

# **Nelson Point Dredging, RGP6 Port Development, Port Hedland**

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**BHP Billiton Iron Ore**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
Report 1337  
September 2009**

### **Environmental Impact Assessment Process Timelines**

| <b>Date</b>       | <b>Progress stages</b>  | <b>Time (weeks)</b> |
|-------------------|---|---------------------|
| <b>04/05/2009</b> | <b>Initial referral information received</b>                                      |                     |
| <b>12/06/2009</b> | <b>Final Environmental Referral Document received</b>                             | <b>6</b>            |
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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 Iron Ore (BHPBIO) to undertake dredging at Nelson Point, Port Hedland.

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 a referral document setting out the details of the proposal, potential environmental impacts and its proposed management of those impacts (BHPBIO, 2009).

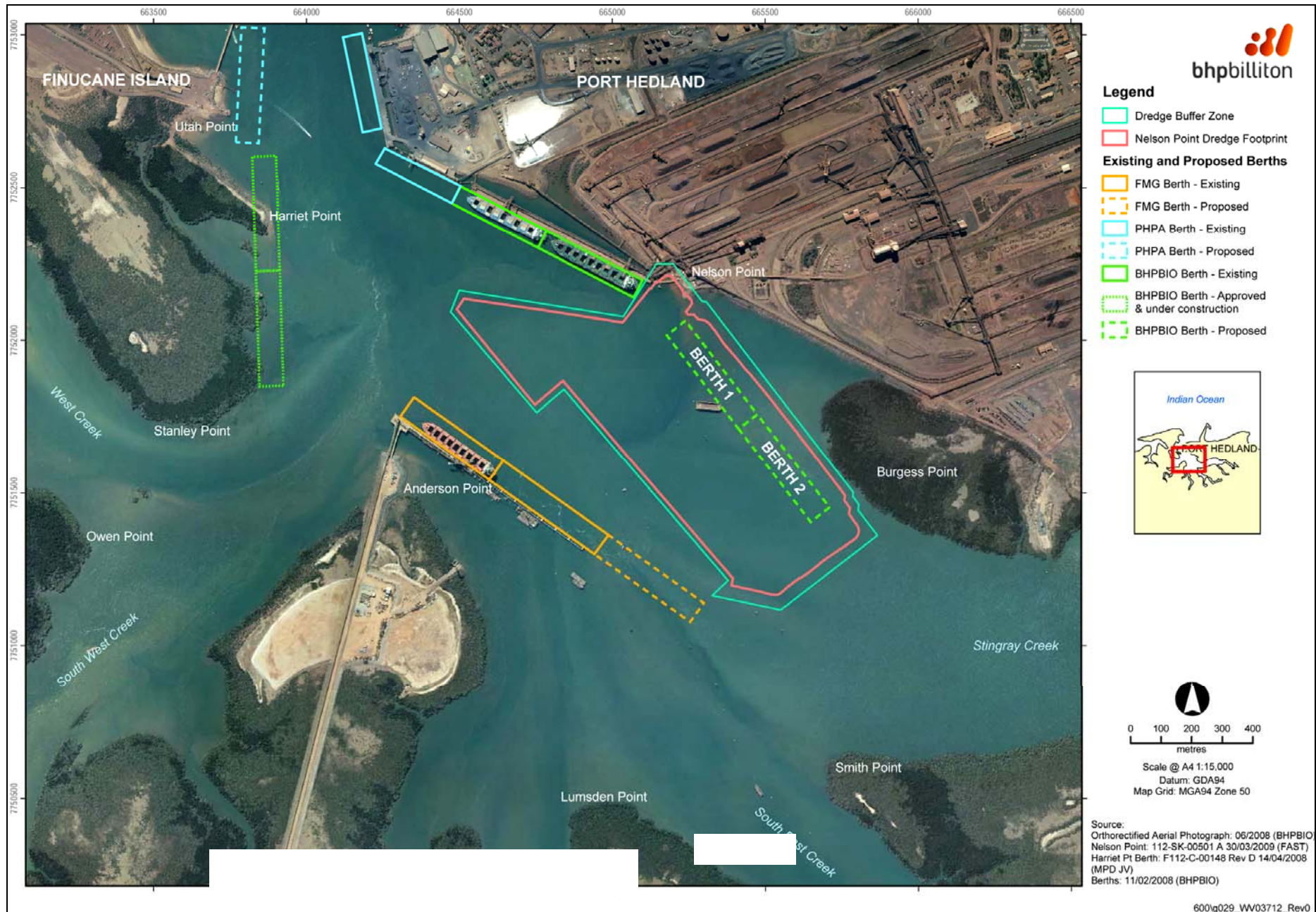
The EPA considers that the proposal, as described, can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA has therefore determined under section 40 of the EP Act that the level of assessment for the proposal is Assessment on Referral Information (ARI), and this report provides the EPA advice and recommendations in accordance with section 44 of the EP Act.

## **2. The proposal**

The proposal involves the dredging of not more than 6.7 million cubic metres (Mm<sup>3</sup>) of material for two new berth pockets and extensions to the existing departure channel and swing basin at Nelson Point to accommodate vessels of approximately 250,000 dead weight tonnes (DWT) (Figure 1). The existing and proposed berths in Port Hedland are also shown in Figure 1, however the berths are not included as part of this proposal.

The management of the dredged material to dredged material management areas (DMMA) will be dependent on its characteristics. Potentially acid sulphate soil (PASS) material will be disposed offshore in Commonwealth waters at the Port Hedland Port Authority (PHPA) Spoil Ground One with the remaining material placed at DMMA H (Figure 2).



**Figure 1: Existing and proposed berth developments in Port Hedland inner harbour (BHPBIO, 2009)**



Figure 2: Dredging at Nelson Point – key proposal components (BHPBIO, 2009)

The main characteristics of the proposal as derived from the proponent’s referral document are summarised in the table below.

**Table 1: Summary of key proposal characteristics**

| <b>Element</b>  | <b>Description</b>  |
|---|---|
| Volume of material to be dredged                          | Not more than 6.7 Mm <sup>3</sup> based on <ul style="list-style-type: none"> <li>• Approx 2.7Mm<sup>3</sup> offshore disposal</li> <li>• Approx 4.0Mm<sup>3</sup> onshore disposal</li> </ul>  |
| Duration of dredging                                      | Off shore disposal: Approx 68 weeks<br>On shore disposal: Approx 46 weeks   |
| Area of marine disturbance for dredging                   | Not more than 60 hectares (ha) at Nelson Point  |
| Area of land disturbance for dredging                     | DMMA H construction footprint not more than 204 ha that includes <ul style="list-style-type: none"> <li>• a 60 m wide pipeline corridor from DMMA H across Lumsden Point to Harbour, temporary haul road, turning areas, and windrows, batters and scour protection</li> <li>• 40 m wide overflow channel from DMMA H to South East Creek including scour protection</li> </ul> |
| BPPH: Area of direct/indirect mangrove loss               | <ul style="list-style-type: none"> <li>• Closed canopy mangroves not more than 0.22 ha</li> <li>• Scattered mangroves not more than 3.78 ha (predominantly <i>Avicennia marina</i> closed canopy and scattered – considered a high value species)</li> </ul>  |
| BPPH: Area of direct/indirect samphire meadow loss        | <ul style="list-style-type: none"> <li>• Not more than 10 ha in DMMA H</li> </ul>   |
| BPPH: Area of direct/indirect of cyanobacterial mats loss | <ul style="list-style-type: none"> <li>• Not more than 78.8 ha in DMMA H</li> </ul>   |
| Offshore disposal of dredged material                     | Not more than 2.7Mm <sup>3</sup> to Spoil Ground ‘1’ (Commonwealth waters)  |
| Onshore disposal of dredged material                      | Not more than 4.0Mm <sup>3</sup> to DMMA H (excluding bulking)  |
| Final height of DMMA H                                    | Not more than +9.0 m AHD  |

Hectares (ha); Australian Height Datum (AHD)

The proposed dredging at Nelson Point is to allow for the construction of two new shipping berths along with extensions to the existing berth pockets, departure channel and swing basin. When completed, the berths will be able to accommodate vessels of approximately 250,000 DWT with a breadth of 55 m and a length of approximately 350 m.

The program is comprised of the following:

- dredging of two new berth pockets to a design depth of -19.2 m CD (chart datum);

- extending and deepening the existing departure channel adjacent to the berths to a design depth of -14.8 m CD to allow for safe departure of loaded vessels;
- extending and deepening the swing basin at Nelson Point to a design depth of -9.3 m CD to enable arriving vessels to gain access to the new berths; and
- associated over-dredging of approximately 0.7 m due to dredging tolerances.

In order to effectively manage the dredged material, one offshore and one onshore site have been identified as DMMA. The offshore Spoil Ground One is located in Commonwealth waters north of the Port Hedland Inner Harbour and immediately adjacent to existing Spoil Ground 'I'. The onshore DMMA H is located to the south of Lumsden Point, within the Port Hedland Harbour. The proposed dredging footprint and associated DMMA are shown in Figure 3.

The dredging works will involve:

- the dredging of PASS and non-PASS material with a Backacter Dredge with subsequent offshore disposal to Spoil Ground One via split hopper barges; and
- the dredging of non-PASS material with a Cutter Suction Dredge and the pumping of dredged material onshore to DMMA H.

Based on the current geotechnical information for the Nelson Point dredge footprint, pre-treatment of sediment material via drilling and blasting will not be required.

Capital works for the development of DMMA H will involve the following:

- construction of perimeter earth bunds to +9.0 m AHD at DMMA H; and
- construction of an approximately 60 m wide pipeline corridor (reduced to 20 m in areas of closed canopy mangroves) from DMMA H north across Lumsden Point out to the harbour to allow the installation of two 900 mm internal diameter steel pipelines (one live, one as spare).

This will allow for the pumping of material from the dredge to DMMA H. This corridor allows for:

- safe access for construction vehicle traffic;
  - windrows, batters and scour protection;
  - a temporary haul road on one side for construction of the pipeline corridor; and
  - an allowance for turning areas and contractor lay down.
- construction of an approximately 40 m wide overflow channel from DMMA H to South East Creek, including scour protection.

A construction boundary will be established around the bund walls and pipeline corridors including a 20 m buffer on each side of the outlet channel. This construction boundary will only be disturbed during the project for construction activities such as lay down areas, haul roads and construction access. Disturbance within this construction boundary will be minimised where possible.

The Nelson Point Dredging proposal will require not more than 6.7 Mm<sup>3</sup> of material to be dredged, incorporating tolerances and over-dredging to achieve the required design depths for safe navigation.

This total volume is based on an allowance for material that was proposed to be dredged by Fortescue Metals Group (FMG) for its third berth development, however this dredging is now included as part of this proposal due to postponement of the dredging works by FMG.

The area of the footprint to be disturbed, including batters, is approximately 60 ha. Estimated dredging volumes and footprint areas are provided in **Table 2**.

**Table 2: Dredging volumes and footprint**

| <b>Location</b>     | <b>Design depth of dredging (m CD)</b> | <b>Approximate dredge volume (Mm<sup>3</sup>)</b> | <b>Approximate footprint area (ha)</b> |
|---------------------|--|---|--|
| New berth pockets   | - 19.2                                 | 1.9   | 6                                      |
| Departure areas     | - 14.8                                 | 3.1   | 34                                     |
| Swing basin         | - 9.3                                  | 1.0   | 10                                     |
| Dredge buffer zones | n/a                                    | n/a   | 10                                     |
| <b>Total</b>        | <b>n/a</b>                             | <b>6.0</b>  | <b>60</b>                              |

The combination of the high tidal range in Port Hedland and the draft of the Backacter Dredge and supporting barges mean that the Backacter Dredge can only operate in waters at least -4.0 m CD in depth.

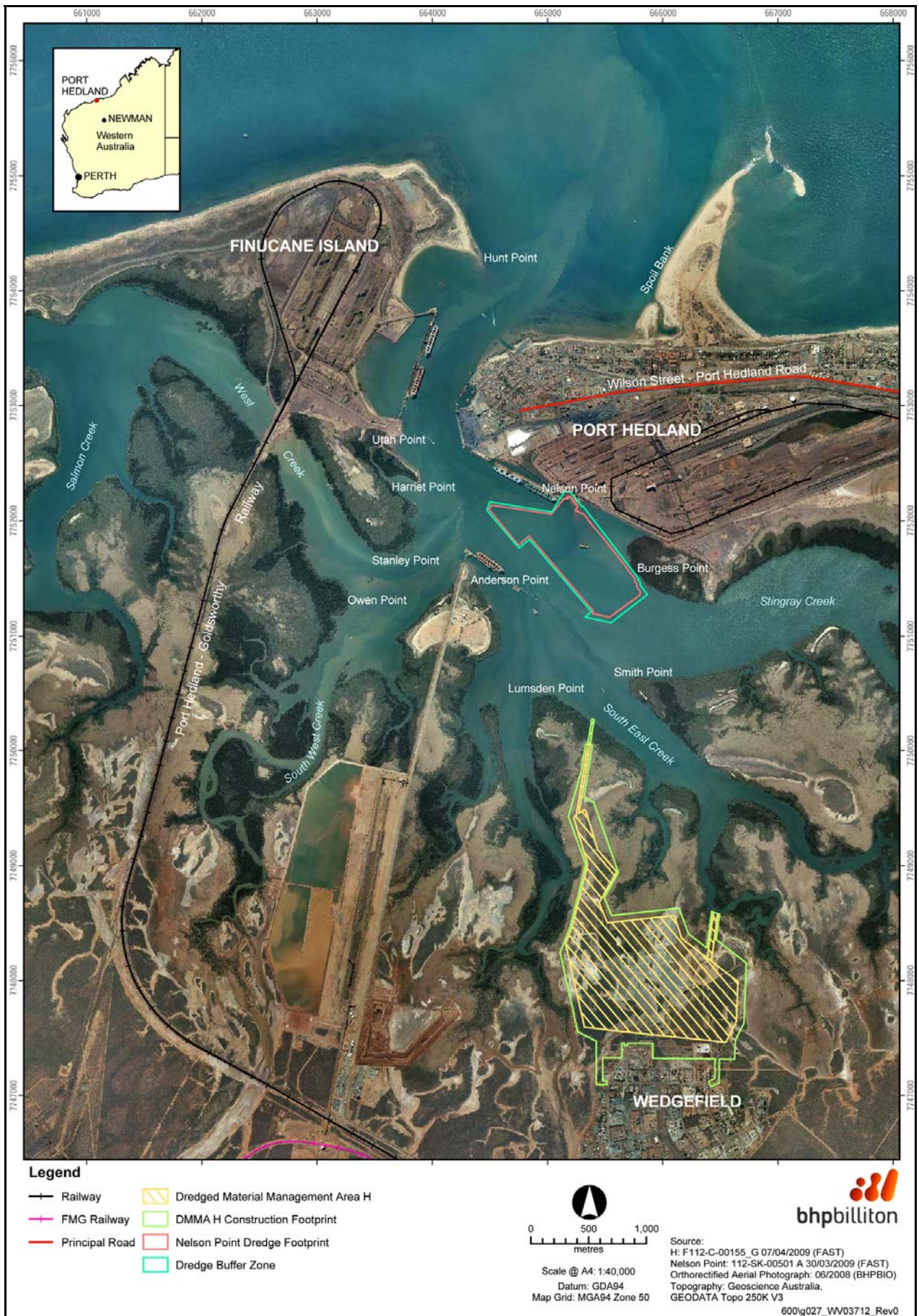
The Backacter Dredge will therefore approach the areas to be disposed of offshore from deep water and progressively dredge these areas to a minimum of -4.0 m CD. The remaining material between -4.0 m CD and the design dredge depth will be dredged by the Cutter Suction Dredge and pumped onshore.

The overlying sediment layer within the dredging footprint has been characterised as PASS material and will be disposed of at the PHPA offshore Spoil Ground One (Figure 2) using split hopper barges. Once the barges have been loaded, they will transport the PASS dredged material to the offshore Spoil Ground One via the existing shipping channel.

Other dredged material (non-PASS) will be pumped directly to onshore DMMA H located in the intertidal area of the Port Hedland harbour (Figure 3). Excess water, for which the fines content has been sufficiently reduced, will be released via outfall weirs.

The proponent carried out a preliminary impact assessment to categorise the inherent risk of the environmental factors as critical, major, moderate, minor or low depending upon the potential significance of the impacts and required management. Inherent risk was determined as the risk without consideration of any management controls. No factors were identified by BHPBIO as having critical or major inherent risk. Factors with a moderate inherent risk were discussed in most detail in the proponent's environmental referral document (BHPBIO, 2009), and were identified as marine water quality, marine habitat (mangroves, cyanobacterial mats, samphire, corals), acid sulphate soils, and land-use of the DMMA H.

Table ES.2 of the proponent's document summarises BHPBIO's evaluation of each of the environmental factors, potential environmental impacts and discusses proposed management actions to reduce the environmental risk.



**Figure 3: Dredging footprint and dredged material management area DMMA H (BHPBIO, 2009)**

### **3. Consultation**

In January 2008 the proponent released *Expansion in the Pilbara: 300 MTPA by 2015. Approvals Support, Community Engagement and Communication Plan* (BHPBIO, 2008b), designed to inform stakeholders and provide an opportunity for discussion and mechanisms for feedback through established, ongoing communications channels. The scope of the plan is predominately targeted towards the effective engagement of Pilbara communities, but also includes processes to facilitate existing communication and engagement with other stakeholder groups such as State and Commonwealth departments and indigenous communities.

Consultation on BHPBIO's growth plans and specifically the inner harbour expansion began in late 2007. The agencies, groups and organisations consulted, the comments received and the proponent's response are detailed in the proponent's referral document (BHPBIO, 2009) in Table 3.1.

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.

### **4. Key environmental factors**

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

- (a) marine ecology – loss of Benthic Primary Producer Habitat (BPPH);
- (b) marine water and sediment quality;
- (c) acid sulphate soils; and
- (d) land use management and rehabilitation.

The key environmental factors are discussed in Sections 4.1 – 4.4. 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 Ecology – loss of Benthic Primary Producer Habitat (BPPH)**

##### **Description**

A Benthic Primary Producer Habitat (BPPH) is made up of the Benthic Primary Producer (BPP) communities and the substrata/seabed to which they are attached (EPA, 2004). The ecological values of BPPH's vary depending on a range of factors including geographic location, species abundance, structural components and productivity.

The BPP communities impacted upon as a result of this project are mangroves, and cyanobacterial mats and samphire, algal reef and sub-tidal microphytobenthos. The impacts on the mangrove community will be described below while the EPA has

provided Other Advice in relation to cyanobacterial mats and samphire, algal reef and sub-tidal microphytobenthos.

As part of the proposed works, not more than 4.0 ha of mangrove vegetation located within the DMMA H will be removed using land-based equipment. Losses will occur as a result of the construction of the DMMA H bund, as well as the temporary pipeline corridor at Lumsden point for a pipeline running from the dredge to DMMA H, and a temporary pipeline corridor for excess discharge water to be piped to South East Creek. The predominant species of mangrove to be impacted is *Avicennia marina* both closed canopy and scattered. The mangroves will be disposed of as green waste, at a waste management facility in Port Hedland.

The project will include the direct removal within DMMA H of:

- not more than 0.22 ha closed canopy mangroves; and
- not more than 3.78 ha (predominantly *Avicennia marina* closed canopy and scattered – considered a high value species) scattered mangroves.

Previously reported losses of mangroves within the Port Hedland area, as defined within the Port Hedland Industrial Area Management Unit, comprise approximately 293.1 ha. This is equivalent to approximately 11% cumulative mangrove loss within the Port Hedland Industrial Area Management Unit area, as calculated from the original historical mangrove extent estimated at 2,676 ha.

**Table 3: Cumulative Loss of Mangroves, as Defined within the Port Hedland Industrial Area Management Unit (Including RGP6)**

| <b>BPPH Loss Calculations</b>  | <b>Port Hedland Industrial Area Management Unit</b> | <b>Comments</b> |
|--|---|-----------------|
| Total Size of Management Unit (ha)   | 15,430  |                 |
| Historical Area of Mangroves 1963 (ha)   | 2676  |                 |
| Current Area of Mangroves 2008 (ha)  | 2382.9  |                 |
| EPA Category and Cumulative Loss Guideline (2004)  | F – 10%   |                 |
| Potential Permanent Mangrove Loss due to Project (ha and (% <sup>^</sup> ))                          | 4.0   | (0.15%)         |
| Estimated Historic Mangrove Loss (ha and (% <sup>^</sup> ))  | 293.1   | (11.0%)         |
| <b>Potential Total Cumulative Mangrove Loss (Historical + this Project) (ha and (%<sup>^</sup>))</b> | 297.1   | (11.15%)        |

In accordance with EPA Guidance Statement 29, the Port Hedland Industrial Area Management Unit is described as a Category F area, “*where cumulative loss thresholds have been significantly exceeded*” (EPA, 2004).

### **Assessment**

The EPA’s environmental objective for this factor is to maintain the abundance, diversity, geographical distribution and productivity of mangroves at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

The area for assessment is the Port Hedland Industrial Area Management Unit which includes the Port Hedland harbour, dredge spoil disposal area DMMA H and South East Creek, the receiving point for DMMA H tailwaters.

EPA Guidance Statement 29 defines a cumulative loss guideline for Category E, which includes Development Areas such as inner port areas as being 10% loss of BHHP. Proposals that exceed the cumulative loss threshold (in this case 10%) are considered Category F.

For mangroves, the proponent has used a realistic approach in dealing with this factor by including 4 ha of proposed mangrove loss and applying the Category F in its analysis. Guidance Statement 29 states that a proponent who wishes to remove BPPH from a Category F area should:

- develop an offsets package;
- demonstrate an understanding of the ecological role and value of the BPPH within the local context, and then determine the significance of any impacts on ecosystem integrity;
- use a ‘best practice’ approach to minimising impacts; and
- develop and commit to the implementation of a comprehensive environmental management plan.

The proponent has demonstrated a ‘best practice’ approach to minimising impacts, involving the following actions:

- the project design phase included a risk analysis to determine the most suitable project design to minimise loss of high quality mangrove forest; and
- disposal of PASS material offshore thus reducing the onshore disturbance footprint.

The proponent included a Mangrove Management Plan within the Environmental Referral Document that includes monitoring programs consisting of:

- water quality monitoring as part of the Dredging Management Plan;
- mangrove mapping;
- mangrove health surveys;
- monitoring of sediment deposition with the mangrove community; and

- assessment of the potential for changes in soil salinity associated with the construction of the bunds and the reclamation.

The EPA notes that the implementation of the Mangrove Management Plan includes outcomes that are important to ensuring that the impacts on mangroves are confined to a maximum area not exceeding 4 ha in total. This maximum area of mangroves to be lost as a result of the implementation of the proposal is specified in the key characteristics table which forms part of the recommended statement of conditions that would apply to this proposal if it is recommended for implementation.

BHPBIO is investigating options for the development of a mangrove offsets package. The proponent intends to develop the proposed package in consultation with the Department of Environment and Conservation (DEC) and other stakeholders and will take into consideration BHPBIO's future growth program within the Port Hedland area, including the dredging associated with this proposal.

The EPA notes that the proponent has conducted research into mangrove loss and accretion in the Port Hedland Industrial Area Management Unit. The EPA is supportive of this science continuing. Initial information suggests that there have been increases in the area of some mangrove vegetation associations demonstrating a capacity for these communities to recover over time; however the information regarding the recovery of mangroves requires verification.

### **Summary**

Having particular regard to the:

- proponent demonstrating a 'best practice' approach to minimising impacts;
- inclusion of a maximum area of mangrove disturbance being 4 ha in total as part of the recommended statement that the proposal may be implemented;
- proponent's undertaking to the development of a mangrove offsets package; and
- proponent's research into mangrove loss and accretion in the Port Hedland Industrial Area Management Unit,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

## **4.2 Marine water and sediment quality**

### **Description**

Marine water quality refers to the state of health of a water body and is defined by its physical, chemical, biological and aesthetic characteristics.

The key marine water quality issues are:

- increased Total Suspended Sediment (TSS) levels in the water column – caused by suspended sediments released into the water column during dredging and/or spoil disposal, and resuspending following deposition;
- increased sedimentation rates smothering benthic habitats – caused by particles settling out of the water column during dredging and disposal;

- potential increase in the levels of dissolved contaminants in the surrounding waters caused by the release of contaminants from the disturbed and suspended sediments during dredging; and
- potential impacts on receiving water quality caused by the return water discharge from the DMMA H.

Water quality criteria for triggering the implementation of contingency measures will be determined prior to dredging for the DMMA H discharge waters based on the results of the baseline water quality monitoring program. Trigger levels will be derived for both ‘high’ and ‘moderate’ ecological protection areas based on the parameters outlined in Table 4.

The proposal will result in the dredging of material containing potentially contaminated sediments from the inner harbour area and involves dredging of up to 6.7Mm<sup>3</sup> over a 114 week period. The results of the sediment quality assessment for the deeper unconsolidated sediments showed elevated levels of copper, zinc, nickel, and lead.

### **Assessment**

The EPA’s environmental objective for this factor is to ensure that water discharges do not adversely affect ecological integrity or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The area for assessment includes the waters of the Port Hedland inner harbour, and South East Creek (the receiving point for DMMA H tailwaters). Spoil Ground ‘1’ is not included in the EPA’s area for assessment as it is located in Commonwealth waters and the proponent will conform with appropriate Commonwealth policies and standards for sea dumping of dredged material.

The *Pilbara Coastal Water Quality Consultation Outcomes: Environmental Values and Environmental Quality Objectives* (Department of Environment, 2006) establishes an environmental quality management framework for the Pilbara region to help manage and protect the marine environment from the effects of waste inputs and pollution. The plan establishes Environmental Values to be protected as well as the Environmental Quality Objectives (EQOs) and levels of ecological protection that should be met. The environmental values to be protected in the harbour are:

- Ecosystem health
- Cultural and Spiritual;
- Fishing and Aquaculture;
- Recreation and Aesthetics; and
- Industrial water supply.

The EQO for *maintenance of ecosystem integrity* has two different levels of ecological protection that apply in Port Hedland harbour – high and moderate. The levels of ecological protection are assigned in such a way that the general integrity of the ecosystem is maintained (DoE, 2006).

Most of the working areas of the inner harbour at Port Hedland have been assigned a ‘moderate’ level of ecological protection in recognition of existing and approved proposals as at 2006. The dredging footprint for this proposal occurs primarily in areas assigned a ‘moderate’ level of ecological protection while discharge from reclamation area DMMA H is into an area of high ecological protection (Figure 4.15, BHPBIO, 2009).

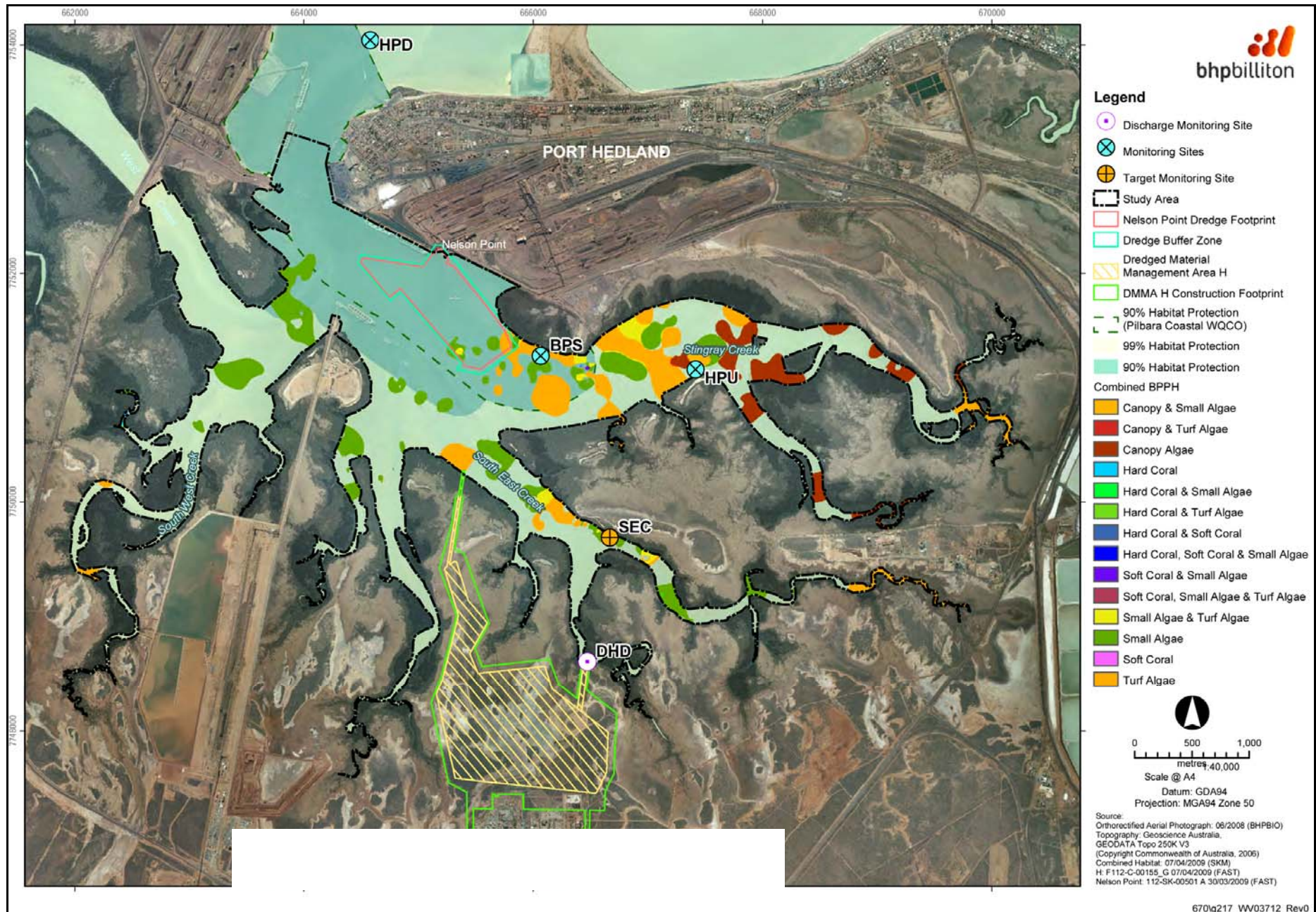


Figure 4: Levels of ecological protection and benthic primary producer habitat identified in Port Hedland inner harbour (BHPBIO, 2009)

The Dredging Management Plan (Appendix B3 of the Environmental Referral Document, BHPBIO, 2009) details the management measures that will be implemented to minimise impacts to water quality and identifies contingency measures to be implemented in the event that important water quality parameters are not maintained within acceptable levels.

Detail includes:

- baseline water quality monitoring to be undertaken prior to the commencement of dredging activities;
- water quality monitoring program at various locations that may be effected by the dredge plume (impact sites), at various reference sites and at the DMMA H discharge points;
- environmental quality indicators and criteria that management will aim to achieve to protect the designated environmental values; and
- contingency management measures based on water quality triggers to be implemented in the event that excess water from DMMA H does not meet prescribed standards.

Water quality criteria for triggering the implementation of contingency measures for the DMMA H discharge waters will be determined prior to dredging based on the results of the baseline water quality monitoring program. Trigger levels will be derived for both 'high' and 'moderate' ecological protection areas (Table 4).

The results of the sediment quality assessment for the deeper unconsolidated sediments showed elevated levels of copper, zinc, nickel, and lead. The proponent will need to demonstrate that these metals have been retained in the dredged sediments and not released to the water column as a result of the dredging and hence discharged at potentially toxic concentrations in the return water from disposal site DMMA H into Southeast Creek. BHPBIO will be required to implement a suitable monitoring and management program with the objective of protecting the environmental quality objectives for South East Creek and Port Hedland harbour for inclusion in the Dredge Management Plan (DMP). The EPA has recommended conditions 6.2.5-6 that address:

1. water quality monitoring during the dredging campaign for the collection of dissolved metals and ammonia concentration data, collected at impact and control sites for the receiving waters of the DMMA H return water discharge and at sites in the Port Hedland Harbour affected by the dredging activity. Monitoring sites are located in the DMP). Pre-impact monitoring will be undertaken over a number of tidal cycles and seasons; and
2. water quality trigger levels based on both 'moderate' and 'high' levels of ecological protection apply to this project and will be derived based on the guidance provided in Table 4 below:

**Table 4: DMMA H discharge water trigger levels for contingency measures**

| <b>Parameter</b> | <b>Trigger Level<br/>(High Protection Level Areas)</b>  | <b>Trigger Level<br/>(Moderate Protection Level Areas)</b>                                   |
|------------------|---|--|
| Turbidity (NTU)  | Median > 80 <sup>th</sup> percentile of baseline or reference site data                       | Median > 95 <sup>th</sup> percentile of baseline or reference site data                      |
| Temperature      | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| pH               | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| Dissolved Oxygen | < 60% saturation  | < 60% saturation   |
| Conductivity     | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| Metals           | 95 <sup>th</sup> percentile ≤ 99% species protection trigger level *                          | 95 <sup>th</sup> percentile ≤ 90% species protection trigger level *                         |

\* ANZECC and ARMCANZ (2000).

If diurnal or seasonal medians of water quality parameters measured at reference sites are found to fall outside the trigger levels, discrete data distributions may be used, and new percentiles calculated for each discrete time interval (e.g. diurnal, seasonal, or tidal) to ensure that management trigger levels are matched as closely as possible to the natural environment.

Monitoring and contingency measures for dredging management are recommended as an environmental condition. The proponent has given an undertaking to the following actions in the event that exceedance of the management trigger levels is observed:

- upon the initial exceedance being detected, management measures (e.g. raise/lower water levels in settlement area) will be implemented to improve quality of the discharge waters (this may or may not include stopping discharge from the DMMA H);
- if water quality has not improved to within trigger levels within 48 hours, discharge will be stopped from that DMMA H. Further management measures (e.g. altering the configuration of the settlement areas) will be implemented. Discharge will resume once measures are implemented; and
- if water quality does not improve after these further management measure are implemented, discharge will stop and will not resume until water quality testing shows that water quality is within trigger levels.

## Summary

Having particular regard to the:

- recommendation for a condition regarding water quality monitoring, including trigger levels and contingency measures, with specific requirements for the proponent to:
  - carry out baseline water quality monitoring;
  - carry out water quality monitoring at agreed locations that may be effected by the suspended sediment (impact monitoring sites), at agreed reference sites and at the DMMA H discharge points;
  - carry out water quality monitoring at agreed locations that may be effected by the dredging and resuspending of potential contaminants (impact monitoring sites), at agreed reference sites and at the DMMA H discharge points; and
  - implement the Dredging Management Plan,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

### 4.3 Acid sulphate soils

#### Description

The proponent identified the presence of Potential Acid Sulphate Soils (PASS) material within the upper couple of metres of the dredging profile. To minimise the potential for dredged PASS material to be oxidised it is proposed that identified PASS material (up to 2.7Mm<sup>3</sup>) will be disposed of offshore within PHPA Spoil Ground '1'.

Oxidation of PASS material has the potential to impact on soil and water quality and may result in the release of sulphuric acid, iron and other heavy metals into the soil and water. This may potentially result in adverse impacts upon the receiving environment. The level of impact is dependent on the quantity of acid generated as well as the concentration, expressed as total and retained acidity.

To minimise the potential for dredged PASS material to be oxidised it is proposed that identified PASS material will be disposed of offshore within PHPA Spoil Ground '1'.

#### Assessment

The EPA's environmental objective for this factor is to ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The area for assessment is the sediments and waters of the Port Hedland inner harbour to be dredged, and South East Creek, the receiving point for DMMA H tailwaters.

Non-Acid Sulphate Soils (NASS) will be pumped to DMMA H. There is minimal risk of PASS occurring in the dredged material at levels requiring management or being oxidised giving rise to acid sulphate soils.

The proponent has developed an Acid Sulphate Soil Management Plan which details environmental monitoring parameters and contingency methods (Appendix B2 of BHPBIO, 2009).

Following advice from DEC Contaminated Sites Branch, the proponent has incorporated monitoring for the presence of iron monosulphides and total acidity within the DMMA H on an annual basis for five years. The EPA has recommended conditions to give effect to the proponent's Acid Sulphate Soil Management Plan.

The conditions address the monitoring of excess water from the Dredged Material Management Area (DMMA H) to ensure it meets the action criteria outlined in *Dewatering Effluent and Groundwater Monitoring Guidance for Acid Sulphate Soil Areas* (Department of Environment and Conservation, 2006) and contingency management measures that will be implemented in the event that action criteria are exceeded.

The recommended conditions include a monitoring program for the presence of iron monosulphides and total acidity within DMMA H on an annual basis for five years following completion of the dredging. Should levels of iron monosulphides and total acidity within DMMA H be detected that require further management, the proponent shall initiate a management response to neutralise this material.

### **Summary**

Having particular regard to the:

- disposal of PASS material offshore in Commonwealth waters within PHPA Spoil Ground '1';
- proponent's Acid Sulphate Soil Management Plan;
- EPAs' recommended conditions regarding monitoring and management of excess water from the Dredged Material Management Area (DMMA H) to ensure it meets the action criteria outlined in *Dewatering Effluent and Groundwater Monitoring Guidance for Acid Sulphate Soil Areas* (Department of Environment and Conservation, 2006); and
- EPA's recommended condition to monitor for the presence of iron monosulphides and total acidity within the DMMA H on an annual basis for five years. The recommended condition addresses contingency management in the event that iron monosulphides are detected and total acidity trigger levels are exceeded,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

## **4.4 Land use management and rehabilitation**

### **Description**

Following completion of the dredging and reclamation activities, DMMA H will contain approximately 4 Mm<sup>3</sup> of material. Due to bulking of materials as they are broken up from consolidated layers for transportation to DMMA H, the final volume to be placed on land will be greater than the volume actually dredged from the harbour.

DMMA H will have a permanent berm to a height of +9 m AHD to contain the 4 Mm<sup>3</sup> dredged material. The berm will be constructed of competent dredged material.

The proponent has committed to the sustainable use of the dredged material and is currently considering opportunities for re-use. The nature of the fill and its high salt levels will influence how it is managed and the ultimate land use by the Port Hedland Port Authority.

Potential impacts associated with DMMA H in the time between being reclaimed and being re-used or stabilised include:

- potential increases in dust generation from DMMA H;
- introduction and establishment of weed species; and
- modification of the landform resulting in altered local erosion, stability and drainage.

### **Assessment**

The EPA's environmental objective for this factor is to ensure that rehabilitation achieves an acceptable standard compatible with the intended land use, ensure that the area does not contribute significantly to background dust levels and the visual amenity of the area and adjacent surrounds is not unduly affected by the proposal.

The area for assessment is the construction footprint of DMMA H. Potential impacts associated with DMMA H in the time between being reclaimed and being re-used or stabilised include:

- potential increases in dust generation from DMMA H;
- introduction and establishment of weed species; and
- modification of the landform resulting in altered local erosion, stability and drainage.

BHPBIO has developed a Land-use Management Plan (Appendix B5 of BHPBIO, 2009) that details measures to stabilise and manage DMMA H upon completion of dredged material disposal activities to protect visual amenity, reduce dust emissions from open areas and minimise impacts to underlying groundwater.

The proponent has indicated that the timing of opportunities to re-use the dredged material has not been finalised. If material is not utilised within five years from completion of dredging, DMMA H will be rehabilitated in accordance with the long-term guiding principles detailed in the Land-use Management Plan. The EPA has recommended a condition to ensure that this occurs.

As noted in the EPA's Report 1311 (EPA, 2008) there are existing concerns regarding dust in Port Hedland and in particular, on the Wedgefield Industrial Estate. It is the EPA's expectation that the DMMA H area will be managed so that it does not add significantly to background dust levels. The EPA is aware of the work of the Government-led Port Hedland Dust Taskforce whose role is to develop an agreed strategy for managing iron ore dust.

The EPA has recommended a condition to ensure there is sufficient monitoring adjacent to the DMMA H area (locations and methodology that are consistent with the Port Hedland Dust Taskforce) during construction and until such time as the area is stabilised. This will require BHPBIO to demonstrate that it is not contributing significantly to background dust levels, and if it is, then BHPBIO will be required to undertake remedial actions such as additional stabilisation to reduce the contribution of this area to background dust levels.

## Summary

Having particular regard to:

- the proponent's intention to find a sustainable use for the dredged material disposed of on-shore;
- the EPA's recommended conditions requiring proponent to demonstrate that the DMMA H area is not contributing significantly to background dust levels, and utilises the data collection methodology and monitoring locations for Wedgefield as per the criteria established for the Port Hedland area by the Government led Port Hedland Dust Taskforce;
- the proponent ensuring that minimal additional wind-born dust generated by the DMMA H during periods of high winds;
- no uncontrolled erosion impacts beyond the DMMA H drainage system;
- sediment loads in drainage system stormwater flows cause minimal change to receiving water quality; and
- the EPA's recommended condition for the area to be rehabilitated if a use for the land is not established within 5 years of dredging,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

## 5. Recommended Conditions

The EPA recommends a set of conditions to be imposed if the proposal by BHPBIO to undertake dredging at Nelson Point, Port Hedland is approved for implementation.

Matters specifically addressed in the conditions (presented in Appendix 2) include:

- **Marine water and sediment quality:** giving effect to the proponent's Dredging Management Plan which provides for water quality monitoring and management, including the establishment of trigger values during the dredging campaign to achieve both 'moderate' and 'high' levels of ecological protection as defined in areas of the Port Hedland harbour (Figure 4). The recommended condition addresses contingency management measures that will be implemented in the event that marine water and sediment quality does not meet described water quality triggers as a result of dredging activities and/or excess water discharge.
- **Acid Sulphate Soils:** giving effect to the proponent's Acid Sulphate Soil Management Plan and recommending conditions to monitor excess water from the Dredged Material Management Area (DMMA H) to ensure it meets the action criteria outlined in *Dewatering Effluent and Groundwater Monitoring Guidance for Acid Sulphate Soil Areas* (Department of Environment and Conservation, 2006) and contingency management measures that will be implemented in the

event that action criteria are exceeded. The recommended conditions include a monitoring program for the presence of iron monosulphides and total acidity within DMMA H on an annual basis for five years following completion of the dredging. Should levels of iron monosulphides and total acidity within DMMA H be detected that require further management, the proponent shall initiate a management response to neutralise this material.

- **Land use management and rehabilitation:** giving effect to the proponent's Land Use Management Plan to ensure that the DMMA H areas is managed to minimise adverse effects on the environmental values of surrounding areas from processes such as dust generation, changes in surface water drainage, weed infestation and impacts on fauna. Specifically the proponent is required to demonstrate that the proposal is able to comply with the criteria established for the Port Hedland area by the Government led Port Hedland Dust Taskforce and is not contributing significantly to background dust levels; and to rehabilitate DMMA H if material is it is not utilised within five years following the completion of dredging.

## 6. Other Advice

### Strategic Assessment of the other BPPH in the Port Hedland Port Area

The proposal includes the removal of 4 ha of mangroves which would take the level of cumulative loss of mangroves in Port Hedland to 11.15%. The proponent has included the proposed cumulative historical loss based on baseline assessments from 1963. There is discussion between the Port Hedland Port Authority and BHPBIO in relation to the recalculation of the present mangrove representation given evidence of recolonisation in pre-disturbed areas and new recruitment however, these figures are still being verified.

The proposal includes the removal of a total area of 88.8 hectares of samphire and cyanobacterial mats. To date there has not been any research into the ecosystem function and productivity of the salt marshes (samphire) and cyanobacterial mats or the sub-tidal microphytobenthos, and algal reefs in the Port Hedland Port Management Unit. Several proposals have been assessed in recent years that have utilised significant areas of these habitat types without a cumulative impact assessment being undertaken.

Guidance Statement 29 states that a proponent who wishes to remove BPPH from a Category F area should provide an offsets package and “... *a substantial justification for the proposal, supported by technically defensible information that demonstrates understanding of the ecological role and value of the BPPH within the local context. Using this understanding, the proponent would be expected to evaluate any impacts, and to determine the significance of those impacts on ecosystem integrity.*”

Given that mangrove, samphire and cyanobacterial mats, algal reefs and sub-tidal microphytobenthos losses in Port Hedland may be moving towards a situation of significantly exceeding the cumulative loss guideline for BPPH, it is appropriate that the proponent is also moving towards:

- an improved understanding of cumulative impacts/loss on these communities;

- an understanding of the significance of any BPPH losses beyond the cumulative loss threshold on ecosystem integrity; and
- a suitable offsets package where required.

BHPBIO has advised that it is investigating options for the development of an offsets package for mangroves. BHPBIO is intending to develop a proposed package in consultation with the DEC and other stakeholders and is taking into consideration the future growth program within the Port Hedland area, including the dredging associated with this proposal.

The EPA supports the approach being taken by BHPBIO. It is recommended that the proponent should demonstrate an understanding of the ecological role and value of mangroves, samphire and cyanobacterial mats, and sub-tidal microphytobenthos, and algal reefs in Port Hedland, then describe the impacts of further loss of these habitats on ecosystem integrity.

#### Aboriginal Heritage

A large portion of the Port Hedland inner harbour was recently identified as an Aboriginal heritage site (No. 22874, Marapikurrinya Yintha). The EPA notes that the proponent will require specific approval from the Minister for Indigenous Affairs if this site is to be impacted by this proposal.

## 7. Conclusions

The EPA has considered the proposal by BHPBIO to undertake dredging at Nelson Point, Port Hedland.

The EPA notes that the proponent has undertaken a risk-based assessment to identify the key environmental factors and has prepared comprehensive management plans to address the potential environmental impacts. A set of outcome-based conditions have been recommended to ensure the appropriate implementation of relevant elements of the proponent's management plans.

The EPA has recommended conditions relating to

- **Marine water and sediment quality:** to achieve both 'moderate' and 'high' levels of ecological protection as defined in areas of the Port Hedland harbour.
- **Acid sulphate soils:** the monitoring and management of excess water from the DMMA H to ensure it meets the action criteria outlined in *Dewatering Effluent and Groundwater Monitoring Guidance for Acid Sulphate Soil Areas* (Department of Environment and Conservation, 2006). The recommended conditions include a monitoring program for the presence of iron monosulphides and total acidity within DMMA H on an annual basis for five years following completion of the dredging. The recommended condition addresses contingency management in the event that iron monosulphides are detected and total acidity trigger levels are exceeded.
- **Land use management and rehabilitation:** to ensure that the DMMA H area is managed to minimise adverse effects on the environmental values of surrounding

areas from processes such as dust generation, changes in surface water drainage, weed infestation and impacts on fauna. This includes rehabilitation of the DMMA H if material is it is not utilised within five years following the completion of dredging. Specifically the proponent is required to demonstrate that the proposal is able to comply with the criteria established for the Port Hedland area by the Government led Port Hedland Dust Taskforce.

The EPA has also provided Other Advice noting that mangrove, samphire and cyanobacterial mats, algal reef and sub-tidal microphytobenthos loss in Port Hedland may be moving towards a situation of significantly exceeding cumulative loss guidelines. BHPBIO has advised that it is undertaking further investigations to demonstrate an understanding of the cumulative loss as well as the ecological role and value of these communities in Port Hedland area. The EPA supports the approach being taken by BHPBIO.

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.

## **8. Recommendations**

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

1. that the Minister notes that the proposal being assessed is for dredging by BHPBIO at Nelson Point, Port Hedland;
2. that the Minister considers the report on the key environmental factors as set out in Section 4;
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.

# **Appendix 1**

## **References**

Department of Environment (2006) *Pilbara Coastal Water Quality Consultation Outcomes: Environmental Values and Environmental Quality Objectives*, Marine Report Series No.1, March 2006.

Environmental Protection Authority (2004) *Guidance for the Assessment of Environmental Factors Western Australia, No. 29: Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment*, June 2004.

Environmental Protection Authority (2008) *Port Facility Upgrade – Anderson Point, Port Hedland: Dredging and wharf construction – third berth. Fortescue Metals Group Ltd.* Report and recommendations of the Environmental Protection Authority, Bulletin 1286, April 2008.

Environmental Protection Authority (2008) *Port Hedland Finucane Island Dredging. BHP Billiton.* Report and recommendations of the Environmental Protection Authority, Bulletin 1304, November 2008.

## **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 relevant 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:

| <b>Decision-making Authority</b>    | <b>Approval</b>                    |
|-------------------------------------|------------------------------------|
| 1. Minister for State Development r | State Agreement Act                |
| 2. Minister for Transport           | Port Management Area               |
| 3. Minister for Indigenous Affairs  | Section 18 Aboriginal Heritage Act |

RECOMMENDED ENVIRONMENTAL CONDITIONS

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

**DREDGING AT NELSON POINT,  
BHP BILLITON RGP6 PROJECT, PORT HEDLAND**

**Proposal:** The proposal involves the dredging of not more than 6.7 million cubic metres (Mm<sup>3</sup>) of material for two new berth pockets and extensions to the existing departure channel and swing basin at Nelson Point to accommodate vessels of approximately 250,000 dead weight tonnes (DWT); disposal of dredged material at both offshore in Commonwealth waters site and to a land based dredged material management area (DMMA), as documented in schedule 1 of this statement.

**Proponent:** BHP Billiton Iron Ore Pty. Ltd.

**Proponent Address:** Level 17, 225 St George's Terrace, PERTH WA 6000

**Assessment Number:** 1803

**Report of the Environmental Protection Authority:** Report 1337

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 assessed by the Environmental Protection Authority 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 (CEO) of the Department of Environment and Conservation 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 within 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 CEO of the Department of Environment and Conservation 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.

### **Notes**

1. Where a condition states “on advice of the Environmental Protection Authority”, the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.
2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.
3. The Minister for Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.

### **4 Compliance Reporting**

- 4-1 The proponent shall prepare and submit a compliance assessment plan to the satisfaction of the CEO of the Department of Environment and Conservation, prior to implementation of the proposal and at least six months prior to the first compliance report required by condition 4-6, whichever is sooner.
- 4-2 The proponent shall implement and maintain, to the satisfaction of the CEO of the Department of Environment and Conservation, the compliance assessment plan required by condition 4-1. 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. reporting of potential non-compliances and corrective actions taken;
  5. the table of contents of compliance reports; and
  6. public availability of compliance 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 CEO of the Department of Environment and Conservation.
- 4-5 The proponent shall advise the CEO of the Department of Environment and Conservation of any potential non-compliance within two business days of that non-compliance being known to the proponent.
- 4-6 The proponent shall submit a compliance assessment report annually from the date of issue of this Implementation Statement addressing the previous twelve month period or other period as agreed by the CEO of the Department of Environment and Conservation. The compliance assessment report shall:
1. be endorsed by the proponent's Managing Director or a person, approved in writing by the Department of Environment and Conservation, 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 Performance Review and Reporting**

- 5-1 The proponent shall submit to the CEO of the Department of Environment and Conservation a Performance Review Report at the conclusion of the first, second, fourth and sixth years after the start of dredging and then, at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which addresses:
1. the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to management of the major risks and impacts;
  2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and
  3. significant improvements gained in environmental management which could be applied to this and other similar projects.

## **6 Marine Water Quality**

- 6-1 The proponent shall implement the Dredging Management Plan included as Appendix B3 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*, to the satisfaction of the CEO of the Department of Environment and Conservation.

The objectives of the Plan are to protect the environmental values of Port Hedland harbour by ensuring water quality meets the levels of ecological protection as spatially defined in Figure 4.15 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*.

- 6-2 Implementation of the Plan referred to in condition 6-1 shall include:

1. water quality monitoring during the dredging campaign for the collection of physical water quality data via loggers incorporating the following parameters: turbidity; pH; dissolved oxygen; conductivity; and temperature, at sites in and adjacent to Oyster Inlet and sites in and adjacent to the Port Hedland harbour as illustrated in Figure 8.10 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*;
2. water quality monitoring for the collection of total suspended solids concentrations and turbidity measurements at the spoil disposal discharge associated with Dredged Material Management Area (DMMA H) and the logged impact sites downstream Figure 8.9-10 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*;
3. water quality monitoring during the dredging campaign for the collection of dissolved metals and ammonia concentration data, collected at impact and control sites for the receiving waters of the DMMA H return water discharge and at sites in the Port Hedland Harbour affected by the dredging activity. Monitoring sites are located in Dredge Management Plan. Pre-impact monitoring will be undertaken over a number of tidal cycles and seasons;
4. water quality trigger levels based on both 'moderate' and 'high' levels of ecological protection apply to this project and will be derived according to the guidance in the table below:

**Table 1: Water quality trigger levels for contingency measures**

| <b>Parameter</b> | <b>Trigger Level<br/>(High Protection Level Areas)</b>  | <b>Trigger Level<br/>(Moderate Protection Level Areas)</b>                                   |
|------------------|---|--|
| Turbidity (NTU)  | Median > 80 <sup>th</sup> percentile of baseline or reference site data                       | Median > 95 <sup>th</sup> percentile of baseline or reference site data                      |
| Temperature      | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| pH               | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| Dissolved Oxygen | < 60% saturation  | < 60% saturation   |
| Conductivity     | Median < 20 <sup>th</sup> or > 80 <sup>th</sup> percentile of baseline or reference site data | Median < 5 <sup>th</sup> or > 95 <sup>th</sup> percentile of baseline or reference site data |
| Metals           | 95 <sup>th</sup> percentile ≤ 99% species protection trigger level *                          | 95 <sup>th</sup> percentile ≤ 90% species protection trigger level *                         |

\* ANZECC and ARMCANZ (2000).

5. contingency management measures that will be implemented in the event that marine water quality does not meet described water quality triggers as a result of dredging activities and/or return water discharge; and
6. the procedures for reporting the results of water quality monitoring, exceedance of any water quality trigger levels and effectiveness of the contingency management measures.

## **7 Acid Sulphate Soils**

7-1 The proponent shall implement the Acid Sulphate Soil Management Plan as included as Appendix B2 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*, to the satisfaction of the CEO of the Department of Environment and Conservation.

The objectives of the Plan are to:

1. minimise the risk to the environment resulting from Acid Sulphate Soils; and
2. maintain and protect water quality for existing environmental values and ecosystem functions.

7-2 Implementation of the Plan referred to in condition 7-1 shall include:

1. monitoring of excess water from the Dredged Material Management Area (DMMA H) that will be discharged through a fixed discharge point to ensure it

meets the action criteria outlined in *Dewatering Effluent and Groundwater Monitoring Guidance for Acid Sulphate Soil Areas* (Department of Environment and Conservation, 2006);

2. monitoring of excess water from the DMMA H for total titratable acidity, electrical conductivity and pH to ensure that water quality parameters are maintained at a pH greater than 6 and a total titratable acidity less than 40 milligrams per litre;
3. contingency management measures that will be implemented in the event that action criteria are exceeded; and
4. a monitoring program for the presence of iron monosulphides and total acidity within DMMA H on an annual basis for five years following completion of the dredging. Should levels of iron monosulphides and total acidity within DMMA H be detected that require further management, the proponent shall initiate a management response to neutralise this material.

## **8 Land use Management and Rehabilitation**

- 8-1 The proponent shall implement the Land Use Management Plan included as Appendix B5 of the *Environmental Referral Document: Port Hedland Nelson Point Dredging, May 2009*, to the satisfaction of the CEO of the Department of Environment and Conservation.

The objectives of the Plan are to:

1. minimise adverse effects on the environmental values of surrounding areas from processes such as dust generation, changes in surface water drainage, weed infestation and impacts on fauna;
2. ensure that the Dredged Material Management Area (DMMA H) land surface is managed such that it is safe, stable and suitable for designated end land use;
3. maintain a landscaped view of the area; and
4. identify an environmentally sustainable final land use for the reclaimed material and management areas.

- 8-2 Specifically the Proponent is required to ensure that:

1. minimal additional wind-born dust generated by the DMMA H during periods of high winds;
2. no uncontrolled erosion impacts beyond the DMMA H drainage system;
3. sediment loads in drainage system stormwater flows cause minimal change to receiving water quality;
4. adequate vegetation established over 80% of revegetation areas within two years of revegetation;
5. no more than 10% of DMMA H surface area and visual berm areas infected by weeds; and

6. no uncontrolled slumping of berm surfaces beyond geotechnical limits.
- 8-3 In accordance with the criteria established for the Port Hedland area by the Government led Port Hedland Dust Taskforce, the proponent will ensure that:
1. the Proponent shall ensure ambient air quality monitoring is conducted for 24 hour average PM10 ambient dust levels at a site located in Wedgefield;
  2. demonstrates that the DMMA H area is not contributing significantly to background dust levels established for the Port Hedland area by the Government led Port Hedland Dust Taskforce;
  3. ensures that minimal additional wind-born dust generated by the DMMA H during periods of high winds;
  4. allows no uncontrolled erosion impacts beyond the DMMA H drainage system;
  5. ensures that sediment loads in drainage system stormwater flows cause minimal change to receiving water quality; and
  6. the proponent shall continue to employ a public complaints receipt and management process and where determined to be the cause, ensure mitigating measures are implemented to reduce dust emission.
- 8-4 The proponent shall rehabilitate DMMA H if material is not utilised within five years following the completion of dredging.

## **9 Aboriginal Heritage**

- 9-1 The proponent shall prepare an Aboriginal Cultural Heritage Management Plan (Plan) and submit the Plan to the Registrar of Aboriginal Sites prior to the commencement of works.

## Schedule 1:

**Table 1: Key Characteristics**

| Element   | Description   |
|---|---|
| Volume of material to be dredged                          | Not more than 6.7 Mm <sup>3</sup> based on <ul style="list-style-type: none"> <li>• Approx 2.7Mm<sup>3</sup> offshore disposal</li> <li>• Approx 4.0Mm<sup>3</sup> onshore disposal</li> </ul>  |
| Duration of dredging                                      | Off shore disposal: Approx 68 weeks<br>On shore disposal: Approx 46 weeks   |
| Area of marine disturbance for dredging                   | Not more than 60 hectares (ha) at Nelson Point  |
| Area of land disturbance for dredging                     | DMMA H construction footprint not more than 204 ha that includes <ul style="list-style-type: none"> <li>• a 60 m wide pipeline corridor from DMMA H across Lumsden Point to Harbour, temporary haul road, turning areas, and windrows, batters and scour protection</li> <li>• 40 m wide overflow channel from DMMA H to South East Creek including scour protection</li> </ul> |
| BPPH: Area of direct/indirect mangrove loss               | <ul style="list-style-type: none"> <li>• Closed canopy mangroves not more than 0.22 ha</li> <li>• Scattered mangroves not more than 3.78 ha (predominantly <i>Avicennia marina</i> closed canopy and scattered – considered a high value species)</li> </ul>  |
| BPPH: Area of direct/indirect samphire meadow loss        | <ul style="list-style-type: none"> <li>• Not more than 10 ha in DMMA H</li> </ul>   |
| BPPH: Area of direct/indirect of cyanobacterial mats loss | <ul style="list-style-type: none"> <li>• Not more than 78.8 ha in DMMA H</li> </ul>   |
| Offshore disposal of dredged material                     | Not more than 2.7Mm <sup>3</sup> to Spoil Ground ‘1’ (Commonwealth waters)  |
| Onshore disposal of dredged material                      | Not more than 4.0Mm <sup>3</sup> to DMMA H (excluding bulking)  |
| Final height of DMMA H                                    | Not more than +9.0 m AHD  |

The dredging works involve:

- The dredging of PASS and non-PASS material with a Backacter Dredge with subsequent offshore disposal to Spoil Ground ‘1’ via split hopper barges; and
- The dredging of non-PASS material with a Cutter Suction Dredge and the pumping of dredged material onshore to DMMA H

Capital works for the development of DMMA H will involve the following:

- Construction of a perimeter earth bunds to +0.9 m AHD at DMMA H
- Construction of an approx 40 m wide overflow channel from DAMMA H to South East Creek, including scour protection.

- Construction of an approx 60 m wide pipeline corridor (reduced to 20 m in areas of closed canopy mangroves) from DMMA H north across Lumsden Point out to the Harbour to allow the installation of the two 900 mm internal diameter steel pipelines (one live, one as spare). This will allow for the pumping of material from the dredge to DMMA H. This corridor allows for:
  - Safe access for construction vehicle traffic;
  - Windrows, batters, and scour protection;
  - A temporary haul road on one side for construction of the pipeline corridor; and
  - An allowance for turning areas and contractor lay down
- A construction boundary will be established around the bund walls and pipeline corridors including a 20 m buffer on each side of the outlet channel. This construction boundary will only be disturbed during the project for construction activities such as lay down areas, haul roads, and construction access. Disturbance within this construction boundary will be minimised where possible.

See figures 1-4 above in the main body of this report (pages 2, 3, 7, 13).

# **Appendix 3**

**Proponent's Environmental Referral Document**