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**BAE Dredging Project Support and Consultancy Services**

## **Environmental Management Plan**



301012-01750

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BAE DREDGING PROJECT SUPPORT AND CONSULTANCY SERVICES  
ENVIRONMENTAL MANAGEMENT PLAN**

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**PROJECT 301012-01750 - BAE DREDGING PROJECT SUPPORT AND CONSULTANCY SERVICES**

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## 1. INTRODUCTION

### 1.1 General

WorleyParsons has been engaged by BAE Systems to prepare an Environmental Management Plan (EMP) for the dredging activities proposed at the Henderson facility as part of a proposed site expansion.

### 1.2 Site Expansion

BAE Systems operate a 14.5 hectare waterfront facility within the Australian Marine Complex shipyard at Henderson. The site is immediately adjacent to Cockburn Sound, approximately 22 km southwest of Perth, Western Australia. The shipyard is used for the construction, repair and maintenance of defence and commercial vessels.

BAE Systems propose to expand the facilities on the site at Henderson and develop the waterfront infrastructure including a 75 metre wharf. The area around the wharf requires the dredging of approximately 22,500 m<sup>3</sup> of sediment. Further details of the dredging are outlined in Section 2.

### 1.3 Objectives

This EMP is to provide a framework for the environmental management of the dredging and dredge disposal activities undertaken as part of a proposed site expansion at Henderson, Cockburn Sound. The EMP provides management measures (where relevant) that may apply to on-site activities as they apply to dredging, stockpiling and reclamation activities.

If a significant change in the duration or nature of the dredging works occurs, the EMP will be reviewed and amended accordingly. The review will include a reassessment of the environmental risks posed by the works. If an increase in risk to the environment is identified, corresponding mitigation and management strategies will be implemented.



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## 2. PROJECT DESCRIPTION

BAE require dredging and disposal of capital dredged material to be carried out as part of waterfront expansion at the Henderson site at Cockburn Sound. To allow access to the new wharf, dredging is required to create a navigable area with a draft of – 6.0m. The dredge footprint is 13,000 m<sup>2</sup> with a total dredge volume of approximately 22,500m<sup>3</sup> (bank volume excluding overdredge) (Figure 1). Dredging is proposed to take approximately 4 weeks and is currently scheduled for September 2013.

The preferred method of dredging is based on using a backhoe dredge (BHD), loading sediment onto barge(s) which will then be unloaded onshore. The dredge material will be unloaded from the barges using crane mounted grab equipment and stockpiled onshore.

It is proposed all material dredged will be disposed of onshore, with some of the material used as backfill for the land-backed wharf at the rear of the new berth. It is estimated that 13,500 m<sup>3</sup> of dredge spoil can be used for this purpose. The remainder of the dredge material is expected to be used for hardstand leveling and maintenance purposes on the project site, depending on volumes of backfill required and the suitability of dredged material.

If material segregation is required, separate stockpiles for the different classes of material will be established in the stockpile area. The proposed stockpile location is also shown in Figure 1. This area is existing hardstand. The material will be left in stockpile to drain before being used on site.

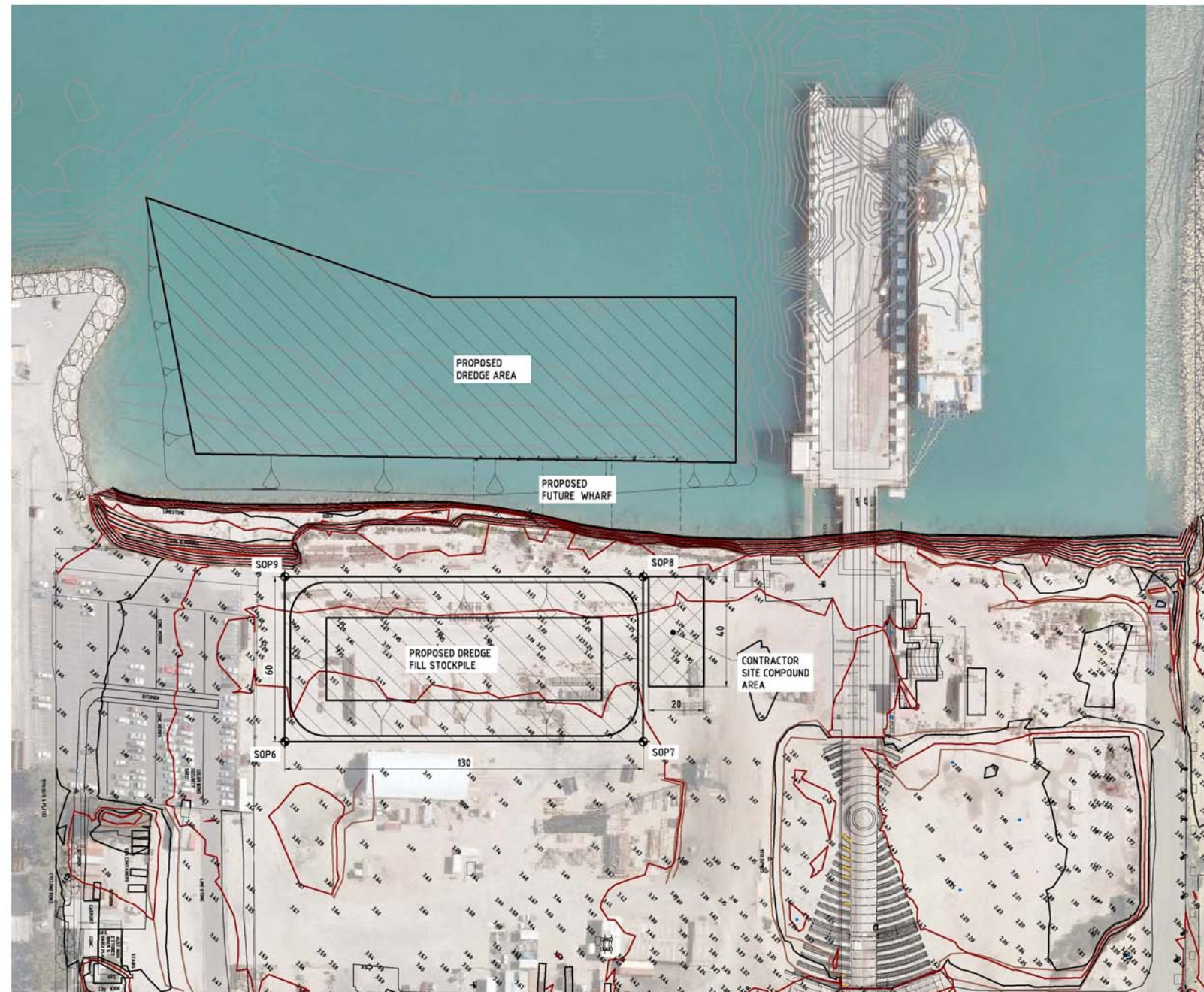


Figure 1: Proposed stockpile location, BAE Systems Henderson shipyard, Cockburn Sound



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## 3. MANAGEMENT OF POTENTIAL IMPACTS

The Henderson shipyard is located in an existing industrial zone within the City of Cockburn. Both the marine and terrestrial environment has been heavily modified through historical development of the site that involved clearing and modification of the original environs.

### 3.1 Water Quality

The environmental objective for marine water quality is to maintain the quality of water so that existing and potential environmental values are protected, including the environmental values and environmental quality objectives set for Cockburn Sound by the EPA (2005).

Water quality in Cockburn Sound is managed in accordance with the following:

- Government of Western Australia, 2005. State Environmental (Cockburn Sound) Policy 2005. Western Australia State Environmental Policy Series 1.
- Environmental Protection Authority. 2005. Revised Environmental Quality Criteria Reference Document (Cockburn Sound). A Supporting Document to the State Environment (Cockburn Sound) Policy 2005, and;
- ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

The State Environmental (Cockburn Sound) Policy 2005 defines the ecological protection zone for this section of Cockburn Sound as:

- Moderate level of protection – to allow moderate changes in the quality of water, sediment and biota (i.e. moderate changes in contaminant concentrations that could cause small changes beyond natural variation in ecosystem processes and abundance/biomass of marine life, but no detectable changes from the natural diversity of species and biological communities).

#### 3.1.1 Potential Impacts

The generation of a turbid plume is one of the most likely adverse environmental effects associated with dredging operations. The generation of dredge induced turbid plumes generally results from the resuspension of existing fine sedimentary material from the seabed during dredging and mobilisation during disposal.

Potential impacts to water quality include:

- Increased turbidity (NTU) levels-caused by suspended sediments released into the water column during dredging; and





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- Mobilisation of potential contaminants through the disturbance of sediments during dredging;

The plumes generated by the Project are expected to be very limited in temporal and spatial extent. This is due to the type of dredging equipment proposed, the short duration (four weeks), the small volume of material to be dredged, and the composition of the sediments which are predominantly sand and coarse rubble.

The sediment quality assessment undertaken for the Project has also confirmed that sediments are uncontaminated limiting any potential for mobilisation of contaminants into the water column or into groundwater once the material is disposed to land.

#### 3.1.2 Objectives

The water quality objectives for the Project are to:

- maintain marine water quality so that existing and potential environmental values are protected;
- cause no increase in turbidity that creates persistent plumes outside the immediate zone of dredging; and
- cause no deterioration in water quality from any potential return water discharge.

#### 3.1.3 Management Measures

The following management measures will be put in place:

- trained operators will be used to ensure minimal loss of turbid water from the backhoe dredge;
- dredging is to be undertaken from well maintained and inspected vessels which are free from structural defects and potential sources of leakages
- well-maintained barges will be used for transport of dredged material;
- the backhoe dredge should be fitted with a suitably accurate positioning system, that ensures reasonable accuracy of dredging both horizontally and vertically;
- material placed on shore should be suitably bunded and managed to prevent the direct discharge of turbid return water and/or run-off back into Cockburn Sound.

#### 3.1.4 Monitoring

Because of the nature and duration of the dredging proposed direct monitoring of water quality has not been recommended for the dredging program. There are no sensitive receptors adjacent to the dredge footprint; however the dredge plume should be monitored



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visually on a daily basis to confirm that the plume is not spreading outside the industrial precinct.

These observations will be undertaken from an elevated location and will include information on the plume extent (e.g. estimated distance in metres from dredging site), plume direction and prevailing conditions (e.g. wind, tide, swell) and any other notable visual characteristics of the plume or dredging activity.

If turbidity is more extensive or persistent than anticipated, additional monitoring will be undertaken to determine the plume extent. If exceedance of turbidity levels is attributable to the dredging, BAE staff would liaise directly with the dredging contractor to determine: (1) which part of the process is likely responsible for the exceedance, and; (2) what can be done in the context of the operating environment on the day to change this factor. The hierarchy of controls would be: (a) modify dredging operations; (b) modify loading operations; (c) modify dredging cycle; (d) cease dredging.

#### 3.1.5 Reporting

A daily log of observations of the plume will be maintained and provided to BAE on demand and at the conclusion of the dredging works.

## 3.2 Introduced Marine Organisms

### 3.2.1 Potential Impacts

Vessels used during the construction phase of the project e.g. dredge and hopper barges, that may be mobilised from State waters have the potential to introduce marine species from other locations.

Marine pests are often introduced either by release of ballast water in water adjacent to the port, or from biofouling species that become attached to the hulls of vessels or released from niche spaces such as sea chests and intakes.

Potential environmental impacts that may occur as a result of the introduction of marine organisms include the following:

- establishment of non-indigenous marine pest species;
- competition for food and space with native species;
- removal of native species;
- predation of native species; and
- introduction of associated pests and disease.



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#### 3.2.2 Objectives

The environmental objective for introduced marine organisms is to minimise the risk of marine pest species introduction, establishment and spread into and within Western Australian waters as a result of dredging activities.

The objective for the Project in relation to introduced marine organisms is to:

- prevent the introduction of introduced marine organisms from dredging operations; and
- implement appropriate management measures where known or suspected introduced marine organisms are detected during vessel inspections or during dredging operations.

#### 3.2.3 Management Measures

Prior to the dredge mobilising to site, it will be a condition of the dredging contract that it has received all necessary approvals with respect to introduced marine pest species from the Department of Fisheries.

An appropriate risk assessment (supported by relevant documentation) of the dredge, associated equipment and vessels should be undertaken to demonstrate, to the satisfaction of the Department of Fisheries, that the vessels and associated equipment present a low risk in terms of the introduction of non-indigenous marine organisms e.g. in sediment, as biofouling (or in ballast water).

#### 3.2.4 Reporting

Documentation demonstrating compliance with the above conditions will be provided to BAE before the arrival of vessels to site.

### 3.3 Hydrocarbons

#### 3.3.1 Potential impacts

The potential exists for hydrocarbon spills and leaks from equipment during implementation of the Project.

#### 3.3.2 Objectives

The objectives for the Project in relation to hydrocarbons are to:

- cause no significant hydrocarbon spills;
- ensure all spills are responded to as per BAE requirements; and



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- ensure no deterioration in local marine water quality occurs as a result of the use of hydrocarbons associated with the dredging activities.

#### 3.3.3 Management measures

The following management measures will be put in place:

- All hydrocarbon spills to the marine environment (regardless of volume) will be reported to BAE. This will set in motion BAE's process for marine oil pollution response and official communication protocol;
- the dredge contractor will maintain an oil spill response capability commensurate with its risk of oil spill;
- relevant staff will be trained to use oil spill response equipment;
- a pre-task job hazard analysis (JHA) will be performed before refuelling activities; and
- oily wastes will be segregated from general wastes and removed from the site in an approved manner.

#### 3.3.4 Monitoring

Refuelling activities will be continuously monitored to ensure no leak or spillage of hydrocarbons.

#### 3.3.5 Reporting

All hydrocarbon spills to the marine environment (regardless of volume) will be reported to BAE.

### 3.4 Reporting

#### 3.4.1 Incident reporting

Any incident with the potential for environmental harm will be reported to BAE as soon as practicable. Incidents will be reported to BAE initially by phone, then followed up with a formal incident report (including incident details, corrective and preventative actions taken), which will be presented to the BAE no more than 48 hours from the incident occurrence.

BAE will notify the relevant authorities, such as OEPA, WA Fisheries and DoT within 24 hours of being notified of the incident.



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### 3.4.2 Roles and responsibilities

As the proponent, the BAE is ultimately accountable for the implementation of the proposal and adherence to the commitments made within the Dredging and Disposal Management Plan (D&DMP). However, the dredging contractor will be made responsible for implementing the Project D&DMP and complying with the associated statutory approvals. Table 3-1 below identifies the key accountabilities and responsibilities associated with key positions for this Project:

**Table 3-1 Roles and Responsibilities**

Authority	Responsibility
BAE	Overall accountability for implementation of the DMP  Overall accountability for compliance with statutory requirements
BAE Superintendent and Superintendent's Representative	Provides advice to Dredging Contractor on dredging and dredge material management related issues  Oversees implementation of environmental controls, monitoring programs, inspections and audits  Completes compliance reporting requirements to regulatory authorities
Dredging Contractor	Responsible for implementation of the BAE approved Project D&DMP  Responsible for compliance with statutory requirements  Day to day implementation of the BAE approved Project D&DMP  Day to day coordination of the Project  Responsible for monitoring and survey work  Ensures adequate training of all staff



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	<p>within area of responsibility</p> <p>Coordinates the training and induction process</p>
All Persons Involved in Project	<p>Comply with the requirements of the BAE approved Project D&amp;DMP</p> <p>Comply with all legal requirements under the approvals documents and relevant Acts</p> <p>Exercise a Duty of Care to the environment at all times</p> <p>Report all environmental incidents.</p>



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