Macedon Gas Development

BHP Billiton Petroleum Pty Ltd

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia

Report 1360
July 2010

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
28/11/08	**Referral received**	
17/12/08	**Intention to set EPS Level of Assessment advertised (no appeals)**	**3**
6/5/10	**Proponent's Final EPS document received by EPA**	**72**
30/6/10	**EPA report to the Minister for Environment**	**8[#]**
5/7/10	**Publication of EPA report**	**1**
19/7/10	**Close of appeals period**	**2**

[#] STATEMENT ON TIMELINESS

The Environmental Protection Authority met its timeline objective for completion of the assessment report and provision of a recommendation to the Minister.

Dr Paul Vogel
Chairman
30 June 2010

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1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by BHP Billiton Petroleum Pty Ltd to construct a subsea pipeline, onshore gas treatment and compression plant and sales gas pipeline. The subsea pipeline from the Macedon Gas Field (100 kilometres west of Onslow) connects to the onshore gas treatment and compression plant at Ashburton North (15 kilometres southwest of Onslow). The sales gas pipeline connects the onshore facility to the Dampier to Bunbury Natural Gas (DBNG) Pipeline.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The proponent has submitted an Environmental Protection Statement (BHP Billiton, 2010a) setting out the details of the proposal, potential environmental impacts and proposed commitments to manage those impacts.

The EPA considers that the proposal, as described, can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA has therefore determined under Section 40 of the EP Act that the level of assessment for the proposal is Environmental Protection Statement (EPS), and this report provides the EPA advice and recommendations in accordance with Section 44 of the EP Act.

2. The proposal

The proposal is to construct a subsea pipeline, onshore gas treatment and compression plant, and sales gas pipeline. The subsea pipeline from the Macedon Gas Field (100 kilometres west of Onslow) connects to the onshore gas treatment and compression plant at Ashburton North (15 kilometres southwest of Onslow). The sales gas pipeline connects the onshore facility to the Dampier to Bunbury Natural Gas (DBNG) Pipeline.

As the Macedon Gas Field and part of the subsea pipeline is in Commonwealth waters, the offshore development and part of the subsea pipeline are not included in this assessment.

The main characteristics of the proposal are summarised in the table below.

Table 1: Summary of key proposal characteristics

Element	Description
Offshore wet gas pipeline and umbilical	Nominal 500mm diameter subsea pipeline and 100-175mm diameter umbilical avoiding all marine reserves, islands and named reef structures with a shore crossing at Urala.
Shore crossing	Urala Station adjacent to Griffin Gas Project shore crossing. Construction using coffer dam/ open trench method at shore and horizontal directional drilling through the sand dunes.
Onshore wet gas pipeline and umbilical	15 kilometre long nominal 500mm diameter buried pipeline and 100-175mm diameter umbilical, crossing the Ashburton River at the Griffin pipeline location.
Plant location	Ashburton North approximately 15 kilometres south east of Onslow on the Urala pastoral lease.
Production - gas - condensate	Single train, 200 million standard cubic feet per day. 250-3200 litres per day
Operation	24 hours per day, 365 days per year
Sales gas pipeline	67 kilometre 500mm diameter buried pipeline from the plant to Onslow Rd and then parallel to Onslow Rd to the DBNG Pipeline
Condensate storage and transport	Bunded 80 cubic metre tank with approximately monthly transport by road tanker to Perth or Dampier.
Pressure relief and blowdown	Low pressure and high pressure ground-flares
Water of condensation (WoC) and produced formation water (PFW)	Small volume of WoC and up to 160 cubic metres per day of PFW toward the end of the well life.
Waste water disposal	Onsite evaporation pond
Power supply	Primary supply from gas turbine generators, approximately 2 Megawatts. Standby supply from diesel powered generator.
Water supply	From deep groundwater aquifer (Birdrong formation) for construction and operations. Desalination for potable water supply.
Vegetation clearing	Total up to 516 hectares

Element	Description
	Indicative components Wet gas pipeline - 60 hectares (15km x 30m) Access road - 120 hectares (13km x 80m) Plant site - 105 hectares Communications/utilities – 6 hectares (2km x 30m) Sales gas pipeline – 225 hectares (67km x typically 30m)

The potential impacts of the proposal are discussed by the proponent in the Environmental Protection Statement (BHPBilliton, 2010).

3. Consultation

During the preparation of the EPS, the proponent has undertaken consultation with government agencies and key stakeholders. The agencies, groups and organisations consulted, the comments received and the proponent's response are detailed in the proponent's referral document (BHP Billiton, 2010a).

A number of environmental issues were raised by the stakeholders during the consultation. Table 2 summarises the main issues raised and details the actions taken by the proponent to address the issues.

Table 2: Summary of issues raised during stakeholder consultation

Issue raised	Stakeholder	Response
Potential for impacts on Ningaloo Marine Park and Muiron Islands Marine Management Area	Cape Conservation Group (CCG) Conservation Council of WA (CCWA) DEWHA Exmouth Community Reference Group (CRG) Onslow CRG The Wilderness Society (TWS)	Decision to avoid these areas.
Potential for impacts on migrating humpback whales	CCG CCWA DEC DEWHA Exmouth CRG Onslow CRG	There are no known whale resting areas within the proposal footprint. The time frame for potential impact with passing whales is confined to the construction period and the most

Issue raised	Stakeholder	Response
	TWS	likely impact is expected to be avoidance behaviour.
Increased disturbance due to separate marine pipeline and umbilical routes.	CCG CCWA DEC DEWHA Exmouth CRG Office of the EPA Onslow CRG TWS	Following analysis of available remote sensing, geophysical and geotechnical data, a single route to meet the requirements of both pipelines was identified.
The threat of introduced marine pests to Ningaloo Marine Park, Muiron Islands Marine Management Area and shallow waters generally.	CCG DEC DEWHA Department of Fisheries Exmouth CRG Onslow CRG	The project will implement a risk based inspection and cleaning program along with mandatory ballast water changes for all vessels working on the project, based on the recently (2009) approved BHP Billiton operated Pyrenees Development – Non Indigenous Marine Species Management Plan.
The near shore pipeline route passes through the Onslow Prawn Fishery. In recent years a high value location has been off Urala Beach. If a safety exclusion area for construction coincides with the prawn fishing season, the catch may be reduced. Also, rock stabilisation of the pipeline could result in damage to nets.	Department of Fisheries; Onslow CRG.	Fishermen will be kept informed by BHPB about the timing and nature of construction activities in order to reduce the potential for disruptions. The Macedon pipeline will be trenched into the seabed through the high value prawn area to minimise potential impacts to trawling.
Turtles are known to occur in the Ashburton coastal region and concern was expressed that the shore crossing during pipeline construction could impact on turtle nesting.	CCWA DEC Onslow CRG	During operations there will be no impact. Turtle surveys over three seasons indicate that significant turtle nesting areas are distant from the proposed construction areas. No evidence was found of nesting in the area of the shore crossing.

Issue raised	Stakeholder	Response
		Mitigation and management measures have been identified in case there is nesting in the vicinity during the shore line construction period.
Potential for trapping fauna in onshore pipeline trench during construction.	CCWA DEC Onslow CRG	The length of open trench at any time will be controlled and fauna monitors will inspect the trench at regular intervals and remove any trapped fauna.
Disturbance of indigenous heritage sites could occur during construction.	Buurabalayji Thalanyji Aboriginal Corporation Department of Indigenous Affairs Onslow CRG	The project has been working closely with the Thalanyi (Native Title holders). A Cultural Heritage Management Plan will be prepared and agreed with both the Thalanyi and Department of Indigenous Affairs prior to any construction. It will include Thalanyi participation via Cultural Heritage Monitors.
The new raised access road from Onslow to the Macedon Gas Plant has the potential to alter natural surface water flow patterns.	DEC; Dept of State Development; Main Roads Department; Onslow CRG; Shire of Ashburton.	The road will be designed with adequate culverts and floodways to minimise impacts on natural water flows.

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders on the proposed development.

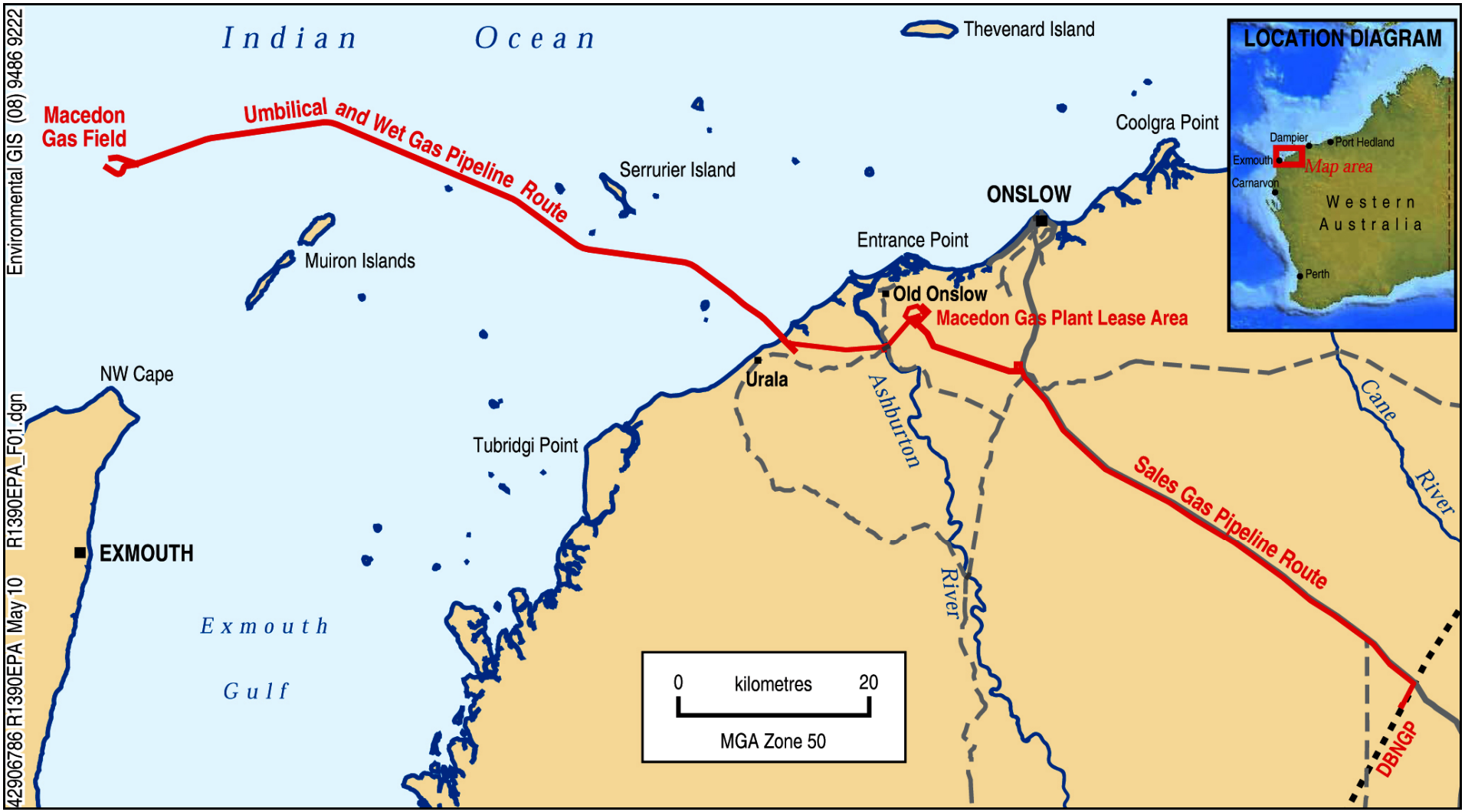

Figure 1: Regional location

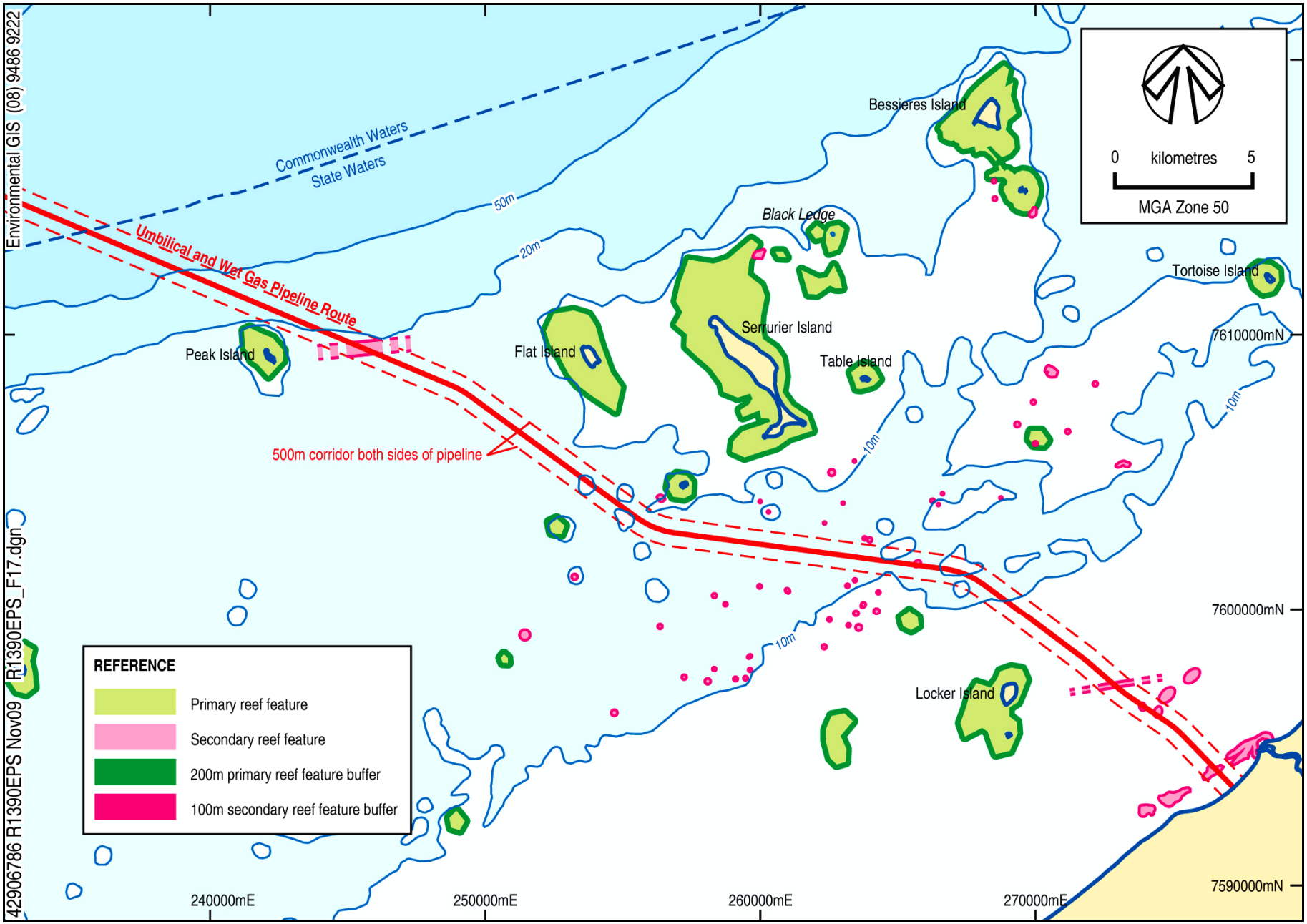

Figure 2: Offshore pipeline umbilical route and shore crossing

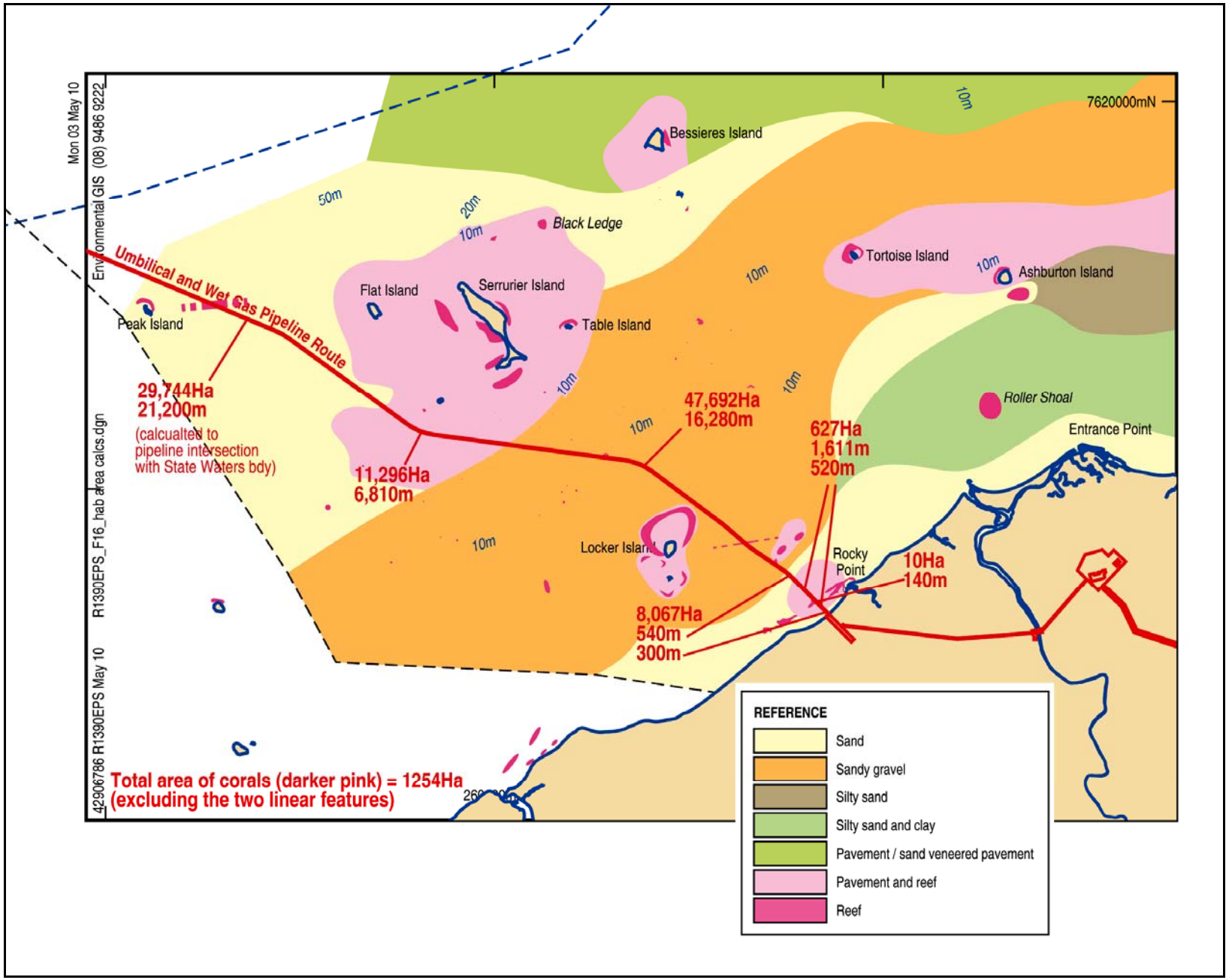

Figure 3: BPPH local assessment areas and pipeline lengths

4. Key environmental factors

It is the EPA's opinion that the following key environmental factors relevant to the proposal require evaluation in this report:

(a) Marine habitats and fauna
(b) Terrestrial flora and fauna
(c) Atmospheric emissions (including Greenhouse Gases)

The key environmental factors are discussed in Sections 4.1 – 4.3. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

4.1 Marine habitats and fauna

Description

Marine impacts will occur principally during the construction phase (and to a lesser extent at decommissioning). Potential physical impacts in State waters during construction and operation are:

- introduction of marine pest species;
- potential gas, condensate or oil leak or spill, including potential fuel spill from vessels during pipeline installation;
- habitat modification along the pipeline route to shore, and shore crossing and impacts on benthic primary producers (BPP);
- localised turbidity caused by suspended sediment in near-shore waters as a result of pipeline trenching operations and to a lesser extent from pipe-laying activities;
- bathymetric changes to the seafloor in the vicinity of the near-shore pipeline route along those parts of the pipeline that would be capped by rock armour (creation of artificial reef habitat);
- light emissions during construction (particularly at the shore crossing) and during operations (from the plant site); and
- underwater noise and vibration in the marine environment during pipe-lay activities.

Introduction of marine pests

The risk of introduction of marine pests results from the activities of vessels that have been in regions and ports where the marine pests are established. The translocation of marine pests can potentially occur due to hull fouling or through ballast water exchange.

Vessel use, and hence introduced marine species risk, would largely be confined to the construction period, when pipe-lay barges and support vessels would be required. There would be little risk during the operational phase as there would be no marine export facility. Although there may be occasional marine inspection surveys at this stage, vessels would be sourced locally.

A Macedon Introduced Marine Pest Species Management Plan (IMPS MP) has been prepared based on the recently (2009) approved and implemented Pyrenees Development – Non Indigenous Marine Species Management Plan (NIMS-MP). Both State and Commonwealth

approvals were obtained for the Pyrenees Development which is currently in execution. Any key learnings arising from the application of the Pyrenees NIMS MP would be incorporated into the Macedon IMPS MP. It would be consistent with the guidance in the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry, and subject to review and approval by the Western Australian Department of Fisheries. The draft IMPS MP would be updated once the Australian Quarantine Inspection Service (AQIS) Guidelines on Introduced Marine Pests have been issued.

Management measures that would be included in the IMPS MP include:

- use of vessel and equipment risk assessments;
- pre-mobilisation vessel inspections;
- hull cleaning;
- in water and haul out vessel inspections; and
- ballast water exchange as per the Australian Quarantine and Inspection Service (AQIS) Australian Ballast Water Management Requirements.

Oil Spill Risk

There would be no permanent surface facilities offshore. In State waters there is potential for diesel spills from vessels operating during the construction phase or a rupture in the marine pipeline.

The potential for a well blowout during drilling is not assessed in detail in this report as the wells are situated within the Commonwealth jurisdiction. However, it is noteworthy that the wells would produce gas. Where it is possible for liquid hydrocarbons to be produced, the volume would be minimal and the volatility and potential for weathering high, such that only an estimated 1 barrel of condensate would be present at any point in time. The proponent estimates that there would be negligible risk of impacting on sensitive reefs or islands in State waters.

Pipeline rupture has a low probability. If it should occur, only a small amount of condensate would be present in the gas. In this case the wells would be shut in, preventing a sustained blowout. Protection of the marine pipeline from impact would be provided by trenching or rock stabilisation. The pipeline would be inspected for structural integrity in accordance with the Department of Mines and Petroleum requirements.

Impacts on Benthic habitats

Most impacts would occur during the marine pipeline construction period due to direct disturbance in the nearshore zone extending from the shoreline at Urala Station to the edge of the inner shelf at about 30 metre (m) depth. Beyond 30m depth, the slope of the seabed increases rapidly. At depths between 30 and 50m, illumination levels at the sea floor become insufficient to support the majority of benthic primary producers.

A map of the marine pipeline route is given in Figure 2. A study of the habitats and benthic communities along the proposed pipeline route indicated that the bulk of the selected route lies over sparsely populated seabed. 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). Small reefs were present at the margins.

The significant marine habitats and benthic producers of the region are associated with the shallow island platforms and major reefs which have been avoided by selection of the pipeline

route. Corals, seagrasses and macroalgae occur at varying density on the isolated reefs and edges of limestone platforms that surround the islands. The proponent considers that these are potentially at low risk from the short term increase in turbidity that may be caused by trenching/jetting and rock dumping for stabilisation, if in the general vicinity. The period of impact would be one or two days at any given point.

The broad areas of seabed between the significant features have much lower productivity, dominated by soft bodied invertebrates (sponges, soft corals, ascidians) with sparse seagrass and macroalgae. The seagrasses are ephemeral and have been observed to recolonise rapidly following temporary impacts such as turbidity. The algae and invertebrate community is also expected to recover quickly and would be able to take advantage of the additional hard substrate provided along the rock stabilised section of the pipeline.

There is a narrow band of shallow subtidal beachrock / low relief reef located approximately 800m offshore from the shore crossing location. This feature comprises exposed rock with scattered corals (predominantly along the seaward edge), sponges and macroalgae. Scattered seagrass and algae were observed on both sides of the reef.

The shore crossing would be at least 2 kilometres from any mangroves and no impacts would result from either the construction or operation phase.

The proponent has selected the pipeline route to avoid primary features such as islands and major reefs, maintaining a minimum separation distance of 700m, with the minimum buffer for vessel movement/anchoring set at 200m. For secondary features these buffer distances are 600m and 100m, which are achieved, other than in cases where linear secondary features are crossed and one small isolated feature where the buffer is reduced.

The pipeline would need to be stabilised where water depth is less than 50m. This may be accomplished by rock stabilisation where the pipeline traverses hard substrate, or trenching and burial in softer near-shore sediments. Trenching would be carried out by excavator or jetting (in soft sediment). The direct impact of stabilisation and trenching would be 10-20m either side of the pipeline.

The pipeline separation buffers (700m for primary features or 600m for secondary features) provide protection from indirect impacts due to turbidity from the pipelay activities. The proponent has argued that these distances are based on conservative estimates of the likely turbidity impact. The vessel movement/anchoring separation buffers (200m for primary features and 100m for secondary features) allow for short term pulses of turbidity associated with these operations.

In summary, the following cumulative impacts on benthic primary producer habitats (BPPH) are expected:

- no direct or indirect loss of island platform or major reef habitats (primary features);
- less than 1% permanent direct loss to secondary features (uncharted raised pavement or low relief reef);
- temporary losses to other habitats (sand, sandy gravel and limestone pavement) dominated by microphytobenthos, with occasional patchily distributed macroalgae, seagrass and benthic invertebrates;
- change in habitat as rock stabilisation creates a habitat favoured by species associated with low relief reef habitat instead of soft seabed.

Impact on turtles
Potential impacts on turtles as a result of activities undertaken during the construction period may include physical disturbance, noise and light, should turtles be present during the installation of the shore crossing.

The results of turtle nesting surveys in 2005 and 2009 indicate that Urala Beach in the vicinity of the shore crossing supports a very low level of turtle breeding activity. Individuals may be occasionally present offshore from the shore crossing; however, the nearest mangrove habitat is found to the east in the Ashburton delta, beyond the influence of construction activities.

On this basis the proponent has concluded that shore crossing at any time of the year would not pose a serious risk to any species of turtle or significant numbers of individuals. Consequently, the proposed management does not preclude construction activities during the peak nesting and hatching period for hawksbill, green and flatback turtles.

Construction of the shore crossing would directly impact on approximately 1 hectare of beach and would be of short duration. The beach would be reinstated and thereafter not restrict breeding activity should it occur. There would be no impact during the operations phase.

Management procedures include:

- construction of shore crossing (including horizontal directional drilling through the dunes) to occur during day light hours, except during pipe pull setup and operations;
- preferred shore crossing outside of nesting/hatching period if practicable;
- width of open trench minimised through use of coffer dam in intertidal section;
- a marine fauna observer will be employed to monitor and manage potential turtle interactions; and
- lighting level and orientation will be restricted to that required to provide safe working conditions.

Offshore construction activities would not pass closer than 4 km from the regionally important rookeries at Ningaloo, the Muiron Islands and Serrier Island. This distance is considerably greater than the 1.5 km radius referred to in Environmental Assessment Guideline 5 (EPA, 2010) and the construction activities would be of short duration.

During the operations phase there would be no light sources at sea or on the beach. Impacts on turtles could only relate to light spill from the onshore gas plant which is to be located 6 km inland from the coast. In line with EAG 5 (EPA 2010) all permanent lighting at the plant site (including the flare) would be kept below the height at which light could shine on the beaches (15m). Light required above 15m for maintenance purposes would be switched off when not in use. Plant site lighting would be shielded to prevent light spill.

Impacts on cetaceans and dugongs
Pipelay activities in State waters could overlap the humpback whale southward migration period. Recent studies relating to drilling noise, cited by the proponent, indicate that cetaceans are not likely to be significantly impacted by that type of noise, which is a similar to that produced by the pipelay activities. It may induce avoidance behaviour and minor route alterations.

The potential for collision with whales during the construction phase is low due to the slow nature of the pipelay activity which involves 3 to 4 km movement per day.

During operations only occasional pipeline inspections would take place using a vessel and remotely operated vehicle (ROV).

A few dugongs may be present during pipeline construction but these are expected to exhibit avoidance behavior and the risk of collision is small due to low vessel speeds. Observation and recording of sightings will be included in the marine environment plan.

Assessment

The EPA's environmental objective for this factor is to:

- maintain the abundance, diversity, geographic distribution and productivity of marine flora at species and ecosystem level; and
- maintain the abundance, species diversity and geographic distribution of marine fauna.

Introduction of marine pests

The EPA considers that construction vessels and equipment used for pipelay and maintenance activities could pose a significant risk of introducing pest species if they are not appropriately managed.

In this regard, the EPA notes that the proponent has provided a draft Macedon Introduced Marine Pest Species Management Plan which is based on the Pyrenees Development – Non Indigenous Marine Species Management Plan for which both State and Commonwealth approvals have been obtained.

Whilst the EPA has a preference for outcome based conditions over provision and implementation of environmental management plans, the EPA notes that a National System for Prevention and Management of Marine Pest Incursions is currently at an advanced stage of development. As part of the National System AQIS has recently implemented a Biofouling Management Protocol and is currently extending its development. Importantly, a revised Vessel Risk Assessment Scoring Sheet is expected. Accordingly, EPA has recommended a condition requiring the proponent to update its proposed Introduced Marine Pests Management Procedure prior to mobilisation of vessels and submersible equipment so that the procedure is consistent with the Commonwealth and State guidelines applicable at that time, to the satisfaction of the Chief Executive Officer of the Environmental Protection Authority on advice from the Department of Fisheries.

Oil spill risk

The EPA considers that oil spill is not a significant risk. Pipeline rupture has a low probability and, if it should occur, the small amount of condensate present in the gas would evaporate and weather quickly. In the case of a pipeline rupture, the wells would be shut in preventing a sustained blowout. The EPA also notes that protection of the marine pipeline from impact would be provided by trenching or rock stabilisation. The pipeline would be inspected for structural integrity in accordance with the Department of Mines and Petroleum requirements.

Benthic habitat

The EPA notes that the proponent has based selection of the pipeline route on analysis of a substantial body of geotechnical, geophysical and airborne sensing information acquired between 2000 and 2010. In this way the direct impact on primary features such as island platforms and major reefs has been avoided and a buffer to provide a significant separation distance for potential impact from turbidity from pipelay activities to primary and secondary features has been achieved.

The EPA considers that the logic in justifying the separation buffers (based on past experience for pipelay activities in the area) is somewhat subjective, but notes that it is supported by a documented case at Magnetic Island on the Great Barrier Reef, which is comparable in respect to excavation techniques and sediment characteristics.

The proponent has made an assessment of the impact on BPPH in accord with EPA Environmental Assessment Guideline (EAG) No.3 (EPA, 2009) and determined that there would be:

- no direct or indirect loss of island platform or major reef habitats (primary features);
- less than 1% permanent direct loss to secondary features (uncharted raised pavement or low relief reef);
- temporary losses to other habitats (sand, sandy gravel and limestone pavement) dominated by microphytobenthos, with occasional patchily distributed macroalgae, seagrass and benthic invertebrates would be temporary;
- change in habitat as rock stabilisation creates a habitat favoured by species associated with low relief reef habitat instead of soft seabed.

Under EAG N0.3 the area that would be impacted by the proposed pipeline fits with category D which is defined as "non designated areas – general coastal waters other than categories A, B, C, E and F". The cumulative loss guideline for category D is 5% of BPPH. Therefore the proposal is well within the guideline. The EPA notes that the proponent has designed the proposal to minimise damage/loss to BPPH and has developed management procedures with the objective of protecting and maintaining ecological integrity.

The EPA considers that the proponent's proposed separation buffers are key aspects for management of impacts and are critical to meeting the EPA's objective for this factor. Therefore the EPA has included a requirement for the specified separation distances in recommended condition 7.

Impacts on marine fauna

The EPA notes that results of turtle nesting surveys in 2005 and 2009 indicate that Urala Beach in the vicinity of the shore crossing supports a very low level of turtle breeding activity, although individuals may be occasionally present offshore from the shore crossing. No evidence of nesting turtles was found at the shore crossing location during four surveys over three nesting seasons. Overall, evidence suggests that the Urala coastline is a marginal rookery supporting occasional very low nesting by flatback turtles. Anecdotal comments by local residents suggests that occasional low level green or loggerhead nesting may also have occurred in the past although there is no scientific evidence (Pendoley, 2009).

Although there are regionally important turtle rookeries at Ningaloo, the Muiron Islands and Serrier Island, offshore construction activities would not pass closer than 4 km to these

regionally important rookeries. This distance is considerably greater than the 1.5 km radius referred to in Environmental Assessment Guideline 5 (EPA, 2010) and the construction activities would be of short duration.

To ensure that there is no impact on turtles, the EPA has recommended a condition requiring a fauna observer to be present during the Urala shore crossing construction activities, if they occur in the flatback turtle nesting and hatching period, which is between 1 November and 30 April (EPA, 2010). If turtle nesting behaviours or hatchlings are observed, immediate action to prevent impacts is required by the condition.

Pipelay activities could overlap the humpback whale southward migration period, however recent studies cited by the proponent, indicate that cetaceans are not likely to be significantly impacted by the type of noise produced by the pipelay activities. It may induce avoidance behaviour and minor route alterations.

The potential for collision with whales during the construction phase is low due to the slow nature of the pipelay activity which involves 3 to 4 km movement per day. A few dugongs may be present during pipeline construction but these are also expected to exhibit avoidance behavior.

Summary

Having particular regard to:

- the proponent's management of risk of introduction of marine pests;
- the low oil spill risk;
- the estimated impact on BPPH; and
- the proponent's management of risk to turtle breeding;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that condition 5 relating to introduced marine pests, condition 7 relating BPPH, and condition 6 relating to turtle breeding are implemented.

4.2 Terrestrial flora and fauna

Description

Vegetation and Flora

The main impact of the project on flora and vegetation would be clearing for the gas plant and access road (permanent for the life of the project) and largely temporary clearing for the pipeline. The total area cleared would be approximately 516 ha. Of this, the plant site, construction camp and connecting road would require 105 ha of clearing, the access road 120 ha, communications and utilities 6 ha and the sales gas pipeline approximately 225 ha.

The width of clearing for the pipeline would be approximately 30m within a 60m corridor running parallel to the Onslow Road. A small amount of additional clearing would be required for access points. The majority of this area would be rehabilitated following construction; however, an access track would remain as required by the Department of Mines and Petroleum (DMP) for inspection and maintenance purposes.

Vegetation types found in the area include:

- *Acacia coriacea* shrubland over *Triodia* hummock grassland dominated the near-coastal habitats;

- Tecticornia clay pans characterised large parts of the northern section of the survey area;
- other parts in the northern section were characterised by Mesquite (Prosopis spp.) tall shrublands;
- other parts in the northern section were also characterised by *Acacia* spp. (*Acacia pyrifolia, Acacia ancistrocarpa, Acacia synchronicia, Acacia sclerosperma, Acacia inaequilatera, Acacia tetragonophylla)* shrublands over *Triodia* hummock grasslands on plains and gentle slopes; and
- inland dunes typically supported *Eucalyptus*, *Corymbia* or *Hakea* scattered low trees or *Grevillea* shrublands over *Triodia* hummock grasslands.

Vegetation condition ranged from Excellent in very few areas such as the limestone dune in the proposed plant area, *Tecticornia* clay pans in the northern part of the survey area and some plains in the southern survey area, to Very Poor / Completely Degraded in areas of mesquite invasion. Many areas of light textured soils in the northern part of the Project Area, including sandy plains and sand dunes, were dominated by Buffel (*Cenchrus ciliaris*), which reduced the condition rating. Similarly, some areas were grazed by cattle, which impacted on vegetation condition.

A review of the flora databases confirmed that there are no records of Threatened Flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Ten Priority species listed under the *Wildlife Conservation Act 1955* are recorded within 50 km of the proposal, but no Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) are recorded.

Dry and wet season surveys of the plant site and pipeline routes were undertaken in 2008 and 2009. Three hundred and ten (310) taxa were recorded during the surveys, which is consistent with an area of this size and for the number of habitats represented.

No listed Threatened Flora species (EPBC) or Declared Rare Flora, Priority species or TECs under the *Wildlife Conservation Act 1950* were located in the project area.

The Declared Plants Database (Department of Agriculture and Food, 2008) lists 83 declared weeds which have the potential to occur within the Shire of Ashburton. Field surveys of the project area recorded ten weed species. Mesquite (*Prosopis* spp.) is the subject of current control/eradication measures within the project area and would be the focus of weed management activities. The proponent's Vegetation Management Procedure will target:

- eradication of targeted weed species within the disturbed area during construction;
- prevention of relocation of propagules carried on vehicles and cleared vegetation; and
- prevention of the establishment of Declared weeds in areas subject to rehabilitation.

Fauna

The project area lies within the Cape Range subregion of the Pilbara Bioregion, and the landscape and vegetation are typical of this region. Most of the pipeline route follows an existing gas pipeline and traverses sandy and spinifex plains with minor and major watercourses. The only major watercourse crossed by the proposed route is the Ashburton River where an existing road crossing and weir already change the water flow.

The fauna survey conducted over the project area recorded two native terrestrial mammal species, one introduced mammal species, fifty two bird species and nine reptile species within the survey area. On the basis of a database and literature review, the project area may support 415 vertebrate species (excluding vagrants): 11 freshwater fish, 6 frogs, 82 reptiles, 194 birds and 42 mammals.

This database search indicates that the fauna could potentially include 66 species of conservation significance occurring in the study area. Of these, 43 are of high significance (Conservation Significance Level 1), being listed under legislation, 10 are of moderate conservation significance (Conservation Significance Level 2), being listed as priority species by the Department of Environment and Conservation, and 13 are of local significance (Conservation Significance Level 3), because they have restricted distributions.

Significant species identified in the desktop assessment as potentially occurring at the plant site or in the linear infrastructure corridor include several that can be found by searching for evidence of their activities. These include the Bilby (*Macrotis lagotis*; burrows, tracks and foraging excavations), Mulgara (*Dasycercus cristicauda*; burrows), Pebble-mound Mouse (*Pseudomys chapmani*; mounds) and Saltwater Crocodile (*Crocodylus porosus*; tracks and slides on riverbank). The presence of the Saltwater Crocodile would be rare at this latitude.

A number of listed species of reptile (including the saltwater crocodile) and birds were recorded, but no listed mammals were observed and for most species suitable habitat was not present within the area of disturbance.

No short range endemic species or subterranean fauna were encountered.

Fauna surveys identified evidence of introduced fauna such as the common house mouse and goat. Feral cat and wild dog tracks were also identified.

Fauna habitats present in the project area generally widespread, while the area of project impact is small, particularly in respect to the infrastructure corridor. Some of the habitats are of significant value to fauna:

- The coastal dunes support a number of reptile species with restricted distributions.
- Tall sand-dunes with complex vegetation and termitaria (termite mounds) are likely to support a rich fauna. Termitaria often support a range of reptile species.
- The Ashburton River and marshes support a range of waterbird species, including some listed as migratory, although only small numbers have been observed.

The proponent considers that impacts on these significant habitats would be low because areas of impact would be small and largely temporary. The plant site is partly located on/adjacent to a salt marsh but in an area of low value for waterbirds, as it is well inland and rarely inundated by tides.

The main management issue is the trapping of fauna in the pipeline trench. The extensive trenching required for the installation of the wet gas and sales gas pipelines (approximately 100 km in total) has the potential to result in the trapping of a range of terrestrial vertebrate fauna, in particular reptiles and small marsupials during the period when it is open.

Assessment

The EPA's environmental objective for this factor is to:

- Maintain the abundance, species diversity, geographic distribution and productivity flora and fauna.

The EPA notes that the total area of clearing would be 516 hectares and that over half of this is for construction of the wet gas and sales gas pipelines. These pipelines require a clearing width of 30m. On completion, the majority of the pipeline area would be rehabilitated, however an access track would remain as required by the Department of Mines and Petroleum for inspection and maintenance purposes.

The flora and vegetation surveys were undertaken in accordance with the EPA's Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia (EPA, 2004) and EPA Position Statement 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002) at Level 1 detail. It was found that:

- vegetation associations present within the proposal area are well represented at other locations but not necessarily in secure conservation reserves;
- no Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) were identified; and
- no Declared Rare Flora or Priority flora were identified.

The EPA is also aware that the proponent has committed to the establishment of a $60,000 Mount Minnie/ Cane River Conservation Park Trust Fund with the intent of offsetting residual impacts attributed to the installation and ongoing maintenance of the domestic gas pipeline on the former Mt Minnie Pastoral Lease (proposed extension to Cane River Conservation Park and currently managed by DEC).

On this basis the EPA considers that its objective for flora and vegetation can be met provided there is adequate rehabilitation at the earliest opportunity. The EPA has recommended condition 8 for management of rehabilitation.

The EPA notes that fauna surveys were carried out in accordance with Guidance Statement 56: Terrestrial Fauna Surveys for Environmental Impact Assessments in Western Australia (EPA, 2004) and Position Statement 3 (EPA, 2002). The field survey was an extended site inspection targeting scheduled and priority species (Level 1 with elements of Level 2)

The database search indicated that the fauna could potentially include 66 species of conservation significance occurring in the study area (43 of high significance being listed under legislation, 10 are of moderate conservation being listed as priority species by the Department of Environment and Conservation, and 13 are of local significance because they have restricted distributions). No short range endemic species or subterranean fauna were encountered.

The EPA has taken the linear nature of clearing for much of the project into consideration. The footprint is largely temporary, passing through widespread landscape lacking in unusual habitat features. The proponent has designed the proposal to avoid alteration of surface water flows so as not to impact on ecosystems.

The EPA considers that the primary risk to fauna is the potential for mortality of either rare or common species if they become trapped in open trenches during pipeline construction. Accordingly, the EPA has recommended condition 9 relating to management of this risk to fauna.

Summary

Having particular regard to the indications that:

- no DRF, Priority flora, TECs, PECs or vegetation associations that are under-represented at other locations were identified in the proposal area;
- the landscape is widespread lacking unusual habitat features; and
- the risk of fauna mortality due to open trenches can be managed;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that condition 8 relating to rehabilitation and condition 9 relating to management of risk to fauna from open trenches, are implemented.

4.3 Atmospheric emissions (including greenhouse gases)

Description

Air Quality

The key pollutant of concern for the proposal is oxides of nitrogen (NO_x) which in normal operations is predominantly associated with the sales and wet gas compressors. The proposal includes the installation of low NO_x burners on the gas turbine powered compressors. A wide operating envelope has been assumed for the gas compressors to allow for foreseeable changes in the required operating pressure of the DBNG pipeline over the life of the project.

Oxides of nitrogen would also be emitted from the flares and vehicle emissions.

The proponent modelled ground level concentrations (GLC) of NO_x, carbon monoxide (CO) and volatile organic compounds (VOC) using the Ausplume dispersion model. The height of the emission sources ranged from 1m (ground flare) to 21m (wet gas turbine). Maximum ground level concentrations occurred close to the emission sources (at approximately 1 km). Maximum modelled concentrations anywhere are shown in Table 2 and compared with the National Environment Protection Measure (NEPM) standard.

Table 3 Maximum modelled concentrations (µg/m^3) compared to NEPM standards

Pollutant	Averaging Period	Maximum modelled GLC	NEPM Standard
NO_2	Annual mean	3.1 µg/m$^{3\,\#}$	61 µg/m^3
	Hourly	100 µg/m$^{3\,\#}$	246 µg/m^3
CO	8 Hourly	0.04 mg/m^3	10 mg/m^3
	1 Hourly	0.13 mg/m^3	30 mg/m^3
VOC	Yearly	0.28 µg/m^3	50 µg/m3 formaldehyde*
	Yearly	0.72 µg/m^3	9 µg/m^3 benzene*

 # Modelling conservatively assumed that sufficient ozone was present in the atmosphere to convert all NO to NO_2.

*** Modelling conservatively considered all VOC as either formaldehyde or benzene for the sake of comparison with the NEPM criteria; whereas these pollutants are typically less the 10% of total VOCs emitted.**

The predicted maximum GLCs shown in Table 3 are in open country without residences, within the proposed lease boundary. At the nearest camping or recreational areas the predicted maximum hourly NO_2 GLCs are less than 50 µg/m^3. Onslow and the Urala Station homestead are beyond the maximum domain distance limit (10 kilometres) of the Ausplume model. Onslow is 5 kilometres to the north east of the model domain boundary and Urala Station homestead is approximately 9 kilometres to the west. On the basis of the predicted GLCs at the boundary the proponent conservatively estimated that the maximum hourly NO_2 GLCs would be less than 40 µg/m^3 at Onslow and considerably less at Urala. Annual average GLCs of NO_2 would be less than 1 µg/m^3 at both locations.

Greenhouse gas

Greenhouse gas (GHG) emissions primarily derive from the gas turbines for power generation and gas compression, with small amounts from maintenance and flaring. The raw gas contains only trace amounts of carbon dioxide and sulphur. The carbon dioxide would not be extracted. The sulphur is likely to be removed by the mercury guard bed.

In order to minimise GHG emissions the flare configuration has been designed for low NO_x emission levels. Waste heat would be recovered from the sales gas compressor turbine exhausts for reuse in regeneration of the silica bed.

GHG emissions would vary over the life of the project in line with the production profile. Early in the gas field life, wet gas compression would not be required and carbon dioxide equivalent (CO_2-e) emissions would be in the order of 85,000 tonnes per annum. After four years, wet gas compression would be required and in the order of 180,000 tonnes CO_2-e per annum would be emitted from year five to ten. From year ten until the end of the field life (year 20) CO_2-e emissions would gradually reduce to zero. This production profile is for the high reserves case. If the gas reserves are lower, gas compression would start earlier (year 2 or 3) and the overall GHG emission for the total field life would be lower. The addition of third party gas to the proposal would increase emissions in the order of 25,000 tonnes CO_2-e per annum

The CO_2-e emissions described above account for a number of GHG contributors. Annual NO_x emissions are anticipated to track CO_2 emissions starting around 135 tonnes NO_x per year, then increasing to 240 from year five to ten, followed by a gradual decrease to zero.

Other minor gas emissions are sulphur dioxide, carbon monoxide, particulates/smoke, methane and other VOCs.

Assessment

The EPA's environmental objective for this factor is to:

- ensure that gaseous emissions, both individually and cumulatively, meet appropriate criteria and do not cause an environmental or a human health problem; and
- use all reasonable and practicable measures to minimise the discharge of gaseous emissions.

The EPA notes that the proponent has used the Ausplume dispersion model to predict GLCs of the key pollutants and that the most significant impact is predicted to be from NOx. Predicted carbon monoxide and VOC levels are very low.

Although the use of the Ausplume model does not account for the Thermal Internal Boundary Layer (TIBL) or for complex terrain, the EPA considers its use appropriate in this case. The TIBL is a coastal phenomenon that occurs as the sea breeze comes onshore, and the EPA considers that the proposal location is far enough inland for it not to be an issue. Also, the EPA has noted that a high degree of conservatism was used in the application of the Ausplume model. For NO_x it is noteworthy that:

- the terrain was assumed to be flat whereas it actually falls away towards the coast;
- all NO_x was assumed to be NO_2 (the NEPM standard) which is unlikely; and
- as the maximum Ausplume model domain boundary fell well short of Onslow and Urala Station homestead, and the predicted NO_2 GLCs at the model domain boundaries were small in comparison to the NEPM standard, conservative estimations (extrapolations) of the possible worst case NO_2 levels at Onslow and Urala were made.

On this basis it was estimated that the maximum hourly NO_2 GLCs would be less than 40 $\mu g/m^3$ at Onslow and considerably less at Urala, and the annual average NO_2 would be less than 1 $\mu g/m^3$ at both locations. This is 16% of the hourly NEPM and less than 2% of the annual NEPM. Similarly, maximum hourly GLCs for NO_2 at nearby camping/recreation spots were all less than 20% of the NEPM.

Although the proponent did not consider the cumulative impact of all NO_x emissions from the proposed Ashburton North strategic industrial area, the EPA is aware of TAPM model predictions by Chevron for the total strategic industrial area which includes Chevron's Wheatstone LNG proposal plus a hypothetical additional gas processing facility and a Domgas facility. The predicted maximum cumulative NO_2 ground level concentration at Onslow was 21% (hourly average) and 2% (annual average) of the NEPM criteria. These figures are indicative only as the emission rates were assumed based on limited knowledge of plant capacities other than Wheatstone. Also, at this stage the second LNG facility is only a possibility, with no definite proposal in process.

With regard to GHG emissions, the EPA notes that whilst the annual emission rate would vary according to the production profile (that is, gas compression would not be required initially, but would be required as the reservoir pressure reduces until a point is reached where gas production and hence compression diminishes to zero) the average annual GHG emission over the operating life of the facility would be 115,000 tonnes of CO_2-e.

The EPA notes that the proponent has incorporated the following energy efficiency initiatives in the plant design:

- waste heat from the sales gas turbine exhausts will be recovered for reuse in the process; and
- the length of the feed and sales gas pipelines has been minimised consistent with other environmental considerations.

The EPA notes that the proponent has committed to further consider, at the Front End Engineering phase, GHG efficiency measures in the plant design and to bench mark the project GHG efficiency against comparable projects. The EPA has recommended condition 10 in relation to management of GHG emissions.

The EPA also notes that the raw produced gas contains only trace amounts of carbon dioxide which would not be removed by the process. The gas would be supplied into the DBNGP to supply the domestic market. In this regard, the EPA reiterates that it has distinct preference for the use of natural gas over coal in the production of power in Western Australia and therefore welcomes an increase in the availability of natural gas.

Summary

Having particular regard to:

- the predicted air quality being well within NEPM criteria in Onslow, Urala and at popular camping and recreation spots; and
- the proponent's management actions and design features;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that condition 10 and 11 are implemented.

4.4 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by BHP Billiton Petroleum Pty Ltd to construct a subsea pipeline, onshore gas treatment and compression plant and sales gas pipeline is approved for implementation. These conditions are presented in Appendix 2.

In developing these conditions the EPA consulted with the proponent, Department of Fisheries and Department of Environment and Conservation in respect to matters of fact and matters of technical or implementation significance. Minor changes, which did not change the intent or scope, were made to conditions 6, 7, 8, 10 and 11.

5. Other Advice

The EPA is strongly supportive of undertaking strategic assessments in a regional context prior to assessing individual projects. The Macedon Gas Project is located in the proposed Ashburton North Strategic Industrial Area (SIA) and the EPA is of the view that it would have been preferable to consider the cumulative impacts of the Ashburton North SIA prior to assessing the Macedon proposal.

The first proposals for development in the SIA, the Macedon Gas Project and the Wheatstone Project are now at an advanced stage of development and, in the absence of a strategic assessment, the EPA will consider cumulative air quality and footprint impacts of the SIA when assessing Chevron's Wheatstone Project. The Wheatstone Project is the largest project currently under consideration for the Ashburton North SIA and is considered to be the foundation industry.

The Wheatstone assessment will therefore include assessment of cumulative impacts associated with the:

- Macedon Gas Project;

- Wheatstone Project (25 MTPA LNG plant, pipelines and port);
- Scarborough Project[1] (anticipated 6 MTPA LNG plant, possibly with additional tanker berth and offshore infrastructure); and
- existing activities in the vicinity.

The EPA considers that the impacts of the Macedon Gas Development are small in comparison to those of the proposed SIA and unlikely to be critical in the cumulative impact assessment.

6. Conclusions

The EPA has considered the proposal by BHP Billiton Petroleum Pty Ltd to construct a subsea pipeline, onshore gas treatment and compression plant and sales gas pipeline in the Shire of Ashburton.

The EPA notes that:

- the risk of introduction of marine pests can be managed;
- the oil spill risk is low;
- the estimated cumulative loss of benthic primary producer habitat from the marine pipeline construction is significantly less than the EPA guidelines;
- the risk to turtles and whales is low and can be managed;
- no conservation significant flora or vegetation associations that are under-represented at other locations were identified in the proposal area;
- no unusual habitat features were noted in the proposal area;
- the risk of fauna mortality due to open pipeline trenches during construction can be managed;
- the predicted air quality is well within NEPM standards in Onslow, Urala and at popular camping and recreation spots; and
- GHG efficiency design features have been included in the proposal.

The EPA has therefore concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2.

7. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is to construct a subsea pipeline, onshore gas treatment and compression plant and sales gas pipeline in the Shire of Ashburton;

2. That the Minister considers the report on the key environmental factors as set out in Section 3;

3. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

[1] The Scarborough Project is conceptual only and has not been referred to the EPA.

Appendix 1

References

Astron Environmental Services (2010) *BHPB Macedon Gas Project Flora and Vegetation Survey (Phases 1 and 2)*, report dated April 2009.

BHP Billiton (2010a) *Macedon Gas Project Environmental Protection Statement July 2010* Final.

BHP Billiton (2010b) *Macedon Project Introduced Marine Pests Management Procedure*

Environmental Protection Authority (2002) *EPA Position Statement 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection*.

Environmental Protection Authority (2004a) *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia.*

Environmental Protection Authority (2004b) *Guidance Statement 56: Terrestrial Fauna Surveys for Environmental Impact Assessments in Western Australia.*

Environmental Protection Authority (2009) *EAG 3 Environmental Assessment Guidelines for Protection of Benthic Primary Producer Habitat in Western Australia's marine Environment*.

Environmental Protection Authority (2010) *EAG 5 Environmental Assessment Guidelines for Protecting Marine Turtles from Light.*

Pendoley Environmental Pty Ltd (2009) *Urala Coastline Marine Turtle Habitat Usage*.

URS (2009a) *Fauna Assessment BHP Billiton Pty Ltd Macedon Gas Development Terrestrial Plant Site and Linear Infrastructure Corridor*. Report prepared by MJ ans AR Bamford Consulting Ecologists, 4 January 2009.

URS (2009b) BHP Billiton Pty Ltd *Macedon Gas Development Air Quality Screening Assessment*, report dated 5 May 2010

URS (2009c) *Macedon Gas Development Assessment of Shore Crossing Construction on Sea Turtles*, report dated 26 June 2009.

URS (2009d) Macedon Gas Development *Subtidal Marine Ecology Survey, report dated 26 March 2010*

Appendix 2

Identified Decision-making Authorities
and
Recommended Environmental Conditions

Identified Decision-making Authorities

Section 44(2) of the *Environmental Protection Act 1986* (EP Act) specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
Minister for Water	*Rights in Water and Irrigation Act 1914*
Minister for Mines and Petroleum	*Petroleum Pipelines Act 1969*
Minister for Lands	*Land Administration Act 1997*
Department of Environment and Conservation	*Wildlife Conservation Act 1950*
CEO, Shire of Ashburton	s162 *Planning and Development Act* 2005 planning approval
Director General, Department of Mines and Petroleum	*Dangerous Goods Safety Act 2004*
Director General, Department of Environment and Conservation	*Environmental Protection Act 1986*) Works Approval and Licence

Recommended Environmental Conditions

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

MACEDON GAS DEVELOPMENT
SHIRE OF ASHBURTON

Proposal: The proposal is to construct and operate a subsea pipeline, onshore gas treatment and compression plant, and sales gas pipeline. The subsea pipeline from the Macedon Gas Field (100 kilometres west of Onslow) connects to the onshore gas treatment and compression plant at Ashburton North (15 kilometres southwest of Onslow). The sales gas pipeline connects the onshore facility to the Dampier to Bunbury Natural Gas (DBNG) Pipeline.

The proposal is further documented in schedule 1 of this statement.

Proponent: BHP Billiton Petroleum Pty Ltd

Proponent Address: Central Park, 152-158 St Georges Terrace
PERTH WA 6000

Assessment Number: 1838

Report of the Environmental Protection Authority: Report 1360

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Office of the Environmental Protection Authority of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the Chief Executive Officer of the Office of the Environmental Protection Authority with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.

4-2 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

1 the frequency of compliance reporting;

2 the approach and timing of compliance assessments;

3 the retention of compliance assessments;

4 the method of reporting of potential non-compliances and corrective actions taken;

5 the table of contents of compliance assessment reports; and

6 public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the Chief Executive Officer of the Office of the Environmental Protection Authority.

4-5 The proponent shall advise the Chief Executive Officer of the Office of the Environmental Protection Authority of any potential non-compliance within seven days of that non-compliance being known.

4-6 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the first compliance assessment report fifteen months from the date of issue of this Statement addressing the twelve month period from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

1 be endorsed by the proponent's Managing Director or a person delegated to sign on the Managing Director's behalf;

2 include a statement as to whether the proponent has complied with the conditions;

3 identify all potential non-compliances and describe corrective and preventative actions taken;

4 be made publicly available in accordance with the approved compliance assessment plan; and

5 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Non-Indigenous Marine Species

5-1 Prior to mobilisation of vessels and submersible equipment for the construction of the Macedon Gas Project marine pipeline and umbilical, the proponent shall update the Introduced Marine Pest Management Procedure contained in Appendix Q of the Macedon Gas Project Environmental Protection Statement (BHPBilliton, May 2010) to be consistent with the Commonwealth and State guidelines applicable at that time, to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice from the Department of Fisheries.

5-2 The proponent shall implement the updated Introduced Marine Pest Management Procedure for the construction and maintenance of the Macedon Gas Project marine pipeline and umbilical.

6 Marine Fauna

6-1 The proponent shall not impact on the health of turtles, disrupt turtle nesting behaviour or cause a change to hatchling orientation in waters and/or beaches adjacent the pipeline shore crossing during construction.

6-2 If the pipeline shore crossing is to take place between 1 November and 30 April the proponent shall prepare a marine turtle impacts management protocol to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice from the Department of Environment and Conservation prior to undertaking the shore crossing. The protocol shall include:

1. employment of a suitably qualified marine fauna observer;
2. indicators for determining if and when there is potential for impacts on turtle nesting or hatchling emergence;
3. management responses to evidence of turtle activity; and
4. triggers for stopping construction activities pending further consultation with the Department of Environment and Conservation; and
5. when resumption of activities can take place, on advice of the Department of Environment and Conservation.

6-3 The proponent shall implement the marine turtle impacts management protocol if undertaking the pipeline shore crossing between 1 November and 30 April.

7 Benthic Primary Producer Habitat

7-1 The proponent shall undertake all works in a manner that ensures that the loss of Benthic Primary Producer Habitat within the Local Assessment Area, as defined in Figure 3, does not exceed 1% for any habitat type and is minimised by maintaining the following separation distances during construction during construction of the marine pipeline and umbilical :

(1) pipeline to primary feature – 700 metres;
(2) pipeline to secondary feature – 600 metres;
(3) vessel movement/anchor to primary feature – 200 metres; and
(4) vessel movement/anchor to secondary feature – 100 metres.

Note: “loss” is loss that does not recover within 5 years, “primary feature” and “secondary feature” are as defined in Figure 18 of the Macedon Gas Project Environmental Protection Statement (BHPBilliton, May 2010).

7-2 The proponent shall monitor the direct loss of Benthic Primary Producer Habitat against the criteria in condition 7-1 starting within one month of completion of the marine pipeline and umbilical.

7-3 Notwithstanding condition 7-1, if monitoring detects that construction activities have contributed to a loss of greater than 1% in any habitat type within the management unit, as defined in Figure 3, the proponent shall notify the CEO of the Office of the Office of the Environmental Protection Authority of the strategies to be implemented to enhance recovery and rehabilitate the impacted Benthic Primary Producer Habitat.

8 Terrestrial Vegetation

8-1 Within two months following completion of construction of the gas plant and associated pipelines, the proponent shall commence rehabilitation of the temporarily cleared areas of the site that are no longer being utilised to achieve re-establishment of vegetation, such that the following criteria are met across the distribution of the disturbance footprint within three years of commencement of rehabilitation:

(1) Species diversity is not less than 60 percent of the known original species diversity;

(2) Weed coverage is equal to or less than that of pre-cleared levels.

Note: The original species diversity and weed coverage must be determined prior to clearing or from analogue sites approved by the CEO of the Office of the Environmental Protection Authority on advice from the Department of Environment and Conservation.

8-2 In liaison with the Department of Environment and Conservation, the proponent shall monitor progressively the performance of rehabilitation for a range of sites against the criteria in condition 8-1 based on appropriately timed surveys after rain, until the completion criteria are met. The surveys shall be conducted annually unless otherwise agreed by the CEO of the Office of the Environmental Protection Authority.

8-3 The proponent shall include a rehabilitation monitoring report in the compliance assessment report referred to in condition 4-6 commencing from the date rehabilitation was commenced. The report shall address in the report the following:

1. The progress made towards meeting the criteria required by condition 8-1; and

2. Contingency management measures in the event that the criteria required by condition 8-1 are unlikely to be met.

9 Terrestrial Fauna

9-1 The proponent shall prevent the death of fauna that becomes entrapped in the onshore pipeline trenches by employing “fauna clearing people” to remove trapped fauna from any open pipeline trench. The “fauna clearing people” shall be able to demonstrate suitable experience to obtain a fauna handling licence from the Department of Environment and Conservation.

9-2 The length of open trenches shall not exceed a length capable of being inspected and cleared by “fauna clearing people” within the time frame specified in condition 9-4.

9-3 Fauna refuges providing suitable shelter from the sun and predators for trapped fauna shall be placed in the trench at intervals not exceeding 50 metres.

9.4 Inspection and clearing of fauna from trenches by “fauna clearing people” shall occur twice daily and not more than half an hour prior to the backfilling of trenches, with the first daily inspection and clearing to be undertaken no later than 3.5 hours after sunrise, and the second inspection and clearing to be undertaken daily between the hours of 3:00 pm and 6:00 pm.

9-5 In the event of rainfall, the proponent shall, following the clearing of fauna from the trench, pump out significant pooled water in the open trench (with the exception of groundwater) and discharge it to adjacent vegetated areas in a manner that does not cause erosion.

Note: "Significant pooled water" is pooled water that would prevent survival of fauna between fauna clearing events.

10 Emissions to Air

10-1 The proponent shall install equipment and manage ongoing operations such that best practice for a petroleum gas/condensate facility in respect to volatile organic compounds and oxides of nitrogen emissions is achieved.

Note: Best practice is as defined in Environmental Protection Authority Guidance Statement No. 55 *Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process*.

10-2 The proponent must provide a report showing the basis on which 'best practice' was determined, to the satisfaction of the CEO of the Office of the Environmental Protection Authority, prior to applying for a Works Approval under Part V of the *Environmental Protection Act 1986.*

11 Greenhouse Gas Abatement

11-1 For the life of the project, the proponent shall include in the environmental compliance reports referred to in Condition 4 the following:

1. annual greenhouse gas emissions and intensity resulting from the operation of the project in comparison to the annual emissions predicted in the Macedon Gas Project Environmental Protection Statement June 2010 and reasons for any variance;

2. details of improvements in equipment, technology or procedures investigated by the proponent that would reduce greenhouse gas emissions; and

3. details of improvements in equipment, technology or procedures implemented by the proponent that will reduce greenhouse gas emissions.

12 Decommissioning

12-1 At least six months prior to the anticipated date of closure, the proponent shall submit a Final Decommissioning Plan designed to ensure that the site is suitable for future land uses, for approval of the Chief Executive Officer of the Office of the Environmental Protection Authority. The Final Decommissioning Plan shall set out procedures and measures for:

1. removal or, if appropriate, retention of plant and infrastructure; and

2. remediation or rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s).

12-2 The proponent shall implement the Final Decommissioning Plan required by condition 12-1 from the date of closure until such time as the Minister for

Environment determines, on advice of the CEO of the Office of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

12-3 The proponent shall make the Final Decommissioning Plan required by condition 12-1 publicly available in a manner approved by the CEO of the Office of the Environmental Protection Authority.

Notes

1. Where a condition states "on advice of the Office of the Environmental Protection Authority", the Office of the Environmental Protection Authority will provide that advice to the proponent.

2. The Office of the Environmental Protection Authority may seek advice from other agencies or organisations, as required.

3. The Minister for Environment will determine any dispute between the proponent and the Office of the Environmental Protection Authority over the fulfilment of the requirements of the conditions.

4. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1838)

The proposal is to construct a subsea pipeline, onshore gas treatment and compression plant, and sales gas pipeline. The subsea pipeline from the Macedon Gas Field (100 kilometres west of Onslow) connects to the onshore gas treatment and compression plant at Ashburton North (15 kilometres southwest of Onslow). The sales gas pipeline connects the onshore facility to the Dampier to Bunbury Natural Gas (DBNG) Pipeline.

The location of the various project components is shown in Figures 1, 2 and 3.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in sections xx to xxx of the project referral document, *Macedon Gas Project Environmental Protection Statement*, prepared by BHP Billiton, Perth, Western Australia (November 2010).

Table 1: Summary of Key Proposal Characteristics

Element	Description
Offshore wet gas pipeline and umbilical	Subsea pipeline and umbilical avoiding all marine reserves, islands and named reef structures with a shore crossing at Urala.
Shore crossing	Urala Station adjacent to Griffin Gas Project shore crossing. Construction using coffer dam/ open trench method at shore and horizontal directional drilling through the sand dunes.
Onshore wet gas pipeline and umbilical	15 kilometre buried pipeline and umbilical, crossing the Ashburton River at the Griffin pipeline location.
Plant location	Ashburton North approximately 15 kilometres south east of Onslow on the Urala pastoral lease.
Production - gas - condensate	Single train, 200 million standard cubic feet per day. 250-3200 litres per day
Sales gas pipeline	67 kilometre 500mm diameter buried pipeline from the plant to Onslow Rd and then parallel to Onslow Rd to the Dampier Bunbury Natural Gas Pipeline
Condensate storage and transport	Bunded 80 cubic metre tank with approximately monthly transport by road tanker to Perth or Dampier.
Pressure relief and blowdown	Low pressure and high pressure ground-flares
Water of condensation (WoC) and produced formation water (PFW)	Small volume of WoC and up to 160 cubic metres per day of PFW toward the end of the well life.

Element	Description
Waste water disposal	Onsite evaporation pond
Power supply	Primary supply from gas turbine generators,. Standby supply from diesel powered generator.
Water supply	From deep groundwater aquifer (Birdrong formation) for construction and operations. Desalination for potable water supply.
Vegetation clearing	Total - up to 516 hectares <u>Indicative components</u> Wet gas pipeline - 60 hectares (15km x 30m) Access road - 120 hectares (13km x 80m) Plant site - 105 hectares Communications/utilities – 6 hectares (2km x 30m) Sales gas pipeline – 225 hectares (67km x typically 30m)

Figures

Figure 1 Location plan (see figure 1 above)
Figure 2 Offshore pipeline and umbilical route and shore crossing (see figure 2 above)
Figure 3 BPPH local assessment areas and pipeline lengths (see figure 3 above)