Appendix A Environmental Identification (ENVID) Summary

A.1 INTRODUCTION

A.1.1 Background

In March 2017, the Onslow Marine Support Base (OMSB) project team held an Environmental Issues Identification workshop (ENVID) to identify and then evaluate the potential environmental risks associated with construction (phase 2) and operation of the Onslow Marine Support Base.

An ENVID is an early and important step in any project, as it allows for identification of:

- Potential environmental fatal flaws (i.e. unacceptable environmental risks);
- Environmental risks that require further information to adequately assess impact; and/or
- Environmental risks that will require specific monitoring and management to ensure that the risks are effectively mitigated.

In addition to identification of environmental risks, the ENVID was used as an early evaluation and screening tool to determine the aspects or activities of the project (if any) which pose a significant risk of compromising the Environmental Objectives for each of the Environmental Protection Authority's (EPA) environmental factors.

A.1.2 Purpose

This document provides a summary of the ENVID process that was undertaken to review and identify the proposal activities that pose a significant risk of compromising the Environmental Objectives for each of the EPA's environmental factors.

A.2 ENVID PROCESS

A.2.1 Overview

The ENVID was undertaken in two key stages:

1. Initial population of an environment risk assessment template based on desktop review of available information and preliminary survey findings;
2. An ENVID workshop to review and evaluate the risks of specific project activities impacting on the environment; and
3. A subsequent review of residual risks considering outcomes of further investigations.

The primary aims of the OMSB ENVID were to:

a) To collectively review, evaluate and align on environmental risks;
b) Rationalise reasonable monitoring and management proposed to be implemented; and
c) Identify whether any gaps, further investigations and/or additional approvals are required.

A.2.2 Participants

The organisations that were invited to participate in the ENVID, included key project team members, subject matter experts, construction contractors and key stakeholders. Participant organisation, roles and representatives are identified in **Table A-1**.

Table A-1 ENVID Participants

Organisation	Role	Representatives
OMSB	Proponent	Andrew Natta
Wallbridge Gilbert Aztec (WGA)	Engineering Design Consultants	Luke Campbell Will Bowyer
O2 Marine	Environmental Consultants	Travis Hurley Chris Lane
Hanley Consulting	Subject Matter Expert – Dredging Impacts	Russell Hanley
Baird Australia	Coastal Engineering Consultants	Jim Churchill
Maritime Constructions	Dredging/Construction Contractor	Imran Lambay
Department of Transport	Stakeholder - Beadon Creek Maritime Facility	Lucya Roncevich

A.2.3 Risk Assessment

The ENVID involved a risk assessment being undertaken for specific project activities (i.e. 'Stressors') in respect to the EPA's environmental factors. The risk assessment utilised the Risk Matrix[1] shown in **Figure A-1**. This matrix evaluates the risk rating as a combination of the consequence of an impact, and the likelihood of that consequence occurring. The risk evaluation includes identification and description of the project specific stressors, description of the environmental setting relevant to each stressor and identification of proposed management and mitigation.

During the ENVID, each of the pre-populated stressors was evaluated and any new stressors were also identified and evaluated. The evaluation enabled stressors to be categorised in terms of their relative importance or concern and subsequently determine which of those stressors warrant referral to the EPA. The evaluation also provides a basis for the identification of environmental priorities for monitoring, management and reporting.

Environmental Impacts		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Catastrophic
		Negligible impact to biota and ecosystems (less than 1 year). Negligible impact to cultural features	Minor impact (up to 1 year) to biota and ecosystems. Minor / repairable impacts to cultural features. Regulatory notice	Moderate impact (up to 2 years) to biota & ecosystems.Moderate impact to cultural features of low significance. Regulatory notice and investigation.	Major impacts (up to 10 years) to biota, ecosystems or environmental harm. Extensive impacts to cultural features of significance. Regulatory fine/prosecution and/or warning.	Significant impacts to biota, ecosystems or environmental harm - Impact Persistence >10 years. Impacts resulting in significant or total loss of cultural features of high significance and/or items of National Heritage Value. Loss of licence/prosecution and/or fine
LIKELIHOOD	**Almost Certain**	MOD	HIGH	HIGH	EXT	EXT
	Has occurred frequently at the location and in the Company. Almost certain to occur during the next year					
	Likely	MOD	MOD	HIGH	HIGH	EXT
	Has occurred frequently in the Company. Likely to occur in the next 2 years					
	Possible	LOW	MOD	HIGH	HIGH	HIGH
	Has occurred once or twice in the Company. May occur within 5 years					
	Unlikely	LOW	LOW	MOD	MOD	HIGH
	Has occurred in Industry but not in the Company. May occur within the next 10 to 20 years.					
	Rare	LOW	LOW	MOD	MOD	HIGH
	Almost unheard of in the Industry. May occur within the next 20 to 50 years					

Figure A-1 **Risk matrix[1] used for a risk-based approach to identification and significance assessment of project stressors which have the potential to effect environmental factors.**

[1] Risk Matrix was supplied by the Pilbara Ports Authority and adapted from the Port Hedland Marine Environmental Quality Management Plan (O2 Marine 2017).

A.3 ENVID RISK ASSESSMENT

The completed ENVID risk assessment is presented in **Table A-2**.

Table A-2 ENVID RISK ASSESSMENT

ITEM	ENVIRONMENTAL FACTOR	EPA OBJECTIVE	STRESSOR	DESCRIPTION	ENVIRONMENTAL SETTING	INITIAL RISK RATING			PREVENTATIVE/MITIGATIVE CONTROLS		RESIDUAL RISK RATING	SIGNIFICANCE
	EPA Environmental Factors	EPA Environmental Objectives	Identify Project stressors affecting Environmental Factors	Description of stressor	Existing Environment Description	Likelihood	Consequence	Risk Rating	Management	Monitoring	Risk Rating	Approvals
THEME: SEA												
1.1	Benthic Communities and Habitat	To protect benthic communities and habitats so that biological diversity and ecological integrity are maintained.	Direct removal of subtidal BPPH from Channel Dredging (17 ha)	Removal of BPPH located in the proposed channel route	Dive survey of Beadon Creek in 2003 determined the creek and surroundings were entirely sand habitat - no seagrass or macroalgae observed. Intertidal reef Offshore from Onslow the benthic habitat is predominantly bare sand with sparse Halophila spp. (<5%) or benthic primary producer habitat (BPPH) (Chevron 2013) Field Survey found low cover (1%) of mixed communities of predominantly filter feeders (i.e. sea pens, hydrozoans) with TA, MA, S, HC, SC and other benthic invertebrates. There were patches of limestone pavement where cover increased although no significant reefs identified.	Almost Certain	Insignificant	**Moderate**	BPPH Cumulative Loss Assessment for EPA approvals Bund construction engineered wall & competent contractor	Hydrographic surveys of dredged areas to ensure channel is within proposed boundaries Real-time monitoring of dredge position (lowers risk)	**Moderate**	Meets EPA Objective (with Management)
1.2			Indirect impact on subtidal BPPH from turbidity and sedimentation	Turbidity and sedimentation caused from resuspension of dredged material during dredging and loading can restrict photosynthetic activity and end in mortality for BPPH	Survey indicated slightly higher patchy cover of similar communities on limestone pavement approximately 1-1.5km to the East of the channel Mangrove/algal] habitat dewatering impacts	Likely	Insignificant	**Moderate**	Moderate size CSD Dredge Management Plan	Plume sketches Site photographs Remote imagery Aerial photography Consider requirement for telemetered water quality monitoring Comparison with CVX dredge sizes/volumes for benchmark	**Moderate**	Meets EPA Objective (with Management)
1.3			Indirect impact on intertidal BPPH from dewatering	Changes to intertidal habitats from dewatering activities, in particular the salinity or smothering during settlement pond wall failure, may cause indirect impacts on benthic habitats.	The proposed disposal location drains into supratidal samphire saltmarsh and upper intertidal algal mat and mangrove habitat.	Likely	Insignificant	**Moderate**	Control discharge Pipeline and positioning of discharge areas Dredge Management Plan	Monitor discharge water quality Environmental survey for pipeline route to discharge back into Beadon Creek	**Moderate**	Meets EPA Objective (with Management) - Considered less important as conditions likely to recover to normal following activities
1.4			Changes to hydrodynamics causes indirect modification of intertidal habitats	Intertidal habitats modified due to change in frequency and duration of tidal inundation, increased hard surfaces, land cover, decreased/increased water velocity	Depth of the channel will be modified, particularly around the turning circle. Mangroves predominantly occur in the upper creek. Sediment sampling indicates the dredge material provides a stable bank relatively resistant to erosion. Intertidal reef system on the opposite side of the bank adds stability.	Unlikely	Major	**Moderate**	Modelling changes to the hydrodynamics in Beadon Creek. Beadon Creek berth-pocket/turning circle slope design provides buffer for erosion	Aerial/site photography	**Moderate**	Meets EPA Objective (with Management) - Erosion of the Eastern bank of Beadon Creek raised as potential concern by the EPA during pre-referral meeting.

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2.1	Coastal Processes	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.	Changes to coastal and creek bank morphology as a result of deeper channel proposed.	Change to coastal processes, erosion of the Eastern bank in Beadon Creek	Evidence of accretion on the Western side of the training wall and existing coastal process studies indicate coastal sediment transport generally to east partly reversing in winter months (DoT 2016). Complex geomorphology at the channel entrance which is in a 'quasi-equilibrium state' whereby sediment can pass across the channel entrance to the sandbar on the eastern side. Modelling undertaken for Chevron MOF indicated erosion of the beaches to the north of the MOF.	Unlikely	Moderate	**Moderate**	Modelling of hydrodynamic and morphological changes around Beadon Creek entrance resulting from the deeper channel and modifications to the tidal prism upstream.	Hydrographic Survey and Aerial Surveys Vegetation surveys from aerial photos	**Moderate**	Meets EPA Objective - Raised as potential concern by the EPA during pre-referral meeting.
2.2			Sedimentation of the channel	Investigate maintenance dredging and how this may be handled under a multi-user facility	Survey and surface sediment data indicates (net) sedimentation may occur at particular sections of the existing channel.	Almost Certain	Insignificant	**Moderate**	Design (create sediment basin) OMSB to take responsibility for maintenance dredging requirements	Modelling Hydrographic surveys	**Moderate**	Meets EPA Objective - Raised as potential concern by the EPA during pre-referral meeting.
3.1	Marine Environmental Quality	To maintain the quality of water, sediment and biota so that environmental values are protected.	Dredging and disposal of contaminated sediments	Disturbance and dewatering of contaminated sediments can release toxins into the water column.	Dredged material is composed of clean sediments and only a small amount of material at the southern end of the berth pocket previously been identified as 'potentially contaminated' with elevated concentrations of tributyltin was removed to assist DoT with remediation of this site. Elevated Arsenic levels recorded in the outer channel is consisted with elevated background concentrations found in previous monitoring programs. One elevation of Nickel above ISQG-Low recorded in deeper sediments in turning circle due to increased fine sediments, a relationship previously identified in previous studies.	Rare	Major	**Moderate**	N/A	Sediment sampling program (completed)	**Moderate**	Meets EPA Objective (with Management) – Clean sediments to be dredged so unlikely to raise contamination concerns
3.2			Changes to the physico-chemical properties of the water column	Sediments resuspended during the dredging and physico-chemical parameters modified after dewatering. Physico-chemical parameters in the water column may be outside the moderate or high ecological protection criteria.	Water quality monitoring undertaken during the existing and previous dredging programs may be used to derive suitable environmental quality criteria for water quality parameters. Waters within the creek and adjacent coastal area is typically turbid, with strong current at the entrance often resulting in clearer water than surrounding coastal waters.	Likely	Minor	**Moderate**	Control discharge Dredge Management Plan	DoT Maintenance Dredge EQMF specifies: plume sketches site photographs remote imagery aerial photography Consider additional monitoring for BPPH outer channel and receiving water monitoring site	**Moderate**	Meets EPA Objective (with Management) - Clean sediments to be dredged so unlikely to raise contamination concerns
3.3			Changes to the physico-chemical properties of the intertidal zone	Intertidal sediment properties altered during dewatering	Hypersaline areas occur in the upper-intertidal supra-tidal areas. These saline habitats support mangroves, algal mats and samphire communities. Changes to the salinity of these environments due to released water being less saline than the receiving environment.	Almost Certain	Insignificant	**Moderate**	Control discharge Dredge Management Plan	site photographs and maps showing any extent of change of hypersaline habitats and recovery after a few years Dewatering water quality monitoring	**Moderate**	Meets EPA Objective (with Management) – Less important as conditions likely to return to hypersaline conditions after completion of the project.

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3.4			Acid sulfate soils	ASS are naturally occurring sediments that contain iron sulphide minerals (commonly pyrite FeS_2). The disturbance of ASS during dredging and its oxygenation during dewatering can lead to sulphide oxidation which releases acid and metals and has the potential to cause significant environmental and economic impacts.	ASS are typically encountered in low-lying, water logged, high organic areas which provide key elements for the formation of sulfuric acid (oxygen, bacteria). Consistent with the results from previous testing of ASS within Beadon Creek and at nearby coastal locations for other dredging programs, field testing indicate PASS occur within the dredge footprint, indicating an ASS management plan is required. However, testing indicates treatment of PASS is not required as the acidity would be effectively buffered by the natural alkaline component of the sediment.	Unlikely	Moderate	**Moderate**	ASS Management Plan	pH monitoring of disposal settlement pond to monitor requirement for treatment Testing of soils before use.	**Moderate**	Meets EPA Objective (with Management)
3.5			Hydrocarbon Spillage	With the use of various hydrocarbons on site, including fuel, oil and lubricants for the dredge and support vessel, there will be a risk of hydrocarbon spillage to the marine environment Consider ongoing management of refuelling vessels and whether this should be included	Testing of sediment samples did not detect any hydrocarbons above the LoR. In 2010/2011 MScience recorded some background concentrations measured as Oil & Grease sampled around the proposed outfall location off the coast of Ashburton North. However, it would be expected background hydrocarbon concentrations are minimal in the Project area.	Unlikely	Minor	**Low**	Vessel Management Plan Fuel Storage and Handling Procedures and Emergency Plan	Reporting of hydrocarbon spills	**Low**	Meets EPA Objective DoT may require Oil Spill Contingency Plan
4.1	Marine Fauna	To protect marine fauna so that biological diversity and ecological integrity are maintained.	Entrainment of protected fauna during dredging	Removal or loss of individual organisms of a specific species (i.e. sawfish, turtles), not a population	Turtle nesting of Flatback, Green and Hawksbill turtles occurs on islands and at Ashburton Delta beach. No known nesting occurs on beaches either side of Beadon Creek although turtles may be found foraging in the project area. Sawfish occur in Beadon Creek. Low likelihood of dredging sawfish inside the creek as historical dredging has not recorded any issues. Potentially avoid dredging during susceptible periods (i.e. calving)	Possible	Minor	**Moderate**	Possible inclusions for DMP: Exclusions zones Dredge move slowly through area before commencing for noise and vibration hazing when dredging new areas Overflow screens for turtle assessment of entrainment	MFO or MFO recording Reporting of injured or dead marine fauna EPBC Matters Search Contact DEC for listed and threatened report	**Moderate**	Meets EPA Objective (with Management) Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth
4.2			Acoustic impacts from dredging activities	Disturbance and general avoidance of the dredge area. Relevant to whales, dolphins, dugongs, marine turtles and sawfish	Baseline acoustic data recorded by Curtin University at Ashburton North and offshore, also piling noise recorded.	Possible	Insignificant	**Low**	Exclusions zones (Wildlife Conservation Notice 1998) Vessel Maintenance	MFO or MFO recording Reporting of injured or dead marine fauna EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective (with Management) Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth

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4.3			Acoustic impacts from piling activities	Repetitive impulsive nature of pile driving can cause physical damage to marine fauna and some fish. Relevant to whales, dolphins, dugongs, marine turtles and sawfish	Baseline acoustic data recorded by Curtin University at Ashburton North and offshore, also piling noise recorded.	Rare	Insignificant	**Low**	Observation zones and Exclusions zones Shutdown and restart procedures Vessel Maintenance Anchored navigation markers inside Beadon Creek Soft start procedures No night operations during low visual visibility	MFO or MFO recording Reporting of injured or dead marine fauna Underwater noise monitoring during piling activities EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth
4.4			Vessel strikes on marine fauna	Vessel strikes can result in fatality or permanent injury. Relevant to whales, dolphins, dugongs and marine turtles	Wheatstone Project has been using speed limits for the Project area except for crew transfer vessels which were exempt from the speed limits.	Unlikely	Insignificant	**Low**	Speed limits for project activities (unless engaged in emergency response) Exclusion zones Harbour user agreement with DoT	MFO or MFO recording Reporting of injured or dead marine fauna EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth
4.5			Habitat modification from dredging activities	Changes in bathymetry and hydrodynamics of Beadon Creek relevant to sawfish. Loss of seagrass foraging habitat for dugong	Sawfish occur in Beadon Creek. Need to assess with information from Dave Morgan Seagrass foraging areas for dugongs to be discussed with Wheatstone as to whether the Project area represents important foraging habitat	Unlikely	Insignificant	**Low**	Dredge Management Plan	Modelling EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth
4.6			Entanglement or ingestion of solid waste (marine debris)	Marine turtles are susceptible to injury or death from entanglement or ingestion of marine debris	Currently very low level of marine debris in remote coastal waters.	Unlikely	Minor	**Low**	Vessel waste management plan Dredge management plan	EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth
4.7			Artificial Vessel Lighting	Attraction of marine turtle hatchlings, Interference with turtle nesting behaviour and attraction of seabirds creating potential for increased predation of turtle hatchlings.	Turtles not known to nest on adjacent beaches and nesting islands are located at a sufficient distance from the Project site. Not many artificial light sources with the exception of Onslow town, ANSIA processing plants and offshore platforms.	Unlikely	Insignificant	**Low**	Visiting vessels will follow international lighting standards & will be present only for the duration of required loading. Project vessel light spill will be reduced at night where reasonably practicable Lights only used when required Project vessels not to be moored within 1.5km of nesting beach buffer zones MARPOL agreement	EPBC Matters Search Contact DEC for listed and threatened report	**Low**	Meets EPA Objective Minimising impacts on conservation significant marine fauna will avoid referral of the project to Commonwealth

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	EPA Environmental Factors	EPA Environmental Objectives	Identify Project stressors affecting Environmental Factors	Description of stressor	Existing Environment Description	Likelihood	Consequence	Risk Rating	Management	Monitoring	Risk Rating	Approvals
4.8			Introduced Marine Pests	Introduction of new marine species to Beadon Creek Boat Harbour as biofouling on the dredge or visiting supply vessels and/or within ballast water, have the potential to significantly impact marine industries and the environment.	Australia has over 250 introduced marine species, most remain relatively harmless but some have become aggressive pests (Wells *et al.* 2009). These species have had significant impacts on marine ecosystems and marine industries. Speak with Fred Wells regarding potential for existing marine pests in Beadon Creek.	Rare	Major	**Moderate**	DoT IMP assessment form Ensure all vessels classified as low risk before entering port, or undertake inspection if not. No international vessels during construction. Consult with DoF regarding assessment of IMP risks and actions.	Undertake IMP risk assessment on all vessels coming to port	**Moderate**	Meets EPA Objective
THEME: LAND												
5.1	Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	Habitat removal or disturbance from clearing required for the pipeline route or disposal site	Removal, loss or disturbance of large areas of terrestrial flora and vegetation due to creation of the pipeline route or onshore disposal site	<u>Beadon Creek</u> Beard Vegetation Association 676 which is described as succulent steppe samphire Sheppard *et al*. 2001). Vegetation is described as degraded Structure severely disturbed, regeneration to good condition requires intensive management (*Keighery 1994*). Given the large proportion of native vegetation remaining in the local and regional context, the hectares under application have not been considered to be a significant remnant. <u>Disposal Area</u> The site contains an area of unvegetated intertidal mudflats bounded to the west by an undulating sandplain. The sandplain contains narrow swales and sandy spurs vegetated with hummock and mixed grasslands of Soft Spinifex (*Triodia pungens*) and the invasive grass, Buffel Grass (*Cenchrus cilaris*), with Buffel Grass dominating in most parts with a sparse scattering of shrubs such as *Acacia bivenosa and Acacia translucens* (ATA, 2000). A total of 67 taxa from 47 genera and 21 families, were recorded from the study area. Average plant species richness was 36.2 taxa per quadrat ± 4.9 from a total of four sites.	Almost Certain	Insignificant	**Moderate**	Minimal disturbance outside narrow pipeline route Preference for disposal site on degraded mudflats. Vegetation clearing permit will likely be required Vegetation clearance will only be required within a permitted area	Preliminary site investigation and literature review. Consider rehabilitation or recovery monitoring. Site photographs. Aerial imagery assessment of the condition of these habitats Contact DER for threatened flora in the area EPBC Matters Report	**Moderate**	Minimal disturbance outside narrow pipeline route Preference for disposal site on degraded mudflats. Vegetation clearing permit will likely be required Vegetation clearance will only be required within a permitted area

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	EPA Environmental Factors	EPA Environmental Objectives	Identify Project stressors affecting Environmental Factors	Description of stressor	Existing Environment Description	Likelihood	Consequence	Risk Rating	Management	Monitoring	Risk Rating	Approvals
5.2			Disturbance of conservation significant terrestrial flora	Flora and fauna are protected formally and informally by various legislative and non-legislative measures, which are as follows: EPBC Act WC Act EP Act DEC Priority lists for flora, fauna and vegetation; DEC Recognition of locally significant populations	<u>Airport Investigation</u> No species listed under the *EPBC Act 1999* (Cth), gazetted as Declared Rare Flora under the *WC Act 1950 (WA)*, or listed as Priority Flora by the DEC, were recorded in the study area. Six priority species have been previously recorded within 40km area of the site therefore priority flora may occur and one species *Maireana lobiflora* was considered to be of local significance. Three introduced species were recorded in the study area. None of which are listed as Declared Plants under the Agriculture and Related Resources Protection Act 1976 (WA). One vegetation association was mapped in the study area. The vegetation association recorded is not listed as a Threatened Ecological Community under the *EPBC Act 1999 (Cth)*, as an Environmentally Sensitive Areas under the *EP Act 1986 (WA)*, or as a Priority Ecological Community by the DER.	Unlikely	Minor	**Low**		Literature review and desktop investigation	**Low**	Meets EPA Objective DER approval for vegetation clearing permit.
6.1	Landforms	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.	Pipeline route, disposal site and plans for reuse need to be evaluated to determine potential impacts on landforms.	Landforms of the proposed disposal area and proposed industrial reuse areas will inevitably change the landform characteristics.	The Project is located within the Carnarvon Basin, and the site is characterised by sediments of Aeolian dominated coastal dunes and beach ridge deposits, minor supratidal and coastal lake deposits, mostly comprised of calcareous sand and calcarenite. The geology of the area also includes Tamala and Bossult Limestones and Aeolian components of Bundera Calcarenite and Exmouth Sandstone (Hooking *et al*., 1987). Much of the coastal area consists of low-lying salt flat areas with minimal vegetation (ATA, 2000). The vegetation association is predominantly located on sand plains and dunes. Landform and habitat association found throughout the Pilbara	Unlikely	Minor	**Low**	N/A	N/A	**Low**	Meets EPA Objective
7.1	Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	N/A for this project									
8.1	Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.	Disposal of contaminated sediments	Sediments see Section 3.4	<u>Sediments</u> See Section 3.4 <u>Terrestrial</u> Red/brown loamy sand on dune systems. Beach sand and spoil disposal area over the beach sand on the coast. Mudflats description	Rare	Minor	**Low**	Dredge Management Plan	N/A	**Low**	Meets EPA Objective
8.2			Disposal of Acid sulphate soils	Sediments see section 3.4	Sediments see section 3.4	Unlikely	Moderate	**Moderate**	ASS Management Plan	TBA - As required in accordance with ASS Management plan	**Low**	Meets EPA Objective

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8.3			Disturbance of existing Acid Sulfate Soils at the proposed disposal ground	The location of the disposal site option 2 may contain ASS. Disturbance of ASS during earthworks can lead to sulphide oxidation which releases acid and metals and has the potential to cause significant environmental and economic impacts.	ASS risk mapping previously provided by the WAPC now accessed via the Landgate SLIP website indicates that the supra tidal saltmarsh and intertidal mudflats are located in a 'high to moderate' ASS risk area	Unlikely	Moderate	**Moderate**	If the risk of ASS is present, the lower intertidal area will require stabilisation of ASS using lime.	TBA - As required in accordance with ASS Management plan	**Low**	Meets EPA Objective
9.1	Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	Removal/smothering of terrestrial vegetation habitat	Removal of vegetation for the pipeline route and disposal site will potentially impact terrestrial fauna in the Project area	Simple habitat with little structure or variety. Good quality habitat for reptiles but otherwise relatively few fauna are able to utilise this habitat. Eight of the 13 conservation significant fauna potentially occurring in the study area were considered as 'Possible' inhabitants and two species were considered as 'Likely'. Include Spatial area description. Previous records indicate: 5 amphibian species 72 reptiles 135 bird species (excluding marine & coastal birds) 26 mammal species	Possible	Minor	**Moderate**	Pipeline and positioning of discharge areas	Environmental survey for pipeline route to discharge back into Beadon Creek	**Low**	Meets EPA Objective DER approval for vegetation clearing permit.
9.2			Disturbance of conservation significant terrestrial fauna		13 conservation significant species previously recorded from within the study area: Peregrine Falcon (*Falco peregrinus*), Western Star Finch, nine migratory birds, the Long-tailed Dunnart (*Sminthopsis longicaudata*) and Short-tailed Mouse (*Leggadina lakedownensis*). Eight of the 13 species are listed as 'Possible' to occur within the study area. A further two species were considered as 'Likely' to occur; one migratory bird was noted as 'Present' (with current project records), and two species (Peregrine Falcon *Falco peregrinus* and Long-tailed Dunnart *Sminthopsis longicaudata*) were considered as 'Unlikely' to occur within the study area. Several of the 'Possible' birds are migrant birds, and the only mammal 'likely' to occur is the Short-tailed Mouse which has been recorded in Onslow town.	Unlikely	Major	**Moderate**	Seek advice how to manage impacts on conservation significant fauna when constructing a disposal site	Desktop review Contact DER for list of threatened Fauna in the area EPBC Matters Report Site investigation	**Low**	Meets EPA Objective DER approval for vegetation clearing permit.
THEME: WATER												

ITEM	ENVIRONMENTAL FACTOR	EPA OBJECTIVE	STRESSOR	DESCRIPTION	ENVIRONMENTAL SETTING	INITIAL RISK RATING			PREVENTATIVE/MITIGATIVE CONTROLS		RESIDUAL RISK RATING	SIGNIFICANCE
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10.1	Hydrological Processes	To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.	Altered surface water runoff patterns	Disposal site and proposed reuse areas may modify land runoff into Beadon Creek, threatening identified upper and supratidal ecosystems (samphires, algal mat and mangroves).	Two disposal sites are proposed at the back of the secondary dune systems which drain into a southern tributary of Beadon Creek. The catchment of Beadon Creek has already been significantly modified by the Onslow Salt Ponds. During times of heavy rains and large tidal cycles, the tidal flats can be subjected to inundation. The southern tributaries of Beadon Creek are the outlets of tidal surges that frequently inundate the intertidal flats (ATA, 2000). Management of the water cycle may be very complex involving a variety of factors that need to be taken into consideration such as rainfall, evapo-transpiration and overland and groundwater flows.	Rare	Minor	**Moderate**	Design of disposal location will consider dewatering flow back into Beadon Creek and overflow situations under tropical cyclone conditions.	Surface water investigation from the disposal site should be undertaken Aerial photography	**Low**	Meets EPA Objective DoW approval for bed and banks permit.
11.1	Inland Waters Environmental Quality	To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.	N/A for this project									
THEME: AIR												
12.1	Air Quality	To maintain air quality for the protection of the environment and human health and amenity.	Dust generation from stockpiles	Failure to implement effective dust suppression can result in detrimental environmental impact and poor air quality	Measures should be taken to ensure dust emissions are as low as possible during the dredging and disposal of sediment.	Possible	Minor	**Moderate**	Stockpiles will be sprayed with a dust suppressant if dust emissions become evident	Visual daily monitoring of dust from stockpiles	**Low**	Meets EPA Objective
THEME: PEOPLE												
13.1	Social Surroundings	To protect social surroundings from significant harm.	Pipeline route restricts public access to beach, roads and other recreational areas.	The HDPE dredge discharge pipe crosses roads and areas accessed by the public. Unless pipe is buried through all access areas there is potential to restrict access with the pipeline.	The pipe route will extend from the beach, along the training wall access track, across Beadon Creek Road and over the light industrial area hardstand and over the back of the dune out to the airport (depending on disposal option selected). Access restriction points occur on the beach, across the training wall access road, across Beadon Creek Rd, over the laydown yard and across dirt access tracks over the back of the dune.	Unlikely	Minor	**Low**	All public access areas to be buried	Public access areas to be assessed	**Low**	Meets EPA Objective
13.2			Dredge plume turbidity and sedimentation	Negative public perception of dredging activity due to turbidity plumes generated	Beadon Creek and the adjacent coastal waters are naturally turbid due to strong tidal currents within the creek and resuspension of fines from minimal wave/wind action in coastal waters. This can be particularly turbid following cyclonic or tropical low storm events	Unlikely	Minor	**Low**	Signage Public Notices and updates No concerns from Phase 1 Working closely with DoT/Shire	Aesthetic water quality monitoring (unlikely to be required)	**Low**	Meets EPA Objective

ITEM	ENVIRONMENTAL FACTOR	EPA OBJECTIVE	STRESSOR	DESCRIPTION	ENVIRONMENTAL SETTING	INITIAL RISK RATING			PREVENTATIVE/MITIGATIVE CONTROLS		RESIDUAL RISK RATING	SIGNIFICANCE
	EPA Environmental Factors	EPA Environmental Objectives	Identify Project stressors affecting Environmental Factors	Description of stressor	Existing Environment Description	Likelihood	Consequence	Risk Rating	Management	Monitoring	Risk Rating	Approvals
13.3			Disposal site management	Poor planning results in pond wall failure, overflow and or insufficient consultation to interfere with requirements of the airport or light industrial activities (depending on disposal area selected)	Two disposal sites are proposed at the back of the secondary dune system to extend the light industrial area or out at the airport. The airport is restricted by air-traffic international guidelines which need to be understood and can be busy during flight landing and departure times. Some residents live in the light industrial zone at their business.	Unlikely	Minor	**Low**	Stakeholder consultation Thorough engineering planning and assessment Cyclone management assessment	Register of complaints and resolutions	**Low**	Meets EPA Objective
13.4			Restrict public vessel access and other commercial use of Beadon Creek	Large supply ships interfere with public and other commercial access to Beadon Creek and other maritime facilities	Numerous commercial wharves (TAMS, Bhagwhan, Chevron) which are regularly utilised and public access fuelling facility and boat ramp used by locals and tourism	Unlikely	Minor	**Low**	Planning with DoT Information handbook Stakeholder consultation Redo signage community education	Vessel logs Reporting to the Port of Onslow Port Captain	**Low**	Meets EPA Objective
13.5			Noise from wharf facility and vessels	Vessel noise from supply vessels approaching and departing the maritime facility and noise from wharf activities may bother local residents, particularly during night time	Vessels entering and departing Beadon Creek may occur over 24-hour period. Wharf operations expected during daylight hours only.	Unlikely	Minor	**Low**	Avoid night time docking operations Stakeholder consultation with Shire and community	Vessel records	**Low**	Meets EPA Objective
13.6			Disturbance of a significant aboriginal heritage site	The pipeline route and disposal site occur on aboriginal archaeological sites resulting in inadvertent impacts without consultation with the Buurabalayji Thalandji Association Inc.	Two ethnographic and archaeological surveys have been undertaken: <u>Beadon Creek</u> No ethnographic or archaeological aboriginal heritage sites or artefacts were reported in the land portion of the Department of Transport's project area. However, certain cultural protocols are requested prior to dredging commencing in order to ensure that proper respect is shown to the *Warnamankura* (mythological water serpent). <u>Disposal Site</u> A search on the aboriginal sites register identified two previously registered sites and an additional site was identified during the survey in the immediate vicinity of the Onslow airport. Site 6617 is outside the proposed project area, although Archaeological Site Onslow Airport 01 and existing site DIA 6620 (Jinta 2) are recommended to be avoided entirely during all future works. Should the site be required to be disturbed, Section 18 Application to the Minister of Indigenous Affairs is recommended and no new access tracks should be permitted.	Rare	Major	**Moderate**	Stakeholder consultation with the Buurabalayji Thalandji Association Inc. Consultation with the Shire of Ashburton to determine responsibilities under intention to dispose and develop airport land.	Additional ethnographic and archaeological survey between airport and light industrial area/ disposal option 1 area required. Salvage work upon an aboriginal site (including full recording and artefact recovery) may be required, in consultation with the Buurabalayji Thalandji Association Inc, if intended to develop over the site	**Low**	Meets EPA Objective Possible Section 18 Application to the Minister of Indigenous Affairs depending on disposal option.

A.4 ENVID OUTCOMES

The ENVID identified a total of 38 project specific stressors which have the potential to compromise the EPA's objectives. Of these, 13 stressors were evaluated as posing a 'moderate' (or greater) risk (Table A-2), whilst the remaining 25 stressors were considered to pose a 'low' risk.

Stressors evaluated as posing 'low' risk, were not considered to warrant referral to the EPA, as the activities were unlikely to result in significant environmental impacts or effects. Typically, these 'low' risk stressors included those that did not require specific management, mitigation or monitoring, or can be effectively managed through typical best practice management (e.g. MARPOL Regulations for offshore waste disposal) of the proposed construction and operational activities.

Stressors evaluated as posing a 'moderate' (or greater) risk are identified in Table A-2. Identification of these stressors was used to identify those activities which were considered to warrant referral to the EPA as they have the potential to result in significant environmental impacts or effects. Typically, these stressors also included a requirement for further investigations, baseline assessment and/or specific management and monitoring actions to be applied during the project construction and/or operational phases.

Table A-2 Summary of project specific stressors evaluated as posing a residual 'moderate' risk on impacting on the EPA's environmental factors

Environmental Factor	Project Specific Stressors	Risk
Benthic Communities & Habitat (BCH)	Direct removal of subtidal BCH from Channel Dredging	Moderate
	Indirect impact on subtidal BCH from turbidity and sedimentation	Moderate
	Indirect impact on intertidal BCH from dewatering	Moderate
	Changes to hydrodynamics causes indirect modification of intertidal BCH	Moderate
Coastal Processes	Changes to coastal and creek bank morphology as a result of deepening channel	Moderate
	Sedimentation of the channel	Moderate
Marine Environmental Quality	Dredging and disposal of contaminated sediments	Moderate
	Changes to the physico-chemical properties of the water column	Moderate
	Changes to the physico-chemical properties of the intertidal zone	Moderate
	Acid sulfate soils	Moderate
Marine Fauna	Entrainment of protected fauna during dredging	Moderate
	Introduced Marine Pests	Moderate
Flora and Vegetation	Vegetation removal or disturbance for the pipeline route and/or disposal site	Moderate

Disclaimer

The ENVID risk assessment outcomes do not necessarily represent the final list of project specific stressors, nor do they define the final proposed management and monitoring to be undertaken in order to manage potential environmental impacts. Rather the ENVID outcomes represents an early identification of the potential environmental risks and possible management and monitoring actions. This information was subsequently used to assist in the preparation of the environmental referral of the Proposal to the EPA.

A.5 References

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