

## Addendum to Revision 9 Dredging and Dredge Spoil Disposal Management Plan

The following addendums have been made to Revision 9 of the DPU D&SDMP in response to correspondence from DEC dated 8<sup>th</sup> December 2006 (Doc 6704):

Comment	Amendment	DSDMP Page
The term "Fixed" in Figure 19, titled Reactive Monitoring and Reporting Process, requires clarification as to how the determination of meeting this process step will be made.	Figure 19: defined Fixed, 'Dredging Management Committee' changed to 'Dredging Management Group' to correspond to Ministerial condition 6-9 nomenclature	100
The role of the 'Dampier Spoil Ground Management Committee' in guiding the dredging contractor in reactive management measures requires clarification.	Glossary: defined Dampier Spoil Ground Management Committee and Dredging Management Group (to ensure differentiation)	107
The reference sites identified in Figure 14 titled 'Water Quality and Coral Monitoring Sites' need to be revised to correspond with Table 19 of the Plan. Reasons should be provided if sites identified in the Table as 'Uncertain' are to be included as reference sites.	Figure 14 and Table 19 have been updated to correspond to Appendix B. Definition of the uncertain site is included in Appendix B section 2.1.3.	81-82

# Reactive Monitoring and Reporting Process

**Water Quality**

**Frequency:**

- Not exceeding 3 days between measurements unless conditions unsafe to undertake monitoring

**Duration:**

- Extending 14 days before and after dredging operations

**Location:**

- Impact sites and reference sites

**Method:**

- TSS, DO and pH near the surface and bottom of the water column

**Reporting:**

- Report results to DoE monthly after the commencement of monitoring

**Coral Health**

**Frequency:**

- Every 14 days unless sea state or turbidity prevents undertaking the survey

**Duration:**

- Starting 14 days before the commencement of dredging and extending two months after cessation of dredging

**Location:**

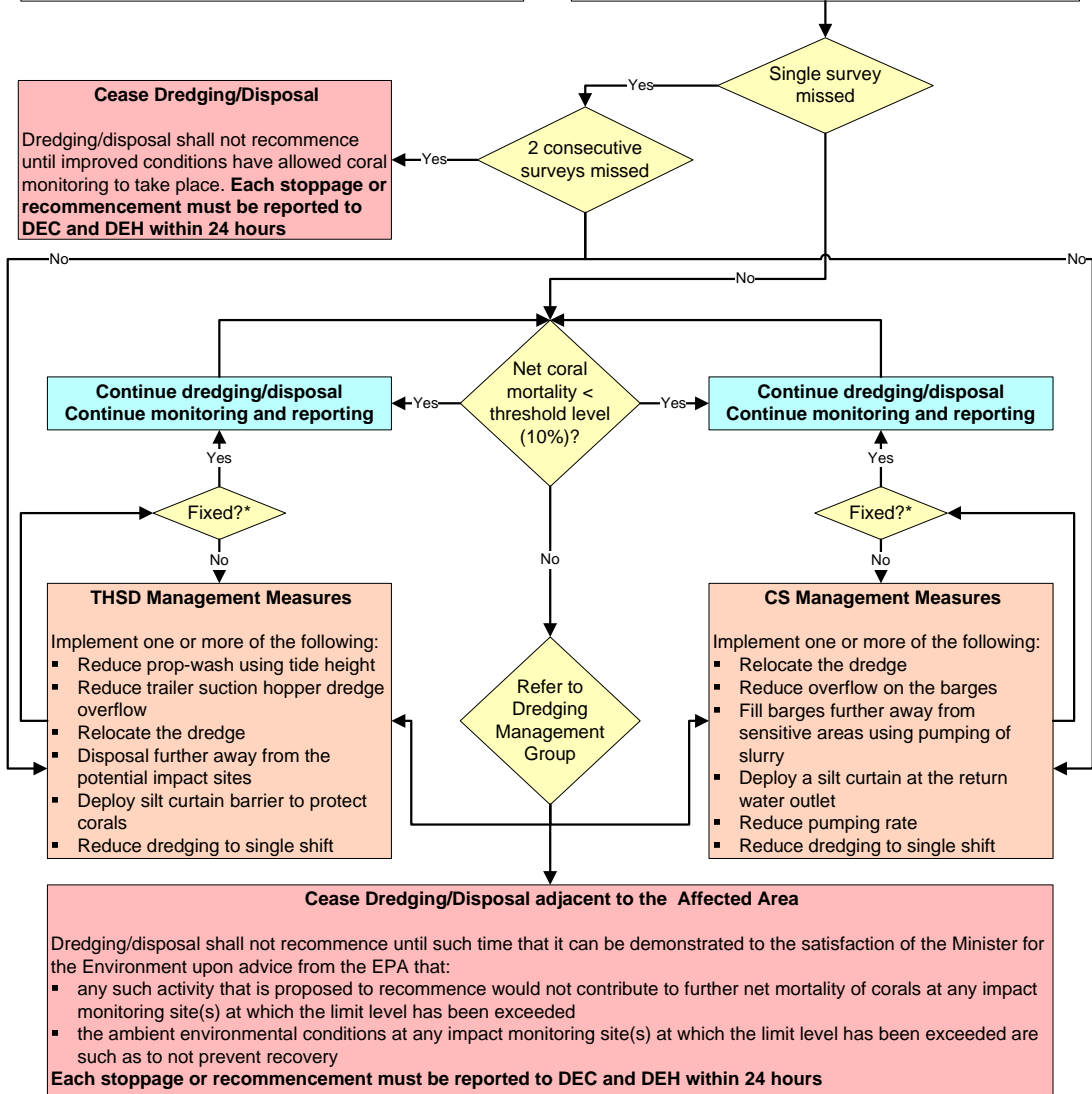
- Impact sites and reference sites

**Method:**

- Visual assessment of net percent mortality

**Reporting:**

- Report results to DoE monthly after the commencement of monitoring



\*Fixed: Determination of whether management measures have been successfully implemented to overcome the cause of coral losses will be assessed by the Dredging Management Group

■ **Figure 19 Reactive monitoring and reporting process**

## Glossary

<i>Bathymetry</i>	Measurement of the changing ocean depth to determine the sea floor topography.
<i>Benthic</i>	Bottom dwelling.
<i>Benthos</i>	All biota living upon or in the sediment of an aquatic habitat.
<i>Bioavailability</i>	Degree to which chemicals can be taken up by organisms.
<i>Biodiversity</i>	The variety of all life forms the different biota, the genes they contain and the ecosystems they form.
<i>Capital Dredging</i>	Dredging for navigation, to enlarge or deepen existing channel and port areas or to create new ones.
<i>Cetaceans</i>	The group containing whales, dolphins and porpoises. Migratory whales are identified as of significance under the Environment Protection and Biodiversity Conservation Act 1999
<i>Contaminant</i>	Any physical, chemical or biological substance or property which is introduced into the environment.
<i>Dampier Spoil Ground Management Committee</i>	An existing committee, invitees include Pilbara Iron, Water Corporation, DoIR, DEC (MEB), DEC Regional Office, DEH, Chevron, Mermaid Marine, Woodside Energy Limited's LNGV and Pluto Projects and DPA. The Committee is chaired on behalf of DPA by appointee (Jim Stoddart of MScience) and meets on an as needed basis related to dredging programs and when issues of common interest arise. Nine meetings have been held as at commencement of December 2006. Agenda items include: current and future dredging within the Port of Dampier, emergency spoil disposal, review of national ocean disposal guidelines, long term monitoring, research. Pilbara Iron will feedback on the DPU dredging program at the Committee's next meeting. Dredging contractors will be guided by the decisions of this committee with regard to disposal of dredge spoil.
<i>Dredging Management Group</i>	Developed in accordance with Ministerial Statement 731 Condition 6-9 and Procedure 3. The Group includes four members with representatives from the DEC, DPA, the proponent and an independent chair appointed by the Minister for the Environment. Terms of Reference for the Dredging Management Group will be developed at the first full meeting.
<i>Ecological function</i>	The combined biological characteristics and processes occurring within an area.
<i>Ecological Integrity</i>	The condition of an unimpaired ecosystem as measured by combined chemical, physical (including physical habitat), and biological attributes.
<i>Ecological value</i>	Mitigation measure to improve water quality, sediment quality or to protect a habitat such as coral or seagrass or a sensitive marine ecological attribute such as coral spawning, whale migration or turtle nesting (ecological value).
<i>Ecology</i>	The study of the relations of animals and plants, particularly of animal and plant communities, to their surroundings.

<i>Ecosystem</i>	The biological and physical environments and their interactions.
<i>Ecosystem integrity</i>	The ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of natural habitat of the region.
<i>Elutriate test</i>	A test which involves mixing sediment with 4 times its volume of seawater under specified conditions, to estimate the amounts of contaminants that will be released during dredging and during sea disposal.
<i>Environment</i>	The surroundings of an organism including the other biota with which it interacts.
<i>Environmental disturbance</i>	Disturbance is an ecological term referring to the perturbation of an ecosystem that affects internal system processes. A highly disturbed system will be one that is disturbed frequently or one which has suffered a strong recent disturbance. In areas classified as ‘highly disturbed’ due to the frequency of disturbance or in areas recovering from severe disturbance, individual organisms may be ‘healthy’ (a very subjective term).
<i>Environmental health</i>	Surveys of habitats may describe biological features as healthy or the system as ‘healthy’ based on living components. However, the species composition and demography of the area may, at the same time, reflect its highly disturbed nature (existing immediately adjacent to a very large stockpiling operation and between two active wharves). It is not correct to infer the system has been degraded between being described as ‘healthy’ then ‘highly disturbed’.
<i>Environmental Management Plan</i>	A procedure that identifies potential impacts and methodologies necessary to prevent or mitigate them.
<i>Environmental Management System</i>	A set of procedures incorporated into a documented framework that defines the environmental policy and organisational responsibility for planning, recording, auditing, and resolving non-conformances through a process of review leading to continual improvement of an organisations environmental management.
<i>Environmental Quality Criteria</i>	The scientific benchmarks upon which a decision may be made concerning the ability of an environment to maintain certain designated environmental quality objectives.
<i>Environmental Quality Objectives</i>	The long-term goals of an environmental management programme in relation to the maintenance of the environmental values of natural systems (ecological and social).
<i>Environmental value</i>	Particular values or uses of the environment that are important for the healthy ecosystem or for public benefit, welfare, safety or health and which require protection from the effects of pollution, waste discharges and deposits.
<i>Fauna</i>	Collectively, the animal life of any particular region.
<i>Flora</i>	Collectively, the plant life of any particular region.
<i>Habitat</i>	The place where the physical and biological elements of ecosystems provide a suitable environment including the food, cover, and space

resources needed for plant and animal livelihood.

<i>HI</i>	Hamersley Iron, one of the companies in the Pilbara Iron Pty. Ltd., owned by Rio Tinto Iron Ore.
<i>Heavy Metals</i>	Metals such as zinc, copper and chromium which accumulate in sediments and tissues or biota and may be passed up the food chain.
<i>Impact</i>	The change in the chemical, physical (including habitat) or biological quality or condition of a waterbody caused by external sources.
<i>Light attenuation</i>	<p>Light attenuation usually refers to a reduction or decrease in available light which occurs with increasing depth of water.</p> <p>The light attenuation coefficient quantifies the rate at which light is attenuated as a result of all absorbing and scattering components of the water column. These components include a background rate (0.1 m<sup>-1</sup> of clear water), and varying components of total suspended solids, phytoplankton, dissolved organic matter and coloured dissolved organic matter (dissolved organic molecules sometimes called humics or gilvin). The light level at a depth of 'z' metres can be calculated from:</p> $I_z = I_0 \exp(-K_d z)$ <p>where I<sub>0</sub> is the surface light, and K<sub>d</sub> is the attenuation coefficient..</p>
<i>Macroalgae</i>	Large algae commonly called seaweed.
<i>Maintenance Dredging</i>	Dredging to ensure that channels, berths or construction works are maintained at their designed dimensions.
<i>Management action</i>	Management option once initiated.
<i>Management option</i>	Mitigation measure to improve water quality, sediment quality or to protect a habitat such as coral or seagrass or a sensitive marine ecological attribute such as coral spawning, whale migration or turtle nesting (ecological value).
<i>PI</i>	Pilbara Iron Pty Ltd, a Rio Tinto Iron Ore company which operates Hamersley Iron (HI) in Dampier.
<i>Pollution</i>	Degradation or impairment of the purity of the environment by causing a condition that is hazardous to public health, safety aesthetics or welfare, or to biota.
<i>PQL</i>	The Practical Quantitation Limit (PQL) is the lowest level achievable among laboratories within specified limits during routine laboratory operations. The PQL represents a practical and routinely achievable detection level with a relatively good certainty that any reported value is reliable (Clesceri <i>et al.</i> 1998). The PQL is often around 5 times the method detection limit.
<i>Reference Site</i>	Specific locality on a waterbody which is unimpaired or minimally impaired and is representative of the expected biological integrity of other localities on the same waterbody or nearby waterbodies.

<i>Sensitive marine ecological attribute</i>	Coral reefs, seagrass meadows and mangrove forests, and the biota associated with these habitats (ecological value).
<i>Total Suspended Solids (TSS)</i>	<p>A measure of the mass of fine inorganic particles suspended in the water. In the model, TSS enters the estuary in the freshwater replacement time. The concentration of TSS in the estuary depends on the load and the loss rate to sinking (a function of salinity) and dilution (a function of ocean flushing time (or tidal range) and inflow rate), and the resuspension rate.</p> <p>Limits:</p> <p>Low     0.1 to 0.5 g/m<sup>3</sup></p> <p>Medium 0.5 to 10 g/m<sup>3</sup></p> <p>High    10 to 100 g/m<sup>3</sup></p>
<i>Toxicity</i>	The quality or degree of being poisonous, or harmful, to humans or biota.
<i>Turbidity</i>	Measure of the clarity of a water body and generally represented in Nephelometric Turbidity Units (NTU).

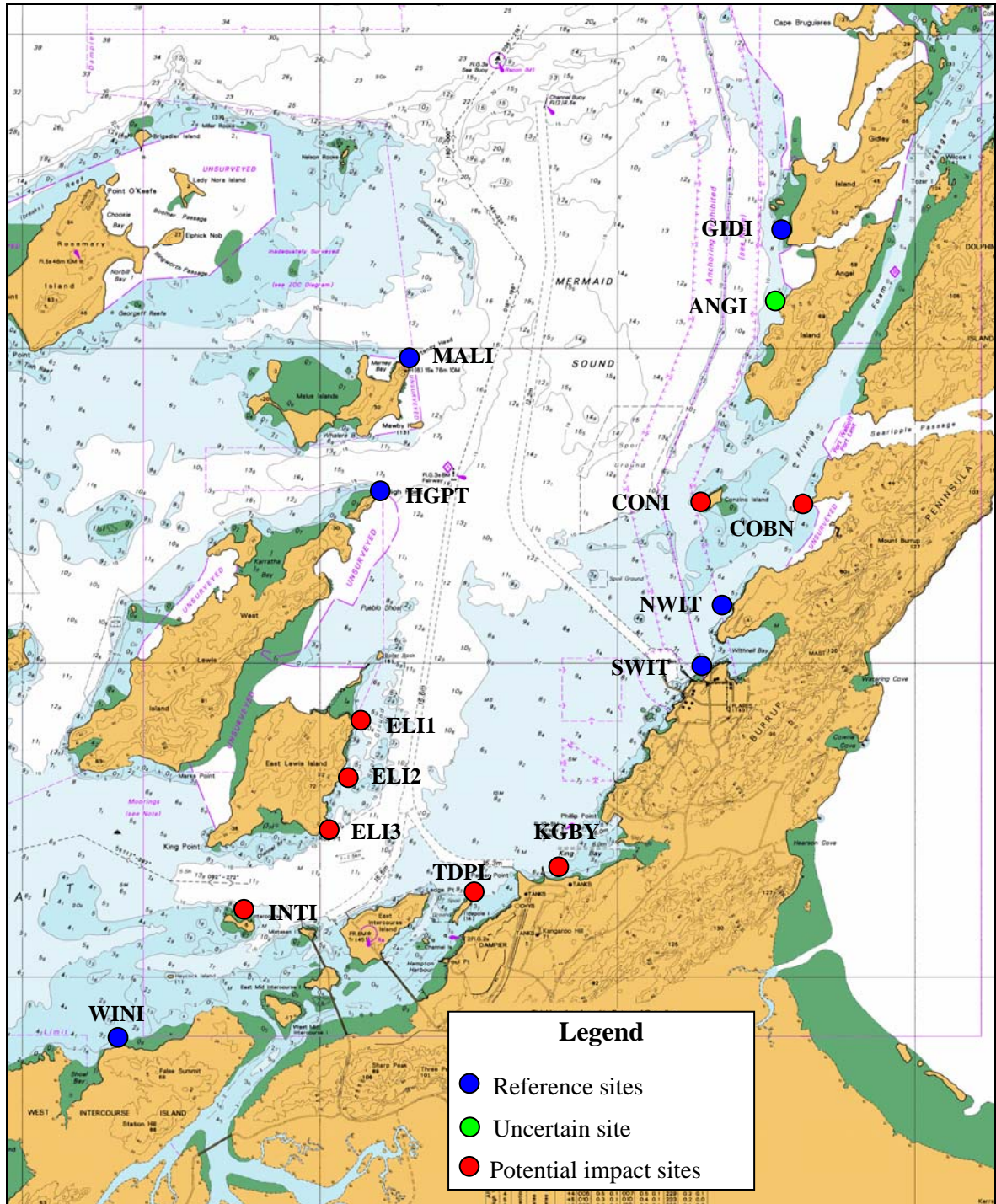
■ **Table 19 Water quality and coral health monitoring sites**

Site Name	Site Code	Function	Latitude	Longitude	General Description
Angel Island North	ANGI	U Disposal	20°29.241' S	116°47.751' E	NW side of Angel Island
Conzinc Bay North	COBN	I Disposal	20°32.417' S	116°48.193' E	Northern tip of Conzinc Bay
Conzinc Island	CONI	I Disposal	20°32.174' S	116°46.669' E	SW corner of Conzinc Island
East Lewis Island 1	ELI1	I Disposal	20°35.952' S	116°40.695' E	Northern tip of East Lewis Island
East Lewis Island 2	ELI2	I Disposal	20°36.655' S	116°40.510' E	Mid East Lewis Is (E shore)
East Lewis Island 3	ELI3	I Disposal	20°37.650' S	116°40.170' E	Southern tip of East Lewis Is
Gidley Island	GIDI	R Disposal	20°28.262' S	116°47.794' E	SW corner of Gidley Island
High Point	HGPT	R Disposal	20°32.460' S	116°41.046' E	NW tip of West Lewis Island
Intercourse Island	INTI	I Disposal	20°39.006' S	116°38.636' E	North shore of Intercourse Is
King Bay	KGBY	I Dredging	20°38.293' S	116°44.077' E	Shoreline of King Bay
Malus Island	MALI	R Disposal	20°31.310' S	116°41.635' E	Southern tip of Malus Island
North Withnell	NWIT	R Disposal	20°34.281' S	116°46.793' E	North of Withnell Bay
South Withnell	SWIT	R Disposal	20°35.137' S	116°46.487' E	South of Withnell Bay
Tidepole Island	TDPL	I Dredging	20°38.721' S	116°42.609' E	Eastern tip of Tidepole Island
West Intercourse Island	WINI	R Dredging	20°40.966' S	116°36.633' E	West Intercourse Is (N shore)

Datum is WGS84

I = Impact, R = Reference, U = Uncertain.

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■ Figure 14 Water quality and coral monitoring sites