were recorded. There are no Threatened Ecological Communities recorded in the Project Area.

3.3 Social Environment

The Australian National Shipwreck Database lists eight shipwrecks in the Onslow region, with the Western Australian Museum listing eleven in the region. No wrecks or relics were identified during the pipeline route surveys.

A number of archaeological and ethnographic surveys have been conducted on the terrestrial pipeline route. There are a number of heritage sites that were identified during these surveys and have been listed on the Department of Indigenous Affairs register as a result. Four sites are located within the Macedon Pipeline easement at the shore crossing location. These sites have been avoided during the construction with the pipeline and umbilical casing through the dunes being installed using Horizontal Directional Drilling.

The Onslow prawn fishery operates in waters through which the Macedon Gas Pipeline will pass. The Onslow prawn fishery involves vessels from the Exmouth and Nickol Bay (Karratha) prawn fisheries in addition to vessels based at Onslow. Four licensees are permitted to operate in the waters immediately offshore Onslow which includes the pipeline shore crossing location. In recent years, the amount of prawns taken has been historically low. Scalefish trap, line and trawl fisheries also operate in the waters offshore Onslow. The number of vessels operating in these waters varies and only a small number are based out of Onslow.

4. DESCRIPTION OF THE ACTION

The Macedon Offshore Pipeline includes the following activities:

- Installation of the umbilical from the onshore connection junction box to the Macedon Gas Field;
- Installation of the main offshore pipeline from the onshore tie-in location to the Macedon Gas Field;
- Installation of infield flowlines and umbilicals, manifold, pipeline termination structures, connection jumpers and flying leads;

- Installation of the shore crossing, including cofferdam approach at the beach intersection;
- Pre trenching for pipe/umbilical pull segment and subsequent backfilling;
- Umbilical post trenching; and
- Pipeline pre-commissioning and controls testing/pre-commissioning.

The Offshore Pipeline Construction period commenced in April 2012 with pre-trenching works and continues through to pre-commissioning works scheduled for completion in late December 2012.

5. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

The Macedon Development Project has implemented a risk management strategy consistent with BHP Billiton's Risk Management policy to ensure that all key risks to the project are identified, analysed and that appropriate measures are in place to eliminate or mitigate these risks. BHP Billiton undertook an environmental risk assessment to understand potential environmental risks associated with the Macedon Offshore Pipeline (routine and non-routine) to ensure they are reduced to As Low As Reasonably Practicable (ALARP). The key environmental hazards and control measures to be applied to the Macedon Offshore Pipeline are shown in Appendix A. All mitigation measures associated with hazards will be used to reduce environmental risk to ALARP and will be of an acceptable level.

6. MANAGEMENT APPROACH

The Macedon Offshore Pipeline will be managed in compliance with the Offshore Construction Environment Plan accepted by NOPSEMA under the regulations and BHP Billiton's risk management policy.

The objective of the Environment Plan is to ensure that potential adverse impacts on the environment associated with the Macedon Offshore Pipeline, during both routine and non-routine operations, are identified, and will be reduced to ALARP and will be of acceptable level.

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

The implementation strategy identifies the roles/responsibilities and training/competency requirements for all personnel (BHP Billiton and contractors) in relation to implementing controls, managing non-compliance, emergency response (oil spills) and meeting monitoring and auditing and reporting requirements during the activity. The Environment Plan details the types of monitoring and auditing that will be undertaken (including audits and monitoring during the activity) and reporting requirements for environmental incidents (recordable and reportable incidents) and reporting overall compliance of the activity.

7. CONSULTATION

BHP Billiton has been actively involved in stakeholder engagement in the Onslow region since the development of the Griffin Joint Venture in the early 1990's. This project included the Griffin gas plant at Tubridgi, located approximately 20 km south of Onslow. This development triggered the start of a long term relationship with the town of Onslow, local pastoralists, Ashburton Shire and the Thalanyji (the recognised Native Title holders).

BHP Billiton's ongoing development in the region includes the Stybarrow and Pyrenees projects and the early project studies associated with the Pilbara LNG Project. To support these developments the Exmouth Community Reference Group (CRG) and the Onslow Community Reference Group have been established to facilitate consultation. The Onslow CRG continues to meet every 3 to 4 months with a CRG newsletter that is distributed to all Onslow residents. The CRG forum aims for proactive and regular interaction to promote open and inclusive communication with relevant stakeholders. Meetings are minuted with actions recorded and tracked. In addition, for specific construction activities that occur between meetings, notifications are sent to relevant stakeholders and placed on local notice boards and at the Shire office in Onslow. BHP Billiton engages with the traditional owners, the Thalanyji, through representation on the CRG, the Macedon Thalanyji Liaison Committee and through Thalanyji heritage monitors who are present for all construction activities on site.

8. CONTACT DETAILS

Further information about the Macedon Development Project can be obtained from:

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Appendix A : Summary of Key Environmental Aspects and Management Measures to be applied to the Macedon Offshore Pipeline

Environmental Aspect	Potential Environmental Impact	Management and Mitigation Measures
Introduced marine pests and ballast water	Introduction of exotic marine organisms to the local environment with the potential to cause an imbalance to the marine ecosystem	Implement Introduced marine pest management plan; vessels located outside C'wealth waters require to be inspected at foreign port prior to entering C'wealth waters. Vessels <12 nm offshore and in port to comply with Australian Ballast Water Management Requirements; non self ballasting vessels to maintain records of ballast levels in "dry" tanks
Marine fauna (cetaceans)	Physical impact via collision with project vessels; underwater noise associated with pipelay activities (anchor handling, engine and propeller noise)	Apply Australian Guidelines for Whale and Dolphin Watching (DEH 2006); trained marine fauna observer on board vessel, observation and recording of all sightings, including observed avoidance behaviour. Short period (<1 month) of installation and construction activities overlapping with peak humpback migration period.
Marine Fauna (turtles)	Limiting capacity for nesting activity and hatching on beach; impede swimming	Implement Turtle Management protocol; install barrier 200 m either side of corridor and at mouth of corridor at high tide position tapering toward ocean; undertake day time and night time monitoring along beach; monitor light and noise levels at shore crossing; lighting of project vessels to be kept to a minimum to maintain safe luminescence level for project.
Physical disturbance to seabed (Commonwealth Waters)	Localised disturbance to seabed. Temporary increase in turbidity, temporary change to water column chemistry, mobilisation of sediment chemistry	Adherence to anchoring procedures to minimise anchor and chain drag. Secondary stabilisation is not required. Seabed disturbance is limited to a few metres either side of the pipeline

Physical disturbance to seabed (State Waters)	Localised damage/smothering to seafloor habitat (benthic primary producer habitat, BPPH); temporary increase in turbidity, temporary change to water column chemistry, mobilisation of sediment chemistry	Loss of BPPH kept within approved working corridor impact to BPPH kept to 1% or less within Local Assessment Area; route selection designed to minimise impact to BPPH; anchoring to remain within pipeline corridor; adherence to anchoring procedures to minimise anchor and chain drag.
Hydrocarbon spills (offshore) , <10 m^3	Toxicity to marine biota; contamination to marine water quality, shoreline impacts	Oil Spill Contingency Plan (Tier 1 response); dry break coupling for all transfers; minimal inventories of hydrocarbon on board; response and recovery equipment on board
Hydrocarbon spills (offshore) >10m^3	Toxicity to marine biota; contamination to marine water quality, shoreline impacts	Oil Spill Contingency Plan; procedures regarding vessel movements, response and recovery equipment on board, Access to Tier 2 & 3 capabilities (AMOSC)
Hydrocarbon spills (onshore)	Contamination to beach, intertidal and littoral marine biota and to water quality	Hydrocarbon storage and transfers, as well as hydraulic fluids, subject to clear handling protocols and containment.
Discharge of Hydrotest fluids	Toxicity to marine biota; contamination to marine water quality	No observable effect concentration likely to be below toxic levels due to dilution; adherence to project pre-commissioning procedures to pipe line hydrotesting
Atmospheric Emissions	Temporary localised impact on air quality (increase in ambient air pollutants NOx, SOx, CO_2)	All fuel will be MARPOL compliant with respect to sulphur; exhaust emissions to be within regulatory standards; vessel schedule maintenance; welding and shot blasting to follow best practice
Deck drainage	Contamination to water column; sub	Best practice protocols for bunding, storage and housekeeping on deck; small quantities likely to have localised effect for short duration reduced rapidly over

	lethal effects to marine organisms	short time due to dilution
Sewage and putrescibles wastes	Contamination to water column; sub lethal effects to marine organisms; localised increase in nutrients affecting populations of some marine organisms	Adherence to MARPOL 73/78 Annex IV; sewage treatment facility and comminuter checked for satisfactory operation prior to commencement; vessel has current "International Sewage pollution Prevention Certificate" in accordance with Regulation 4 MARPOL Annex IV; rapid dispersion of discharged material due to open water currents; sewage discharged from vessel within 3 nm of nearest land to be compliant with Regulation 9 (1) (1) of Annex IV of MARPOL; maintenance of garbage record book; training provided in waste disposal and management on board vessels
Light	Disorientation of marine migratory mammals; potential for marine mammal exhaustion	Lighting of project vessels to be kept to a minimum to maintain safe luminescence level for project; undertake Marine Turtle Management Impact Protocol
Noise	Interference with marine mammal communication; damage to marine mammal hearing; changes in behaviour of commercially targeted species	Trained marine fauna observer on board vessel. Apply Australian Guidelines for Whale and Dolphin Watching (DEH 2006); short period (<1 month) of installation and construction activities overlapping with peak humpback migration period; marine mammals likely to exhibit avoidance behaviour
Hazardous materials	Material discharge is toxic to marine organisms; ingestion leads to increased morbidity of marine organisms	Hazardous materials are segregated into clearly marked containers, manifested and stored securely for onshore disposal; waste disposal in accordance with BHPB policy, ie reuse, recycle etc; onshore disposal managed by licensed operators and taken to licensed landfill (except Onslow)
Non -Hazardous materials	Physical impedance of marine organisms entangled in waste	Non-ferrous or plastic material is biodegradable; non-hazardous materials are segregated into clearly marked containers, manifested and stored securely for onshore disposal; waste disposal in accordance with BHPB policy, ie reuse,

		recycle etc; onshore disposal managed by licensed operators and taken to licensed landfill (except Onslow)
Vegetation clearance (onshore)	Loss of floral habitat, increased potential for erosion	Vegetation clearance to occur in areas that have DEC approval for ground disturbance/clearing
Commercial fishing	Disruption to prawn trawling	Inform fisherman of timing and nature of construction activities to allow them to plan their operations and reduce potential disruptions.
Shipwrecks	Activity in the immediate area will be suspended and relevant State and Federal authorities notified	Detailed marine geophysical surveys of shore crossing and pipelaying corridor indicate that no wrecks have been identified.
Aboriginal Heritage	Entering Culturally significant sites with authorisation and approval from local indigenous land owners	Cultural Heritage Management Plan to be observed at all times; all Culturally significant sites will be cordoned off with suitably visible bunting; cultural awareness training in induction
Onshore Marine Pests	Mosquito borne disease transmitted to workforce during shore crossing activity. Spread of potential infectious disease from rats and mice	Observing Department of Health Mosquito warnings and applying standard precautions issued by the Department of Health (mosquito repellent). Inspection and approval of buildings and facilities on shore by Shire Environmental Health Inspector.
Vessel topside risks	Introduction of non-endemic species inhabiting project infrastructure at time of departure from foreign ports	Application of Quarantine Management Plan. Approval from AQIS Inspectors on all material transported by vessels departing from foreign ports.