OCTOBER 2008

PORT OPERATIONS

PORT HEDLAND
HARRIET POINT DREDGING

Land Use Management Plan

IRON ORE

bhpbilliton

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

BHPBIO is seeking approval under Part IV of the Environmental Protection Act 1986 for dredging at Harriet Point on Finucane Island. The proposal is a component of the Rapid Growth Project 5 (RGP5) expansion to increase the throughput capacity at BHPBIO's operations to 205 Mtpa.

The proposal involves the dredging of approximately 3.9 million cubic metres (Mm3) of material for two new berth pockets and extensions to the existing departure channel and swing basin at Harriet Point to accommodate vessels of approximately 250,000 dead weight tonnes (DWT).

The management of the dredged material to Dredged Material Management Areas (DMMA) will be dependent the characteristics of the dredged material. Due to the highly variable nature of the marine sediments, it is estimated that between 250,000 m3 and 800,000 m3 of Potential Acid Sulphate Soils (PASS) material will be disposed offshore at the Port Hedland Port Authority (PHPA) Spoil Ground 'I'. All other dredged material will be managed at DMMA B1 and B2, with excess fines managed at DMMA A.

Long term re-use and management options for the dredged material include re-use as fill material in future projects or rehabilitation of the management areas in-situ.

1.2 PLAN OBJECTIVES

This Land Use Management Plan (LMP) has been developed to define the overall environmental management objectives of the onshore DMMA A, B1 and B2.

The LMP proposes guiding principles and performance indicators that will assist in the management of the DMMA following completion of the dredging and associated activities.

The objectives of the LMP are to:

- Ensure that each DMMA land surface is managed such that it is safe, stable and suitable for designated end land use;
- Minimise adverse effects on the environmental values of surrounding areas; e.g. dust generation, changes in surface water drainage, weed infestation and impacts on fauna;
- Maintain a landscaped view of the area; and
- Identify an environmentally sustainable final land use for the reclaimed material and management areas.

1.3 LEGAL REQUIREMENTS AND GUIDELINES

The environmental objective for the land use is to ensure the rehabilitation of DMMA achieves an acceptable standard compatible with the intended land use.

The key EPA Position Statements and Guidelines that are likely to be of relevance to land use management are as follows:

- EPA Position Statement 6: Towards Sustainability (2004);
- EPA Position Statement 7: Principles of Environmental Protection (2004); and
- EPA Guidance Statement No. 55: Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process (2003).

2 PROJECT DESCRIPTION

2.1 DESCRIPTION OF PROPOSED DREDGED MATERIAL MANAGEMENT

The locations of dredging activities and Dredge Material Management Areas are shown in **Figure 1**. Dredging of approximately 3.9 Mm^3 of material will be required for two new berth pockets and extensions to the existing departure channel and swing basin at Harriet Point. The overlying unconsolidated layer of dredged material has been characterised as PASS which will be disposed of offshore. It is estimated that up to 800,000 m^3 of mainly clayey silts and fine sands will be dredged and disposed of at the designated PHPA Spoil Ground 'I'.

It is estimated that up to 3.7 Mm^3 of non-PASS material will be directed to the onshore DMMA. The majority of the material will be placed at DMMA B1 and B2. Fine material will be pumped to DMMA A and it is estimated that up to 20% by volume of total in-situ material will be fines.

Due to bulking of materials as they are broken up from consolidated layers for transportation to DMMA, the final volume to be placed on land will be greater than the volume actually dredged from the harbour. The estimated maximum volume to be placed onshore (based on a minimum volumes of material to be placed offshore of 250,000 m^3) for DMMA B1 and B2 is 3.1 Mm^3 and for DMMA is 2.8 Mm^3.

Prior to the commencement of disposal activities the following preparatory works will be carried out:

- A seawall will be constructed along the harbour face of both DMMA B1 and B2. The sea wall will be built to an elevation of 7.0 m AHD using competent core material protected by rock armour overlying geotextile fabric;
- A berm will be constructed at DMMA B1 and B2 to an elevation of 17.5 m AHD;
- Prior to construction of DMMA A, tests will be conducted of the topsoil to identify any non-PASS topsoil resource. If suitable, sufficient non-PASS soils will be extracted and stockpiled adjacent to the DMMA area to be used for rehabilitation of the containment bunds or capping of the DMMA in the event that the stored dredge material is not reused.
- Bund walls will be constructed around DMMA A to contain fines and dredging water. These bund walls will be built to an elevation of 7.5 m AHD using suitable insitu material and clean sourced fill. These containment bunds will be designed and constructed using appropriate civil engineering techniques to ensure geotechnical stability. Portions of these bund walls may be protected with rock armour to prevent erosion of the bund;
- A pipeline will be installed between DMMA B1 and B2 to facilitate the transfer of water and fine material; and
- A pipeline will be installed along the existing overland conveyor causeway to facilitate the transfer of the excess water and fine material from the DMMA B1 and B2 to DMMA A.

Following the placement of dredge spoil in DMMA B1 and B2, and environmental berm will be constructed along the harbour side of the reclaimed areas to an elevation of 17m AHD to provide visual barrier between the existing Finucane Island onshore infrastructure and the township of Port Hedland.

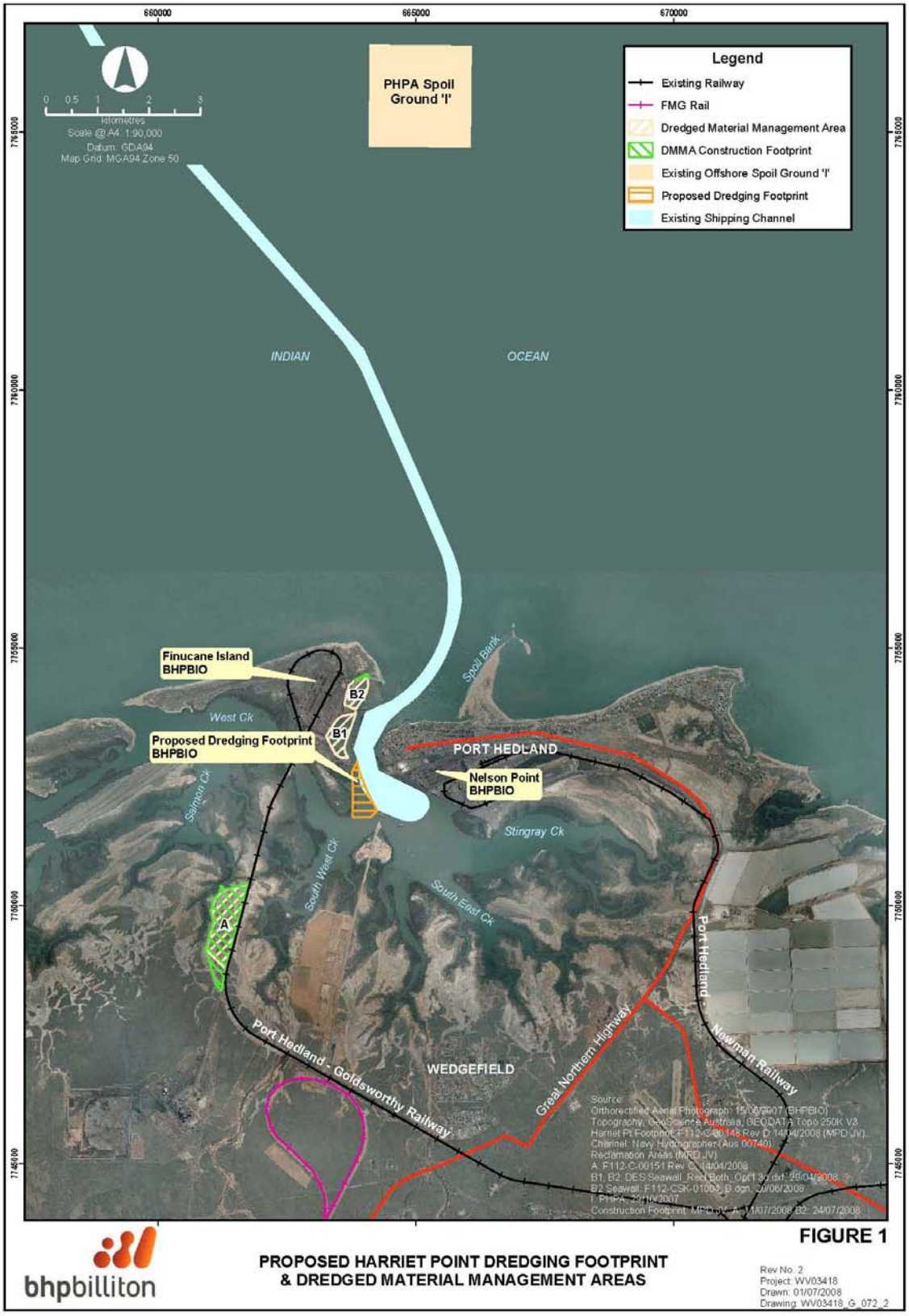

Figure 1 Overview of Dredging Footprint and DMMA

3 POTENTIAL IMPACTS & MANAGEMENT

Potential impacts associated with the DMMA in the period between the transfer of material and being re-used or stabilised include:

- Potential increases in dust generation from DMMA following completion of dredging;
- Introduction and establishment of weed species; and
- Modification of the landform resulting in altered local drainage which could lead to erosion and adjacent vegetation damage.

3.1 PROPOSED GUIDING MANAGEMENT PRINCIPLES

A degree of flexibility with respect to the management of the DMMA following the completion of the dredging and reclamation activities is required so that the actual final land use can be optimised as necessary. To achieve this flexibility, the following guiding post-dredging management principles for the DMMA are proposed:

Short-term (up to five years post dredging)

- There will be no significant, physical off-site impacts.
- There will be no unsafe areas where members of the general public could inadvertently gain access.
- The short-term post dredging landform will be stable and respond to erosive forces in a similar manner to equivalent naturally occurring landforms in the Port Hedland area.
- Declared Weeds and significant environmental weeds will be controlled. Weeds from adjacent areas will be prevented from establishing within the DMMA, and weeds will be prevented from establishing in surrounding areas as a result of earthworks or rehabilitation activities.
- The environmental berms at DMMA B1 and B2 will be partially vegetated using vegetation suitable to the characteristics of the area. Other exposed surfaces of the berm will be stabilised with rock armour or other suitable stabilisation practices.
- The final land use for the DMMA will be determined in consultation with stakeholders, and agreed with the Port Hedland Port Authority within five years of completion of the dredging.

Long-term (greater than five years post dredging)

- There will be no significant, physical off-site impacts.
- There will be no unsafe areas where members of the general public could inadvertently gain access.
- BHPBIO will rehabilitate areas of the DMMA where dredged material has not been re-used. This will include reshaping batters from the construction batter of 2:1 (H:V) to more suitable batter angles of 4:1 (H:V) to promote revegetation and reduce erosion risks.
- Vegetation of remaining DMMA will be aimed at establishing local native vegetation suitable to the characteristics of the area.
- Declared Weeds and significant environmental weeds will be controlled. Weeds from adjacent areas will be prevented from establishing within the DMMA, and weeds will be prevented from establishing in surrounding areas as a result of earthworks or rehabilitation activities.
- A long-term systems-based monitoring approach will be used to track the trajectory of rehabilitated areas towards self-sustaining status.

3.2 MANAGEMENT MEASURES

BHPBIO is committed to the sustainable use of the dredged material, however, there are currently several opportunities for re-use under consideration and the timing of these opportunities has not been finalised. Furthermore, the nature of the fill influences how it is managed and the ultimate landuse. Given these uncertainties, BHPBIO proposes to either:

- Re-use the dredged material within five years of the completion of dredging; or
- Fully rehabilitate any areas of the DMMA not re-used.

It is likely that material stored in DMMA B1 and B2 will be suitable for re-use as fill. During the period between being reclaimed and re-use, this material will be managed in accordance with the guiding principles discussed above, to ensure that it does not result in a dust emission source and is not eroded during periods of heavy rains.

Vegetation

The dredged material is likely to be unsuitable in its existing state for vegetating due to high salt levels. Natural rainfall infiltration processes will assist the flushing of salts from the dredged material constituting the visual berms at DMMA B1 and B2. Surface water will be collected and retained in settlement ponds within each DMMA, and if sufficient fresh water is available, areas to be revegetated will be irrigated to complement the natural salt flushing processes. Subsequent to the flushing, a layer of growth medium will be placed over the nominated areas of the visual berms and revegetated with an appropriate selection of coastal vegetation.

Upon completion of dredging activities, DMMA A will consist of reclaimed fines with high water content, and will be used as a settlement area for up to one year. After this time, BHPBIO will investigate possible re-use of the dredged material. In the event that the material is not utilised within a five year timeframe (following completion of dredging) the area will be rehabilitated in accordance with the long-term guiding principles detailed above.

Dust and Wind Erosion

A crust is likely to form on the DMMA due to the saline nature of the source environment. Potential dust lift off from the reclaimed areas will be managed through establishment of crust to seal the exposed surfaces and dust suppression techniques will be utilised as required. The surface of the dredge management areas will be stabilised upon completion of dredge spoil disposal activities.

Additional water used for irrigation of vegetation on the visual berms and for dust suppression may be sourced from the existing Finucane Island water supply infrastructure. BHPBIO has committed to a 10% reduction in fresh water consumption per tonne of iron ore (produced) during the period 2006 to 2012. However the use of water for revegetation of the visual berms is a short-term non-production use and should be consistent with this commitment.

Introduction and establishment of weed species

Ongoing weed management activities following construction will include:

- Conducting regular monitoring/inspections for the presence of weeds within areas of disturbance; and
- Treatment of infested areas, including the application of herbicides to pre-emergents where appropriate.

Modification of the landform resulting in altered local erosion, stability and drainage

Erosion within the DMMA will be managed through the installation of appropriate drainage controls.

Stormwater channels will be constructed to divert stormwater around the construction site. Stormwater flow and possible storm surge events will be calculated and allowed for when designing these channels. The external batters of DMMA A will be intercepted by tidal flows intermittently and will periodically also receive large storm surge flows from the southeast. Rock armour will be placed on exposed wall surfaces to manage potential erosion impacts from intermittent tidal influence.

Structural integrity of DMMA A will be maintained during cyclonic rainfall events by maintaining a combination of suitable internal wall height free-board above the stored dredge material, combined with a suitably sized stormwater emergency overflow structure and suitable engineering design of the tidal intercept zone.

4 MONITORING

Following cessation of dredging and reclamation activities, BHPBIO will develop and implement a monitoring programme to evaluate the management of the DMMA and assess guiding management principles. Monitoring will also be undertaken to assess against the performance indicators outlined below. It is expected that the following will be monitored:

- Visual inspection of wind-born dust during high wind periods;
- Surface water quality and flows within the modified drainage areas;
- Groundwater monitoring of the underlying aquifer;
- Public safety;
- Rehabilitation performance, including weeds; and
- Stability of landforms.

5 PERFORMANCE INDICATORS

- Minimal additional wind-born dust generated by the DMMA's during periods of high winds;
- No uncontrolled erosion impacts beyond the DMMA drainage system;
- Sediment loads in drainage system stormwater flows cause minimal change to receiving water quality.
- Reflective warning signs stating "Warning - Unstable Material – NO ENTRY" erected at 100m intervals around the perimeter of each DMMA prior to the storage of dredge material;
- Adequate vegetation established over 80% of revegetation areas within two years of revegetation;
- No more than 10% of DMMA surface area and visual berm areas infected by weeds.
- No uncontrolled slumping of berm surfaces beyond geotechnical limits.

6 RISK ASSESSMENT

A summary of the key potential impacts for land use and their associated management measures as well as their associated severity, likelihood and residual risk is provided in **Table 1**.

Potential impacts are considered to be 'known to happen, but only rarely as defined in the BHPB Risk Guidelines. Any impacts are considered to be 'moderate short term effects not effecting ecosystem function' except for the establishment weed species which is considered to have a severity of 'limited damage to minimal area of low significance' of as defined in the BHPB guidelines. The residual risk (i.e. after the management measures proposed in the plan have been applied) has therefore been determined to be minor.

Table 1 Summary of Potential Impacts resulting from land use associated with the DMMA

Potential Impact	Management	Risk Assessment		
		Severity	Likelihood	Residual Risk
Dust generation from DMMA	Implementation of LMP including: - Once dry, stabilising of the surface of DMMA and covered where possible; - Dust mitigation measures; and - Berms at B1 and B2 will be partially vegetated, partially rock	3	0.3	0.9 (minor)

Potential Impact	Management	Risk Assessment		
		Severity	Likelihood	Residual Risk
	armoured and also contained by surface sealants.			
Introduction and establishment of weed species	Proactive hygiene measures and treatment of infested areas, as required.	1	0.3	0.3 (minor)
Modification of the landform resulting in altered local erosion, stability and drainage	Installation of appropriate drainage controls. Designed to accommodate interception with tidal movement	3	0.3	0.9 (minor)