

APPENDIX B1

Dredge Management Plan



1.0 Introduction

This Dredge Management Plan (DMP) outlines requirements related to dredging operations associated with the Port Expansion Project (PEP).

1.1 Purpose, Scope and Outcomes

Purpose

The purpose of this DMP is to identify the preferred means of addressing environmental aspects associated with dredging and associated management of dredge material placement via reclamation for the PEP, namely: widening of the Platypus and Sea Channels and dredging of Berth 12 (Stage 1); dredging of a new harbour basin seaward of the existing eastern breakwater, and reclamation to create Berths 14, 15 and 16 (Stage 2); deepening of the Platypus and Sea channels, construction of the eastern breakwater and remaining berths in the outer harbour (Stage 3).

In general, the DMP reflects and/or provides a greater level of detail to mitigation and monitoring commitments discussed in the preceding chapters of the PEP EIS and AEIS and sets out the framework for management, mitigation and monitoring of relevant impacts affiliated with dredging.

Scope

The scope of the DMP covers dredging-related works associated with the PEP as follows:

- Capital dredging activities by various plant
- Placement of dredged material in reclamation
- Management of dredge tailwater at the reclamation site; and
- General operation of dredge vessels upon commissioning, during the dredging campaigns and prior to decommissioning.

The DMP does not address the construction of maritime structures such as breakwaters, marine pile driving or other land-based aspects of the reclamation as these are covered in the Construction Environmental Management Plan from the EIS. It also does not apply to operational (maintenance) dredging which will be addressed as part of POTLs standard operational approvals and controls as required.

Objectives

The principal objectives of this DMP are as follows:

- To protect environmental values from long term adverse effects due to dredging-related water quality effects
- To reduce impacts to marine flora and fauna, and their habitats, during capital dredging and dredge material placement activities
- To adopt best practice management for the handling and storage of waste materials on board the dredger
- To manage the risk of translocation of organisms in ballast water by the dredger
- To reduce the risk of an environmental incident occurring such as an oil spill, vessel collision or similar to prevent damage to the surrounding marine environment and the public
- To reduce nuisance noise on surrounding sensitive receptors from the dredging; and
- To reduce the air emissions produced during dredging operations and thereby reduce potential effects on the natural airshed.

1.2 Relationship with Future Approvals

The DMP is a framework document to guide future activities and decision-making associated with the PEP. The DMP contains procedures, guidance and commitments to monitoring and other environmental management measures that will be required to be carried through into more detailed approvals (such as tidal works approvals under the *Sustainable Planning Act 2009*) and by the future dredge contractor for the works as part of the contractor's Management Plans.

It is recognised that compliance with the requirements of this DMP does not remove general obligations and responsibilities under relevant legislation or for approvals or permits that will need to be obtained in the future in order to carry out the development.

1.3 Environmental Legislation

The DMP has been developed in accordance with, and taking into account legislative requirements set out in Acts and Regulations at Commonwealth and State level that are listed below. The DMP has been developed to include

measures that POTL believes are necessary for protection of sensitive environmental receptors, however will need to incorporate any additional actions / controls as required by approvals and/or permits that are issued under the EIS or the state assessment process.

Commonwealth legislation considered in development of this DMP (including Acts implementing relevant international conventions) includes:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*
- *Great Barrier Reef Marine Park Act 1975; and*
- *Great Barrier Reef Marine Park Zoning Plan 2003 and associated regulations.*

The following State legislation is relevant to the dredging:

- *State Development and Public Works Organisation Act 1971*
- *Coastal Protection and Management Act 1995 and Coastal Management Pla;*
- *Environmental Protection Act 1994 and Environmental Protection Policies and Regulations*
- *Fisheries Act 1994 and Regulations*
- *Marine Parks Act 2004 and Marine Parks (Great Barrier Reef Coast) Zoning Plan*
- *Transport Operations (Marine Safety) Act 1994 and Regulations*
- *Transport Infrastructure Act 1994*
- *Transport Operations (Marine Pollution) Act 1995 and Regulations*
- *Land Act 1994*
- *Nature Conservation Act 1992 and Conservation Plans*
- *Sustainable Planning Act 2009 and Regulations; and*
- *Sustainable Ports Development Act 2015.*

In particular, the requirements of the Queensland State Development Assessment Provisions (SDAP), Module 10 (Coastal Protection) as it relates to dredging and material placement have been accounted for in developing this DMP.

2.0 Dredging Design and Plan of Operations

The revised PEP design consists of three stages (1-3) which are described in greater detail below. The design and construction methodology represents the most likely approach to undertaking the works including identification of the most suitable plant and equipment for the work however will need to be revisited prior to each of the three stages.

Stage 1

Stage 1 will be undertaken over a 4.5 year period and consists of the following:

- Construction of temporary perimeter revetment structures to capture any soft sediments and subsequent construction of revetment structures including removal of soft sediments (0.3 million m³) under retaining wall structures along the perimeter of the proposed interim reclamation area. This will be carried out by a mechanical dredger and relocated to temporary bund area.
- Widening the Platypus Channel on its western side (a new width of 180 m at the outer harbour, tapering to 135 m at its northern end), and widening the Sea Channel on its eastern side (for 135 m at the southern end to 120 m at its northern end). The soft marine sediments and dense clayey sands will be dredged by TSHD (dredge volume of 1.5 million m³). The stiff, very stiff and hard clays will be dredged by a mechanical dredger (dredge volume of 2.4 million m³).
- The dredging of Berth 12 by mechanical dredger (dredge volume of 1.4 million m³).
- Total dredge volume of approximately 5.6 million m³.
- All dredge material to be placed in the reclamation.
- Duration of dredging for Stage 1 estimated as follows:
 - Construction of temporary revetment structures including placement of soft material – 12 months
 - Channel widening by TSHD – 4 months

- Channel widening by mechanical dredger – 2.3 years
- Berth 12 – 15 months
- Total duration of Stage 1 ~ 4.5 years.

For the purposes of the AEIS, it was assumed that a small TSHD (hopper capacity of approximately ~ 3,000 m³) would complete the TSHD dredging.

Stage 2

Stage 2 involves dredging Berths 14, 15 and 16 in the outer harbour (3.6 million m³), as well as soft sediments under the footprint of the final reclamation bunds and breakwater (0.2 million m³). The total dredge volume is expected to be 3.8 million m³ and be undertaken over a duration of 4.5 years by a mechanical dredger as follows:

- Reclamation works – 12 months
- Berths 14, 15 and 16 ~ 3.5 years
- Total ~ 4.5 years.

Stage 3

Stage 3 dredging will be undertaken over a 2.5 year period and consists of the following:

- Deepening of the Platypus Channel and the Sea Channel to a Navigation Design Depth of -12.8m LAT. The total dredge volume is expected to be 2.0 million m³, with the soft marine sediments and dense clayey sands will be dredged by TSHD (dredge volume of 0.7 million m³), and the stiff, very stiff and hard clays will be dredged by a mechanical dredger (dredge volume of 1.3 million m³).
- The dredging of the berth pockets for Berths 17 and 18 by a mechanical dredger (0.08 million m³).
- Duration of dredging is:
 - Channel deepening by TSHD – 8 weeks
 - Channel deepening by mechanical dredger – 2.2 years
 - Berths 17 and 18 – 5 weeks
 - Total ~ 2.5 years.

3.0 Mitigation Strategies for Water Quality and Benthic Ecology

3.1 Introduction

Dredging activities associated with the PEP have the potential to impact on benthic communities such as corals and seagrass in the marine environment of Cleveland Bay. The widening (in Stage 1) and deepening (in Stage 3) of the Platypus and Sea Channels undertaken by a TSHD is considered to have the greatest potential for environmental impacts due to the proximity to sensitive environments and extent of suspended sediments generated by the dredge. As such, this activity is the main focus of this DMP, however controls are included for all dredge plant where relevant.

The key threatening processes to water quality and benthic ecology identified in the AEIS that are relevant for developing further mitigation measures include:

- Periodic light extinguishment of benthic communities above background conditions along Magnetic Island; and
- Sedimentation in benthic communities along Magnetic Island.

The AIES has concluded that the Port Expansion Project (unmitigated scenario) is not likely to cause any significant impacts to water quality, benthic ecological receptors and marine megafauna in Cleveland Bay, which are key components of the Outstanding Universal Values (OUV) of the Great Barrier Reef World Heritage Area. Nevertheless, predicted impacts are able to be further reduced through the implementation of mitigation strategies (discussed below).

This section of the DMP outlines the key mitigation strategies that will be implemented during dredging. Further, specific environmental management strategies are outlined in Sections 10.0 to 20.0 of this DMP.

3.2 Mitigation Measures – Dredging and Placement

A range of mitigation measures will be committed to and required to be undertaken by the dredge contractor from the outset of the Project. These commitments are outlined in the relevant chapters of the AEIS and are summarised as follows:

- No dredging (all plant) is to be undertaken outside of approved dredge footprint.

- Hopper compartments / barges (all plant) are maintained water tight at all times.
- The top of overflow valves on TSHD are not lowered during the transport component of the dredging cycle (dredging area to reclamation) to reduce spillage/overflow during transport (within the safety constraints of the vessel).
- The TSHD is fitted with a 'green valve' in order to reduce the spatial extent of turbidity plumes generated by dredge operation. The green valve ensures that overflow from the TSHD during dredging is released under the keel of the vessel rather than the surface (TSHD).
- Marine turtle deflectors will be mounted on the draghead of the TSHD.
- Any washdown of the hopper/barge compartment (all plant) must be appropriately contained and managed.
- Undertake capital dredging with the TSHD of the channel (during Stage 1 and Stage 3) during the most appropriate time to avoid coral spawning, seagrass recruitment, turtle breeding and extreme weather events.
- Develop and implement a Reactive Monitoring Program (RMP) with appropriate triggers and corrective actions (this program is outlined below).

The environmental windows for dredging and the reactive monitoring program are discussed in greater detail in Section 8.0.

4.0 Governance and Implementation

4.1 Governance Structure

Further refinement of the governance structure for implementation of mitigation commitments has occurred since the EIS DMP and is outlined below.

As shown in Figure 4.1, three main bodies will be created to oversee the RMP and other mitigation commitments:

- (i) a regulatory 'Oversight Committee' made up of the key approving agencies for the PEP that would review and approve subsequent plans and strategies as well as oversee compliance with the RMP during dredging.
- (ii) the 'Technical Advisory Committee' of both government and non-government scientific experts to review and advise on the technical aspects of the RMP including the location of control and impact sites, ecological thresholds, monitoring design and triggers for corrective action as well as oversight of the RMP during operation.
- (iii) a 'Dredging Implementation Committee' made up of the proponent, its dredging consultant/contractor and the Regional Harbour Master which would oversee the dredge campaign and interact where necessary with the other committees with respect to operational and logistical issues.

It would be envisaged that these bodies are funded, organised and provided secretariat services by POTL through its PEP Environment Supervisor (see below).

Implementation Strategy and Governance

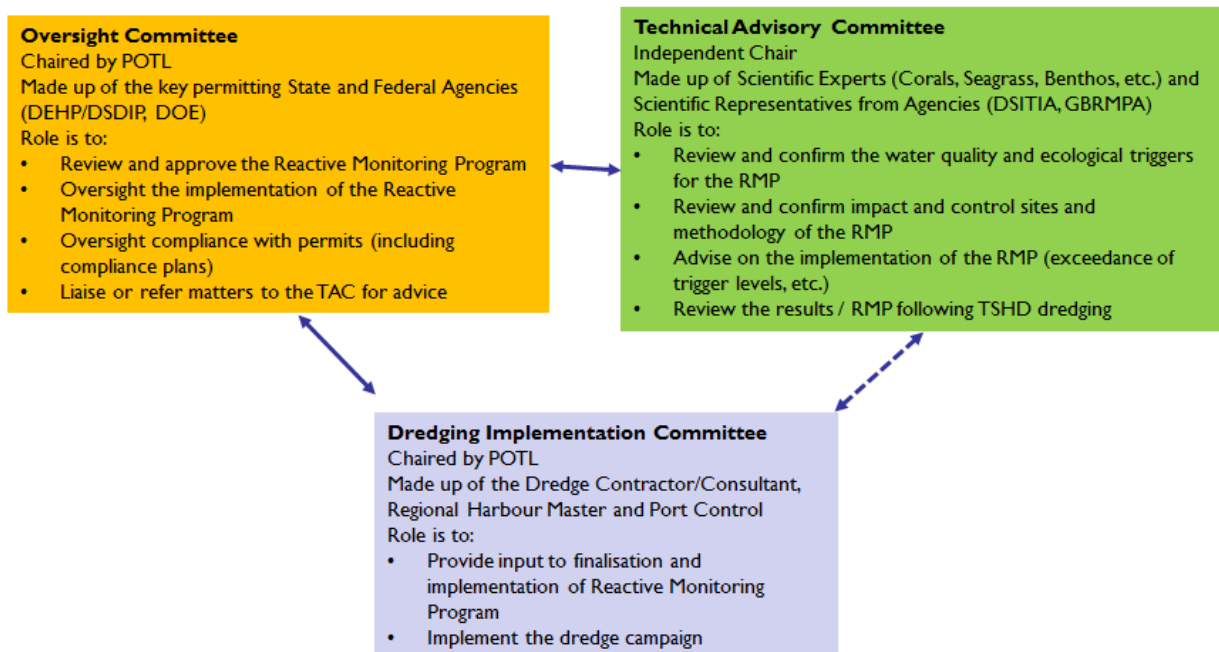


Figure 4.1 Governance Arrangements

4.2 Technical Advisory Committee

A Technical Advisory Committee will be appointed by and funded by the port and would likely include representation from the following:

- POTL Chair
- Recognised specialists with expertise on seagrass, turtles, coral health, water quality, monitoring and statistics, and
- Regulatory bodies that would be able to have scientific input such as the Queensland Department of Science, Information Technology, Innovation (DSITI).

The function of the Technical Advisory Committee will be to provide advice to POTL in relation to the following:

- 1) Oversee the development of trigger values with consideration of condition and tolerances of coral and seagrasses
- 2) Endorse the control and impact site location plan and dredge mitigation strategy prior to commencement of works; and
- 3) Review environmental performance of the dredging against criteria and triggers and evaluate corrective actions implemented.

The Interim RMP design, monitoring locations and trigger values will need to be approved by the Technical Advisory Committee prior to commencement of dredging.

4.3 Environmental Supervisor

The implementation of the mitigation commitments will be overseen by an Environmental Supervisor for the PEP appointed by POTL.

The Environmental Supervisor's role will be to:

- Oversee the dredging contract on behalf of POTL
- Oversee the development and implementation of the RMP and other mitigation commitments
- Provide secretariat and support services to the Oversight Committee, Technical Advisory Committee, and Dredging Implementation Committee

- Liaise with Regulatory Agencies prior to, during and following the dredge campaigns including recording and responding to any complaints
- Prepare and review internal and external compliance reports (to be confirmed as part of future conditions and management arrangements) which are likely to include the following:
 - Compile and maintain a data register for monitoring data (updated weekly and archived for a minimum period of 10-15 years)
 - Prepare and submit a validation of modelling report based on validation monitoring (see below)
 - Provide reports (likely weekly) to regulatory agencies of dredge campaign progress and environmental performance against the RMP including recorded exceedances of trigger values and corrective actions implemented
- Undertake reviews of the dredge contractor's compliance with the DMP
- Prepare specific incident reports with respect to environmental or other major incidents and/or the implementation of corrective actions to POTL and external agencies where relevant.

5.0 Condition of Benthic Communities Prior to Dredging

The impact predictions in the AEIS should be considered in the context of the condition of sensitive ecological receptors (e.g. seagrass and corals) prior to dredging. If their condition is poor and resilience is low (e.g. due to a major coral bleaching event), the impacts may be greater than predicted.

To address this, the condition of seagrass and corals in areas that may be affected by dredging are to be assessed prior to commencement of dredging. If their condition is poor, then the trigger values as discussed in Section 8.2.4 may need to be revised (more conservative) in consultation with the Technical Advisory Committee.

6.0 Validation Monitoring

Separate to impact monitoring described above, specifically targeted monitoring will be undertaken to validate the dredge plume source assumptions that underpin the water quality impact assessments in the AEIS. This further 'validation' monitoring would be undertaken ahead of the commencement of each stage of capital dredging that was modelled as part of the PEP.

The methodologies associated with this monitoring component will be governed by the goal of obtaining additional data for the dredge plume model validation. It is likely to involve a combination of vessel-mounted ADCP (or similar) and in-situ water quality measurements and sampling for laboratory analysis, specifically targeted at characterising the dredge plume intensity and spatial dimensions on top of the ambient suspended sediment climate.

Outcomes of the monitoring will be spatial and temporal maps of the dredge plume during the validation exercise, quantification of the plume sediment characteristics and quantification of the range of plume generation source rates associated with the monitored dredging operations. These results will directly feed into water quality model simulations to validate the model configuration used in the AEIS and to suggest any improvements to model input parameters (i.e. dredge plume source rates).

7.0 Adaptive Management and New Technology

With a number of years between the major dredging campaigns of the channels with the TSHD, the initial channel widening to be undertaken in Stage 1 will also provide a blueprint for the deepening to be undertaken in Stage 3 of the dredge methodology.

Given this, it will be critical to ensure proper documentation of the achievement of performance criteria, monitoring data and behaviour of the plume, and dredging techniques such that the outputs and results of the initial dredging can inform future activities both in terms of capital dredging and maintenance dredging. In this context, a formal review of the RMP is recommended to be undertaken following completion of Stage 1 by the Technical Advisory Committee.

While care has been taken in preparing this RMP to recommend the best current approaches to monitoring and impact detection, new or improved technology or approaches may also be available by the time the campaigns are undertaken. A performance based approach is therefore the preferred approach as it allows flexibility to adopt new or improved technology as it becomes available and allows for the consideration of current conditions (as outlined in Section 5.0).

8.0 Mitigation Measures in Detail

8.1 Environmental Windows for Dredging

The preferred time to undertake capital dredging of the channels with the TSHD during Stage 1 and Stage 3 is in the autumn and winter months from April to September. The months of October through to the end of March are proposed to be avoided in terms of TSHD capital dredging of the channels.

This time period has been chosen on the basis of the following:

- (i) to minimise impacts to key coral spawning periods in the region and identified spawning periods for Magnetic Island corals after the full moon in October
- (ii) to limit impacts to seagrass during a potentially important period for growth; and
- (iii) to reduce impacts to corals that may have lower resilience in the summer months (due to the greater frequency of extreme weather events);

This proposed programming to avoid summer months also presents a beneficial avoidance of the marine turtle nesting season.

The adopted timing for TSHD dredging will further reduce potential impacts on sensitive receptors and is seen as a best practice management measure given the current low resilience of these receptors.

8.2 Reactive Monitoring Program

8.2.1 Program Aims and Design

The overall aim of the Reactive Monitoring Program (hereafter referred to as the RMP) will be to avoid or otherwise reduce impacts to sensitive marine environments that could be affected by TSHD dredging.

The RMP will have two interlinked components:

- A water quality dredge plume suspended sediment monitoring program; and
- A seagrass and coral monitoring program.

The RMP will only be undertaken during the TSHD dredging. Dredging by the mechanical dredger will be undertaken over a number of years and dredge plumes from this plant are expected to be negligible. Therefore routine water quality monitoring undertaken by POTL will be sufficient to monitor these activities.

The design of the program is similar to that undertaken in 1993 as part of the last major capital dredging campaign for the channels and will be overseen by an Technical Advisory Panel and employs a range of trigger levels for further investigation and instigation of corrective actions. The monitoring of the two components of the RMP would be done in parallel. The approach, methodology and equipment recommended for use is discussed below.

8.2.2 Sampling Locations and Monitoring

Indicative monitoring locations under the RMP are shown in Figure 8.1. These monitoring sites have been initially selected based on the location of sensitive ecological receptors, the location of previous data collection sites, and the outputs of water quality modelling with respect to areas of impact.

These locations will be reviewed by the Technical Advisory Committee (TAC), which was discussed previously in Section 4.2.

Water quality instruments capable of continuous logging of data for a range of parameters, eg. of turbidity, dissolved oxygen (DO), pH, salinity and conductivity and photosynthetically active radiation (PAR) are proposed to be deployed for the construction water quality monitoring as part of the RMP. Telemetry and other appropriate water quality monitoring equipment would also be installed to ensure dredging can be reactive in a timely manner and flag exceedances in real time. This data would be available to both the contractor and POTL Project Superintendent, with alerts via mobile text message or email of any exceedance under the RMP.

Ecological monitoring approaches under the RMP would be expected to consist of collecting data on the following indicators:

- Collection of data on additional physical-chemical parameters such as light (PAR), temperature and salinity
- Coral cover and health parameters (to be determined by the Technical Advisory Committee); and
- Seagrass cover and health parameters (to be determined by the Technical Advisory Committee).

Baseline monitoring would occur at regular intervals (frequency to be determined by Technical Advisory Committee) throughout the dredge campaign (to measure chronic or long term trends), supported by rapid deployments in response to water quality impacts to investigate potential acute impacts.

In this context, key constraints/issues to be considered in further developing the ecological component of the program would need to be able to:

- Cover off a large number of potential impact sites
- Allow rapid deployment of field staff and turnaround of results
- Be measurable in poor visibility
- Detect acute and chronic (stress) effects; and
- Take into account differences in communities in and among sites.

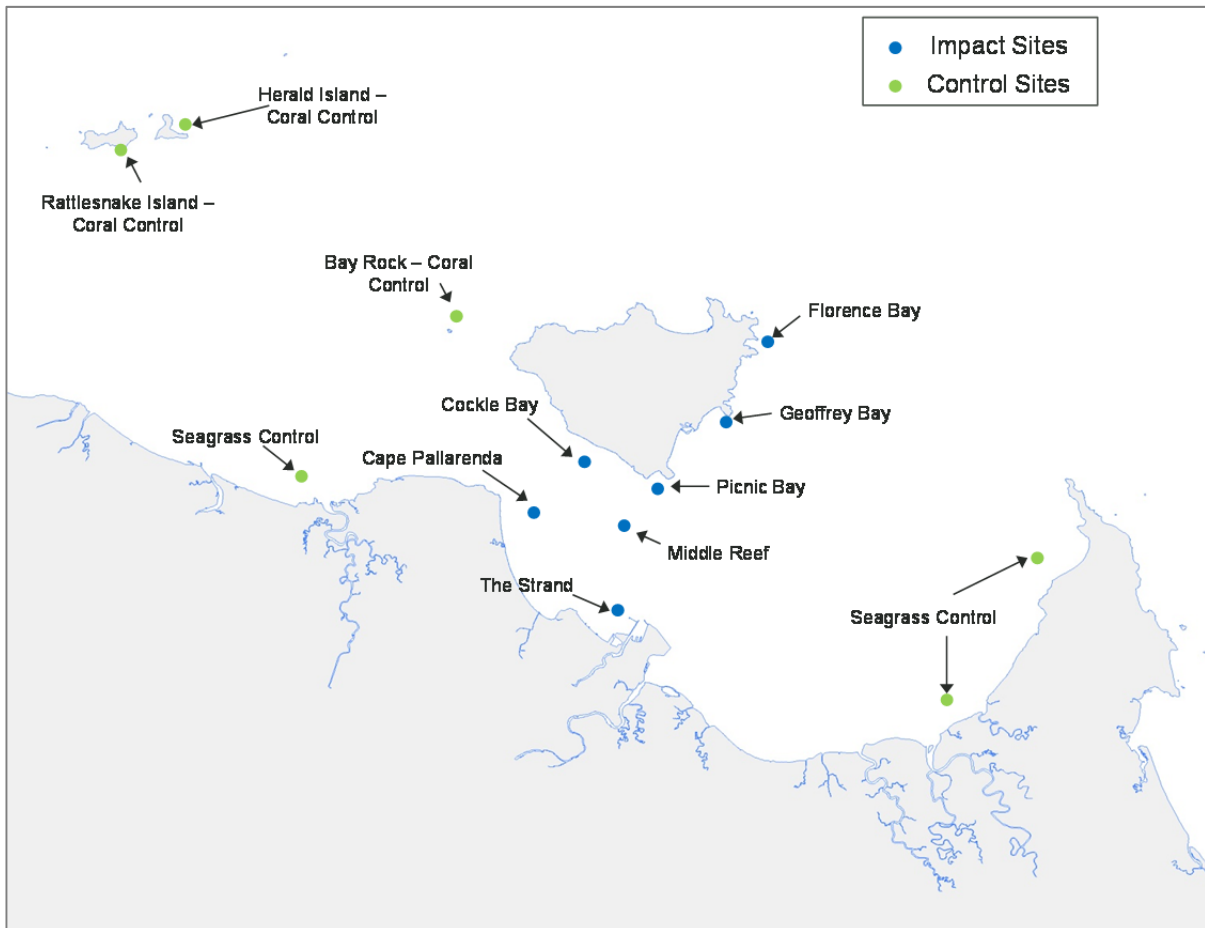


Figure 8.1 RMP Possible Impact and Control Sites

8.2.3 How the RMP will work

A schematic of the RMP is shown in Figure 8.2.

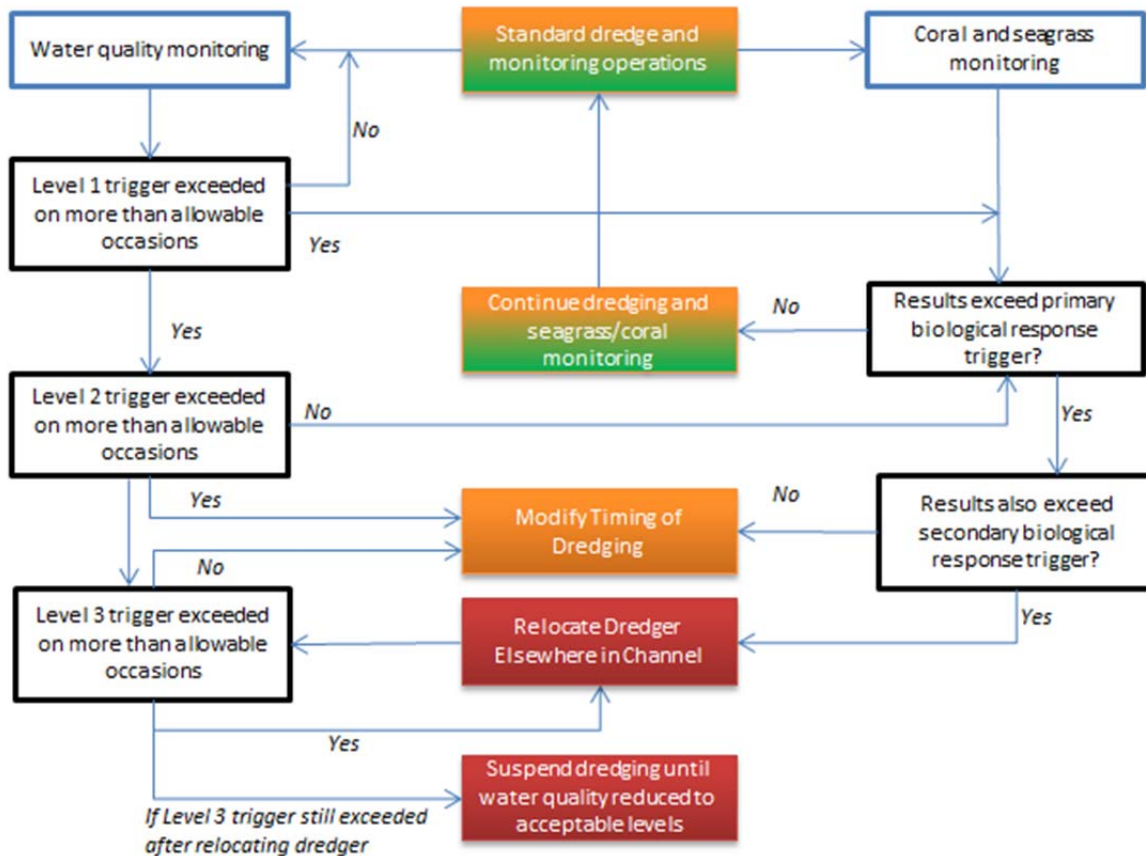


Figure 8.2 Framework for RMP Trigger Levels

As shown in Figure 8.2, the RMP will have three trigger levels which are described as follows:

- Level 1 Investigation Level (Green) – This trigger level provides for an initial water quality assessment through comparison of monitoring data to derived triggers values and background conditions. Water quality measured at putative ‘impact’ locations (as shown in Figure 8.1) would be compared against ‘control’ locations to determine if increased turbidity levels are attributable to dredging or are shown to be within natural ranges for the ambient conditions. If it is determined as part of this investigation phase that the water quality is attributable to the dredging, there is a requirement to examine coral and seagrass monitoring data to determine if the detected water quality impacts are resulting in a biological response in sensitive receptors (seagrass and corals). The dredge would continue to operate during this period of investigation up until a level 2 trigger is reached.
- Level 2 Management Response Level (Orange) – Exceedance of a level 2 trigger levels means that the dredger will likely need to review its operations and/or take corrective actions to either control a water quality impact. There are several practical mitigation measures and corrective actions that can be employed by the dredger to reduce impacts. Water quality and biological triggers as part of level 2 will be set on the basis of known stress tolerances of coral and seagrass. Where possible, the design of the RMP will be to ensure that these trigger levels are set such as to ensure they are triggered prior to unacceptable impacts occurring.
- Level 3 Compliance Level (Red) – Exceedance of this trigger level would require immediate action by the dredger to suspend dredging or otherwise implement other mitigation measures such as moving the dredge away from the habitat where the exceedance occurs. Dredging would not be able to resume in this area until monitored water quality reduced back to acceptable levels (below level 3). Generally this trigger will be set on the basis of known impact levels for biological systems (partial mortality of corals or seagrass) based on background data. Level 3 trigger levels would also generally be set commensurate with performance measures set in development conditions.

The RMP will be used in ‘real time’ to guide the dredging campaign.

If an initial/investigation (level 1) trigger level is exceeded the dredge would continue to operate while the data from control and impact sites are compared to determine if the impact is attributable to dredging and further ecological monitoring is carried out.

However, once management action (level 2) triggers are reached, the dredge contractor will be responsible for taking actions to ensure impacts are avoided at sensitive receptors and impacts are controlled prior to defined trigger level exceedance (level 3). This will occur in consultation with POTL and the advisory panel discussed previously in Section 4.0.

The subsections below set out the additional mitigation measures and corrective actions that can be implemented by the dredger to reduce impacts and ensure exceedances are reduced or avoided during the campaign. As outlined above, these actions would be assessed and are intended to be implemented prior to a level 3 exceedance in the RMP being reached.

TSHD Dredging in Flood and Ebb Tidal Currents

Numerical modelling and previous dredging activities undertaken by similar TSHD dredges in Cleveland Bay have demonstrated the behaviour of plumes under various tidal conditions. In general, dredging during a flood tide will result in the movement of plumes to the west from the dredge position while dredging during an ebb tide will have the effect of a localised plume around the dredge that will be somewhat stationary and then tend to move northward.

Advice from the Project dredging advisers is that capital dredging of the Platypus and Sea Channel in 1993 trialed an approach whereby dredging was phased with the tides and where practical, dredging in the Sea Channel and outer Platypus Channel was undertaken on the ebb tide and dredging closer to the port (e.g. the inner Platypus Channel) was undertaken on the flood tide.

This approach was employed as a means to further reduce the normal movement of the plume westward into Magnetic Island embayments and was able to be implemented by the dredge contractor without significant impact on the overall dredge programme.

Additional numerical modelling was undertaken as part of the EIS to quantify if such an approach would lead to an improvement in overall water quality compared to the expected mode of operation (which does not differentiate dredging mode or direction by tide). In general, the modelling demonstrated a widespread reduction in above-background TSS/NTU levels to the west of the channel and between Cape Pallarenda and Magnetic Island which would be of ecological benefit to these environments.

Implementation of this approach can be factored into the program during each tidal cycle based on the trigger levels detected in the RMP (pending Regional Harbour Master approval and shipping schedules).

Preferential Movement of the TSHD Dredge to Other Areas

Similar to the approach above, the dredger will have some flexibility in terms of the areas of channel dredging. If impacts are detected at a particular sensitive receptor, the TSHD dredge can be relocated to another dredge area. Given that the key impacts are light deprivation, preferentially dredging other areas while allowing a particular area to settle can be an important strategy to ensure coral environments are obtaining necessary light to maintain photosynthetic processes.

It should also be noted that the dredge vessel will need to undertake routine maintenance, refuelling and crew changes during campaigns. During these 'down time' periods of the dredge, there will be environmental benefits accrued related to settlement of fines and allowance of greater light penetration back into surrounding environments (assuming background turbidity levels are also low). To a certain extent, the dredger can plan such maintenance to maximise environmental benefits in accordance with the RMP.

TSHD Dredging on High Tides

A component of the overall TSS plume generated by the TSHD dredger is through the operation of the propellers. This impact is generally greater where there is less underkeel clearance between the bottom of the dredger (particularly when fully laden) and the seabed that is being dredged.

Based on this principle, an additional mitigation measure that can be employed by the dredge contractor is to dredge particularly sensitive areas of the channel (e.g. near sensitive receptors) on higher tides which maximise underkeel clearance. This approach will help to reduce the amount of TSS generated by the dredge, also reducing the amount of displaced sediment that can be resuspended by natural wave and wind action.

Implementation of this approach can be factored into the program based on the trigger levels detected in the RMP (pending Regional Harbour Master approval and shipping schedules).

Temporary Suspension of Dredging

Suspension of dredging would be implemented if all other mitigation measures and corrective actions as outlined above have been unsuccessful to control impacts and the compliance (red) trigger has been exceeded.

The work method for TSHD operations is designed to operate 24/7 so as to reduce the overall duration of the campaign which has both cost and environmental benefits compared to a longer term dredge operation or intermittent capital dredge operations that involve multiple deployments of vessels.

Notwithstanding this, suspension of dredging operations will be undertaken if compliance trigger levels in the RMP (level 3) are exceeded and dredging not re-commenced until water quality levels are within defined parameters.

8.2.4 Establishing Trigger Values

The level of data collection and modelling investigations undertaken as part of the AEIS are robust and in accordance with all relevant guidelines including the data collection and modelling guidelines published by the Great Barrier Reef Marine Park Authority. As such, the impact predictions are considered to be robust and suitable to allow regulators to determine the acceptability of impacts from dredging and placement activities on marine environmental values.

That said, final water quality and ecological trigger values to support the RMP are not proposed to be set within the AEIS based on the need for final input of regulatory and scientific experts as part of the Technical Advisory Committee (see Section 4.2).

The water quality trigger levels will be based on an assessment and understanding of prevailing baseline conditions within Cleveland Bay, and at least a 12 month water quality data set. This data set will likely be supplemented with further monitoring just prior to commencement of dredging to re-confirm baseline conditions and establish final trigger levels.

The trigger values will be set using an approach similar to that used to determine impact assessment threshold values in Section 6 of the AEIS (Marine Water Quality). The final trigger levels will consider a range of temporal scales, including 20th, 50th and 80th percentile trigger levels. This approach provides a metric for both chronic and acute impacts. These trigger levels will be based on different levels of concern, as follows:

- Level 1 (green) – slightly greater than average conditions. Trigger level calculated using background mean plus half of one standard deviation at each percentile for nearshore sites and one standard deviation for offshore sites.
- Level 2 (orange) – approaching limits of natural variability. Trigger value calculated using background mean plus one standard deviation at each percentile for nearshore sites and two standard deviations for offshore sites. These trigger levels represents the delineation of the Zone of Moderate impact as per Section 6 of the AEIS (Marine Water Quality).
- Level 3 (red) – limits of natural variability. Trigger value calculated using background mean plus two standard deviations at each percentile for nearshore sites and three standard deviations for offshore sites. These trigger levels represents the delineation of the Zone of High impact as per Section 6 of the AEIS (Marine Water Quality).

The continuous monitoring data collected at each compliance monitoring location throughout the dredge campaign will be analysed using percentiles (20th, 50th and 80th). These will then be compared to the trigger values, with implementation of management actions if trigger levels are exceeded.

If trigger levels are exceeded during unusually high ambient turbidity conditions which may occur during large storms or unusually strong and sustained wind periods, the data from the control sites will be assessed to see if the high turbidity at the compliance monitoring sites is naturally occurring or attributable to the dredger.

9.0 General Requirements – Dredge Contractor

This section of the document outlines the general environmental requirements of the DMP that a future dredge contractor would be expected to fulfil. POTL's role with respect to this section would be to ensure these requirements are addressed and met by the contractor as part of the contract and to ensure activities are being carried out consistently with any existing procedures or protocols in Port Limits or under relevant corporate environmental policies or strategies, and all approvals, conditions and licences.

Section 10.0 (Specific Environmental Strategies) identifies particular elements or aspects of the dredging activity under which there are specific requirements that will need to be met by the Dredge Contractor in addition to the general requirements stated in Table 1 below.

Table 1 General requirements - dredging

| General Requirements - Dredging | |
|---------------------------------|--|
| Objective | To ensure dredging operations and associated activities comply with relevant environmental duties and obligations as set out in Queensland legislation and with environmental permit requirements. |
| Applicability | All capital dredging works and associated activities |
| Performance Criteria | All relevant permit and licence conditions will be met. |
| Implementation Strategy | <p>The dredge contractor will need to address the following requirements:</p> <p>General Method Statement</p> <p>A general method statement will need to be prepared outlining the intended scope of works and methodology to be employed. At a minimum, the method statement should include the following:</p> <p>Introduction</p> <ul style="list-style-type: none"> ▪ Description of the General Scope of Works (noting this may need to be by Stage only). ▪ References to International Dredging Standards. Company Standards (such as quality, OHS and environment management systems), how they apply to the current project and any other project specific document. ▪ Responsibilities of the Contractor and Key Staff (on the dredge vessel and on shore). ▪ Provide a clear map of the areas where the dredging activities are to take place consistent with regulatory approvals. ▪ Provide a general description of the dredging process and the specifics of the plant to be used in the dredging process including the dredging methods, dredging control, possible dredging patterns, vessel navigation routes to be used and vessel operations while at the pump out location including ancillary activities such as waste management and fuel bunkering. ▪ Include Specific Method Statements in accordance with the requirements outlined in this DMP. <p>Site-Based Environmental Management Plan (Dredge Operations)</p> <p>Preparation of a site-based environmental management plan related to the dredging operation to be submitted to the relevant regulatory agencies (e.g. DEHP) as required. The management plan (hereafter referred to as the 'Dredge Operations' EMP) must address the following:</p> <ul style="list-style-type: none"> ▪ Environmental commitments – including a commitment by senior management of the contractor to achieve specified and relevant environmental goals; ▪ Identification of environmental aspects and potential impacts; ▪ Control measures for routine operations to reduce the likelihood of environmental harm; ▪ Contingency plans and emergency procedures for non-routine situations; ▪ Organisational structure and responsibility; ▪ Proposed communication; ▪ Staff training; ▪ Record Keeping; and ▪ Periodic review of environmental performance and continual improvement. <p>In addition to the general requirements above, the Dredge Operations EMP must also address specific requirements (such as water quality monitoring) as outlined in this DMP.</p> <p>Maintenance of Measures, Plant and Equipment</p> <p>The dredge contractor must ensure that all measures, plant and equipment necessary to undertake the activity are operated and maintained in a proper and efficient condition.</p> <p>This includes appropriate servicing and maintenance of engines and emission control devices such that emissions comply with relevant guidelines and standards.</p> <p>Complaint Response (General Requirements)</p> <p>All complaints received by the dredge contractor related to environmental issues such as noise, air, or water quality must be recorded including investigations undertaken, conclusions formed and actions taken. Notification about the complaint and any associated response must be provided to POTL in a timely fashion. The complaint response procedure will include:</p> <ol style="list-style-type: none"> (a) The time, date name and contact details of the complainant; (b) Reasons for the complaint; (c) Any investigations undertaken; |

| General Requirements - Dredging | |
|---------------------------------|---|
| | <p>(d) Conclusions formed; and (e) Any actions taken.</p> <p>Reasonable and Practicable Measures The dredge contractor must take all reasonable and practicable measures to prevent and/or minimise the likelihood of environmental harm being caused.</p> <p>Notification of Environmental Harm The dredge contractor is responsible for ceasing activities and notifying POTL and appropriate regulatory bodies eg DoE or DEHP if it becomes aware of material or serious environmental harm (as defined in the Queensland <i>Environmental Protection Act 1994</i>) as a result of carrying out of the dredging and associated works. The contractor must also contact the relevant agencies as per approvals/legislation as soon as practicable after becoming aware of any release of contaminants not in accordance with the condition of any approvals granted, and in the event of injuries caused to fauna.</p> <p>Notifications of Commencement The contractor must inform POTL and regulatory agencies of its intention to commence dredging in timeframes identified in any approvals granted.</p> |
| Monitoring | <p>Record of Monitoring The dredge contractor must keep records of all monitoring results required by POTL or as part of regulatory agency permit requirements. Specific monitoring requirements of reporting are contained in Section 10.0.</p> <p>Record of Dredging Volumes and Megafauna Sightings/Incidents The dredge contractor must keep records on the volume and size distribution of material removed from the approved dredge footprint area. These records must be provided to POTL in the timeframe specified. The dredge contractor must also keep records of megafauna sighted and/or any incidents with megafauna as required in any approvals granted.</p> |
| Reporting | <p>The documentation outlined in the 'Implementation Strategy' above will need to be to the satisfaction of regulatory agencies. Copies of all plans will be provided to POTL for review prior to lodgement with regulatory authorities.</p> <p>A weekly report containing dredging volumes must be provided by the contractor to POTL as outlined above. Other specific reporting requirements are outlined in Section 10.0 of this DMP.</p> |
| Auditing | <p>All relevant documentation outlined in the 'Implementation Strategy' must be lodged and confirmed as approved by regulatory agencies prior to commencing work. Proof of this must be provided to POTL. Audits may be conducted by regulatory authorities periodically during any permit term. POTL can monitor contractor performance in line with DMP.</p> |
| Corrective Action | <p>Corrective action will be required in the context of the findings of the audits or in the context of any issues raised by regulatory bodies.</p> <p>Corrective actions may also be required as a result of complaints in accordance with the complaint response process outlined above.</p> |

10.0 Specific Environmental Strategies of the DMP

10.1 General

This section of the DMP identifies specific environmental strategies for each element of the DMP related to the dredging and dredge material placement (in reclamation) activity that will need to be addressed by the dredge contractor.

Unless specifically stated, given the long timeframes involved and the scale of the Project over several stages, commitments to activities such as environmental monitoring may be undertaken by the contractor, by POTL or by a third party contracted by POTL depending on the procurement approach taken for the works. As such, the focus of the DMP is on outlining the management and monitoring commitments with the responsibility for implementing the commitments to be developed as part of the procurement strategy for the Project and subsequently as part of the final DMP developed in consultation with relevant Agencies.

The requirements in this section are intended to apply in addition to the general requirements outlined in Section 3.2 of this DMP and in most cases will need to be integrated in documentation and any conditions of approval imposed on the dredging activity under relevant legislation (including the EPBC Act and relevant State legislation).

POTL would ensure these requirements are addressed and met by its appointed dredge contractor as part of project planning and to ensure activities are being carried out consistently with any existing procedures or protocols in Port Limits or under relevant corporate environmental policies or strategies.

10.2 Purpose

The purpose of the environmental strategies and DMP are to:

- Identify potential and actual environmental aspects and impacts associated with the works
- Describe the appropriate measures to prevent, monitor and manage all possible effects; and
- Indicate the corrective action(s) to be undertaken if an undesirable impact or unforeseen level of impact occurs.

10.3 Elements and Structure

The following are the key elements that make up the DMP:

- Marine Megafauna Management
- Tailwater Management
- Sediment Quality
- Vessel wastewater management (including washdown of plant and equipment)
- Ballast water and marine pest incursion management
- Vessel waste management
- Fuel management
- Noise Quality
- Air quality; and
- Emergency planning and procedures.

The structure used for the specific management plans within the DMP is identified in Table 2 below.

Table 2 Structure for management plan within the DMP

| Item | Content |
|-------------------------|--|
| Element | The aspect of dredging to be managed (as it affects environmental values). |
| Objective | The guiding policy of management objective that applies to the element. |
| Applicability | Aspect of dredging that this strategy applies to. |
| Performance Criteria | The measurable performance criteria (outcomes)/indicators for each element. |
| Implementation Strategy | The strategies, tasks or action programme (to nominated standards) that would be implemented to achieve the performance criteria. |
| Monitoring | The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change). |
| Auditing | The auditing requirements to demonstrate implementation of agreed dredge management strategies and compliance with agreed performance criteria. |
| Reporting | The format, timing and responsibility for reporting of auditing and monitoring results. |
| Corrective Action | The action of options to be implemented in case a performance criteria is not reached and the person(s) responsible for action (including staff authority and management structure). |

11.0 Marine Megafauna

This section outlines requirements that are to be met associated with the management of potential interactions between dredge equipment and marine megafauna. Management of underwater noise from marine piling and other construction activities associated with PEP are addressed in Appendix B2 – Construction Environmental Management Plan.

| Element/Issue | Marine Megafauna |
|---------------------------|--|
| Objective | <ul style="list-style-type: none"> ▪ To reduce the risk of disturbance or injury to marine mammals and sea-turtles resulting from the dredging and placement activities. ▪ Establish and maintain awareness of the importance of protecting marine mammals and sea turtles. |
| Applicability | All dredge vessels |
| Performance Criteria | <ul style="list-style-type: none"> ▪ No incidents of vessel related disturbance to marine mammals and sea-turtles. ▪ All members of the dredging team to complete an induction, which will include information on marine mammal and sea turtle management requirements. ▪ Vessel masters and spotters trained in marine mammal and sea turtle interaction procedures. |
| Implementation Strategies | <ul style="list-style-type: none"> ▪ Prior to commencement of dredging activities, employees responsible for marine megafauna spotting will be appropriately trained. ▪ Marine mammal and turtle observation and response procedures including the application of a 300 m exclusion zone will be implemented during dredging activities. Dredging operations shall be stopped where these fauna are observed within 300 m of the operating dredge until the animals have moved further than 300 m or have not been sighted for 15 minutes. ▪ A lookout will be maintained for cetaceans while the dredge sails between the dredging area and reclamation. In the event that a cetacean is sighted, vessel speed and direction will be adjusted to avoid impact on the observed individual (within the safety constraints of the vessel). ▪ Marine mammal and turtle observation during night dredging will be undertaken using appropriate lighting.. ▪ Turtle deflectors will be mounted on the draghead of the TSHD. ▪ TSHD dredge pumps will only be started when the draghead is close to the seafloor (not while lowering pipe). ▪ The TSHD dredge pump will be stopped as soon as possible after the completion of dredging. ▪ Light levels from the dredging works will be limited to those lights that are necessary for the safe operation of the vessel, for spotting marine megafauna at night, and the health and safety of those on board. ▪ Any injury to marine megafauna shall be recorded and reported immediately as per below. |
| Monitoring | Marine mammal and turtle activity will be performed by a person at a suitable location on each vessel. |
| Auditing | POTL will undertake checks of the dredge contractor's compliance with the DMP |
| Reporting | <ul style="list-style-type: none"> ▪ A record of sighted animals will be maintained, indicating the sighting of each individual animal and actions taken. ▪ Down-time will be reported as Environmental Delay in the equipment daily report. ▪ Immediate reporting of any incident involving injured or killed animals to POTL and regulatory agencies. ▪ Any injury to marine megafauna shall be recorded and reported immediately via the Department of National Parks, Sport and Racing (NPSR) online incident report form (https://www.business.qld.gov.au/industry/tourism/parks-recreation-forests/incident-report-form). ▪ Details of the incident are to be compiled into an incident report. |
| Corrective Action | <ul style="list-style-type: none"> ▪ In the event of an environmental incident, appropriate emergency response measures shall be implemented to ensure environmental harm from the event is reduced. ▪ If injury to marine megafauna occurs, liaise with NPSR immediately to identify rescue options and develop future corrective strategy. ▪ Assist in capture of injured animals per advice from regulatory agencies. ▪ Other strategies will implemented, as advised by regulatory agencies or POTL, to reduce likelihood of incident recurring. |

12.0 Tailwater Management

This section outlines requirements that are to be met associated with management of tailwater discharged from the reclamation. The dredged material will be hydraulically placed into the reclamation, with supernatant tailwater moving through the various cells of the reclamation to an ultimate discharge point at the mouth of the Ross River. The guidelines below identify environmental management measures and monitoring that will be undertaken by the construction/dredge contractor in undertaking this work.

| Element/Issue | Tailwater Quality Management |
|---------------------------|---|
| Objective | To ensure discharge water (dredging tailwaters) released to the environment is of an acceptable standard. |
| Applicability | Tailwater from the reclamation area during dredging works. |
| Performance Criteria | <ul style="list-style-type: none"> ▪ Tailwater discharge is to achieve the following limit prior to release: <ul style="list-style-type: none"> ▪ TSS: 80th percentile < 100 mg/L (or equivalent turbidity level); and ▪ pH: between a range of 6.5 – 8.5. ▪ Specified number of exceedances of TSS/turbidity and pH trigger levels at the discharge outlet. |
| Implementation Strategies | <ul style="list-style-type: none"> ▪ Cells to be established in a manner that maximises settlement of sediments and reduces further erosion and mobilisation of sediments. ▪ Development of a turbidity/TSS relationship to enable in situ turbidity readings to be taken on site and correlated to a TSS concentration. To achieve this, samples for TSS and turbidity are required to be taken at the same time, over a period long enough to provide a sufficient dataset necessary to determine a good correlation between the two parameters. ▪ If turbidity/TSS exceeds the performance criteria in the tailwater ponds, the control measures on site will be promptly reviewed to ensure that all reasonable and practicable measures are being taken in terms of both pond operation and the hydrologic and sediment loading on the tailwater ponds (refer to Corrective Actions below). ▪ ASS and PASS to be managed in accordance with the ASS Management measures outlined in Chapter B1 of the EIS. |
| Monitoring | <p>Implement a tailwater monitoring program, comprising the following:</p> <ul style="list-style-type: none"> ▪ Turbidity/TSS and pH monitoring of tailwater at the discharge point from the sediment ponds. ▪ Visual observations to check for scum formations, oil spills etc. ▪ Plume validation monitoring of turbidity/TSS in receiving waters adjacent to the discharge point. This monitoring is to be used to validate modelling results. |
| Auditing | POTL will undertake checks of the dredge contractor's compliance with the DMP Reporting of tailwater performance to be provided to POTL regularly. |
| Reporting | <p>Tailwater Monitoring Program</p> <ul style="list-style-type: none"> ▪ Monitoring results to be maintained in a database within one week of each monitoring episode. On completion of the reclamation, the database is to be stored in accordance with legal retention requirements. ▪ A surveillance report is to be prepared at the completion of each monitoring episode. The surveillance report will be submitted to POTL within one week of each monitoring episode, and will identify any significant changes to tailwater discharge and corrective actions implemented. ▪ A post construction monitoring report will be prepared at the end of each stage of the reclamation process. <p>Incident Reporting</p> <ul style="list-style-type: none"> ▪ An Incident Report is to be prepared in the event of any exceedances of performance criteria. The report will be submitted to POTL within one week of the exceedance and stating corrective actions taken. |
| Corrective Action | <p>If continual turbidity/TSS exceedances are observed, the following contingency actions could be implemented:</p> <ul style="list-style-type: none"> ▪ Increase tailwater residence time in the tailwater pond. ▪ Redirect supernatant from the filling cells to other cells to allow further settlement before being discharged. ▪ Modify decanting rates and ensure hydraulic efficiency. ▪ Install additional controls in the tailwater ponds or other controls that can regulate wind and wave action in the pond. <p>If the pH of tailwater is outside of the specified range:</p> <ul style="list-style-type: none"> ▪ Add lime or other mechanism to increase pH and monitor pH during dosing to limit risk of over dosing. ▪ Review ASS/PASS treatment measures to ensure they are being properly implemented. |

13.0 Sediment Quality

This section outlines requirements that are to be met associated with sediment quality, and controls that will be implemented to reduce impacts to water quality, seabed and marine flora and fauna through the disturbance of any contaminated sediments. These are documented in Chapter B4 (Marine Sediment Quality) of the EIS, and are primarily designed to ensure contaminated sediments are identified through further sediment sampling, and if detected, can be segregated and disposed of at an appropriate onshore facility. The environmental commitments include the following actions:

- Undertake sediment quality testing prior to works to characterise dredged sediments before dredge operations (note: while indicative testing has been undertaken, additional contemporary sediment quality data is required closer to the commencement of works to ensure currency of data).
- Develop and implement procedures and arrangements to appropriately manage and remove any contaminated materials if encountered.

| Element/Issue | Sediment Quality |
|---------------------------|--|
| Objective | To reduce impacts to water quality, seabed and marine flora and fauna through the disturbance of any contaminated sediments. |
| Applicability | All dredged material |
| Performance Criteria | <ul style="list-style-type: none"> ▪ Ensure further sediment quality testing occurs in general accordance with National Guidelines (i.e. NAGD). ▪ Ensure appropriate treatment of contaminated material if required. |
| Implementation Strategies | <ul style="list-style-type: none"> ▪ Use appropriate methods to excise any contaminated sediment hot spots identified by detailed sediment quality testing. ▪ Excised contaminated materials to be placed onshore and treated in the reclamation or other suitable onshore facility and disposed of at an appropriate location, in accordance with relevant Queensland guidelines (and licenses sort if required). |
| Monitoring | <p>Construction Monitoring</p> <ul style="list-style-type: none"> ▪ Monitoring will be undertaken in general accordance with the NAGD guidelines prior to construction. ▪ Monitoring of treatment/dewatering of land based material disposal will be undertaken. <p>Long Term Monitoring</p> <ul style="list-style-type: none"> ▪ Once Stage 1 is constructed and operational, the existing long term sediment monitoring program will be extended to monitor operational impacts. ▪ Prior to construction of subsequent stages, further sediment testing will be undertaken to guide sediment management or disposal. |
| Auditing | POTL will undertake checks of the dredge contractor's compliance with the DMP |
| Reporting | <ul style="list-style-type: none"> ▪ Dredge volumes will be reported to regulatory agencies in accordance with any permits granted. ▪ For any contaminated sediment excised and taken to land, report the following: <ul style="list-style-type: none"> ▪ Volume excised ▪ Treatment applied ▪ Volume removed to landfill after dewatering ▪ Any validation testing required <p>Incident Reporting</p> <ul style="list-style-type: none"> ▪ The dredge contractor will prepare an Incident Report in the event of any corrective actions being implemented. |
| Corrective Action | As indicated above, corrective action will be taken where monitoring shows potential impacts to the marine environment from sediment contamination, or otherwise, where exceedances of trigger levels or permit conditions are observed. If contaminated sediments are identified, this material will be treated (if required) and appropriately placed. |

14.0 Vessel Wastewater Management

This section outlines requirements that are to be met associated with vessel washdown procedures during operations such as washdown of the decks and the dredge head and other equipment. It does not include discharge of sewage or other waste (addressed later in this document).

| Element | Vessel Wastewater Management (including Washdown of Dredge Plant and Equipment) |
|-------------------------|---|
| Objective | To prevent the release of potential contaminants to the environment from washdown operations. |
| Applicability | All dredge vessels. |
| Performance Criteria | No inappropriate use of degreasers or washdown in sensitive environments. |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ Washdown of the deck and/or dredge head shall only be undertaken in accordance with relevant permits and approvals. ▪ Degreasers only to be used if other methods, such as sweeping or watering the deck/equipment, is not appropriate or practicable. |
| Monitoring | Visual inspection for contamination of waters while washing deck or equipment. |
| Auditing | Nil |
| Reporting | POTL is to be notified in the event of any unintentional spill of contaminant associated with washdown. |
| Corrective Action | If an unintentional release of contaminant occurs, review of procedures and rectify immediately. |

15.0 Ballast Water and Marine Pest Incursion Management

This section outlines requirements that are to be met by the dredge contractor associated with ballast water management before leaving the port of origin, during transit between areas of operation, during operations, and following completion of dredging activities prior to departing the Port of Townsville.

| Element | Ballast Water and Marine Pest Incursion Management |
|-------------------------|---|
| Objective | To ensure risk of translocation of organisms in ballast water or on the hull of a dredge vessel is prevented. |
| Applicability | All dredge vessels and equipment brought in for the Project. |
| Performance Criteria | <ul style="list-style-type: none"> ▪ No high risk ballast water brought into Port limits. ▪ Ensure ballast water discharge and marine pest inspections occur in accordance with Department of Agriculture and Water Resources (DAWR) standards. ▪ No harmful marine organisms are translocated on the underkeel hull, dredge heads or in the hopper of the dredge. |
| Implementation Strategy | <p>Port of Origin Prior to leaving the port of origin:</p> <ul style="list-style-type: none"> ▪ The dredge vessel is to be thoroughly washed. ▪ If discharge pipes have been utilised in prior operation, undertake a thorough flush of these systems. ▪ Inspect ship hull, hopper and dredge gear (especially dredge heads) to ensure that no material which may transport organisms (sediments, organic material, or waters) is retained. <p>During transit between Port of Origin and Port of Operations (Port of Townsville)</p> <ul style="list-style-type: none"> ▪ No deep water ballast exchanges to occur in the Great Barrier Reef Marine Park. ▪ Any ballast tanks holding seawaters to be exchanged with a minimum 150% of design volume with seawaters at a location as distant from the coastline or other shallow (<100 m) areas as possible but not less than 5 nautical miles from the coast (in accordance with IMO requirements). ▪ Any waters held in the hopper during transit to be treated as for other ballast waters. <p>During operation at Port of Townsville</p> <ul style="list-style-type: none"> ▪ On arriving at the port of operations, the dredge is to operate in accordance with DAWR and Australian Customs regulations. ▪ Hull inspections to be carried out if requested by DAWR for attached marine pests. Vessels to comply fully with DAWR requirements. <p>Leaving Port of Townsville</p> <ul style="list-style-type: none"> ▪ When leaving the port of operations, relevant State and Commonwealth requirements pertaining to ballast water management are complied with. |
| Monitoring | Monitoring may be carried out by DAWR on the dredge contractor at their prerogative. POTL will assist the agency as required. |
| Auditing | Audits may be carried out by DAWR on the dredge contractor at their prerogative. POTL will assist the agency as required. |
| Reporting | <ul style="list-style-type: none"> ▪ Hopper water discharge and replacement records are to be kept in the Ship's log and made available upon request. ▪ A record will be kept of volumes, location and time of ballasting and deballasting operations. |
| Corrective Action | <ul style="list-style-type: none"> ▪ If an unintentional release or exchange occurs, review of ballast and deballasting procedures and rectify immediately. ▪ If marine pests are encountered on ships hulls or other equipment, they are to be treated and removed in accordance with DAWR instruction before commencing work. |

16.0 Vessel Waste Management

This section outlines requirements to manage wastes generated from or incidental to the dredging operations. It is separated into three categories:

- Solid waste and garbage
- Sewage treatment; and
- Hazardous waste management.

| Element | Vessel Waste Management: Solid Waste and Garbage |
|-------------------------|--|
| Objective | To ensure that general refuse produced on-board the dredge vessel is collected, retained, and transferred to an appropriate facility without unintentional material loss. |
| Applicability | All dredge vessels. |
| Performance Criteria | <ul style="list-style-type: none"> ▪ No loss of solid wastes material overboard during collection or transfer. ▪ No discharge other than at berth. |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ Vessel fitted with appropriately sized waste disposal bins. ▪ These bins are to be secured and fitted with secure lids to prevent material being blown overboard during storage or handling. ▪ Where practicable, ensure material compacted to further prevent unintentional loss. ▪ Ensure the bins are collected and emptied at appropriate intervals. |
| Monitoring | Dredge crew to carry out regular visual inspections of collection points and visual inspection of on-deck bins. |
| Auditing | Nil. |
| Reporting | Dredge Contractor to report any loss of waste material or any community complaints received about solid waste management to POTL. |
| Corrective Action | If practicable, take measures to retrieve material that is lost. Review procedures causing material loss and take immediate action to rectify. |
| Element | Vessel Waste Management: Sewage Treatment |
| Objective | To ensure sewage generated on-board is appropriately treated and managed. |
| Applicability | All dredge vessels. |
| Performance Criteria | Sewage discharge to meet relevant legislative requirements (<i>Queensland Transport Operations (Marine Pollution) Act 1995</i> and regulation). |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ Must comply with relevant regulation and maritime requirements depending on the size of the vessel. ▪ Where possible, material is to be held on board and disposed onshore ▪ The holding tank is to be pumped out either in accordance with untreated sewage requirements under Queensland legislation or otherwise by appropriate licensed contractors while the dredge is in port. |
| Monitoring | Monitoring of treatment system as required by legislation. |
| Auditing | Nil. |
| Reporting | Report any breach and maintain records of sewage pumped ashore |
| Corrective Action | Ensure regular review of sewage storage system inputs and operation. Modify procedures to meet discharge requirements. |
| Element | Vessel Waste Management: Hazardous / Regulated Waste Management |
| Objective | To ensure hazardous waste generated on-board is appropriately managed. |
| Applicability | All dredge vessels. |
| Performance Criteria | No inappropriate storage or disposal of hazardous waste. |

| Element | Vessel Waste Management: Hazardous / Regulated Waste Management |
|-------------------------|---|
| Implementation Strategy | <p>During at-sea operations:</p> <ul style="list-style-type: none"> ▪ Hazardous waste must be stored in an appropriate and secure manner and clearly marked in accordance with legislative requirements. <p>During transfer:</p> <ul style="list-style-type: none"> ▪ Where required, hazardous wastes shall be transferred to appropriate containers and transported to an appropriate facility for disposal. ▪ Collection and transport of designated hazardous wastes is to be undertaken only by a licensed contractor. <p>Procedures to reduce spills or leakage during storage and transfer shall be followed. Spill response equipment must be easily identifiable and conveniently located so as to respond to a spill if it occurs.</p> |
| Monitoring | Dredge crew to carry out regular visual inspections of hazardous waste storage containers to determine their integrity and identify if any spills or leakage has or is occurring. |
| Auditing | Nil. |
| Reporting | Incident reports to be provided to POTL detailing any spills or incidents involving hazardous waste and clean-up operations. |
| Corrective Action | If procedures breakdown or a spill occurs, procedures to be reviewed and staff trained about appropriate responses. |

17.0 Fuel Management

This section outlines requirements that are to be met associated with the bunkering of fuel by the dredge vessel during the operation. This section deals with fuel transfer; the section below on emergency planning and procedures deals with general oil spills and response.

| Element | Fuel Management |
|-------------------------|--|
| Objective | To ensure bunkering of fuel to the dredge vessel is appropriately transferred and spillage is prevented. In the event of a spill, there is a rapid response to reduce impacts on the marine environment. |
| Applicability | All dredge vessels that will require bunkering of fuel during the dredge campaign. |
| Performance Criteria | No spills or leaks during fuel transfer operations. |
| Implementation Strategy | During transfer: <ul style="list-style-type: none"> ▪ A licensed contractor is used; and ▪ Fuel levels are being monitored both by the contractor and the dredge vessel. Vessel to apply for and give notification as to the transfers of bulk liquids to Port Control as per Port of Townsville Procedures and appropriate forms. |
| Monitoring | Visual inspections of fuel-dispensing equipment and surrounding water are undertaken during operations and after fuel transfer. |
| Auditing | Nil. |
| Reporting | POTL is to be notified in the event of any unintentional spill of fuel or oil associated with fuel bunkering. |
| Corrective Action | If an unintentional release or spill occurs, review of procedures and rectify immediately. Implement contingency and clean up procedures as per relevant plans outlined in the Emergency Planning and Procedures DMP element. |

18.0 Noise Quality

This section outlines requirements that are to be met with regard to nuisance noise issues from dredging operations.

| Element | Noise Quality |
|-------------------------|--|
| Objective | <ul style="list-style-type: none"> ▪ To protect the acoustic amenity and reduce nuisance noise on surrounding sensitive receivers. ▪ To respond effectively to any noise complaints that may arise during construction. |
| Applicability | All dredge vessels. |
| Performance Criteria | There are no complaints received about noise associated with dredge operations. |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ Ensure that engines and equipment on board the dredge are properly maintained in good working order. ▪ Maintain and operate all equipment on board the dredge in a safe and efficient manner. ▪ Carry out non-essential maintenance during day-light hours. ▪ The contractor staff are aware of noise requirements in relevant permits and/or approvals. ▪ Operate a complaints management system. |
| Monitoring | Noise monitoring will be conducted in response to non-vexatious noise complaints received during the dredging operations. Noise monitoring will be conducted at the location / receiver considered to be most affected during the works. |
| Auditing | Nil. |
| Reporting | <ul style="list-style-type: none"> ▪ In the event that the monitoring indicates an exceedance of a performance criteria set out in a permit or other statutory instrument, refer to Corrective Actions. |
| Corrective Actions | <ul style="list-style-type: none"> ▪ In the event that responsive noise monitoring indicates an exceedance of the performance criteria, investigate and if warranted, implement actions to reduce noise emission levels to nearby receivers. |

19.0 Air Quality

This section outlines requirements that are to be met with regard to nuisance air quality issues from dredging operations.

| Element | Air Quality |
|-------------------------|--|
| Objective | <ul style="list-style-type: none"> ▪ To protect the air quality of surrounding sensitive receivers. ▪ To respond effectively to any air quality issues that arise during dredging. |
| Applicability | All dredge vessels. |
| Performance Criteria | <ul style="list-style-type: none"> ▪ There are no complaints received regarding air quality associated with dredge operations. |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ Ensure that engines and equipment on board the dredge are properly maintained in good working order. ▪ Maintain and operate equipment on board the dredge in a safe and efficient manner. ▪ The contractor staff are aware of air quality requirements in relevant permits and/or approvals. |
| Monitoring | Investigation of complaints and review of equipment versus relevant standards / requirements |
| Auditing | Nil. |
| Reporting | <ul style="list-style-type: none"> ▪ The results of any air quality monitoring are to be provided to POTL within two weeks following completion of any monitoring / investigation. ▪ In the event that the monitoring indicates an exceedance of a performance criteria set out in a permit or other statutory instrument, refer to Corrective Actions. |
| Corrective Actions | <ul style="list-style-type: none"> ▪ In the event that responsive air quality monitoring indicates an exceedance of the air quality criteria, an investigation shall be undertaken into potential cause/s. ▪ Follow up measurements are to be conducted two weeks later to confirm whether air quality is within performance criteria. If air quality continues to exceed criteria, the Contractor is to submit a plan to POTL indicating how air quality issues can be further mitigated. |

20.0 Emergency Planning Procedures

This section outlines requirements that are to be met associated with emergency planning and procedures for environmental incidents that could result from dredging and pump-out operations. This includes, but is not limited to, oil spills, ship collision, and similar incidents.

| Element | Emergency Planning and Procedures |
|-------------------------|---|
| Objective | To identify and reduce the potential for an environmental incident before it occurs so as to prevent damage to the surrounding marine environment and the public. |
| Applicability | All dredge vessels. |
| Performance Criteria | <ul style="list-style-type: none"> ▪ No environmental incidents occur during the dredging campaign. ▪ In the event of an incident, there is a rapid response to reduce impacts on the marine environment. |
| Implementation Strategy | <ul style="list-style-type: none"> ▪ The dredge vessel has and maintains a shipboard oil pollution emergency plan (or equivalent) which outlines the role, responsibilities, and actions to be followed should an uncontrolled release of oils/fuels occur. ▪ A risk assessment regarding potential environmental incidents that could occur during the dredge operation is to be prepared by the dredge contractor prior to commencing work. The risk assessment will: <ul style="list-style-type: none"> ▪ Identify the incidents/hazards that may occur during the campaign ▪ Identify the environmental consequences of the hazard occurring ▪ For each hazard, identify measures that can be implemented to prevent the likelihood of the hazard occurring and/or will reduce the severity of consequences ▪ Contingency measures that are to be implemented in the event of an incident occurring. ▪ On-board procedures are to be made available to crew. ▪ The vessel is to have at least two lines of communication (VHF and mobile phone) with port control and maintain constant contact. ▪ Meet requirements of the Regional Harbour Master, including Notice to Mariners. Protocols will be developed with the Regional Harbour Master for dropping the anchor lines as part of normal operations to ensure safe passage of vessels. |
| Monitoring | Nil. |
| Auditing | POTL will undertake checks of the dredge contractor's compliance with the DMP. |
| Reporting | <p>POTL to be provided with copies of the following prior to the commencement of work:</p> <ul style="list-style-type: none"> ▪ The shipboard oil pollution emergency plan as required in the above Implementation Strategy. ▪ The environmental incident risk assessment as required in the above Implementation Strategy. <p>POTL is to be notified within 24 hours in the event of any incident while the vessel is operating in port limits.</p> |
| Corrective Actions | <p>If an incident occurs, review procedures and rectify immediately. Implement contingency and/or clean up procedures as set out in relevant plans.</p> |