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CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Draft Environmental Impact Statement

APPENDIX BC: Waste Management Impact Assessment Report (2017)

1 June 2017

CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Environmental Impact Statement - Waste Management

Submitted to:
David Finney
Flanagan Consulting Group

REPORT

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Response to Commonwealth and Coordinator General Comments

This Waste Management Impact Assessment forms part of the Revised Draft EIS for the Cairns Shipping Development (CSD) Project, and has been prepared in response to changes to the project scope, and comments provided by the Commonwealth in its Terms of Reference, and the Queensland Coordinator General, following their review of the Draft EIS.

The Table below, provides details on where the comments of the Commonwealth and the Coordinator General have been addressed in this revision.

Relevant Queensland Government Coordinator General Terms of Reference

Reference	Title	Details	Response
Not Applicable	Legislative updates	Various publications (e.g. State Planning Policies) and legislation etc. have been updated since the ToR and guidelines were produced. Current versions are to be referred to.	Section 2.2 provides a revised review of the relevant legislative framework.
5.9.1	Waste	Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with pre-construction, construction, operation and decommissioning of all aspects of the project. Refer to regulated waste listed in Schedule 7 of the *Environmental Protection Regulation* 2008 (QLD).	Section 3.0 (Existing Situation) and Section 4.0 (Assessment of Potential Impacts) include a breakdown and assessment of potential waste types and waste volumes generated and managed from the existing and proposed operations. To the extent possible estimates of potential volumes have been provided, but in some instances this will not be known until the detailed design stage.
		Describe: waste generated by delivery of material to site(s)	Section 4.1 provides a description of the waste types, volumes and means of management of wastes generated during the pre-construction (mobilisation) phase of the project.

Relevant Queensland Government Coordinator General Terms of Reference			
		Describe: all chemical and mechanical processes conducted on the construction sites that produce waste	To the extent possible at this stage of the project Section 4.1 has sought to outline the aspects and processes of pre-construction and construction that are likely to generate wastes, and provide detail of the waste types and volumes to be generated by these.
		Describe: the amount and characteristics of solid and liquid waste produced on site by the project	To the extent possible estimates of potential volumes have been provided, but in some instances this will not be known until the detailed design stage. These estimates are included in Sections 4.1.
		Describe: hazardous materials to be stored and/or used on site, including environmental toxicity data and biodegradability.	Hazardous and Regulated Wastes will not be generated through general land-side operations. Those generated from vessels will generally be the result of vessel maintenance, and the ad hoc nature of this makes it difficult to estimate potential volumes. Nonetheless Section 4.2.2 provides a review of potential hazardous waste types that may be generated from vessels.
		Detail the proposed management of solid and liquid waste. Assess the potential impact of all waste generated during construction and operation, with regard for best practice waste management strategies, the Environmental Protection (Waste Management) Policy 2000 and the Environmental Protection (Waste Management) Regulation 2000 (QLD).	Section 4.3 describes the proposed waste management practices to be employed through the pre-construction and construction phases of the project.

Relevant Queensland Government Coordinator General Terms of Reference

Relevant Commonwealth Government Guidelines

Reference	Title	Details	
5.10.11	Increased Shipping	vi. Management of ship waste, in particular quarantine waste, domestic garbage, oil and sewage;	Section 4.2.2 provides details of the solid and liquid ship wastes that are estimated to be generated through the project. Estimated volumes have been provided to the extent possible, noting that the variability of some waste streams makes estimation difficult.
5.11	Proposed avoidance, safeguards, management and mitigation measures	f) Measures to ensure that increases in shipping and ship movements do not negatively impact on water quality objectives and environmental values of the Great Barrier Reef Marine Park and Great Barrier Reef World Heritage Area, including but not limited to: *ii. Provision of best practice waste disposal facilities;*	Section 4.3 provides a description of the waste avoidance and minimisation practices to be employed through the pre-construction, construction, operation and maintenance phases of the project.
5.19	Reference List and Bibliography	The reference list and bibliography provided in the EIS is to be accurate and concise and include the address and date accessed of any internet pages used as data sources.	Section 8.0 includes all references cited in the body of the document. For internet based resources, the source URL and date the materials were viewed are detailed.
5.20.	Appendices and Glossary	Detailed technical information studies or investigations necessary to support the main text of the EIS, but not suitable for inclusion in the main text must be included as appendices; for example, detailed technical or statistical information, maps, risk assessment, baseline data, supplementary reports etc. A copy of the Guidelines must also be included. A glossary defining technical terms and abbreviations used in the text must be included to assist the general reader.	Relevant calculations made through this assessment have been provided in the body of the document, and no technical appendices are required. Details of technical acronyms is provided.
Attachment 1 Section 7	Information sources	7.01 For information given the EIS must state:(a) the source of the information; and (b) how recent the information is; and (c) how the reliability of the information was tested; and (d) what uncertainties (if any) are in the information.	All cited references are detailed in the References (Section 8.0), with statements of reliance provided throughout the body of the document.

Acronyms

AMSA	Australian Maritime Safety Authority
ARRT	Advanced Resource Recovery Technology
BaU	Business as Usual
BCT	Brisbane Cruise Terminal
BIRA	Biosecurity Import Risk Analysis
C&D	Construction and Demolition waste
C&I	Commercial and Industrial waste
CCLT	Cairns Cruise Liner Terminal
CRC	Cairns Regional Council
CSD	Cairns Shipping Development Project
DEHP	Department of Environment and Heritage Protection
DMPA	Dredge Material Placement Areas
DOAWR	Department of Agriculture and Water Resources
DSC	Douglas Shire Council
EBPR	Enhanced Biological Phosphorus Removal
EIS	Environment Impact Statement
EP Act	*Environment Protection Act* 1994
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GHS	Global Harmonized System of Classification and Labelling of Chemicals
IBC	Intermediate Bulk Container
IFO	Intermediate Fuel Oil
IMO	International Maritime Organisation
L/s	Litres per second
m^3	Cubic Metres
ML	Mega-litres
ML/day	Mega-litres per day
MRF	Materials Recovery Facility
MSC	Mareeba Shire Council
MSDS	Materials Safety Data Sheet
MSW	Municipal Solid Waste

nm	Nautical miles
PASS	Potential Acid Sulphate Soils
PAX	Passengers and Crew
PSSA	Particularly Sensitive Sea Area
QLD	Queensland
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SMF	Submerged Membrane Filtration
SNP	Self-Neutralising Potential Acid Sulphate Soils
SWMF	Springmount Waste Management Facility
TOMPA	*Transport Operations (Marine Pollution) Act* 1995
ToR	Queensland government Coordinator General Terms of Reference
tpa	Tonnes per Annum
WRR Act	*Waste Reduction and Recycling Act* 2011
WWTP	Wastewater Treatment Plant
WMP	Waste Management Plan

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APPENDICES

1.0 INTRODUCTION

This report identifies and assesses the impacts associated with potential waste and wastewater generation during pre-construction, construction, operations and demobilisation phases of the Cairns Shipping Development (CSD) Project (the project). This report considers changes in the project scope, design, planning and proposed operations that have evolved from the Draft EIS for the project. With respect to waste management, the principal changes to the project include:

- The existing wharf is at capacity in terms of allowable berthing and mooring loads to the existing heritage listed wharf structure. In order to allow larger cruise ships to berth, and also to provide long-term protection of these culturally important wharves, additional wharf upgrade works are required. The wharf upgrade has been designed so that landside work is minimised to limit disturbance of the heritage-listed wharf. To cater for the projected increase in ship arrivals it will be necessary to rebuild wharf 6 which will allow for berthing of two mega class ships simultaneously. The project is proposed to accommodate Sun, Vista and Grand Class vessels, with the larger Voyager Class unable to be accommodated within the revised channel profile.
- There will be a reduced volume of dredged material generated through the project, owing to the reduced quantum of channel widening and deepening. Dredge material has been characterised as soft clay which is pumpable and stiff clay which is not pumpable, therefore separate material handling processes will be necessary.
- Land-side disposal of dredge material generated through the project will be required. The soft clay, and the stiff clay, will require different dredge methodologies, and owing to the differing geotechnical capabilities, will have different management and end-use outcomes. Accordingly two separate Dredge Material Placement Areas (DMPAs) are proposed for the project, as follows:
  - Northern Sands DMPA: Northern Sands and Waste Management Facility, which is an existing void in the Barron River delta created by past sand extraction, and is now used for burial of 'inert' construction and demolition fill, as well as the management of PASS. This site will accept the soft clay and PASS and self-neutralising PASS (SNP).
  - Tingira Street DMPA: Tingira Street, which will reuse the stiff clays as fill within Ports North Tingira Street Precinct, which is currently undergoing reclamation.

  Both DMPAs will require associated infrastructure to support the transfer and placement of dredge material, and this will include storage bunds; transfer pipeline; pumps; pump out stations; and, tailwater ponds. Waste management related to the construction and operation of this associated infrastructure is assessed in this report, with further description and assessment provided in Section 4.1. At the completion of the project the associated infrastructure for the DMPAs will be demobilised.
- As part of the Revised EIS process, the Northern Sands and Tingira Street DMPAs were selected by Ports North as the preferred sites on the basis of optimal environmental, social, economic and logistical characteristics. The waste management associated with handling and placing of the dredge material in the DMPAs, rather than the dredge material itself, is the focus of this assessment.
- To the extent practicable the dredge material will be dewatered, with the treated tailwater to be returned ultimately to the sea. Dewatering methodologies and technical options for the dredge material are still to be finalised.
- Maintenance dredge material, which is to be generated throughout the operating life of the project, is intended to be placed at sea, as per existing practices.
- Although the current use of tanker trucks for sewage removal from cruise vessels, whilst alongside, may be adequate for the future situation, the proposal is to introduce a system of direct discharge into the Cairns Regional Council's (CRC) sewerage reticulation system. The challenge is to provide a tank which will buffer the discharge flows of large cruise ships (which can pump up to 15 litres per second (L/s) to that of the limited capacity of CRC Wastewater Treatment Plants (WWTPs) infrastructure to

accept these (which is 7 L/s). For this reason, two connections to the existing sewerage system are required:

- One connection in the Wharf 3 area which allows a discharge of up to 7 L/s (limited use to vessels that comply with the required discharge flow) into CRC's reticulated sewage system.
- One connection in the Wharf 1 area that allows a discharge greater than 7 L/s. For this connection, a 150 millimetre (mm) diameter sewer line will discharge sewage to a storage facility and a submersible pumping station will limit the sewage discharge in the CRC's reticulation system to 7 L/s.

Within the defined EIS Study Area, which encompasses the broader Cairns region, this report relates specifically to the Land-side Project Area (CCLT upgrade works), and the two DMPA Project Areas, namely, the Northern Sands and Tingira Street DMPAs, as they relate to socio-economic and environmental aspects of the project, and the management of waste generated by the project. The aims of this report are to:

- Describe the legal framework associated with waste and wastewater management in the context of the project;
- Explain the processes associated with the project that have the potential to generate waste and wastewater, and the characteristics of the waste and wastewater itself;
- Describe the existing Cairns' waste management economy, and its current capability and capacity to manage wastes generated within the EIS Study Area.
- Describe the potential impacts of managing the wastes from the project within the township of Cairns, and its associated waste economy;
- Outline mitigation and management measures to minimise environmental and social impacts associated with the management of the potential waste streams generated as a result of the project;
- Assess the residual risks to the Cairns environment and waste economy as a result of applying the proposed mitigation and management measures, and,
- Respond to the specific waste management related commentary provided by Queensland Co-ordinator General, in its Terms of Reference (ToR) for the EIS, and the former Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), in its EIS Assessment Guidelines for the project.

This report seeks to address the above aims and describe the predicted environmental and social impacts associated with the project, and proposed mitigation measures, which are aimed at reducing those potential impacts. This includes both direct impacts at the land-side interface, and the need to manage the transfer, storage and handling of wastes at the wharf, but also the broader potential impacts on the Cairns waste economy as a result of the additional waste streams, and waste volumes requiring management within the township of Cairns. This report assesses the Land-side Project Area, and the two DMPA Project Areas independently through the pre-construction; construction; operations and maintenance; and, demobilisation phases of the project.

2.0 METHODOLOGY

This report has been developed in two parts. The first being to review and describe the 'Existing Situation' for waste management at the Port of Cairns, and the capability and capacity of the Cairns' waste management economy to manage these wastes. The second part then provides the assessment of the 'Impacts, Mitigation and Management' measures required to manage the additional waste streams, and waste volumes generated through the revised project.

2.1 Desktop Assessment

2.1.1 Existing Situation

Developing an understanding of the existing situation for the management of current Port of Cairns waste streams within the existing Cairns' waste economy has been undertaken primarily through the desktop review of the waste management capability and capacity within the EIS Study Area. This information provides the baseline status of the Cairns waste economy and will inform the assessment of the potential impacts posed by the influx of additional waste streams, and waste volumes from the project.

The assessment has reviewed current waste and wastewater generating activities, waste types and quantities, and waste and wastewater management activities at the Port of Cairns. The assessment of the existing situation also included a review of the available waste management capability and capacity in the EIS Study Area (i.e. Cairns waste management economy), with the intention of understanding the potential for this existing capacity to absorb and manage the types of wastes, and volumes of wastes generated through the construction, operation and maintenance of the project, or whether there may be gaps in the ability of the Cairns waste economy to manage these wastes.

This information forms the baseline information from which the impact assessment is completed.

2.1.2 Impact Assessment

The results of the impact assessment have focused on a desktop assessment of the types of wastes, and volumes of wastes projected to be generated through the pre-construction; construction; operation and maintenance; and, demobilising of resources from the Land-side Project Area, and the two DMPA Project Areas.

Projections of waste types and volumes from berthing vessels at the CCLT are based on Ports North's projections of additional cruise ship vessel berths at the wharf, with projections accounting for:

- Vessel size and class;
- Vessel passenger and crew populations; and,
- Frequency and duration of berths.

Normalised waste generation rates are based on international studies in the volumes of waste generated by cruise ships; their passengers and crews; and, the various forms of sea-side waste management practices applied. This method will estimate the volume of waste projected to be discharged from berthing vessels and requiring of land-side management within the EIS Study Area.

The volumes of dredge material requiring land-side management, and the types and volumes of wastes that may be generated through the construction of the DMPAs, has been based on estimations prepared to inform the Conceptual Designs for the project, and in particular the Northern Sands, and Tingira Street target DMPAs.

The assessment of waste management related risks presented in this report are discussed in relation to the following three factors:

- The magnitude of impacts (significance/consequence) (Table 1)
- The likelihood of impact (Table 2)

- The duration of impact (Table 3).

Table 1: Impact Significance for Waste

Impact Significance / Consequence	Description
Very High	Likely to exhaust all available waste management capacity in the EIS Study Area; or, existing capacity does not, and cannot be established to manage the waste types and/or volumes generated by the project. All solid waste generated by the project is disposed to landfill, with no reuse or recycling. A significant volume of solid waste beyond baseline levels is generated, representing >10 percent of waste processed at facilities in the region. A significant increase in the volume of wastewater to be treated representing >10 percent of wastewater volume being treated at the receiving wastewater treatment plant. Irreversible and severe change to current amenity (e.g. visual amenity, odour), resulting in the displacement of residents and businesses. Irreversible and significant disturbance of ecology due to contamination of the environment (e.g. land contamination, water quality impacts, and improper waste management causing wildlife poisoning, physical injury or death) over a regional spatial scale.
High	Likely to significantly limit available waste management capacity in the EIS Study Area; or, require new and currently unavailable waste management capacity to be established. The majority of solid waste generated by the project is disposed to landfill, with little reuse or recycling. A high volume of solid waste beyond baseline levels is generated, representing five-10 percent of waste processed at facilities in the region. A high increase in the volume of wastewater to be treated representing five-10 per cent of wastewater volume being treated at the receiving wastewater treatment plant. Extensive disturbance to current amenity (e.g. visual amenity, odour). Considerable permanent adverse disturbance of ecology due to contamination over a local scale. Mitigation measures and detailed design work are unlikely to remove all of the significant effects.
Moderate	Likely to require active management of waste volume discharges into the local waste economy to avoid limiting available waste management capacity in the EIS Study Area; or, may require amendment to current approvals for available waste management capacity. Some solid waste generated by the project is disposed to landfill, with a reasonable amount of reuse or recycling. A moderate volume of solid waste beyond baseline levels is generated, representing two-five percent of waste processed at facilities in the region. Adverse change resulting in some loss of amenity. Loss and permanent damage to ecology on a local scale. Some recovery is anticipated following completion of the works concerned. Mitigation measures are anticipated to alleviate some impacts. A moderate increase in the volume of wastewater to be treated representing two-five percent increase of wastewater volume being treated at the receiving wastewater treatment plant.
Minor	No additional management required to avoid limiting available waste management capacity in the EIS Study Area. The majority of solid waste generated by the project is

Impact Significance / Consequence	Description
	reused or recycled. A small volume of solid waste beyond baseline levels is generated, representing zero-two percent of waste processed at facilities in the region. A minor increase in the volume of wastewater to be treated representing zero-to-two percent increase of wastewater volume being treated at the receiving wastewater treatment plant. Limited or temporary effects resulting in low levels of disturbance or loss to local amenity and ecology. Close to full recovery is anticipated following completion of the works concerned. Mitigation measures are anticipated to alleviate close to all impacts.
Negligible	No additional management measures are required to manage wastes. No appreciable impact upon local amenity or ecology. Effects are within normal bounds of variation or within the margin of forecasting error. No additional solid waste or wastewater is generated beyond baseline levels.
Beneficial	The establishment of new resource recovery waste management infrastructure through additional waste stream volumes providing the economies of scale to support their operation. The amount of solid waste generated is less than that currently generated by the existing activities at the port. Increased rates of recycling and recovery of waste streams than is currently achieved for waste generated at the port. Recirculation measures to reduce wastewater generation result in less than what is currently generated requiring processing. Any measures that are expected to result in an improvement of social values, amenity and ecological health.

Table 2: Likelihood of Impact

Likelihood of Impacts	Risk Probability Categories
Highly Unlikely	Highly unlikely to occur but theoretically possible
Unlikely	May occur during construction of the project but probability well below 50 percent; unlikely, but not negligible.
Possible	Less likely than not but still appreciable; probability of about 50 percent.
Likely	Likely to occur during construction or during a 12-month timeframe; probability greater than 50 percent.
Almost Certain	Very likely to occur as a result of the proposed project construction and/or operations; could occur multiple times during relevant impacting period.

Table 3: Duration of Impact

Duration	Description
Temporary	Days to months
Short Term	Up to one year
Medium Term	From one to five years
Long Term	From five to 50 years
Permanent / Irreversible	In excess of 50 years

These were considered together to determine the initial risk assessment (unmitigated risk), as well as a residual risk assessment, once additional mitigation and management measures are applied. The risk assessment matrix is described in Table 4, with the risk rating legend described in Table 5 further below.

Table 4: Risk Matrix

Likelihood	Significance				
	Negligible	**Minor**	**Moderate**	**High**	**Very High**
Highly Unlikely/ Rare	Negligible	Negligible	Low	Medium	High
Unlikely	Negligible	Low	Low	Medium	High
Possible	Negligible	Low	Medium	Medium	High
Likely	Negligible	Medium	Medium	High	Extreme
Almost Certain	Low	Medium	High	Extreme	Extreme

Table 5: Risk Rating Legend

Extreme Risk	An issue requiring change in project scope. Likely to exhaust all available waste management capacity in the EIS Study Area; or, existing capacity does not, and cannot be established to manage the waste types and/or volumes generated by the project.
High Risk	An issue requiring further detailed investigation and planning to manage and reduce risk. Likely to significantly limit available waste management capacity in the EIS Study Area; or, require new and currently unavailable waste management capacity to be established.
Medium Risk	An issue requiring project specific controls and procedures to manage. Likely to require active management of waste volume discharges into the local waste economy to avoid limiting available waste management capacity in the EIS Study Area; or, may require amendment to current approvals for available waste management capacity.
Low Risk	Manageable by standard mitigation and similar operating procedures. No additional management required to avoid limiting available waste management capacity in the EIS Study Area.
Negligible Risk	No additional management required.

2.2 Legislative Framework

The impact assessment has been reviewed for consistency with relevant State and Federal requirements of the assessment to ensure that any potential changes to these requirements, which have occurred since the preparation of the Draft EIS are accounted for in this Revised Draft EIS. The management of waste in Queensland is currently regulated under the following statutory framework:

- *Environmental Protection (EP) Act 1994*
  - *Environmental Protection Regulation 2008*
- *Waste Reduction and Recycling (WRR) Act 2011*
  - *Waste Reduction and Recycling Regulation 2011*

Key elements of the statutory framework include:

- Local government administration of waste management activities;
- Approval and control of waste management and disposal facilities;
- Waste management hierarchy to minimise, reuse, recycle various waste streams to limit disposal to landfill; and,
- Design standards for selected waste management infrastructure.

The *Environmental Protection (Waste Management) Regulation 2000* expired on 29 August 2014 and all waste management legislation in Queensland is now incorporated into the EP Act, WRR Act and associated subordinate regulations.

The assessment of proposed waste management practices related to the project, and the impact assessment of these proposed measures is informed by the following key legislative instruments:

2.2.1 MARPOL 73/78 and *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth)

The operational discharges from ships are regulated through the implementation of the International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 (MARPOL 73/78), to which Australia is a signatory.

MARPOL 73/78 is the primary international protocol for the prevention of pollution of the marine environment by ship operations or accidents. It covers all forms of waste disposal from ships and includes regulations aimed at preventing and minimising pollution from ships via six technical annexes that cover oil, bulk noxious liquid substances, harmful substances in packaged form, sewage, garbage, and air pollution. Where a State or Territory does not have complementary legislation for a specific Annex of the Convention, the Commonwealth legislation applies.

Under MARPOL, every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons, is required to carry and implement a Garbage Management Plan. Both categories will include the cruise ships that will be accommodated by the CCLT.

The Australian Maritime Safety Authority (AMSA) is charged with the implementation and enforcement of MARPOL 73/78 throughout Commonwealth waters. Implementation of MARPOL 73/78 is administrated through the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth).

The Great Barrier Reef has been designated by the International Maritime Organisation (IMO) as a Particularly Sensitive Sea Area (PSSA). Under MARPOL, there are specific requirements for waste management in these areas.

Management requirements in MARPOL also reference the defined term ‘nearest land’. Nearest land means:

"from the baseline from which the territorial sea of the territory in question is established in accordance with international law, except that, for the purpose of the present Convention "from the nearest land" off the north eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in:

latitude 11°00' S, longitude 142°08' E
to a point in latitude 10°35' S, longitude 141°55' E,
thence to a point latitude 10°00' S, longitude 142°00' E,
thence to a point latitude 9°10' S, longitude 143°52' E,
thence to a point latitude 9°00' S, longitude 144°30' E,
thence to a point latitude 10°41' S, longitude 145°00' E,
thence to a point latitude 13°00' S, longitude 145°00' E,
thence to a point latitude 15°00' S, longitude 146°00' E,
thence to a point latitude 17°30' S, longitude 147°00' E,
thence to a point latitude 21°00' S, longitude 152°55' E,
thence to a point latitude 24°30' S, longitude 154°00' E,
thence to a point on the coast of Australia in latitude 24°42' S, longitude 153°15' E".

(MARPOL Annex II Resolution MEPC. 118, 2007)

In applying the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth), AMSA, MARPOL Annex V, 2011 states that vessels are not permitted to discharge the following wastes in the Great Barrier Reef Marine Park (GBRMP):

- Food waste not comminuted or ground.
- Cargo residues that are Harmful to the Marine Environment. Cargo residues are considered to be harmful to the marine environment if they are residues of solid bulk cargoes which are classified according to the criteria of the United Nations Globally Harmonized System (GHS) of Classification and Labelling of Chemicals.
- Cargo residues that are not Harmful to the Marine Environment that cannot be recovered using commonly available methods for unloading, not contained in wash water. However, discharge is permitted, while *en route*, as far as practicable from the nearest land, but in any case, ≥ 12 nm from the nearest land, subject to conditions.
- Carcasses of animals carried on board as cargo which died during the voyage.
- All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse.

The following wastes (with conditions) are permitted to be discharged in the GBRMP:

- Food waste that is ground up into small particles <25 mm in diameter; however, discharge is permitted, while *en route*, as far as practicable from the nearest land, but in any case, ≥ twelve nautical miles (nm) from the nearest land.
- Cargo material not harmful to the marine environment, contained in cargo hold bilge water is permitted to be discharged from a loaded hold through the ship's fixed piping bilge drainage system.
- Cleaning agents and additives contained in cargo hold wash water is permitted to be discharged while *en route*, as far as practicable from the nearest land, but in any case, ≥ 12 nm from the nearest land subject to conditions.
- Mixed garbage, if garbage has been mixed with, or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements apply.
- For ships ≥ 400 gross tons, machinery space bilges may be discharged to all waters, as long as:

- The vessel is proceeding *en route* (i.e. is not stationary)
- Oil content is less than 15 parts per million
- Oil discharge monitoring and control system and oil filtering equipment is operating.

All vessels likely to be berthing at the CCLT are expected to be ≥ 400 gross tons, and are required to abide by the above measures. In the unlikely scenario of ships less than 400 gross tons berthing at the CCLT, oil and all oily mixtures must be retained on board for on shore disposal unless the ship is proceeding on route and has in operation approved equipment that ensures oil content is less than 15 parts per million.

With regard to greywater and sewage, as per MAPROL and GBRMPA advice (GBRMPA, 2011), cruise ships operating in the GBRMP must ensure that:

- Greywater is only discharged when maintaining at least 3 nm distant from a reef, island or the mainland.
- Treated sewage (from an IMO approved plant) is only discharged when maintaining at 3 nm from a reef, island or the mainland.
- Macerated and disinfected sewage (from an IMO approved plant) is not discharged into the GBRMP. Ships may only discharge this type of sewage if located at least 3 nm from the boundary of the GBRMP boundary (which is taken as 'nearest land' by the IMO).
- Untreated or treated sewage (from a non-IMO approved plant) must not be discharged into the GBRMP or an area at least 12 nm from the boundary of the GBRMP.

Commercial ships require written permission from the GBRMPA and the Queensland Department of Environment and Heritage Protection (DEHP) to discharge waste, and these permissions may stipulate additional requirements for ships to manage discharges of waste. Table 7 describes the relevance of MARPOL for each type of waste generated by ships.

2.2.2 *International Convention for the Control and Management of Ships' Ballast Water and Sediments* (BWM) *2004* (Commonwealth Unratified Convention)

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM, 2004) has been tabled before Parliament as part of the *Biosecurity Bill* 2012. The Convention is not yet in force. This will occur on 8 September 2017, which is 12-months after 30 nations, with a combined merchant fleet constituting 35 percent of the gross tonnage of the world's merchant shipping, signed the Convention. Australia signed the Convention subject to ratification on 27 May 2005.

2.2.3 Australian Ballast Water Management Requirements, Department of Agriculture and Water Resources, 2016 (Commonwealth)

On 1 July 2001, Australia introduced mandatory ballast water management requirements (the requirements) to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels.

These requirements were regulated under the *Quarantine Act 1908*, which was replaced on 16 June 2016 by the *Biosecurity Act 2015* (Commonwealth), which is now Australia's primary piece of legislation used to manage the biosecurity risks posed by ballast water and sediments.

The requirements are consistent with the IMO Ballast Water Convention 2004 that aims to minimise the translocation of harmful aquatic species in ships' ballast water and ballast tank sediments.

The discharge of high-risk ballast water in Australian ports or waters is prohibited, unless the biosecurity risk of the ballast water has been managed using an approved method, as prescribed by the *Biosecurity Act 2015* (Commonwealth).

All internationally plying vessels intending to discharge ballast water anywhere inside the Australian territorial sea are required to manage their ballast water in accordance with Australia's mandatory ballast water management requirements.

Therefore, this requirement applies to all international cruise ships visiting the Port of Cairns.

2.2.4 *Transport Operations (Marine Pollution) Act 1995* (Queensland)

The overall purpose of the *Transport Operations (Marine Pollution) Act 1995* (QLD) (TOMPA) is to protect Queensland's marine and coastal environment by minimising deliberate and negligent discharges of ship-sourced pollutants into coastal waters. As mentioned in Section 2.2.1, the act gives effect to MARPOL 73/78 and compliments approaches adopted by the Commonwealth Government. The Act covers discharges within Queensland coastal waters, as well as waste discharges that enter Queensland coastal waters (after being discharged outside of Queensland coastal waters).

The *Transport Operations (Marine Pollution) Act 1995* (QLD) (TOMPA) prohibits the discharge of sewage into marinas, boat harbours, canals and smooth waters. Additionally, nil discharge waters are waters where the discharge of sewage is not permitted, however, discharge restrictions for nil discharge waters are based upon the type of sewage being discharged (that is treated or untreated sewage) and the type of vessel from which the sewage is being discharged (that is a declared ship or any other ship).

Ships entering the port (as well as Ports North's own fleet) are required to adhere to the provisions of TOMPA.

2.2.5 *Biosecurity Act 2015* (Commonwealth)

A replacement to the *Quarantine Act 1908,* the *Biosecurity Act 2015* (Commonwealth) sets up the requirements and regulatory powers that will affect how Australia manages the biosecurity risks associated with goods, people and conveyances entering Australia. The new legislation operates on a risk-based approach, using the Biosecurity Import Risk Analysis (BIRA) guidelines which describe the process followed and matters to be taken into account when conducting a BIRA under the *Biosecurity Act 2015* (Commonwealth) and *Biosecurity Regulation 2016* (Commonwealth).

Under the *Biosecurity Act 2015* (Commonwealth), goods will automatically become 'subject to biosecurity control' when they enter into Australian territory (generally meaning 12 nm from the coast line, and includes Australia, Christmas Island, Cocos Islands and other external territories). At this point, biosecurity officers will be able to assess and manage biosecurity risk associated with those goods without making an order.

Imported materials and substances, including waste products, are subject to quarantine requirements as advised by the Department of Agriculture and Water Resources (DOAWR). Ship's masters are required to determine the procedures for the assessment, treatment and disposal of quarantine waste at ports from their agent or the DOAWR regional office prior to entering Australian territory.

2.2.6 *Environmental Protection Act 1994*, *Waste Reduction and Recycling Act 2011*, and associated Regulations (Queensland)

Section 13 of the *Environmental Protection Act 1994* (QLD) (EP Act) defines waste as 'anything, that is a left over, surplus, or an unwanted by-product, from an industrial, commercial, domestic or other activity. Waste can be a gas, liquid, solid or energy, or a combination of any of these'.

Under Section 319 of the EP Act, waste generators are bound by the general environmental duty. This means that an activity undertaken by Ports North, cruise ship operators or contractors must not release waste that is likely to cause environmental harm, unless all reasonable and practical measures are taken to prevent or minimise the harm.

The waste generator must follow this general environmental duty and ensure that waste is transported by a licensed transporter and that it is delivered to a licensed facility.

The transportation of some wastes is also regulated. These are referred to as 'trackable wastes' and a substance is considered 'trackable waste' if it is regulated waste as defined in Part 2, section 6 of the *Waste Reduction and Recycling Regulation 2011* (QLD), and listed in Schedule 2E of the *Environmental Protection*

Regulation 2018 (QLD). If transporting trackable waste commercially or transporting more than 250 kg non-commercially, an environmental permit is required.

If wastes are considered trackable, then waste handlers must submit waste tracking information in the approved forms when transporting regulated waste or waste residues. The waste generator, waste transporter and waste receiver all have certain obligations that are set out under the *Environmental Protection Regulation 2008* and on the prescribed forms.

2.2.7 Department of Environment and Heritage Protection, 2016, *Technical Licensing Guideline - Wastewater Release to Queensland Waters* (Queensland)

The regulation of wastewater management and discharge is controlled at state level through the DEHP, 2016, Technical Licensing Guideline - Wastewater Release to Queensland Waters through the DEHP. The guideline provides technical information and guidance to support a risk-based approach to assessing and deciding applications for wastewater releases to Queensland waters against the provisions of the EP Act and subordinate legislation.

3.0 EXISTING SITUATION

3.1 Existing Waste Management Capability and Capacity in Cairns

Cairns Regional Council (CRC) is responsible for the management of most solid waste generated in the EIS Study Area through the operation of a kerb-side household and commercial collection program and network of public waste transfer stations.

In addition, Cairns and surrounding areas are also generally well serviced by a broad range of commercial waste companies that operate both under contract to CRC, and directly to commercial and industrial clients. A range of solid and liquid waste management infrastructure is available within the EIS Study area, with many of these currently used by Ports North, or its waste contractors supporting the operation of the Cairns Cruise Liner Terminal (CCLT). A brief description of the identified infrastructure in the area is provided in the following sub-sections, and the location of this infrastructure is shown in a map presented in Figure A-1 (at the end of this report).

3.1.1 Cairns Regional Council Facilities

The CRC provide both solid waste management and limited wastewater management services within the EIS Study Area, with these services summarised as follows:

3.1.1.1 Solid Waste Management

Existing key solid waste management facilities operated by CRC are summarised in Table 6. Processing capacity is based on information provided by CRC in their *Waste Management Strategy 2010-2015,* herein referred to as the CRC Strategy (CRC, 2009), and for the purposes of this assessment are considered consistent with current capacity (see projections included in Figure 1.

Table 6: Summary of CRC Solid Waste Management Facilities

Facility	Waste Types	Distance from CCLT	Processed 2008/09	Total Capacity
Waste Transfer Stations				
■ Smithfield ■ Portsmith	■ All Domestic wastes ■ Commercial – Greenwaste only	15 km 3 km	40,000 tonnes across all CRC facilities	Unknown
Material Recovery				
■ Portsmith	■ Domestic recyclable waste (plastics, paper/cardboard, glass, aluminium, steel)	3 km	10,000 tonnes	10,000 tonnes

Residual inert waste material collected by CRC at the Smithfield and Portsmith Transfer Stations and the Portsmith Material Recovery Facility (MRF) is disposed of at the Springmount Landfill (refer to Section 3.1.3).

3.1.1.2 Wastewater and Trade Waste Management

The CRC currently operate six Wastewater Treatment Plants (WWTP) providing sewerage services the EIS Study Area, including the management of wide range of Trade Wastes. Wastewater contractors removing wastewater from ships may be able to tanker transport wastewater from vessels berthed at the CCLT to any one of the six CRC WWTPs, however the Northern WWTP at Aeroglen is the facility servicing the CCLT.

The Northern WWTP has capacity to service approximately 72,000 people, or 19.4 ML/day of treatment through put. This facility applies a tertiary treatment process where the liquid stream passes through a 5 stage Enhanced Biological Phosphorus Removal (EBPR) configuration with separate reactor tank for Submerged Membrane Filtration (SMF). Treated effluent is discharged to the Barron River, while sludge is dewatered from the aerobic digestion system using a belt filter press, and discharged and managed at the Springmount Landfill (see Section 3.1.3) (CRC, 2017c).

Only Trade Wastes from the CCLT that can be treated through biological processes may be disposed to sewer under permit from the CRC. Other liquid wastes require specialist treatment through other service providers in the EIS Study Area.

3.1.2 Suez Recycling and Recovery ARRT Facility

Suez Recycling and Recovery Pty Ltd (Suez) is part of an international waste management company that is contracted by CRC, Douglas Shire Council (DSC) and Mareeba Shire Council (MSC) until 2026 to operate an Advanced Resource Recovery Technology (ARRT). The ARRT processes Municipal Solid Waste (MSW) to produce commercial organic compost, with the relatively inert, less bulky residual waste sent to landfill. Bio-solids from CRC waste water treatment plants are added to increase moisture content and assist in the composting process.

The CRC Strategy provides the following information for the Suez ARRT:

- Commenced operations in 2006.
- Capacity of approximately 90,000 tonnes per annum.
- Processed approximately 78,000 tonnes per annum in 2008/09.
- Produced approximately 20,000 tonnes of compost in 2008/09.

Commercial use of the produced compost is restricted by waste stream contaminants (primarily glass). Limited volumes of viable compost material are predominantly used by non-food agricultural properties in the area south of Cairns.

Residual waste from the ARRT is currently disposed of at the Springmount Landfill (refer to Section 3.1.4 below). During maintenance/breakdown periods at the ARRT, unprocessed waste is also disposed of at Mareeba Landfill, with limited use of Springmount Landfill (refer to Section 3.1.3 below).

Suez has previously indicated that its ARRT facility can accept suitable waste material on a commercial basis outside its contract with CRC. Existing contracts with CRC give it first preference for use of the remaining capacity resulting from any growth in domestic waste quantities until 2026.

3.1.3 Springmount Waste Management Facility

Springmount Waste Management Facility (SWMF) is a Joint Venture between Remondis Pty Ltd, part of an international waste management company, and FGF Developments Pty Ltd, a Cairns based contactor and land developer.

SWMF owns and operates a regional general waste commercial landfill l located in the Tablelands approximately 90 km west of Cairns. Springmount Landfill is a fully engineered landfill that commenced operations in 2004 with the following volumes of waste disposal capacity available:

- Constructed waste cells: Approximately 410,000 m^3.
- Additional waste cells with regulatory approval: Approximately 5,750,000 m^3.

Springmount Landfill is currently approved by DEHP to accept 100,000 tonnes to 200,000 tonnes of waste per annum. The SWMF currently has DEHP approval for the acceptance of the following waste streams from within the EIS Study Area:

- Construction and demolition (C&D) waste;
- Commercial and industrial (C&I) waste;
- Household and commercial kerbside waste (also referred to as MSW);
- Contaminated soil (requiring and not requiring treatment);
- Industrial waste (requiring and not requiring treatment);

- Biosolids;
- Regulated Waste (subject to conditions); and,
- Clinical wastes (if rendered non-infection and shredded).

The SWMF is a private commercial landfill and independent of CRC, although it is a key piece of regional waste management infrastructure, supporting a range of objectives of the CRC Strategy.

3.1.4 Mareeba Shire Council

MSC owns and operates a general waste landfill at Mareeba, an engineered landfill, since 2006 located approximately 55 km west of Cairns. Mareeba Landfill is approved by DEHP to accept 75,000 tonnes to 100,000 tonnes of waste per annum, with DEHP approved waste acceptance consisting of:

- Residues from the ARRT;
- C&D waste;
- C&I waste; and,
- Household and commercial kerbside waste.

Based on current waste acceptance rates at the landfill MSC have previously indicated that the Mareeba Landfill is expected to operate until approximately 2026 (Aquis, 2014).

3.1.5 General Liquid Waste Management

Liquid wastes that cannot be discharged to sewer as Trade Waste for management at a CRC WWTP are collected and managed by a variety of commercial operators within the EIS Study Area. Non-Trade Waste liquid wastes currently managed within the EIS Study Area include:

- Grease trap waste;
- Waste oil;
- Contaminated groundwater; and
- Waste chemicals and paints.

Currently 10 separate operators provide a broad suite of liquid waste management capacity, with many of these providers offering a combined collection, treatment and disposal service.

3.1.6 General Solid Inert Waste Landfills

Presently three relatively small solid inert waste landfills are located within with Barron River delta, which are within the EIS Study area and are relatively close to the CCLT. These are not engineered landfills as per Mareeba and Springmount, and are therefore limited in the types and volumes of wastes they can accept. Generally these sites are confined to accepting limited volumes of C&D wastes for use in the rehabilitation of current, or former sand mining operations.

3.2 Current Projected Waste Management Planning in Cairns

CRC prepared the CRC Strategy (CRC, 2009), which set out the principles, objectives, targets, programme areas and action plans for managing municipal solid waste (MSW) across the Cairns region (CRC, 2017a).

The CRC Strategy, was developed based upon the following key information that was available at the time of preparation:

- Increase in MSW from approximately 87,000 tonnes in 2003/04 to 120,000 tonnes in 2008/09.
- Underlying annual municipal waste growth of 5.1% between 2003/04 and 2008/09.
- Annual average waste generation of 857 kg per capita and 2,080 kg per household.

- Diversion of approximately 64% of MSW away from landfill disposal in 2008/09.
- Approximately 78,000 tonnes of MSW processed by an ARRT facility in Cairns annually between in 2007/08 to 2008/09.
- Projected increase in households from 60,000 in 2010 to 75,000 in 2020.
- Projected population growth from 160,000 in 2010 to 220,000 in 2030.

Five scenarios used by CRC to estimate future domestic MSW growth are summarised in Figure 1. Scenarios 3 to 5 indicate that annual total waste managed by CRC will increase from approximately 120,000 tonnes in 2010 to a range between 180,000 tonnes and 210,000 tonnes in 2030. Scenario 2 was not considered by CRC to reflect a likely outcome, as this historic growth rate did not account for future waste avoidance and reduction actions applied by the CRC and Cairns community.

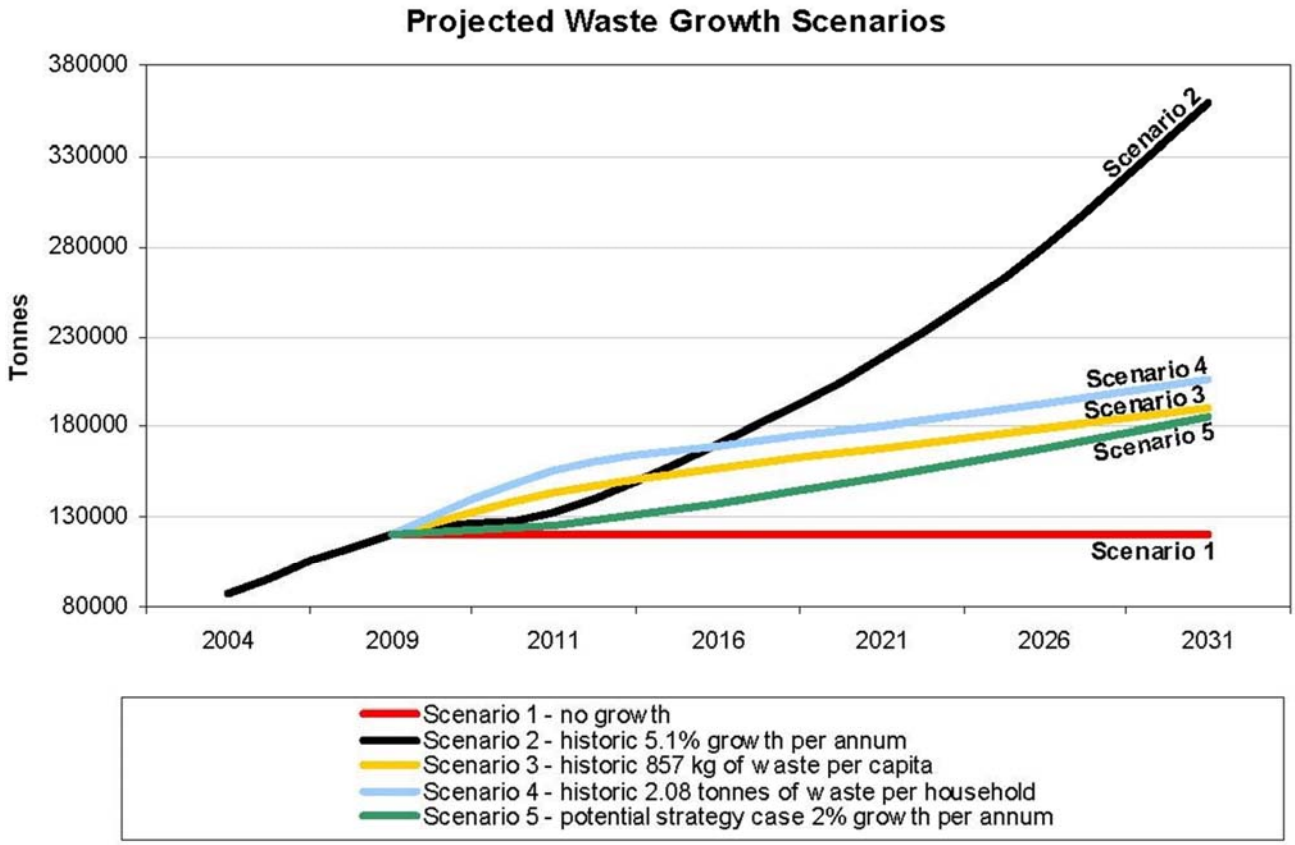

Figure 1: CRC Waste Growth Scenarios (Source: CRC, 2017a)

It is important to note that the most recent waste generation data published by the CRC is from 2008/09, and that formed the baseline information for the Waste Management Strategy. Nonetheless, waste generation rates are growing generally in-line with Scenario 5, reflective of CRC's implementation of the Waste Management Strategy, with growth at approximately 2% per annum (as opposed to relying on continuation of the recent historic growth of 5.1% per annum (Scenario 2). On this basis, following Scenario 5 projections, approximately 140,000 tonnes is managed by the CRC in 2017 (projected from the growth scenarios in Figure 1). The CRC website reports that Council continue to be implementing this iteration of the Waste Management Strategy, and it is considered current for the purposes of this impact assessment.

The CRC adopted the following policy drivers, and guiding principles in the formulation of the CRC Strategy:

- Recognising waste as a material resource not a disposal problem.

- Waste management hierarchy (refer to Figure 2).

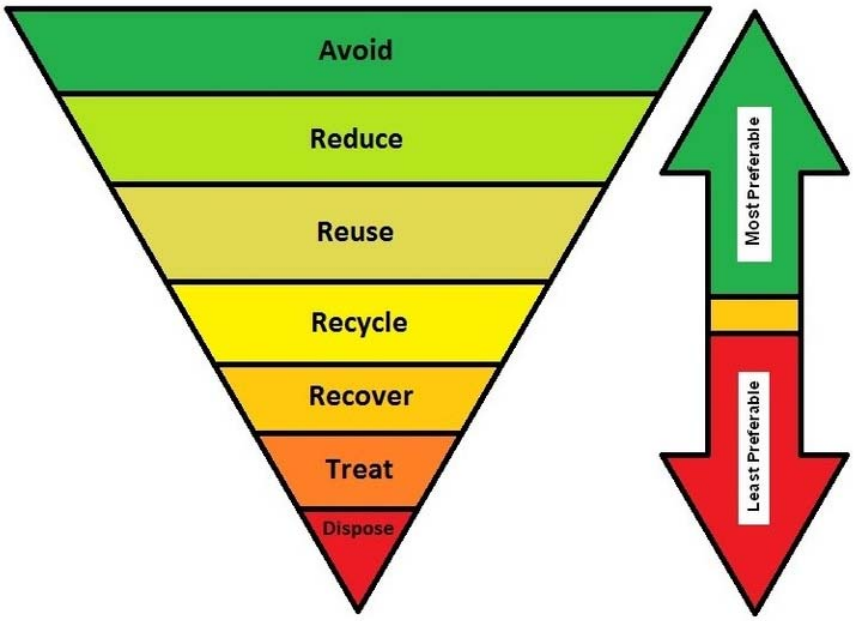

Figure 2: Waste Management Hierarchy

- Proximity principle of identifying and using local markets and solutions for recovered resources as close as possible to the source of generation.
- User pays to ensure that those who generate the waste pay an appropriate price for managing and disposing of it.
- Support and participation in product stewardship programs.
- Sustainable balance of economic, environmental and social considerations.
- Explore possibilities for strategic partnerships and collaboration with other stakeholders.

Implementation of the CRC Strategy is supported by the CRC Waste Strategy Action Plans (CRC, 2017b), which encompasses seven program areas, including education and waste reduction; recycling and composting; residual waste; market development; waste assets; strategic partnerships; and, best value services. Ports North, in its operation of the CCLT have a role in assisting CRC in achieving the objectives of the CRC Strategy, with the types and volumes of wastes generated at the site forming part of the Cairns waste economy.

3.3 Existing Port of Cairns and Shipping Waste Management

Wastes generated by cruise-ship related activities are described in Table 7 below. This includes wastes generated by cruise ships at port, and whilst at sea (while sailing from previous port and disposal point).

Table 7: Existing Cruise Ship Operations - Waste Generation and Management Procedures

Type / Generation	Management
General garbage ■ This includes mixed solid waste (e.g. food wastes, paper, glass, packaging), and recyclables. This is akin to domestic kerbside (MSW) waste collected by CRC.	■ General garbage is currently disposed of at the Port of Cairns via agreements with appropriately qualified and licensed waste contractors. When ships book into the port, the required waste facilities (timing and capacity) are identified by the ship's agent and waste

Type / Generation	Management
■ A cruise ship (all classes) produces approximately 3.5 kg of solid waste daily per passenger and crew (Butt, 2007; Campbell 1999 in EPA, 2008). ■ Approximately 75 percent of solid waste produced in cruise ships is incinerated on board (ADEC 2000 in EPA, 2008). The incineration method generally reduces the solid waste volume by 90 percent and weight by 70 percent (World Bank 1999). Some 25 percent of waste produced in the vessel is not incinerated (non-incinerable wastes include glass, aluminium, hazardous wastes, etc.).	contractors are then engaged to collect the waste when the ship arrives. ■ All waste is transported to a suitable licensed facility, with this generally being the Remondis SWMF, or the MSC Mareeba landfill, which are outside the EIS Study Area, but within the broader accessible region. Recording of waste volumes/masses; and, waste types is the responsibility of waste contractors. ■ Discharge of incinerator ash at sea is prohibited under Annex V of MARPOL, and while vessels do have on board storages for incinerator ash, occasionally these will require landfill disposal via a local waste contract company, most likely being deposited at the Springmount landfill. ■ There is generally no recovery of recyclables due to quarantine requirements (see below). These materials are consigned to landfill disposal, with this arranged by the ship's agent, and waste contractors are then engaged to collect the waste when the ship arrives.
Regulated wastes and liquid wastes ■ This includes trackable and other hazardous wastes, but excludes sewage and CRC permitted Trade Wastes that can be managed at a CRC WWTP. ■ On cruise ships, this includes waste oil, bilge water, residues, tank washing slops, ballast water, and other oily mixtures that contain chemicals. Other regulated wastes may include photo processing chemicals, cleaning wastes and used paints.	■ These wastes are currently managed via agreements with appropriately qualified and licensed waste contractors. When ships book into the port, the required waste facilities (timing and capacity) are identified by the ship's agent and waste contractors are then engaged. ■ Regulated wastes are generally managed at the Remondis SWMF. ■ Recording of waste volumes/ masses and types is the responsibility of waste contractors. ■ Waste management measures depend on the type of waste, though usually include skip bins, autoclave or tanker trucks that are able to pump, remove and transport liquid waste. All waste is transported to a suitable licensed facility. ■ Opportunities to recycle waste oil are identified and applied by the ships agent and waste contractors, and is transported to a suitable licensed facility. ■ There are specific requirements relating to the management of ballast water which prohibit the discharge of high risk ballast water in Australian ports. All ships entering the Port are required to adhere to these regulations.
Sewage and greywater	■ Whilst the discharge of sewage is allowed to sea under the *TOMPA Act* 1995 the discharge of sewage into the Port of Cairns does not occur due to its

Type / Generation	Management
■ Approximately 30 litres of sewage per person per day is generated on board (EPA, 2008) and approximately 250 litres of greywater per person per day is generated (EPA, 2008).	proximity the GBRMP, and smooth waters classification under *TOMPA*. ■ The discharge of both greywater and sewage at sea is prohibited under the MARPOL for ships and vessels greater than 100 gross tonnage and/ or carrying more than 15 persons unless appropriately treated. This applies to all cruise vessels likely to berth at the CCLT. ■ Sewage tanker truck services are provided for cruise ships and other vessels berthing at the Port of Cairns. Each tanker uses a vacuum method for obtaining the sewage from vessels. The trucks transfer waste to one of the CRC WWTPs. This can be a 24-hour operation for the duration of the ship's stay. Recording of waste volumes/masses and types is the responsibility of waste contractors.
Quarantine waste ■ This includes quarantine wastes and ballast water taken up overseas with the intention of discharge within Australian waters ■ The definition Quarantine Waste from the *Quarantine Regulations* 2000 includes: − material used to pack or stabilise cargo (dunnage) − galley and food waste; − human, other animal or plant waste; − refuse or sweepings from holds or decks of vessels or installation; − any other waste or other material, which comes into contact with quarantine waste; − contents of DOAWR amnesty bins; − any goods surrendered to a DOAWR Officer; and, − articles seized by DOAWR, which are not collected by clients. ■ Any other import that will not be used in the manner for which it was imported and is to be destroyed; and, ■ Quantities of quarantine waste vary depending on the origin and size of ship.	■ All quarantine waste that is discharged at the port must be collected, transported, stored and/or treated by an approved service provider signed on to a DOAWR compliance agreement or under DOAWR supervision. Recording of waste volumes/masses and types is the responsibility of waste contractors. ■ At present, quarantine waste services are booked through Ports North who arrange an approved contractor to collect the waste and transport it to an approved waste management service provider. ■ The packaging, transport and treatment of quarantine waste are conducted in accordance with DOAWR requirements.

Table 8 below describes wastes that are generated through the land-side operations, and general maintenance of the CCLT, including maintenance of the shipping channel.

Table 8: Existing Port Operations - Waste Generation and Management Procedures

Type / Generation	Management
Sewage and greywater Sewage and greywater generated by built amenities at the wharves.	As per **Chapter A3, Project Description**, the Port has an existing sewer reticulation network that is connected to CRC's sewer main in Wharf Street. This currently services built amenities at the wharves. Collected sewage and greywater is transferred to a CRC WWTP, with the closest being the CRC Southern WWTP.
Maintenance dredging materials As per **Chapter A3, Project Description**, the existing shipping channel is regularly monitored and dredged as required by Ports North to maintain safe navigation for all vessels entering Port of Cairns. Maintenance dredge material is uncontaminated sediment that has been tested, and is suitable for sea based disposal. Approximately 350,000 cubic metres (m^3) per year of dredge material is generated.	Dredge material from maintenance works is currently placed at an existing GBRMPA approved DMPA. Refer to **Chapter A3, Project Description** for further information. Dredged material is not considered to be a waste for the purposes of this report.
General garbage General garbage generated by Cairns Cruise Liner Terminal staff, pedestrians and cruise ship passengers within the Terminal and surrounds. This includes mixed solid waste, e.g. food wastes, paper, glass, packaging as well as recyclables.	Waste generated or deposited at the CCLT in waste receptacles is managed via agreements with appropriately qualified and licensed waste contractors. General waste bins are provided throughout the terminal and are collected regularly. All waste is transported to a suitable licensed facility. Unlike wastes from vessels, where quarantine restrictions inhibit the opportunity to recycle waste, land-side wastes from the CCLT can be managed through existing recycling pathways within the EIS Study Area. Recording of waste volumes/masses and types is the responsibility of waste contractors.

The waste streams identified within Table 7 and Table 8 above are currently managed utilising existing waste management infrastructure within the EIS Study Area, or just outside this area, in the case of the MSC Mareeba landfill.

4.0 ASSESSMENT OF POTENTIAL IMPACTS

This section identifies and assesses the significance of potential impacts associated with the management of waste that is generated during the project's construction, operations and ultimate demobilisation of supporting infrastructure. To the extent practicable, on the available knowledge of the project concept (i.e. it is not at detailed design stage), this section outlines the types, and estimated quantities of waste, which will be generated through the project. This section focuses on wastes from the Land-side Project Area (CCLT), and the two DMPA Project Areas as distinct waste catchments, each with unique waste management needs.

4.1 Pre-Construction and Construction

Development of the project will generate wastes during the pre-construction and construction phases. Pre-construction wastes relate to those generated through the mobilisation and establishment of the various construction zones required to support the project, while construction wastes relate to those generate through the building and commissioning of the project.

4.1.1 Pre-Construction Wastes

It is anticipated that minor volumes of specific wastes will be generated during the pre-construction phase of the project, primarily related to the mobilisation and establishment of plant, equipment and materials at the various construction zones. The duration of waste generation will generally be restricted to a short-window in the weeks preceding construction, and do not represent an ongoing waste source associated with the project.

4.1.1.1 Land-side Project Area

Table 9 below provides a summary of the potential Land-side Project Area pre-construction waste types; the sources of these wastes; volumes of these wastes; and, the potential impacts associated with their management. This section considers the pre-construction of assets supporting the land-side elements of the CCLT including wharf and services upgrade works.

Table 9: Land-side Project Area Pre-Construction Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	Establishment of the construction zones may require the demolition and clearance of some minor structures, or surface coverings.	<100 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Temporary	Highly Unlikely	Minor	Negligible
			Risk of impacts to water quality if spills occur	Temporary	Highly Unlikely	Minor	Negligible
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Unlikely	Negligible	Negligible
Packaging Wastes	Packaging materials include plastic wrapping; wooden pellets; plastic containers and IBCs; and, strapping and binding.	<10 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low
Contaminated soils, PASS and SNP	Some machinery (i.e. cranes) may require piles to be installed in	Not possible to estimate, but likely	Waste types, and waste volume not able to be	Temporary	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	the underlying ground, potentially generating contaminated soils, PASS, and SNP.	to be relatively small volume.	managed by the Cairns waste management sector				
			Risk of soil contamination	Short-term	Unlikely	Minor	Low
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Minor	Low
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Unlikely	Minor	Low

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to low.

4.1.1.2 DMPA Project Areas

Table 10 below provides a summary of the potential DMPA Project Areas pre-construction waste types; the sources of these wastes; volumes of these wastes; and, the potential impacts associated with their management. This section considers the pre-construction tasks associated with the establishment of the storage bunds comprising the DMPAs; construction of the inlet pipeline, pumps and pump stations; and, construction of the tailwater discharge pipeline and temporary storages.

Table 10: DMPA Project Areas Pre-Construction Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Organic waste	Clearance of vegetation to create Work Areas.	<100 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Unlikely	Minor	Low
			Dispersion of weeds and pathogens	Temporary	Unlikely	Minor	Low
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	Establishment of the construction zones may require the demolition and clearance of some minor structures, or surface coverings.	<100 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Temporary	Highly Unlikely	Minor	Negligible
			Risk of impacts to water quality if spills occur	Temporary	Highly Unlikely	Minor	Negligible
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
			Impacts due to odour	Temporary	Unlikely	Negligible	Negligible
Packaging Wastes	Packaging materials include plastic wrapping; wooden pellets; plastic containers and IBCs; and, strapping and binding.	<10 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low
Contaminated soils, PASS and SNP	Some machinery (i.e. cranes) may require piles to be installed in the underlying ground, potentially generating contaminated soils, PASS, and SNP.	Not possible to estimate, but likely to be relatively small volume.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Short-term	Unlikely	Minor	Low
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Minor	Low
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Unlikely	Minor	Low

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to low.

4.1.2 Construction Wastes

Predicted wastes generated by the project during construction, and the associated risks in their management for the Land-side Project Area are detailed in Section 4.1.2.1, while those associated with the DMPA Project Areas are detailed in Section 4.1.2.2.

4.1.2.1 Land-side Project Area

The project requires limited land-side construction, and accordingly construction waste volumes will be small compared to those generated during operations. Estimations of waste masses have been provided to the extent practicable, but may only be considered indicative. More substantive quantification of potential waste volumes will be undertaken at the detailed design phase of the project, with this to inform the development of the Construction Waste Management Plan (refer to Section 5.1).

Table 11 below provides a summary of the potential Land-side Project Area construction waste types; the sources of these wastes; volumes of these wastes; and, the potential impacts associated with their management.

Table 11: Land-side Project Area Construction Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Contaminated soils, PASS and SNP	Construction will require piles to be installed in the underlying ground, potentially generating contaminated soils, PASS, and SNP.	Likely to be a relatively small volume (i.e. <10 tonnes)	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Short-term	Unlikely	Moderate	Low
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Moderate	Low
			Impacts due to odour	Temporary	Unlikely	Minor	Low
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	May include off-cuts of timber, concrete, brick, plastic and metal. It is foreseen that surplus materials will be returned to the supplier for resale.	<100 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Minor	Negligible
			Risk of litter discharge if not effectively contained	Short-term	Unlikely	Minor	Low
			Inappropriate disposal	Temporary	Highly Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
			Impacts due to odour	Temporary	Highly Unlikely	Minor	Negligible
Gaseous wastes and particulates	Machinery with internal combustion engines such as on site generators, pile driving equipment, work boats, delivery transport and workforce vehicles will generate gaseous wastes.	Not possible to estimate	Refer to **Chapter B11, Air Quality** for an assessment of air quality impacts associated with these wastes.	Temporary	Possible	Minor	Low
Sewage & greywater	Sewage will be generated during construction by construction staff.	Not possible to estimate	Sewage and greywater volumes not able to be managed by CRC WWTPs	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium
			Odour impacts	Temporary	Unlikely	Moderate	Low
			Risks to human health or other fauna or flora if spill occurs	Short-term	Possible	Moderate	Medium
			Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	Construction will require temporary construction workshops, supporting maintenance facilities and construction equipment maintenance areas. Liquid hydrocarbons and other waste chemicals generated from these areas include used industrial lubricants, oils, thinners, coolants, solvents, petrol and paints. Although hazardous wastes are not specifically identified in this assessment, these will be managed appropriately as the need arises. The use and volumes of such substances are likely to be minimal during both construction and operation of the project.	<1,000L total	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Short-term	Unlikely	Moderate	Low
Office and other general waste	Site construction offices will generate general office waste. This could include	Not possible to estimate	Waste types, and waste volume not able to be managed by the Cairns	Temporary	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	cardboard, paper, food scraps, packaging, etc.		waste management sector				
			Reductions in visual amenity	Temporary	Unlikely	Negligible	Negligible
			Risk of injury to terrestrial or marine fauna	Temporary	Highly Unlikely	Minor	Negligible
			Risk of encouraging pest fauna (mosquitos or rodents)	Temporary	Highly Unlikely	Minor	Negligible

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to medium.

4.1.2.2 DMPA Project Areas

Dredged sediment from the capital dredging works, associated with the channel expansion, will be placed at the two DMPA Project Areas, and is not considered a waste, and as such, is not considered further as part of this assessment of waste management impacts. Nonetheless, waste management associated with the handling and placing of the dredge material in the DMPAs and the associated infrastructure is considered within the scope of this assessment. The associated infrastructure includes construction of the storage bunds comprising the DMPAs; construction of the inlet pipeline, pumps and pump stations; and, construction of the tailwater discharge pipeline and temporary storages.

Table 12 below provides a summary of the potential DMPA Project Areas construction waste types; the sources of these wastes; volumes of these wastes; and, the potential impacts associated with their management.

Table 12: DMPA Project Areas Construction Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Contaminated soils, PASS and SNP	Construction may require excavation of underlying ground to generate bund airspace, potentially generating contaminated soils, PASS, and SNP.	Likely to be a moderate volume (i.e. >10,000 tonnes)	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Possible	Minor	Low
			Risk of soil contamination	Short-term	Unlikely	Moderate	Low
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low
			Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Possible	Minor	Low
			Impacts due to odour	Temporary	Possible	Negligible	Negligible
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	May include off-cuts of timber, concrete, brick, plastic and metal. It is foreseen that surplus materials will be returned to the supplier for resale.	<100 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of litter discharge if not effectively contained	Short-term	Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
			Inappropriate disposal	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Possible	Negligible	Negligible
Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	Construction will require temporary construction workshops, supporting dredging equipment maintenance facilities and construction equipment maintenance areas. Liquid hydrocarbons and other waste chemicals generated from these areas include used	<1,000L total	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of soil contamination	Short-term	Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	industrial lubricants, oils, thinners, coolants, solvents, petrol and paints. Although hazardous wastes are not specifically identified in this assessment, these will be managed appropriately as the need arises. The use and volumes of such substances are likely to be minimal during both construction and operation of the project.		Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium
			Impacts due to odour	Temporary	Possible	Negligible	Negligible
			Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora	Short-term	Possible	Moderate	Medium
Gaseous wastes and particulates	Machinery with internal combustion engines such as the dredge barge, dredge backhoe, on site generators, pile driving equipment, work boats, delivery transport and	Not possible to estimate	Refer to **Chapter B11, Air Quality** for an assessment of air quality impacts associated with these wastes.	Temporary	Possible	Minor	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	workforce vehicles will generate gaseous wastes.						
Sewage & greywater	Sewage will be generated during construction by construction staff.	Not possible to estimate	Sewage and greywater volumes not able to be managed by CRC WWTPs	Temporary	Highly Unlikely	Negligible	Negligible
			Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium
			Odour impacts	Temporary	Possible	Minor	Low
			Risks to human health or other fauna or flora if spill occurs	Short-term	Possible	Moderate	Medium
			Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low
Office and other general waste	Site construction offices will generate general office waste. This could include cardboard, paper,	Not possible to estimate	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	food scraps, packaging, etc.		Reductions in visual amenity	Temporary	Unlikely	Negligible	Negligible
			Risk of injury to terrestrial or marine fauna	Temporary	Highly Unlikely	Minor	Negligible
			Risk of encouraging pest fauna (mosquitos or rodents)	Temporary	Highly Unlikely	Minor	Negligible

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to medium.

4.2 Operations and Maintenance

This section considers the wastes, and their management, associated with the operation and maintenance of the Land-side Project Area, as it relates to the CCLT operations. While there may be minor works required for the ongoing maintenance of the DMPAs, these waste volumes are considered to be very small, and the potential impacts associated with these have not been assessed here.

4.2.1 Projected Demand

The current sources of waste types are unlikely to change with the expansion of the port; however, it is anticipated that the volume of waste being collected at the port will increase into the future due to increases in port demand from ships. The additional waste generation will be driven by the increased number and size of ships that visit the port. This report is based on revisions to the projected demand on the CCLT as a result of the revised project shipping demands, with projections being revised down on account of Voyager Class vessels no longer being accommodated by the project at the CCLT. The project will continue to accommodate Sun, Vista and Grand Class vessels in addition to the existing fleet of vessels accommodated at the CCLT.

A Demand Study for the recalibrated project was completed in June 2016 (AEC Group, 2016), which considered the potential demand on the CCLT through the project, which is based on the following emerging changes in the cruise industry that were not foreseen by the earlier studies:

- Home porting of mid classified ships in Cairns commencing 2016.
- Potential for future home porting of vista class vessels in Cairns.
- Relocation of additional larger cruise ships to the Australian market.
- Impacts associated with other port constraints/developments, in particular the proposed new Brisbane Cruise Terminal (BCT).

The Demand Study applied a baseline projection of ship visit growth (excluding home porting ships), established at 5% per annum, on which alternative scenarios were assessed. Four alternatives to the base case were incorporated in the projections. The combination of the four alternatives gave sixteen potential demand scenarios. The alternatives applied were.

- With or without development of a Brisbane Cruise Terminal (BCT) expected to be in place by 2019.
- With or without home porting.
- With or without channel modifications, expected to be in place for 2021.
- With or without availability of bunker fuels (IFO, HFO etc.).

Alternatives 3 and 4 were however assumed to coincide.

Assumptions used in the demand projections are as follows:

- Growth in cruise ship visits from the BCT was estimated to triple from 2018 to 2035, in a linear fashion, based on Mega class ships accounting for increases in the average size of cruise ships. Cairns was assumed to receive 30% of these cruise ship visits.
- Home porting was assumed to number 20 ship visits per annum of sub-Regal class, with no channel modifications, switched to 16 of Vista class with channel modifications.
- Channel modifications through the project will allow port access to Vista and Grand class ships commencing in 2021. Without channel modifications only Sub-Regal and Sun class ships can enter the CCLT. The additional access to the CCLT was estimated to increase Mega class visits to Cairns by 20% for Regal, Vista and Grand class ships.

- The availability of bunker fuel (IFO) is estimated to increase all cruise ship visits for those that can access the port by 10%.

Of the 16 potential demand scenarios, Scenario 1 represents the 'Business as Usual' (BaU) model (no BCT, no homeporting, and no channel modifications), and even under this scenario demand for the CCLT would grow to 52 ship visits in 2031. However, construction of the revised channel and bunker fuel availability through the project would see less demand for the Yorkeys Knob anchorage, and the total number of vessel accommodations at the CCLT would increase to 105 ships by 2031 (see Table 13 below).

Table 13: Business as Usual Projected Ship Visits (Scenario 1 Business as Usual - Medium Projection). Source: AEC Group, 2016

Class	Trinity Wharves			Yorkey's Knob			Total Cairns		
	2021	2026	2031	2021	2026	2031	2021	2026	2031
Sub-Regal	25	33	42	-	-	-	25	33	42
Regal	-	-	-	3	2	2	3	2	2
Sun	16	14	10	-	-	-	16	14	10
Vista	-	-	-	18	23	16	18	23	16
Grand	-	-	-	3	9	20	3	9	20
Voyager	-	-	-	8	14	29	8	14	29
Total	**41**	**47**	**52**	**32**	**48**	**67**	**73**	**95**	**119**

Looking at the scenario of the BCT facility coming on-line, and the homeporting of vessels in Cairns, and the channel modification and bunker fuelling (Scenario 16 in the Demand Study), the overall number of ships visits in Cairns is projected to reach 200 in 2031, with 152 at the CCLT (see Table 14 below).

Table 14: Project Development Projected Ship Visits (Scenario 16 Brisbane Cruise Terminal & Home Porting - Medium Projection). Source: AEC Group, 2016

	Trinity Wharves			Yorkey's Knob			Total Cairns		
Class	**2021**	**2026**	**2031**	**2021**	**2026**	**2031**	**2021**	**2026**	**2031**
Sub-Regal	28	36	45	-	-	-	28	36	45
Regal	6	4	5	-	-	-	6	4	5
Sun	33	26	17	-	-	-	33	26	17
Vista	56	64	47	-	-	-	56	64	47
Grand	6	18	38	-	-	-	6	18	38
Voyager	-	-	-	16	25	48	16	25	48
Total	**129**	**148**	**152**	**16**	**25**	**48**	**145**	**173**	**200**

To enable an estimation of the total solid waste, sewage and greywater generated and subsequently requiring management at the CCLT due to the project, the following assumptions have been made:

- A cruise ship (all classes) may produce 3.5 kg of solid waste daily per passenger and crew, as quoted by the IMO (Butt, 2007; Campbell 1999 in EPA 2008). Solid waste includes bottles, cans, plastic, cardboard, glass, and food/ organic wastes, solid regulated wastes as per Table 16 and Table 17.
- Approximately 75 percent of solid waste produced in cruise ships is incinerated on board (ADEC 2000 in EPA 2008).

- The incineration method generally reduces the solid waste volume by 90 percent and weight by 70 percent (World Bank, 1999).
- 25 percent of waste produced in the vessel is not incinerated (non-incinerable wastes include glass, aluminium, hazardous wastes etc.).
- It is assumed that 30 litres of sewage per person per day is generated whilst on board (EPA, 2008) and that two days' worth of sewage will need to be offloaded at the CCLT while berthed.
- It is assumed that 250 litres of greywater per person, per day is generated whilst on board (EPA, 2008), and that two days' worth of greywater will need to be offloaded at the CCLT while berthed.
- Four days of solid waste generation (between ports) is assumed, with all waste (apart from non-incinerable waste) assumed to be incinerated.
- Waste production while in port (one day) has also been considered, at the conservative generation rate of 3.5 kg per passenger and crew (recognising that passengers and crew will also utilise land-side waste management).

Baseline projections are based on the Scenario 1 BaU detailed in the Demand Study, while the projected increase in demand brought about by the project, being represented by Scenario 16 in the Demand Study, (AEC Group 2016). Passenger and crew populations have been estimated by applying the projected vessel numbers, as presented in Table 13 and Table 14 respectively (AEC Group 2016), against the following conservative assumptions are made regarding passengers and crew for each class of ship:

- Boutique (equate to Sub-Regal and Regal Class) – 500 passengers and 150 crew members.
- Mid-size (equate to Sun and Vista Class) – 1500 passengers and 500 crew members.
- Mega (equate to Grand Class) – 3000 passengers and 1000 crew members.

BaU and project demand projections that have formed the basis of this waste assessment are therefore summarised as per Table 15 below:

Table 15: Projected BaU and Project Demand Scenarios by Vessel Class

	Trinity Wharves			Yorkey's Knob			Total Cairns		
Class	**2021**	**2026**	**2031**	**2021**	**2026**	**2031**	**2021**	**2026**	**2031**
BaU Demand - Existing Channel									
Boutique	45	53	62	5	3	4	50	56	66
Mid-size	31	25	16	35	41	27	66	66	43
Mega	-	-	-	21	41	80	21	41	80
TOTAL	**76**	**78**	**78**	**61**	**85**	**111**	137	163	189
Project Demand - Revised Channel									
Boutique	34	40	50	-	-	-	34	40	50
Mid-size	89	90	64	-	-	-	89	90	64
Mega	6	18	38	16	25	48	22	43	86
TOTAL	**129**	**148**	**152**	**16**	**25**	**48**	**145**	**173**	**200**
Difference	***53***	***70***	***74***	***-45***	***-60***	***-63***	***8***	***10***	***11***

4.2.2 Ship Waste

Despite the above demand estimations for the CCLT, waste volumes may vary significantly from these estimations due to influences outside the scope of the project. This may be due to changes to products; packaging; passenger and crew behaviour; cruise liner operator waste management strategies; technologies on-board; or, legislative requirements regarding the management of wastes at sea.

The estimations in relation to ship waste volumes presented in the following sub-sections are exposed to market variability. This market variability may include changes in fleet make-up; the dynamics of the local cruise ship market; and the frequency and duration of berths at the CCLT, which may all influence the volumes of waste that may be generated through the operating life of the project.

The Cairns waste economy has sufficient capacity, and diversity of waste management capability to manage variations in waste volumes from those estimated volumes informing this assessment. Accordingly, the risk is assessed as negligible.

4.2.2.1 Solid Waste

Table 16 shows that by the year 2031, approximately 1,230.5 tonnes per annum (tpa) of incinerated waste per year will require handling at the CCLT for subsequent disposal to landfill. It is predicted that approximately 945.8 tpa (77 %) of this waste will be generated above the baseline scenario.

Table 16: Predicted Solid Waste Refuse – Incinerated Waste

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total PAX (Pass and Crew) per Passenger Class		650	2,000	4,000	6,650
Solid waste produced per day, per ship.	(kg/day)	2,275	7,000	14,000	23,275
Solid waste to be incinerated (75 percent of total waste produced).	(kg/day)	1,706	5,250	10,500	17,456
Incinerated waste (after incineration process, which reduces the mass by 70 percent).	(kg/day)	511.875	1,575	3,150	5,237
Total incinerated waste for removal at port, including quarantine facilities. (five days – refer to assumptions in above table).	(kg/visit)	2,559	7,875	15,750	26,184
Total Visits per Passenger Class per annum in 2031		50	64	38	152
Total incinerated waste for removal at port per year in 2031 project scenario (including quarantine facilities).	**(tonnes/ year)**	**128.0**	**504.0**	**598.5**	**1230.5**

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total incinerated waste for removal at port per year in 2031, above baseline scenario (including quarantine facilities).	(tonnes/ year)	-30.7	378.0	598.5	945.8

The discharge of incinerator ash at sea is prohibited under Annex V of MARPOL. Collection and management of incinerator will be in accordance with current arrangements, undertaken by appropriately qualified and licensed waste contractors. When vessels book into the port, the required waste facilities (timing and capacity) are identified by the ship's agent and waste contractors are then engaged to collect the waste when the ship arrives. All waste is transported to a suitable licensed facility, with this generally being the Remondis SWMF, or the MSC Mareeba landfill.

By 2031 it is estimated that the project would generate an additional 945.8 tonnes of incinerator waste above the baseline case. Applying a conservative 1 tonne: 1 m^3 weight-to-volume conversion for the incinerator waste, 945.8 tonnes of incinerator waste equates to 0.025% of the 4,000,000 m^3 of available capacity at the SWMF, and presents a negligible impact on landfill airspace availability for local industry and the broader community. It is anticipated that the Mareeba landfill will be closed by 2031.

In addition to the Incinerated Waste, and as shown in Table 17, approximately 1367.2 tpa of non-incinerable waste will require handling at the CCLT and subsequent management through local waste management facilities. It is predicted that approximately 1050.9 tpa (77 %) of this waste will be generated above the baseline scenario in the year 2031. Therefore, the total waste (incinerated and non-incinerable) to be handled at the CCLT in 2031 is estimated at 2597.7 tpa. Although a proportion of the additional waste will be made up of hazardous, or other regulated wastes, the proportion of waste that is considered regulated or hazardous cannot be accurately predicted, but the volume is nonetheless considered to be small relative to other waste types, and the significance is considered negligible.

Table 17: Predicted Solid Waste Refuse – Non-Incinerated Waste

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total PAX (Pass and Crew) per Passenger Class		650	2,000	4,000	6,650
Solid waste produced per day, per ship.	(kg/day)	2,275	7,000	14,000	23,275
Non-incinerated waste (25 percent of total waste).	(kg/day)	568.75	1,750	3,500	5,819
Total non-incinerable waste for removal at port per visit. (five days). (refer to assumptions in above table).	(kg/visit)	2,844	8,750	17,500	29,094
Total Visits per Passenger Class per annum in 2031		50	64	38	152

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total non-incinerable waste for removal at port per year in 2031 (recyclables - aluminium, glass, etc), project scenario.	**(tonnes/ year)**	**142.2**	**560.0**	**665.0**	**1,367.2**
Total non-incinerable waste for removal at port per year in 2031, above baseline scenario (including quarantine facilities).	(tonnes/ year)	-34.1	420.0	665.0	1,050.9

Approximately 125,000 tonnes of waste is processed at the ARRT per year (Suez, 2014). It is predicted that waste volumes will grow approximately four percent per year based on estimations associated with Cairns' Waste Transfer Stations (CRC 2009). Although this rate of growth may change in the future, if it is extrapolated to the year 2031, approximately 243,000 tonnes of waste will be received at the ARRT (or similar facilities) in the 2031 financial year. The project would therefore represent less than one percent of the waste received by the ARRT (or similar facilities) in the region.

In the context of waste management in the region, the project will provide a permanent impact through increased volumes requiring management, but this increase will be of minor significance relative to the general increase in waste generation across the community and industry within the EIS Study Area.

4.2.2.2 Wastewater

Although the current use of tanker trucks for sewage removal may be adequate for the project, Ports North intend to apply a system of direct discharge into the CRC's sewerage reticulation system, subject to demand and resolution of detailed design and approvals with CRC at some stage in the future.

Table 18 shows, based on port demand predictions, that approximately 18.75 megalitres (ML) of sewage will be handled at the port by 2031. Of this, 14.41 ML (77 %) will be above the baseline scenario. Further to this, it is estimated that approximately 156.25 ML of greywater will be handled at the port per year by 2031, with 120.1 ML (77 %) of this above the baseline scenario. This equates to an estimated 175 ML of effluent being pumped into CRC's WWTPs.

Table 18: Predicted Wastewater Volumes Requiring Management

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total PAX (Pass and Crew) per Passenger Class		650	2,000	4,000	6,650
Sewage produced per day, per ship.	L/day)	19,500	60,000	120,000	199,500
Greywater produced per day, per ship.	(L/day)	162,500	500,000	1,000,000	1,662,500
Total sewage for removal at port per visit. (two days). (refer to assumptions in above table).	(L/visit)	39,000	120,000	240,000	399,000

Items	Units	Boutique Class	Mid-size Class	Mega Class	Total
Total greywater for removal at port per visit. (two days). (refer to assumptions in above table).	(L/visit)	325,000	1,000,000	2,000,000	3,325,000
Total Visits per Passenger Class per annum in 2031		50	64	38	152
Total sewage for removal at port per year in 2031.	(ML/ year)	**1.95**	**7.68**	**9.120**	**18.75**
Total greywater for removal at port per year in 2031.	(ML/ year)	**16.25**	**64**	**76**	**156.25**
Total sewage for removal at port per year in 2031, above baseline scenario	(ML/ year)	-4.68	5.76	9.12	14.41
Total greywater for removal at port per year in 2031, above baseline scenario	(ML/ year)	-39	48	76	120.1

The current WWTP at Aeroglen services CRC and can treat 7,081 ML per year (CRC, no date [b]). Predicted wastewater generation equates to less than 2.5 % of the total capacity at Aeroglen.

As mentioned in 2.2.1, as per MARPOL and GBRMPA advice (GBRMPA, 2011), ships operating in the GBRMP must ensure:

- Greywater is only discharged when maintaining at least three nautical miles distance (or as far as possible) from a reef, island or the mainland.
- Treated sewage (from an IMO approved plant) is only discharged when maintaining at least three nautical miles (or as far as possible) from a reef, island or the mainland.
- Macerated and disinfected sewage (from an IMO approved plant) is not discharged into the GBRMP. Ships may only discharge this type of sewage if located at least three nautical miles from the boundary of the GBRMP boundary (which is taken as 'nearest land' by the IMO).
- Untreated or treated sewage (from a non IMO approved plant) must not be discharged into the Marine Park or an area at least 12 nautical miles from the boundary of the GBRMP boundary.
- The TOMPA prohibits the discharge of sewage into marinas, boat harbours and smooth waters.

Most ships currently discharge sewage and greywater at sea, however, only greywater and treated sewage is permitted to be discharged into the GBRMP, and only when at a distance of a minimum three nautical miles

from a reef, island or mainland. Therefore, while the increased shipping into Cairns may result in an increase in the discharge of greywater and treated sewage, it would not result in any discharge of untreated, macerated or disinfected sewage into the GBRMP surrounding the Cairns region.

The *Great Barrier Reef Outlook Report* (GBRMPA 2009) outlines that discharge of sewage from vessels operating in the region surrounding the GBRMP contributes a very small load of nutrients to the system. Total sewage discharge accounts for approximately three to four percent of the total nutrient load of the GBRMP (Productivity Commission 2003, in GBRMPA 2009), and tourism vessels (including diving and reef tour vessels) contribute only a small portion of this total (GBRMPA, 2009).

For this reason, the consequence of the likely impact (Table 1) of the project is expected to be negligible impact to nutrient loads in aquatic environments.

4.2.2.3 Liquid Shipping Wastes

Some liquid ship wastes may be considered hazardous wastes, or regulated wastes, and will require specialist management. These wastes may include waste oils, solvents and engine fluids that are generated during the operation and maintenance of the vessels. Others may include waste paints and cleaning chemicals generated during maintenance of the vessels.

The future generation of liquid shipping waste cannot be predicted with accuracy. This is because the amount of liquid waste generated varies significantly depending on a number of factors, including size of the ship; the engine room design; on- board preventative measures that are in place; and, the age and condition of components of the vessel (EPA 2008). Berthing vessels will only have need to discharge liquid shipping wastes where their on-board storages are filled. These wastes will continue to be managed via agreements with appropriately qualified and licensed waste contractors. When ships book into the port, the required waste facilities (timing and capacity) are identified by the ship's agent and waste contractors are then engaged.

The MARPOL Convention prohibits the discharge of cargo residues within 12 nautical miles of the GBRMP, and also prohibits the discharge of any substance that could be considered harmful to the environment. Further to this, the *Australian Ballast Water Management Requirements* (DOAWR, 2011) prohibit the discharge of any high risk ballast waters into Australian water.

Given the current international and national regulation of liquid shipping wastes it is expected that the project will result in a negligible impact from this type of waste. Further, it is not anticipated that the volumes will increase significantly from existing volumes, and there will be negligible impact on the existing liquid waste management capacity and capability within the EIS Study Area.

4.2.3 Land-side Solid Waste Generation and Management

General garbage, sewerage and greywater generated at the terminal itself will also increase due to additional patronage (see Section 4.2.1). The existing availability of source-segregated receptacles for general waste and recyclables will be increased incrementally in-line with the projected growth in patronage of the CCLT.

It is anticipated that the existing system and configuration of larger volume (front-lift) waste bins for general wastes and recyclables will remain, however the frequency of collection of these front-lift bins will increase in-line with the projected growth in patronage of the CCLT.

Overall land-side general waste and recyclable volumes are anticipated to increase commensurate to increased patronage. The increase that may be provided by the project (i.e. above baseline scenario) is expected to be insignificant when compared to the volume, and types of wastes generated from cruise shipping operations. On this basis specific waste volumes have not been calculated, as they will have a negligible impact on the Springmount Landfill airspace and Portsmith MRF capacity available to local industry, and the broader community.

Where necessary, the Suez ARRT may be considered as an alternative receival facility in the unlikely event land-side wastes cannot be received at the Springmount Landfill or Portsmith MRF.

Hazardous wastes and regulated wastes are not anticipated to be generated through land-side operations, and there will be no need to establish storages for these materials pending off-site management. In the rare instances that these materials may be generated during emergency, or maintenance works at the CCLT, these will be collected as they are generated by licensed waste management contractors.

4.2.4 Maintenance Dredge Sediment

Maintenance dredge material which may otherwise be considered a waste will increase due to the Project. It is predicted that there will be an estimated 6-10% (refer to **Chapter A3, Project Description**) increase of outer channel maintenance dredge volume following the widening of the channel. Furthermore, there will be the requirement for some limited maintenance dredging of the inner port.

Maintenance dredge material, which is to be generated throughout the operating life of the project, is intended to be placed at sea, as per existing approved practices.

4.2.5 Waste Management Impact Assessment

Predicted wastes generated by the project during its operations and maintenance are presented in Table 19, along with an assessment of potential associated risks.

Table 19: Operations and Maintenance Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Ship Incinerator Waste	Berthing vessels will discharge waste incinerator ash at the CCLT. The waste is from the on-board incineration of wastes generated at sea.	Estimated to be 1,230.5 tonnes per annum in 2031	Incinerator waste volume not able to be managed by the Cairns waste management sector	Temporary	Unlikely	Minor	Low
			Inappropriate disposal and risk of soil contamination	Short-term	Highly Unlikely	Minor	Negligible
			Inappropriate disposal and risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low
			Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Highly Unlikely	Minor	Negligible
			Inappropriate handling and disposal at receiving facility	Short-term	Unlikely	Moderate	Low
Ship Non-incinerable Waste	Berthing vessels will discharge non-incinerable waste at the CCLT. This is generally non-	Estimated to be 1,367.2 tonnes per annum in 2031	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	combustible solid wastes generated at sea.		Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low
			Inappropriate disposal and risk of soil contamination	Short-term	Unlikely	Moderate	Low
			Inappropriate disposal and risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low
			Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Negligible	Negligible
			Impacts due to odour	Temporary	Possible	Minor	Low
			Inappropriate handling and disposal at receiving facility	Short-term	Unlikely	Moderate	Low
Sewage	Berthing vessels will discharge sewage at the CCLT. Unlike existing practices Ports North will discharge directly to CRC reticulated	Estimated to be 18.75 ML per annum in 2031	Sewage volume not able to be managed by CRC WWTPs	Temporary	Unlikely	Moderate	Low
			Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
	sewerage system via a buffering tank to manage acceptable inflows.		Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium
			Impacts due to odour	Temporary	Unlikely	Moderate	Low
			Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium
Greywater	Berthing vessels will discharge greywater at the CCLT. Unlike existing tanker pump out practices, facilities are proposed to enable discharge directly to CRC reticulated sewerage system via a buffering tank to manage acceptable inflows.	Estimated to be 156.25 ML in 2031	Greywater volume not able to be managed by CRC WWTPs	Temporary	Unlikely	Moderate	Low
			Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	Moderate	Low
			Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium
			Impacts due to odour	Temporary	Unlikely	Moderate	Low
			Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
Liquid Shipping Waste	A variety of vessel related ship-born liquid wastes will be generated, and may consist of waste oils, solvents, cleaning liquids, paints etc.	Not possible to estimate	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Unlikely	Negligible	Negligible
			Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	High	Medium
			Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium
			Impacts due to odour	Temporary	Unlikely	Moderate	Low
			Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium
Land-side Solid Waste	CCLT management offices and staff facilities will generate general office and personnel wastes. This could include cardboard, paper, food scraps, packaging, etc.	Not possible to estimate	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Inappropriate disposal and risk of soil contamination	Short-term	Highly Unlikely	Minor	Negligible
			Inappropriate disposal and risk of impacts to	Short-term	Highly Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
			water quality if spills occur				
			Risk of litter discharge if not effectively contained	Temporary	Highly Unlikely	Moderate	Low
			Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Negligible	Negligible
			Impacts due to odour if not effectively contained	Temporary	Highly Unlikely	Moderate	Low
			Inappropriate handling and disposal at receiving facility	Short-term	Highly Unlikely	Moderate	Low
			Risk of encouraging pest fauna (mosquitos or rodents) if not effectively contained	Temporary	Highly Unlikely	Minor	Low

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to medium, depending on the waste stream.

4.3 Demobilisation and Decommissioning

Demobilisation at the completion of the civil works at each of the Project Areas may generate typical C&D waste, noting such volumes will be minor and well within the scope of capacity of existing waste contract arrangements, and subject to standard management and mitigation for site waste management as outlined in respective EMP's.

It is assumed that the channel will be utilised indefinitely into the future, unless it is no longer required, or there is no longer capacity to maintain the channel. As such, active decommissioning of the Land-side Project Area (channel or CCLT itself) is not expected to occur in the foreseeable future.

Current plans in the City Port Local Area Plan (Cairns Port Authority, 2006) intend for the Port of Cairns to be developed to utilise the infrastructure created by the project. There are no plans beyond the project's current planned operational period. Waste types and impacts due to decommissioning of land-side infrastructure and the wharf structure will be assessed in the future, when it is required.

Post-construction of the DMPAs, it will be necessary for these Project Areas to be decommissioned, stabilised or vegetated depending on intended end use, informed by the commercial intent of each site. While the DMPAs will revert to other uses, demobilising of the associated infrastructure supporting their construction will generate wastes that will require management. Decommissioning and demobilisation of the inlet pipeline, pumps and pump stations; the tailwater discharge pipeline; and, temporary storages will be required, and an assessment of managing the residual wastes is detailed in Table 20 below.

Table 20: Demobilising Waste Sources and Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
C&D waste piping, soil, concrete, timber, asphalt, metal, plastic etc.	May include decommissioned and demobilised piping, and associated valves, flanges and pumps. It is foreseen that recyclable materials (i.e. metals) will be returned to the supplier for resale, or recycled.	<1,500 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible
			Inappropriate disposal	Temporary	Unlikely	Minor	Low
			Potential amenity (dust and noise) impacts associated with the decommissioning and demobilising works	Temporary	Unlikely	Moderate	Low
			Risk of soil contamination	Short-term	Highly Unlikely	Moderate	Low
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk
			Odour impacts	Temporary	Unlikely	Minor	Low
			Risks to human health or other fauna or flora if spill occurs	Short-term	Unlikely	Moderate	Low
			Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low

Overall, the unmitigated risk of the likely impact (Table 1) is considered to be negligible to low.

5.0 RECOMMENDED MITIGATION AND MANAGEMENT MEASURES

In responding to the potential project risks identified in Section 4.0 a range of mitigation and management measures are proposed to reduce the likelihood, or consequence of these risks being realised through the project. Consistent with the Australian Standard, *Risk Management – Principles and Guidelines* (AS/NZS, 2009), the intent of the proposed mitigation measures are to beneficially change the likelihood, or consequence of the identified risks. Broadly these mitigation measures are focused on resource efficiency and application of the waste management hierarchy; and, the application of environmental and management controls to limit adverse emissions to the environment.

During the pre-construction and construction phases of the DMPA Project Areas and Land-side Project Area, and the operations and maintenance phase of the CCLT, separate Waste Management Plans (WMPs) will be in place to manage potential impacts from the project. These WMPs are intended to detail the necessary mitigation measures, and will focus on resource efficiency; protecting amenity and surrounding environs; and, ensuring the management of wastes is undertaken in accordance with regulatory requirements. Further to this, the waste management hierarchy, as shown in Figure 2: Waste Management Hierarchy

, will form the basis of the WMPs, and this requires the project to reduce waste generation, or carefully manage these wastes if generation cannot be avoided.

The following sections outline the mitigation and management measures that will be employed during the pre-construction and construction phase of the Land-side Project Area, and the two DMPA Project Areas. Further, it provides management measures that will be employed through the operations and maintenance phase of the CCLT to minimise the impacts of waste. The application of these management measures is intended to correlate to reducing the likelihood and/or consequence of project related risks identified for the Land-side Project Area and DMPA Project Areas, as identified in Section 4.1 and Section4.2, with the effectiveness of these measures in ameliorating risks assessed later in Section 6.0.

5.1 Pre-Construction and Construction

The mitigation and management measures outlined here and in Section 4.1 will be integrated into a Construction Environmental Management Plan where appropriate, with this to include a Pre-construction and Construction WMP for both the DMPA Project Areas and the Land-side Project Area. The WMPs will include waste management requirements, and responsibilities of project personnel.

5.1.1 Waste Minimisation and Resource Efficiency

Waste will be avoided or reduced via:

- Minimising the use of packaging in the mobilisation of plant and materials to the construction zones.
- Where possible, sourcing materials from suppliers who participate in the Australian Packaging Covenant.
- Accurate estimation of materials for use during construction; and taking care in the preparation of materials for use, thus minimising the volume of off-cut material being generated.
- Consideration of the durability of construction materials to avoid ongoing replacement.
- Where quality is maintained, preference should be given to sourcing products that have reduced packaging, or utilise recycled material content (e.g. fly ash in concrete) or higher recycling content.
- Considering contractual clauses to encourage best practice waste management.
- Source segregation of materials that can be reused, or recycled, to prevent contamination, readily enable their recovery, and prevent them from being transported to landfill.
- Scheduling works to maximise the re-use of materials.

5.1.2 Management of Environmental Emissions

In managing the potential environmental risks associated with pre-construction and construction phase wastes general, specific environmental management measures will also be implemented. The WMPs will include measures and procedures that account for the following:

- Source segregated general waste and recyclable bins will be provided where feasible, and safe, to facilitate effective resource recovery.
- Waste collection bins will be in place prior to construction commencing.
- Designated lay-down areas for waste off-cuts and over-supply materials will be defined prior to the commencement of construction, to facilitate the ease of recovery of these materials.
- Bins will be covered to prevent wind, rain, animals or vandalism spreading litter or contaminants throughout the construction site, and manage potential amenity risks associated with the inappropriate containment of wastes.
- Waste management locations will be kept tidy and well maintained.
- Staff will be briefed on waste management procedures as part of site induction processes, and will be actively encouraged to undertake re-use or recycling of materials.
- Wastes will be regularly removed by a licensed contractor and disposed of in a suitable and licensed facility.
- Hazardous, regulated, chemical or hydrocarbon wastes will be stored in a bunded or secure location prior to removal from site.
- In the event of release of waste into the environment, incident response and incident reporting procedures will be followed as per requirements of the Construction Environmental Management Plan. An Environmental Incident Report and Corrective Action Report will also be completed within 24 hours of the incident occurring.
- Appropriate spill clean-up procedures will be followed as per the Construction Environmental Management Plan.
- Known contamination (e.g. minor hydrocarbon spills) caused during construction will be remediated prior to completion of construction, with recovered wastes either treated in-situ, or disposed to an appropriately licensed waste management facility.
- Any unknown, or suspected contaminated or hazardous materials will be investigated and handled, and disposed of, in accordance with the relevant Material Safety Data Sheet (MSDS), and legislative requirements (e.g. waste tracking) where relevant.
- Records of waste generation and management fate will be kept via retention of waste receipts from contractors, and maintained by the Principal Contractor responsible for construction of the project.

5.1.3 Waste Handling and Management

Specific waste management measures for each type of pre-construction and construction waste are presented Table 21.

Table 21: Specific Waste Management Measures for Each Type of Pre-Construction and Construction Waste

Waste Type	Mitigation Measure
Packaging wastes	■ Source segregated sealed bins will be provided to separate non-recyclables (i.e. plastic film packaging) from recyclables (i.e. cardboard boxes; plastic and metal containers). ■ Bins will be regularly collected by the project waste contractor, and disposed to an appropriate waste management facility.
Contaminated soils, PASS, and SNP	■ Separate stockpiles of potentially contaminated soils, PASS, and SNP will be created to allow for their testing and classification, and to avoid contamination with other waste streams. ■ Contaminated soil, PASS, and SNP will be disposed to an appropriately licensed waste management facility.
Concrete and bitumen	■ Separate stockpiles of waste concrete and bitumen will be created to avoid contamination with other waste streams. This will assist in their re-use or recycling. ■ Waste concrete and bitumen will be assessed for re-use as recycled aggregate, or fill.
Metals	■ There are several metal recycling facilities around Cairns. Metals will be separated into ferrous and nonferrous metals. These will then be directed to a recycling facility.
Wood products	■ Waste wood will be re-used during the construction to the extent practicable. Where this is not possible, wood products will be stockpiled separately and then dispatched to an appropriate end use such as recycling.
Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	■ Specific waste bins, drums and IBCs with appropriate bunding will be used to isolate waste liquids, chemicals and hazardous wastes. ■ Minimal quantities will be kept on site. ■ Empty drums and other storage containers will be stored sealed and in bunded areas. ■ Containers will be re-used or recycled where possible. ■ An inventory of MSDSs for hazards substances will be maintained. ■ Appropriately licensed contractors will be engaged to regularly remove waste to appropriate facilities. ■ Spill kits will be available close to areas where chemicals are being used or kept.
Sewage and greywater	■ Existing facilities that have connections to the CRC reticulated waste water system will be used in preference to temporary, or mobile ablution facilities. ■ A minimal number of temporary and mobile ablution facilities will be used on site.

Waste Type	Mitigation Measure
Office and other general waste	■ Recyclables will be sorted, stockpiled or contained in the appropriate recycling bins. ■ Licensed contracts will be engaged to regularly remove waste bins to the appropriate facility. ■ Waste areas will be kept tidy and all waste is to be placed in the appropriate receptacle. ■ Staff will be inducted on waste management. ■ Waste will be collected in sealed bins to reduce attracting pest fauna, and other associated amenity risks. ■ Any native vegetative waste will be diverted to existing green waste recovery facilities for mulching where possible. Weeds will be disposed of in general waste bins, or skip bins.

Waste management will also be undertaken in accordance with the following best practice guidance documents:

- *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain* (DSEWPC, 2012i)
- *Guidelines to the Recycling Policy for Buildings and Civil Infrastructure* (DPW, 2009).

Mitigation for air emissions during construction are discussed in **Chapter B11, Air Quality** and capital dredging waste volumes for the proposed channel are described in **Chapter A3, Project Description**.

5.2 Operations and Maintenance

Mitigation and management of wastes generated through the operations and maintenance of the Land-side Project Area are primarily those to be generated by cruise-ship related activities at the CCLT, as described in Section 4.2.2. While some minor maintenance of the DMPA Project Areas will be required, waste generation will be negligible, and have not been considered further.

Wastes to be managed in the Land-side Project Area includes the management of wastes generated by cruise ships at port, and whilst at sea. Ports North will have limited scope to manage wastes being handled at the port as ship wastes will continue be collected by appropriately qualified and licensed contractors, who are engaged directly by the ships agents and stevedores, which operate independently of Ports North.

Section 4.2 describes the likely waste types and volumes that will be generated through the operations and maintenance of the project, with Section 4.2.5 providing an assessment of the potential impacts posed by these in the EIS Study Area.

5.2.1 Cruise Ship Wastes

Ports North propose that, waste generated on-board from visiting cruise ships during the Operations and Maintenance phase, will be included in a revision to existing port procedures; the port EMS; and, future waste contracts. Table 22 below describes the intended management of sea-side wastes (ship wastes)

Table 22: Management of Wastes Generated by Cruise Ships during Operations

Type / Generation	Management
General garbage This includes incinerated mixed solid waste, (e.g. food wastes, paper, packaging), and non-incinerable solid waste and recyclables.	■ As outlined in Section 2.2.1 discharge of general garbage to sea is not permitted under MARPOL. ■ Waste generation and management on-board cruise ships (e.g. incineration or waste separation) is outside the scope of management associated with the project. Thus, Ports North cannot directly influence the volume and type of waste being received at the port, except where regulations do not permit the waste to be offloaded. ■ In consultation with relevant authorities, when applicable, consideration will be made to install internationally recognised signs throughout the CCLT (e.g. ISO signage). This is to aid international visitors and crew to meet Australian Maritime Safety Authority and DOAWR requirements for their waste and to prevent mixing. ■ As per current operations, solid ship wastes (see Table 16 and Table 17) will be collected by appropriately qualified and licensed contractors who are engaged by booking agencies. Booking agencies operate independently of Ports North, however Ports North will continue to work with booking agencies to promote opportunities to improve waste management for cruise ship generated wastes. ■ Wastes will be transferred to a licensed reception facility by licensed contractors. ■ There is minimal transfer or recyclables due to quarantine requirements. Recycling will be the responsibility of each operator, as per current arrangements, however it is foreseen that majority of non-incinerable solid wastes from ships will require landfill disposal.
Wastewater management This includes Sewage and greywater generated by cruise ship operations	■ Sewage generation and management on board cruise ships is outside the scope of management associated with the project. Thus, Ports North cannot directly influence the volume and type of waste being discharged to sea or received at the port, except where regulations do not permit the waste to be offloaded (GBRMPA 2011). ■ Management of discharges of sewage and greywater in the region will continue to be the responsibility of Queensland and Commonwealth Governments (including the GBRMPA), though the implementation of legislation discussed in Section 2.2. The GBRMPA is currently reviewing its requirements regarding vessel-based sewage. ■ Although the current use of tanker trucks for sewage removal may be adequate for the future situation, a more robust system of direct discharge into CRC's reticulated sewage system is proposed through the project. A buffer tank will be installed at the CCLT to manage the sustainable inflow of sewage into CRC infrastructure. ■ Prior to finalisation of design, information on likely flow volumes, trunk connection points and a network analysis will be provided to CRC to aid in the assessment of impacts to their existing infrastructure. It is estimated that the volumes of sewage generated by the project, in addition to the baseline case (Table 18), can be managed by CRCs existing WWTP network.
Regulated wastes and liquid wastes generated by cruise ship operations This includes bilge water, residues, tank washing slops, ballast	■ Control and regulation of discharges of regulated and liquid wastes will continue to be the responsibility of Queensland and Commonwealth Governments (including the GBRMPA), through the implementation of legislation discussed in Section 2.2. ■ Regulated and liquid waste generation and management on board cruise ships is outside the scope of management associated with the project. Ports North cannot directly influence the volume and type of waste being received at the port, except where regulations do not permit the waste to be offloaded.

Type / Generation	Management
water, and other oily mixtures that contain chemicals. It includes regulated, trackable and hazardous wastes.	■ As per current operations, ship liquid wastes (Section 4.2.2.3) will be collected by appropriately qualified and licensed contractors who are engaged by booking agencies. As Ports North is not involved in collection of liquid waste from ships at the port, there is limited scope for direct management of these waste streams. ■ Ports North will seek to work with ships agents, booking agencies and promote opportunities to improve waste management for cruise ship generated wastes. ■ All waste will be transported to a suitable licensed facility, and will only be removed from ships by suitably licensed contractors. ■ Licensed contractors will be required to handle regulated and liquid waste in accordance with the relevant MSDS and DEHP regulatory requirements. MSDSs will be held by the waste contractor for reference during collection, handling and disposal. ■ Licensed contractors will be required to carry spill kits and equipment in case of spillage. Other equipment will be made available by the port in case of large spills (see **Chapter B17, Hazard and Risk**).
Quarantine wastes Quarantine wastes are generated by cruise ship operations.	■ Ships will be required to adhere to relevant MARPOL annexes and other legislative requirements with regard to disposal of quarantine wastes. ■ As per current operations, all movements and quantities of wastes will be recorded by contractors. ■ Packaging, transport and treatment of wastes will continue to comply with DOAWR requirements, with the fate of the material dependent upon its physical and chemical characteristics. The Cairns waste management sector has capacity to manage both liquid and solid quarantine wastes.

5.2.2 Land-side Wastes

Ports North propose that the measures and procedures that account for waste generated during the Operations and Maintenance phase will be included in a revision to existing port procedures; the port EMS; and, future waste contracts. Management outcomes for the wastes generated by land-side operations of the CCLT are described in Table 23.

Table 23: Management for Wastes from Land-side Operations and Maintenance

Type / Generation	Management
General solid waste Generated by wharf staff, pedestrians and cruise ship passengers within the passenger terminal and surrounds.	■ Source segregated general waste and recyclables bins will continue to be provided throughout the CCLT. ■ It is anticipated that the existing system and configuration of larger volume (front-lift) waste bins for general wastes and recyclables will remain, however the frequency of collection of these front-lift bins will increase. ■ Waste bins will be covered to prevent wind, rain or animals spreading waste throughout the port, and minimise potential amenity risks associated with their management. ■ Internationally recognised signs (e.g. ISO signage) will be used to aid international visitors and crew to meet AMSA and DOAWR requirements for their waste and to prevent mixing.

Type / Generation	Management
	■ As per current operations, waste generated at the CCLT is managed via agreements with appropriately qualified and licensed waste contractors. All waste will be transported to a suitable licensed facility. ■ The port will continue to be kept free of wastes to avoid animal attraction (e.g. rats) and breeding (e.g. mosquitos), and reduce potential associated amenity risks.
Sewage and greywater generated by built amenities at the wharves.	■ No upgrades to existing ablutions amenities at the CCLT are proposed as part of the project, and sewage from existing facilities will continue to be discharged into the CRC's reticulated sewage system. This may be revisited by Ports North in the future, were passenger visitations to increase beyond those estimated as part of this assessment.

Mitigation for air emissions during operations is discussed in **Chapter B11, Air Quality** whilst maintenance dredging waste is described in **Chapter A3, Project Description**.

5.3 Demobilisation and Decommissioning

The mitigation and management measures outlined here and in Section 4.3 will be integrated into a Construction Environmental Management Plan, with a specific section related to decommissioning works that will include waste management requirements, and responsibilities of project personnel.

5.3.1 Management of Environmental Emissions

In managing the potential environmental risks associated with decommissioning wastes general, specific environmental management measures will also be implemented. The WMP will include measures and procedures that account for the following:

- Source segregated general waste and recyclable bins will be provided where feasible, and safe, to facilitate effective resource recovery.
- Waste collection bins will be in place prior to decommissioning and demobilising commencing.
- Designated lay-down areas for waste off-cuts will be defined prior to the commencement of decommissioning, to facilitate the ease of recovery of these materials.
- Bins will be covered to prevent wind, rain, animals or vandalism spreading litter or contaminants throughout the site, and manage potential amenity risks associated with the inappropriate containment of wastes.
- Waste management locations will be kept tidy and well maintained.
- Staff will be briefed on waste management procedures as part of site induction processes, and will be actively encouraged to undertake re-use or recycling of materials.
- Wastes will be regularly removed by a licensed contractor and disposed of in a suitable and licensed facility.
- Hazardous, regulated, chemical or hydrocarbon wastes will be stored in a bunded or secure location prior to removal from site.
- In the event of release of waste into the environment, incident response and incident reporting procedures will be followed as per requirements of the Construction Environmental Management Plan. An Environmental Incident Report and Corrective Action Report will also be completed within 24 hours of the incident occurring.
- Appropriate spill clean-up procedures will be followed as per the Construction Environmental Management Plan.

- Known contamination (e.g. minor hydrocarbon spills) caused during construction will be remediated prior to completion of construction, with recovered wastes either treated in-situ, or disposed to an appropriately licensed waste management facility.
- Any unknown, or suspected contaminated or hazardous materials will be investigated and handled, and disposed of, in accordance with the relevant MSDS, and legislative requirements (e.g. waste tracking) where relevant.
- Records of waste generation and management fate will be kept via retention of waste receipts from contractors, and maintained by the Principal Contractor responsible for construction of the project.

5.3.2 Waste Handling and Management

Specific waste management measures for each type of waste generated through the demobilising phase are presented Table 24.

Table 24: Specific Waste Management Measures for Each Type of Waste Generated through Demobilisation

Waste Type	Mitigation Measure
Packaging wastes	■ Source segregated sealed bins will be provided to separate non-recyclables (i.e. plastic film packaging) from recyclables (i.e. cardboard boxes; plastic and metal containers). ■ Bins will be regularly collected by the project waste contractor, and disposed to an appropriate waste management facility.
Contaminated soils, PASS and SNP	■ Separate stockpiles of potentially contaminated soils, PASS, and SNP will be created to allow for their testing and classification, and to avoid contamination with other waste streams. ■ Contaminated soil, PASS, and SNP will be disposed to an appropriately licensed waste management facility.
Concrete and bitumen	■ Separate stockpiles of waste concrete and bitumen will be created to avoid contamination with other waste streams. This will assist in their re-use or recycling. ■ Waste concrete and bitumen will be assessed for re-use as recycled aggregate, or fill.
Metals	■ There are several metal recycling facilities around Cairns. Metals will be separated into ferrous and nonferrous metals. These will then be directed to a recycling facility.
Wood products	■ Waste wood will be re-used during the construction to the extent practicable. Where this is not possible, wood products will be stockpiled separately and then dispatched to an appropriate end use such as recycling.

Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	■ Specific waste bins, drums and IBCs with appropriate bunding will be used to isolate waste liquids, chemicals and hazardous wastes. ■ Minimal quantities will be kept on site. ■ Empty drums and other storage containers will be stored sealed and in bunded areas. ■ Containers will be re-used or recycled where possible. ■ An inventory of MSDSs for hazards substances will be maintained. ■ Appropriately licensed contractors will be engaged to regularly remove waste to appropriate facilities. ■ Spill kits will be available close to areas where chemicals are being used or kept.

Waste management will also be undertaken in accordance with the following best practice guidance documents:

- *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain* (DSEWPC, 2012i)
- *Guidelines to the Recycling Policy for Buildings and Civil Infrastructure* (DPW, 2009).

5.4 Augmentation of Cairns' Waste Management Infrastructure

A potential risk posed by the project, and assessed in this report, is the potential for the types and volumes of wastes generated through the pre-construction, construction, demobilisation, operation and maintenance of the CCLT, and decommissioning and demobilisation of the DMPAs construction zones to exceed the capacity and capability of the Cairns waste management sector. This report has assessed whether the increase in waste generation that will be brought about by the project, above baseline levels, will require augmentation of the existing waste management infrastructure in the EIS Study Area.

The review of the existing waste management sector capacity and capability in Cairns (Section 3.0) and consideration of the solid and liquid waste volumes projected to be generated through the project, shows the projected volume increases for all waste streams represents a small proportion of the available capacity, and future capacity taking into account planned growth of the local waste management sector.

The only capacity constraint identified through the assessment is managing the flow of sewage and greywater discharge into the CRC reticulated sewage system. It is not an issue of treatment capacity in the CRC WWTPs, but rather the flow capacity of the sewerage network. Ports North have proposed the installation of a buffer tank as part of the project, which will regulate the flows of sewage and greywater discharged from berthed vessels into the CRC sewage system. This mitigates the potential risk associated with exceeding existing capacity and will alleviate the need to upgrade CRC infrastructure.

The risk of the Cairns waste economy being unable to manage the wastes generated through the project is considered negligible. This assessment has not identified a need to augment the capacity and capability of the Cairns waste management sector to manage the increased volumes of liquid and solid wastes generated by the project.

6.0 RESIDUAL IMPACTS AND ASSESSMENT SUMMARY

6.1 Pre-Construction

Development and effective implementation of the Construction Environmental Management Plan, with the included Pre-construction and Construction WMP, will be central to the management of risks associated with solid and liquid wastes generated through this phase of the project. With implementation of risk mitigating measures outlined in Section 5.1, the residual risks have been assessed and described in the following sub-sections.

6.1.1 Land-side Project Area Pre-construction Residual Impact Assessment

Table 25 presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.1 targeted at the management of pre-construction wastes in the Land-side Project Area.

Table 25: Land-side Project Area Pre-Construction Waste Residual Impact Assessment

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	Establishment of the construction zones may require the demolition and clearance of some minor structures, or surface coverings.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
Packaging Wastes	Packaging materials include plastic wrapping; wooden pellets; plastic containers and IBCs; and, strapping and binding.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
Contaminated soils, PASS and SNP	Some machinery (i.e. cranes) may require piles to be installed in the underlying ground, potentially generating contaminated soils, PASS, and SNP.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Short-term	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible

With the application of the proposed mitigation and management measures outlined in Section 5.1, residual risks to human health and ecological values were generally assessed as negligible.

6.1.2 DMPA Project Areas Pre-construction Residual Impact Assessment

Table 26 below presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.1 targeted at the management of pre-construction wastes in the DMPA Project Areas.

Table 26: DMPA Project Areas Pre-Construction Waste Residual Impact Assessment

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
Organic waste	Clearance of vegetation to create Work Areas.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Dispersion of weeds and pathogens	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	Establishment of the construction zones may require the demolition and clearance of some minor structures, or surface coverings.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
Packaging Wastes	Packaging materials include plastic wrapping; wooden pellets; plastic containers and IBCs; and, strapping and binding.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
Contaminated soils, PASS and SNP	Some machinery (i.e. cranes) may require piles to be installed in the underlying ground, potentially generating contaminated soils, PASS, and SNP.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Short-term	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible

With the application of the proposed mitigation and management measures outlined in Section 5.1, residual risks to human health and ecological values were generally assessed as negligible.

6.2 Construction

Development and effective implementation of the Construction Environmental Management Plan, with the included Pre-construction and Construction WMP, will be central to the management of risks associated with solid and liquid wastes generated through the construction phase of the project. With implementation of risk mitigating measures outlined in Section 5.1.

6.2.1 Land-side Project Area Construction Residual Impact Assessment

Table 27 below presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.1 targeted at the management of construction wastes in the Land-side Project Area.

Table 27: Land-side Project Area Construction Waste Residual Impact Assessment

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
Contaminated soils, PASS and SNP	Construction will require piles to be installed in the underlying ground, potentially generating contaminated soils, PASS, and SNP	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Temporary	Unlikely	Minor	Low	Highly Unlikely	Negligible	Negligible
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	May include off-cuts of timber, concrete, brick, plastic and metal. It is foreseen that surplus materials will be returned to the supplier for resale.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Risk of litter discharge if not effectively contained	Short-term	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Inappropriate disposal	Temporary	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
Gaseous wastes and particulates	Machinery with internal combustion engines such as on site generators, pile driving equipment, work boats, delivery transport and workforce vehicles will generate gaseous wastes.	Refer to Chapter B11, Air Quality for an assessment of air quality impacts associated with these wastes.	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
	Sewage will be generated during	Sewage and greywater volumes not able to be	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
Sewage & greywater	construction by construction staff.	managed by CRC WWTPs							
		Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible
		Odour impacts	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risks to human health or other fauna or flora if spill occurs	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible
		Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	Construction will require temporary construction workshops, supporting maintenance facilities and construction equipment maintenance areas. Liquid hydrocarbons and other waste chemicals generated from these areas include used industrial lubricants, oils, thinners, coolants, solvents, petrol and paints. Although hazardous wastes are not specifically identified in this assessment, these will be managed appropriately as the need arises. The use and volumes of such substances are likely to be minimal during both construction and operation of the project.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
Office and other general waste	Site construction offices will generate general office waste. This could include cardboard, paper, food scraps, packaging, etc.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Reductions in visual amenity	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of injury to terrestrial or marine fauna	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Risk of encouraging pest fauna (mosquitos or rodents)	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible

Unmitigated risks to human health and ecological values were generally assessed as negligible or low, with some medium risks associated with certain aspects of liquid waste management (Section 4.1). With the application of the proposed mitigation and management measures outlined in Section 5.1, residual risks to human health and ecological values were generally assessed as negligible.

6.2.2 DMPA Project Areas Construction Residual Impact Assessment

Table 28 below presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.1 targeted at the management of construction wastes in the DMPA Project Areas.

Table 28: DMPA Project Areas Construction Waste Residual Impact Assessment

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
Contaminated soils, PASS, and SNP	Construction may require excavation of underlying ground to generate bund airspace, potentially generating contaminated soils, PASS, and SNP.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
		Risk of soil contamination	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the demolition works	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Possible	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
C&D waste brick, concrete, timber, asphalt, metal, plastic etc.	May include off-cuts of timber, concrete, brick, plastic and metal. It is foreseen that surplus materials will be returned to the supplier for resale.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of litter discharge if not effectively contained	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Inappropriate disposal	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Possible	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
Liquid hydrocarbons and other chemical wastes (including hazardous wastes)	Construction will require temporary construction workshops, supporting dredging equipment maintenance facilities and construction equipment	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
	maintenance areas. Liquid hydrocarbons and other waste chemicals generated from these areas include used industrial lubricants, oils, thinners, coolants, solvents, petrol and paints. Although hazardous wastes are not specifically identified in this assessment, these will be managed appropriately as the need arises. The use and volumes of such substances are likely to be minimal during both construction and operation of the project.	Risk of soil contamination	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Possible	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible
Gaseous wastes and particulates	Machinery with internal combustion engines such as the dredge barge, dredge backhoe, on site generators, pile driving equipment, work boats, delivery transport and workforce vehicles will generate gaseous wastes.	Refer to **Chapter B11, Air Quality** for an assessment of air quality impacts associated with these wastes.	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
Sewage & greywater	Sewage will be generated during construction by construction staff.	Sewage and greywater volumes not able to be managed by CRC WWTPs	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
		Odour impacts	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
		Risks to human health or other fauna or flora if spill occurs	Short-term	Possible	Moderate	Medium	Highly Unlikely	Minor	Negligible
		Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
Office and other general waste	Site construction offices will generate general office waste. This could include cardboard, paper, food scraps, packaging, etc.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Reductions in visual amenity	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of injury to terrestrial or marine fauna	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Risk of encouraging pest fauna (mosquitos or rodents)	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible

Unmitigated risks to human health and ecological values were generally assessed as negligible or low, with some medium risks associated with certain aspects of liquid waste management (Section 4.1). With the application of the proposed mitigation and management measures outlined in Section 5.1, residual risks to human health and ecological values were generally assessed as negligible.

6.3 Operations and Maintenance

Through the operations and maintenance of the CCLT the most substantial volumes of wastes requiring management will be those generated on the visiting and berthed vessels, and discharged from the vessels for management at land-side facilities across the EIS Study Area. This assessment has considered the implications of managing CCLT operations and maintenance wastes from the perspective of both protection of human health and ecological values, as well as impacts on the capacity and capability of the Cairns' waste management sector to manage the increased volumes.

6.3.1 Assessment of Residual Impact

Table 29 below presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.2 targeted at the management of wastes generated in the operation and maintenance of CCLT.

Table 29: Land-side project Area (CCLT) Operations and Maintenance Waste Residual Impact Assessment

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
Ship Incinerator Waste	Berthing vessels will discharge waste incinerator ash at the CCLT. The waste is from the on-board incineration of wastes generated at sea.	Incinerator waste volume not able to be managed by the Cairns waste management sector	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Inappropriate disposal and risk of soil contamination	Short-term	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Inappropriate disposal and risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Impacts due to odour	Temporary	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Inappropriate handling and disposal at receiving facility	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
Ship Non-incinerable Waste	Berthing vessels will discharge non-incinerable waste at the CCLT. This is generally non-combustible solid wastes generated at sea.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of litter discharge if not effectively contained	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
		Inappropriate disposal and risk of soil contamination	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Inappropriate disposal and risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Impacts due to odour	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
		Inappropriate handling and disposal at receiving facility	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
Sewage	Berthing vessels will discharge sewage at the CCLT. Unlike existing practices Ports North will discharge directly to CRC reticulated sewerage system via a buffering tank to manage acceptable inflows.	Sewage volume not able to be managed by CRC WWTPs	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
		Impacts due to odour	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
Greywater	Berthing vessels will discharge greywater at the CCLT. Unlike existing practices Ports North will discharge directly to CRC reticulated sewerage system via a buffering tank to manage acceptable inflows.	Greywater volume not able to be managed by CRC WWTPs	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
		Impacts due to odour	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
Liquid Shipping Waste	A variety of vessel related ship-born liquid wastes will be generated, and may consist of waste oils, solvents, cleaning liquids, paints etc.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Risk of soil contamination if spill occurs	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
		Risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
		Impacts due to odour	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible

Waste Type	Source	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
		Risks to impacts to human health (see **Chapter B17, Hazard and Risk**) or other fauna or flora if spill occurs	Short-term	Highly Unlikely	High	Medium	Highly Unlikely	Moderate	Low
Land-side Solid Waste	CCLT management offices and staff facilities will generate general office and personnel wastes. This could include cardboard, paper, food scraps, packaging, etc.	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Inappropriate disposal and risk of soil contamination	Short-term	Highly Unlikely	Minor	Negligible	Highly Unlikely	Minor	Negligible
		Inappropriate disposal and risk of impacts to water quality if spills occur	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of litter discharge if not effectively contained	Temporary	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Potential amenity (dust and noise) impacts associated with the transfer to waste contractor	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
		Impacts due to odour if not effectively contained	Temporary	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Inappropriate handling and disposal at receiving facility	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Risk of encouraging pest fauna (mosquitos or rodents) if not effectively contained	Temporary	Highly Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible

6.3.3 Cruise Ship Wastes

The volumes and types of solid waste generated by cruise ships is within the management scope of cruise ship operators. Through requirements of MARPOL and the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth), there is an intent to reduce waste volumes across the industry. This is nonetheless outside the scope of the project. Ports North will have limited scope to manage wastes being handled at the port as ship wastes will continue be collected by appropriately qualified and licensed contractors who are engaged by booking agencies. Ports North will seek to work with booking agencies and promote opportunities to improve waste management for cruise-ship generated wastes.

This assessment has considered the risks associated with the management of wastes discharged from berthed vessels at the CCLT, with the volume of wastes discharged from berthed vessels to increase as a result of the project (above baseline projections). Risks to human health and ecological values were generally assessed as negligible or low, with some moderate risks associated with certain aspects of liquid waste management (Section 4.2). Ports North has committed to the development and implementation of an Operations and Maintenance WMP, which is to include a range of risk mitigating measures for application in the management of cruise ship wastes.

With implementation of risk mitigating measures outlined in Section 5.2, the management of wastes discharged from berthed vessels is expected to have negligible impact to human health, ecological values and amenity. Further the assessment has found that there is sufficient capacity and capability within the Cairns waste management sector to effectively manage the increased volumes of cruise ship wastes (above baseline projections) without need to augment the existing mix of waste management infrastructure.

Continued implementation by CRC of the implementation actions stemming from the *Cairns Regional Waste Management Strategy 2010-2015*, which are designed to achieve improved resource recovery, improved residual waste treatment and recovery and minimisation of waste sent to landfill, will provide further waste management capacity within the EIS Study Area.

With this in mind, solid and liquid waste (including wastewater) collected from the increased number of berthed vessels at the CCLT, as a result of the project, is likely to result in a negligible residual impact due to implementation of the WMP control measures, and the regulatory requirements for follow-on treatment and/or disposal at the licensed receiving waste management facilities.

6.3.4 Land-side Wastes

Waste generated at landside facilities (at the CCLT) during operations is likely to be insignificant when compared to the volume and type of wastes from the cruise ships themselves. Unmitigated risks to human health and ecological values were considered negligible to low, but nonetheless, in addition to its existing waste avoidance and resource efficiency initiatives at the CCLT, Ports North has committed to the development and implementation of an Operations and Maintenance WMP, which is to include a range of risk mitigating measures for application in the management of land-side wastes.

The types and increased volumes of wastes that are estimated to be generated through the increased patronage of the CCLT, as a result of the project, represent a very small proportion of the available capacity and capability in the Cairns' waste management sector. This assessment has not identified need to augment the available waste management capacity in order to accommodate the wastes that will be generated by the project.

This assessment considers that the effective implementation of the Operations and Maintenance WMP at the CCLT will result in a negligible risk human health and ecological values as a result of the project. Further, it will have negligible impact on the available waste management capacity and capability of the Cairns' waste management sector.

The Cairns waste economy has sufficient capacity, and diversity of waste management capability to manage variations in waste volumes from those estimated volumes informing this assessment.

Unmitigated risks to human health and ecological values were generally assessed as negligible or low, with some medium risks associated with certain aspects of liquid waste management (Section

4.2.2.2). With the application of the proposed mitigation and management measures outlined in Section 5.2, residual risks to human health and ecological values were generally assessed as negligible or low.

6.4 Demobilisation and Decommissioning

Development and effective implementation of the Construction Environmental Management Plan, with the inclusion of an appropriate sub-section for demobilisation, will be central to the management of risks associated with solid and liquid wastes generated through that phase.

Table 30 below presents an assessment of the residual impacts following application of the mitigation measures described in Section 5.3 targeted at the management of wastes generated through the decommissioning and demobilisation of the two DMPA Project Areas.

Table 30: DMPA Project Areas Demobilising Waste Residual Impact Assessment

Waste Type	Source	Estimated Volume	Potential Impacts	Duration	Likelihood	Consequence	Unmitigated Risk	Likelihood	Consequence	Residual Risk
C&D waste piping, soil, concrete, timber, asphalt, metal, plastic etc.	May include decommissioned piping, and associated valves, flanges and pumps. It is foreseen that recyclable materials (i.e. metals) will be returned to the supplier for resale, or recycled.	<1,500 tonnes	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Highly Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible
			Inappropriate disposal	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
			Potential amenity (dust and noise) impacts associated with the decommissioning works	Temporary	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
			Risk of soil contamination	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
			Risk of impacts to water quality if spills occur	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
			Odour impacts	Temporary	Unlikely	Minor	Low	Highly Unlikely	Minor	Negligible
			Risks to human health or other fauna or flora if spill occurs	Short-term	Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
			Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible

With the application of the proposed mitigation and management measures outlined in Section 5.3, residual risks to human health and ecological values were generally assessed as negligible.

7.0 CONCLUSION

This report has outlined the regulatory framework associated with waste management at the CCLT, as well as existing and proposed waste generation activities as a result of both the Land-side Project Area, and the two DMPA Project Areas, and the potential impact of their management on the EIS Study Area. This report has also outlined the existing and proposed environmental management and resource efficiency practices to be applied through the project life, and the risk mitigation measures to be applied in reducing the likelihood or consequence of risks to human health and ecological values being realised as a result of managing these wastes.

The limited extent of land-side works required for the project mean that waste generation during pre-construction and construction phases will be minimal, and will primarily relate to the construction of the two DMPA Project Areas. Works will generate wastes typical of a construction site, and Ports North will develop and implement a Construction Environmental Management Plan, which will include a Pre-Construction and Construction WMP with specific measures to minimise waste generation, mitigate risks associated with the management of residual wastes, and their potential emission to the environment. With these measures applied, this assessment has found that risks to human health and ecological values as a result of managing wastes generated during the pre-construction and construction phases of the project will be negligible.

Waste from ships docked at the port is currently the largest source of waste handled at the port. Ships require offloading of a variety of wastes while at port, including general waste, quarantined waste, liquid and hazardous wastes, as well as sewage and greywater. During the operations and maintenance phase of the Land-side Project Area (i.e. the CCLT), the assessment has found that, while the project will allow for an increased volume of cruise ship visits to the CCLT, with a corresponding increase in liquid and solid waste volumes being generated from these vessels, there is sufficient capacity and capability within the Cairns waste management sector to effectively manage these wastes.

The only capacity constraint identified through the assessment is managing the flow of sewage and greywater discharge into the CRC reticulated sewage system. It is not an issue of treatment capacity in the CRC WWTPs, but rather the flow capacity of the sewerage network. Ports North have proposed the installation of a buffer tank as part of the project, which will regulate the flows of sewage and greywater discharged from berthed vessels into the CRC sewage system. This will alleviate the need to upgrade CRC infrastructure, with the residual risk to the capacity of the CRC sewage system assessed as negligible to low.

During the operational phase, land-side waste generated from patrons and staff at the terminal building will be minimal, and will continue to be collected by licensed waste contractors. It is anticipated that the existing system and configuration of larger volume (front-lift) waste bins for general wastes and recyclables will remain, however the frequency of collection of these front-lift bins will increase.

The assessment found that there is no need to augment the existing, and planned growth in waste management capacity in the EIS Study Area to accommodate the increased volume of waste from the pre-construction, construction, operation and maintenance phases of the project.

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Report Signature Page

GOLDER ASSOCIATES PTY LTD

Garrett Hall
Senior Environmental Scientist

Bruce Dawson
Principal Environmental Consultant

GCH/BED/gch

A.B.N. 64 006 107 857

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APPENDIX A

Figure A-1

16,200,000

-1,900,000

CLIFTON BEACH
KEWARRA BEACH
TRINITY BEACH
YORKEYS KNOB
REFER TO INSET
KOAH
HOLLOWAYS BEACH
MACHANS BEACH
PENINSULA DEVELOPMENTAL RD
SPEEWAH
CAPTAIN COOK HWY
KAMERUNGA RD
CAIRNS NORTH
REDLYNCH
RESERVOIR RD
MULGRAVE RD
CAIRNS
PORTSMITH
BIBOOHRA
MOUNT SHERIDAN
KENNEDY HWY
BYRNES ST
MAREEBA DIMBULAH RD
MAREEBA
WRIGHTS CREEK
EDMONTON
BRUCE HWY
GIANGURRA

INSET MAP

CAIRNS SHIPPING DEVELOPMENT PROJECT

FLANAGAN CONSULTING GROUP

CAIRNS REGION WASTE MANAGEMENT INFRASTRUCTURE

LEGEND

- Waste Management Facility
- Town Locality
- Major Highway
- Northern Sands Pipeline
- Landside Project Area
- Northern Sands DMPA Project Area
- Tingira Street DMPA Project Area

SITE FEATURES

Cairns Regional Council:

1 - Material Recycling Facility (MeRF)
2 - Portsmith Waste Transfer Station
3 - Smithfield Waste Transfer Station

Mareeba Shire Council:

4 - Mareeba Landfill

Suez Australia:

5 - Advanced Resource Recovery Facility

Springmount Waste Management Facility:

6 - Woree Waste Transfer Station
7 - Springmount Landfill

Inert Landfills:

8 - Metalfield
9 - Northern Sands
10 - Sand Quarry

NOTES

Northern Sands Pipeline digitised from Ports North Figure A2-1: Project Concept Plan and is to be used as a guide.

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0 0.5 1 2 3 4 5 Km

DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **1546223-021-R-Rev1**
DATE: **01 JUN 2017**
DRAWN: **AFE**
CHECKED: **GH**

FIGURE A-1

APPENDIX B

Important Information Relating to this Report

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For more information, visit golder.com

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 44 1628 851851
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Pty Ltd
216 Draper Street
Cairns, Queensland 4870
Australia
T: +61 7 4054 8200

Golder Associates