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Ports North

CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Draft Environmental Impact Statement

Chapter B15: Waste

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B15.1 Introduction

B15.1.1 Scope

This chapter presents the results of a desktop review of waste generation issues and impact assessments undertaken as part of the Cairns Shipping Development Project (the CSD Project) Revised Draft EIS.

This involves describing the existing situation regarding waste management in the Cairns region in general and at the Port in particular and estimating the effect that the construction and operation of the CSD Project will have on current infrastructure and the environment in general. It uses a risk-based methodology, developing mitigation measures that can be incorporated into the design and future management of the project, and assessing the residual impacts following mitigation.

The ToR / EIS guidelines require that the assessment of waste includes the following:

- 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 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.

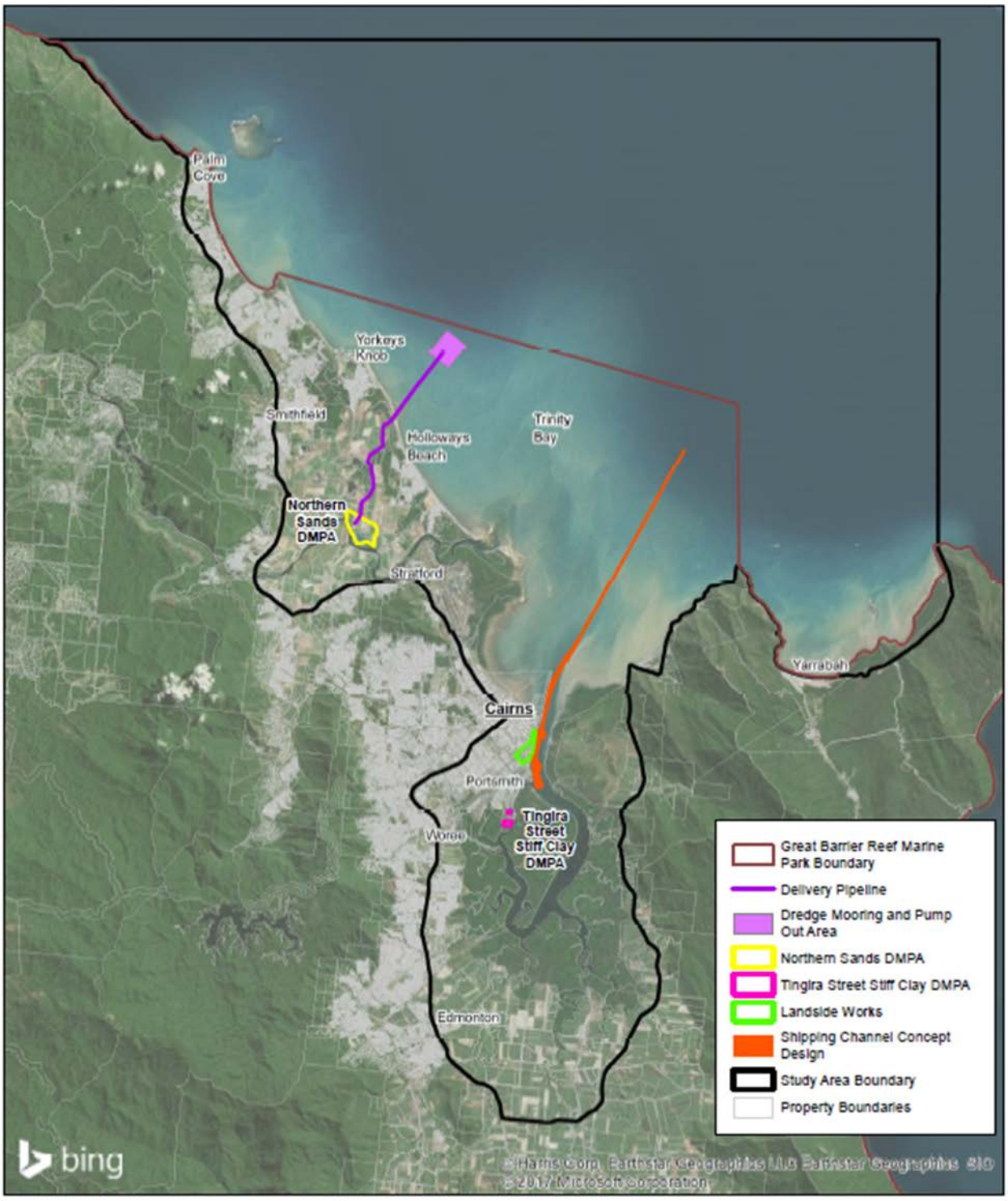
B15.1.2 Study Area and Project Areas

As noted in **Chapter A1** (Introduction), the 'study area' for the EIS varies depending on the issue at hand while various 'project areas' are the immediate footprints of the proposed works. For the consideration of waste, the 'local scale' is considered to be most appropriate although as noted later a regional approach is required when considering waste management infrastructure. Elements of the local scale (**Figure B15-1**) relevant to this chapter are the Cairns coastal plain generally between the Wet Tropics World Heritage Area and the coast between Trinity Inlet and Cairns' Northern Beaches. This area is characterised by (from south to north):

- the Trinity Inlet wetlands
- the Cairns CBD (fronting the Cairns foreshore between Trinity Inlet and the Barron River and spreading south-west, west, and north-west) to the coastal ranges
- the Port of Cairns and the allied industrial area east of the CBD and fronting Trinity Inlet
- the Barron River flood plain with its mosaic of agricultural, industrial, and residential developments of the southern Northern Beaches (Machans Beach to Yorkeys Knob)
- the township of Smithfield and the balance of the Northern Beaches.

Project areas are also shown on **Figure B15-1** and encompass:

- Channel Project Area including the shipping channel and the route to the pump-out point at the seaward end of the pipeline to the Northern Sands DMPA.
- Landside Works Project Area for wharf upgrades and berthing of cruise ships.
- Northern Sands DMPA Project Area (includes the DMPA, delivery pipeline corridor, tailwater ponds, and tailwater outlet works).
- Tingira Street Stiff Clay DMPA Project Area.



Ports North

Cairns Shipping Development Project
Revised Draft EIS

Project Location Plan

Ref: 3527-02-02b
Date: 30/05/2017
Projection: MGA94 Zone 55
Scale at A4 Size 1:200,000

0 2 4 8 Kms

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Figure B15-1 Study Area and Project Areas.

This chapter focuses on potential impacts of waste generated by the CSD Project at the local scale which is essentially the last three project areas described above and their immediate surrounds. However, some of the key waste management infrastructure is located in the Mareeba area and therefore the regional scale is appropriate. Further discussion of impacts at regional and whole of Great Barrier Reef (GBR) scale are outlined in **Chapter B18** (Cumulative Impacts Assessment).

B15.1.3 End use of DMPAs

Both of the DMPAs will revert to other uses following the completion of the dredging / dredge placement phase. That is, they will play no role in the operational phase of the CSD Project as outlined below.

B15.1.3.a Northern Sands Project Area

Northern Sands DMPA

The Northern Sands DMPA contains an operating sand mine and a 25 ha water-filled void that is to be enlarged and used for the placement of soft clays pumped to the site. The current void contains fresh water from groundwater seepage and rainfall.

The soft clay placement campaign will fill all or most of the void over a period of some three months. Once this filling is complete, the DMPA will revert to the control of the owner who will then determine subsequent uses. No assumptions can be made about this use although current approvals imply that at some time the void is to be completely filled.

Delivery Pipeline

After the completion of the soft clay placement campaign, the delivery pipeline and booster stations will be disassembled and removed. The disturbed area will be restored and the small amount of natural vegetation cleared for its construction will be rehabilitated using appropriate native species. A specific Restoration Plan will be prepared and implemented for this purpose.

Tailwater Discharge Pipeline(s)

Similarly, the tailwater discharge pipelines will be disassembled and removed and the disturbed area restored rehabilitated as part of the Restoration Plan.

Tailwater Ponds

When no longer required, the tailwater ponds will be filled and the disturbed area restored such that the area can be re-used. No rehabilitation will be necessary.

B15.1.3.b Tingira Street Project Area

The Tingira Street DMPA is currently cleared (although some marine plants have recolonised much of the area not covered by anthropogenic grasslands) and in its past has been filled to above Highest Astronomical Tide.

The placed stiff clay will be used to fill and preload the site to accelerate settlement. As a separate project, Ports North intends to import additional fill and construct industrial hardstands and other infrastructure. This project has been under consideration for many years and most of the necessary approvals have already been obtained.

Site landscaping will be undertaken on the DMPA once placement is complete and future site use is better defined. In the interim, the area will be maintained as per existing Ports North management, including mowing.

B15.2 Methodology

B15.2.1 Detailed Technical Assessments

A detailed technical assessment of waste generation and impacts was undertaken in support of this chapter. Details are provided in **Table B15-1** below. The final column shows where this report is located in this Revised Draft EIS.

TABLE B15-1 DETAILED TECHNICAL ASSESSMENTS

STUDY	DETAILS	APPENDIX NO
Cairns Shipping Development Project Revised Environmental Impact Statement – Waste Management	Desktop assessment of current waste management infrastructure, likely waste generation of the CSD Project, and assessment of impacts / mitigation opportunities.	Appendix BC

This study is referred to where appropriate. While all relevant findings have been incorporated into this chapter, readers are referred to the original report for further details if required. Two issues addressed in **Appendix BC** that have not been incorporated into this chapter in the interests of clarity are:

- legislation and policy (all of Section 2.2 – although this is referred to where relevant)
- detailed calculations of waste streams (Tables 13 to 18 of Section 4 – although the results are presented).

B15.2.2 Desktop Assessment

B15.2.2.a Existing Situation

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

The assessment of the existing situation considers current waste and wastewater generating activities, waste types and quantities, and waste and wastewater management activities at the Port of Cairns. It also includes a review of the available waste management capability and capacity in the Cairns waste management economy as a precursor to an assessment of 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 CSD Project.

B15.2.2.b Impact Assessment

The impact assessment task uses 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 decommissioning of all project elements associated with the Landside Works Project Area and the two DMPA Project Areas.

Projections of waste types and volumes from berthing vessels at the existing Cairns Cruise Liner Terminal (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
- 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 methodology allows an estimate to be made of the volume of waste projected to be discharged from berthing vessels and requiring of landside management within the Study Area.

In this assessment, dredged material is not considered to be a waste and its production and management is addressed in other technical chapters.

B15.3 Existing Situation

B15.3.1 Existing Waste Management Capability and Capacity in Cairns

Cairns Regional Council (CRC) is responsible for the management of most solid waste generated in the 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 Study area, with many of these currently used by Ports North, or its waste contractors supporting the operation of the CCLT. A brief description of the identified infrastructure in the area is presented in the following sub-sections.

B15.3.1.a Cairns Regional Council Facilities

CRC provides both solid waste management and limited wastewater management services within the Study Area, with these services summarised as follows and shown on **Figure B15-2**.

Solid Waste Management

Key existing solid waste management facilities operated by CRC are summarised in **Table B15-2**. Processing capacity is based on information provided by CRC in its Waste Management Strategy 2010-2015 (CRC 2009) and, for the purposes of this assessment, are considered consistent with current capacity (see projections included on Figure B15-3).

TABLE B15-2 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

Source: Appendix BC (Table 6).

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 Waste Management Facility (see **Section B15.3.1.c**).

Wastewater and Trade Waste Management

CRC currently operates six Wastewater Treatment Plants (WWTPs) providing sewerage services the 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 to which most of the Cairns CBD, including the CCLT, is connected to.

The Northern WWTP has capacity to service approximately 72 000 people, or 19.4 ML/day of treatment throughput. 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 B15.3.1.c**) (CRC 2017c).

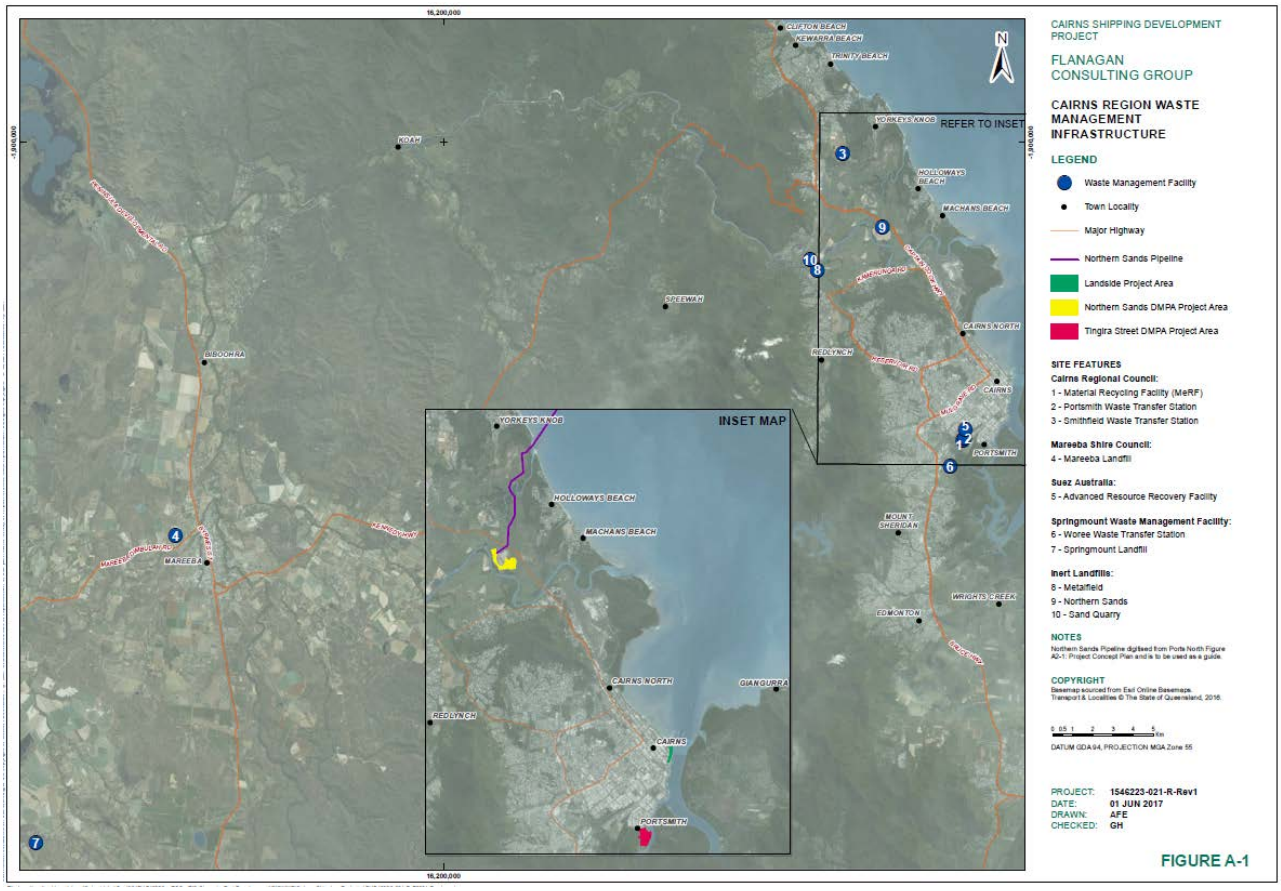

Figure B15-2 Regional waste management infrastructure.

Source: Appendix BC (Figure A-1). See Appendix BC for a larger version of this figure.

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 Study Area.

B15.3.1.b 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 (CRC 2009) 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 B15.3.1.c** 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 Council first preference for use of the remaining capacity resulting from any growth in domestic waste quantities until 2026.

B15.3.1.c 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 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 the Department of Environment and Heritage Protection (EHP) to accept 100 000 tonnes to 200 000 tonnes of waste per annum. The SWMF currently has EHP approval for the acceptance of the following waste streams from within the 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)
- clinical wastes (if rendered non-infectious and shredded).

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

B15.3.1.d Mareeba Shire Council

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

- residues from the ARRT
- C&D waste
- C&I waste
- 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).

B15.3.1.e 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 Study Area. Non-Trade Waste liquid wastes currently managed within the Study Area include:

- grease trap waste
- waste oil
- contaminated groundwater
- 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.

B15.3.1.f General Solid Inert Waste Landfills

Presently three relatively small solid inert waste landfills are located within with Barron River delta, which are within the Study area and are relatively close to the CCLT. One of these is at Northern Sands, the site of the Northern Sands DMPA. 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.

B15.3.2 Current Projected Waste Management Planning in Cairns

The CRC (2009) Strategy sets out the principles, objectives, targets, program areas, and action plans for managing 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 on Figure B15-3. 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.

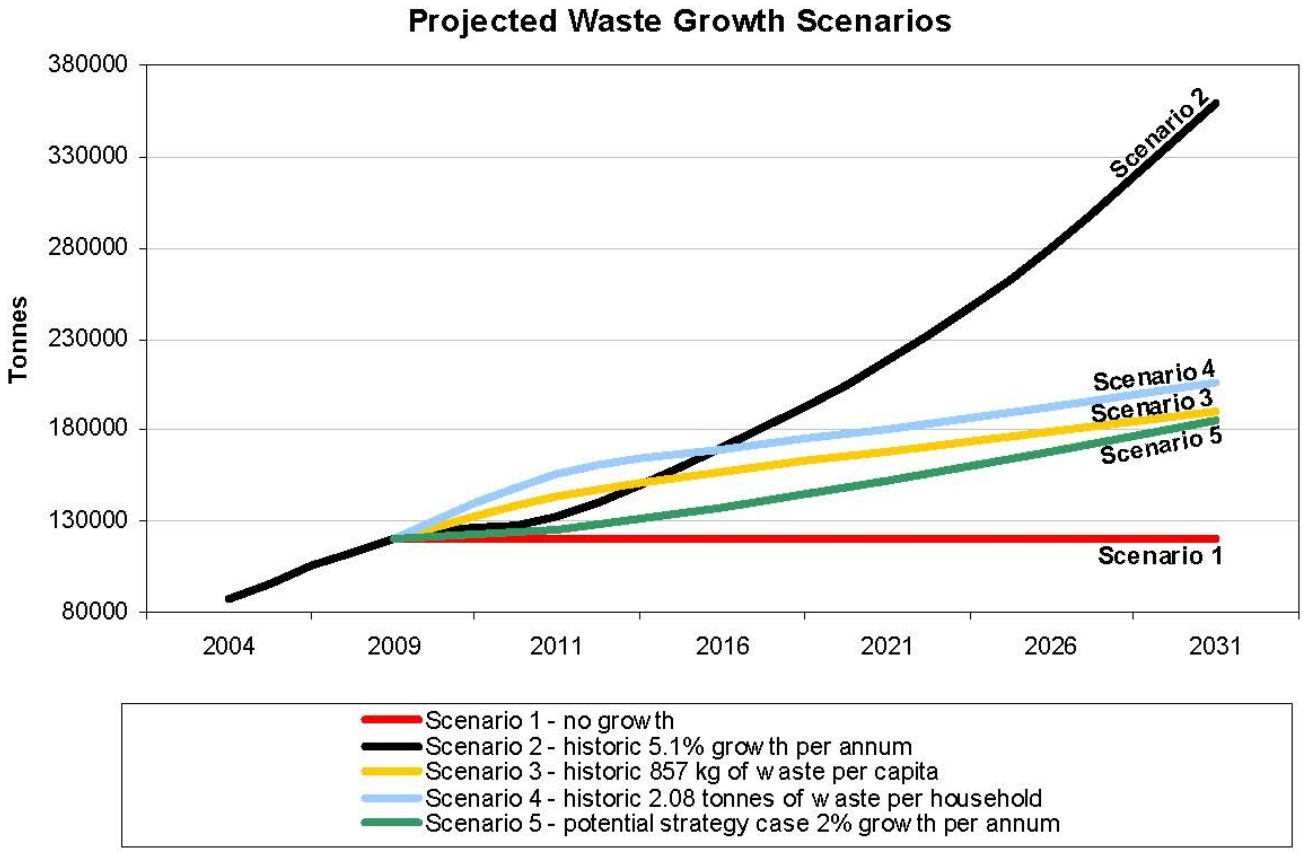

Figure B15-3 CRC waste growth scenarios.

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. This involves 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 shown on Figure B15-3). The CRC website reports that CRC continues 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 B15-4)
- 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.

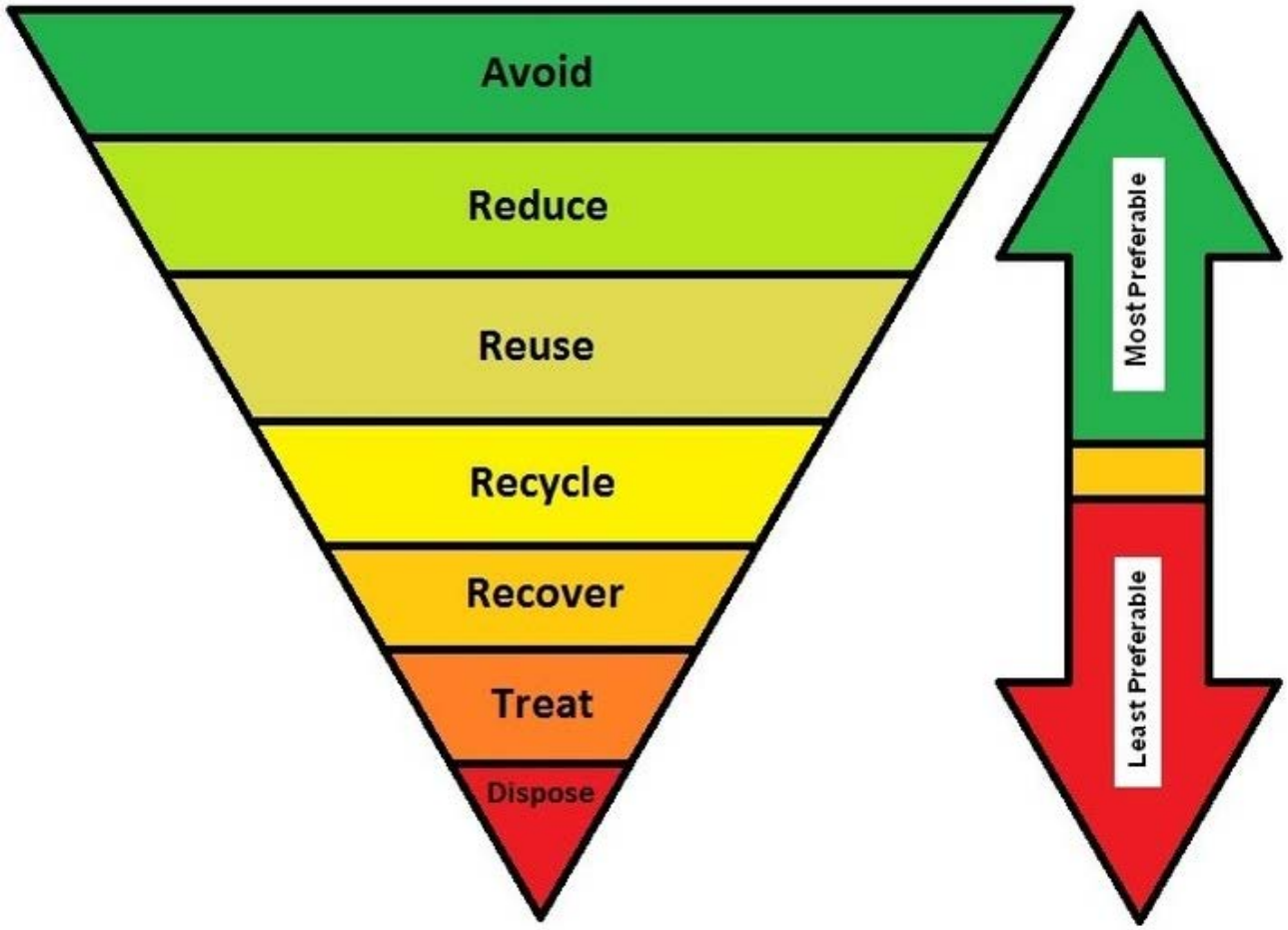

Figure B15-4 Waste management hierarchy.

Source: CRC (2017a).

Implementation of the CRC Strategy is supported by the CRC Waste Strategy Action Plans (CRC 2017b) which encompasses seven program areas, namely:

- education and waste reduction
- recycling and composting
- residual waste
- market development
- waste assets
- strategic partnerships
- 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.

B15.3.3 Existing Port of Cairns and Shipping Waste Management

Wastes generated by cruise-ship related activities are described in **Table B15-3** below. This includes wastes generated by cruise ships at port, and while at sea (while sailing from previous port / disposal point).

TABLE B15-3 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. • 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.).	• 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 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 Study Area, but within the broader 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[1], 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.

[1] MARPOL 73/78 is the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978. ('MARPOL' is short for 'marine pollution' and 73/78 short for the years 1973 and 1978.) MARPOL 73/78 is one of the most important international marine environmental conventions. Refer **Appendix B15.1** for details.

TYPE / GENERATION	MANAGEMENT
	• 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 • 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).	• Whilst the discharge of sewage to sea is allowed under the TOMPA Act[2] the discharge of sewage into the Port of Cairns does not occur due to its proximity the GBRMP and smooth waters classification under the TOMPA Act. • 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.

(Continued over)

[2] *Transport Operations (Marine Pollution) Act 1995* (Qld). Refer **Appendix B15.1** for details.

TYPE / GENERATION	MANAGEMENT
Quarantine waste • This includes quarantine wastes and ballast water taken up overseas with the intention of discharge within Australian waters. • The definition of 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 Department of Agriculture and Water Resources (DOAWR) amnesty bins - any goods surrendered to a DOAWR Officer - 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. • 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.

Source: Appendix BC (Table 7).

Table B15-4 below describes wastes that are generated through the landside operations, and general maintenance of the CCLT, including maintenance of the shipping channel.

TABLE B15-4 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 material • 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 waste is uncontaminated sediment that has been tested, and is suitable for sea based disposal. • Approximately 350 000 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 CCLT 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, landside wastes from the CCLT can be managed through existing recycling pathways within the Study Area. • Recording of waste volumes/masses and types is the responsibility of waste contractors.

Source: Appendix BC (Table 8).

The waste streams identified within **Table B15-3** and **Table B15-4** above are currently managed utilising existing waste management infrastructure within the Study Area, or just outside this area, in the case of the MSC Mareeba landfill.

B15.4 Assessment of Potential Impacts

B15.4.1 Impact Assessment Methodology

B15.4.1.a Risk-based Assessment

The following impact assessment has been undertaken for each of the matters described in the previous chapter. It uses the risk-based process adopted for the Revised Draft EIS as outlined in **Chapter A1** (Introduction) and includes an assessment of the following:

- the magnitude of impacts (consequence) (**Table B15-5**)
- the duration of impact (from **Chapter A1** (Introduction)
- the likelihood of impact (from **Chapter A1** (Introduction)
- risk level (from **Chapter A1** (Introduction).

These are considered together to determine the final level of impact risk, which is defined in **Table B15-9**.

B15.4.1.b Impact Consequence Criteria

Impact consequence criteria are different for each matter under discussion. **Table B15-5** shows the criteria used for this chapter.

TABLE B15-5 IMPACT CONSEQUENCE CRITERIA

IMPACT CONSEQUENCE	DESCRIPTION OF SIGNIFICANCE
Very High	Likely to exhaust all available waste management capacity in the 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 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.

(Continued over)

IMPACT CONSEQUENCE	DESCRIPTION OF SIGNIFICANCE
Moderate	Likely to require active management of waste volume discharges into the local waste economy to avoid limiting available waste management capacity in the 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 Study Area. The majority of solid waste generated by the project is 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.

Source: Appendix BC (Table 1).

B15.4.1.c Duration

Table B15-6 shows the general approach to classifying the duration of identified impacts.

TABLE B15-6 CLASSIFICATIONS OF THE DURATION OF IDENTIFIED IMPACTS

RELATIVE DURATION OF IMPACTS	
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

B15.4.1.d Likelihood of Impact

Likelihood of impact is described in **Table B15-7** below.

TABLE B15-7 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%; unlikely, but not negligible
Possible	Less likely than not but still appreciable; probability of about 50%
Likely	Likely to occur during construction or during a 12 month timeframe; probability greater than 50%
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

B15.4.1.e Risk Matrix

Risk is described as the product of likelihood and consequence as shown in **Table B15-8** below.

TABLE B15-8 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

B15.4.1.f Risk Rating

The rating of risk as assessed above is as shown in **Table B15-9** below.

TABLE B15-9 RISK RATING LEGEND

RISK RATING	DESCRIPTION
Extreme Risk	An issue requiring change in project scope. Likely to exhaust all available waste management capacity in the 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 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 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 Study Area.
Negligible Risk	No additional management required.

Source: Appendix BC (Table 4.

B15.4.1.g The Role of Mitigation

In accordance with the adopted impact assessment process, impacts are assessed in **Section B15.4** in the absence of mitigation. Recommended mitigation actions are described in **Section B15.5**, and mitigated impacts assessed in **Section B15.6**.

B15.4.2 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 immediately preceding construction, and do not represent an ongoing waste source associated with the project.

B15.4.2.a Landside Works Project Area

Table B15-10 provides a summary of the potential Landside Works Project Area pre-construction waste types, the sources of these wastes, volumes of these wastes, and the potential impacts associated with their management. The assessment considers the pre-construction of assets supporting the landside elements of the CCLT including wharf and services upgrade work.

Overall, the unmitigated risk is considered to be Negligible to Low.

B15.4.2.b DMPA Project Areas

Table B15-11 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. The assessment considers the pre-construction tasks associated with the establishment of the storage bunds at the Northern Sands DMPA, construction of the delivery pipeline, pumps and pump stations, and construction of the tailwater discharge pipeline and temporary storages.

Overall, the unmitigated risk is considered to be Negligible to Low.

TABLE B15-10 LANDSIDE 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 – see **Chapter B1** (Land)	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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED VOLUME	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
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 – see **Chapter B1** (Land)	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

Source: Appendix BC (Table 9).

TABLE B15-11 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
			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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED VOLUME	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
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

Source: Appendix BC (Table 10).

B15.4.3 Construction Wastes

B15.4.3.a Landside Works Project Area

Generally, the project requires limited landside construction, and accordingly construction waste volumes will be small compared to those generated during operations. The exception is associated with the demolition of Wharf 6. It is expected that this will generate approximately 1300 t of concrete rubble and about the same mass of timber joists and piles. Some (estimated to be 50%) of the latter will be able to be recycled.

Estimates of other 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 a Construction Waste Management Plan (refer to **Section B15.5**).

Table B15-12 provides a summary of the potential Landside Works Project Area construction waste types, the sources of these wastes, volumes of these wastes, and the potential impacts associated with their management.

Overall, the unmitigated risk of construction waste at the Landside Works Project Area is considered to be Negligible to Medium.

B15.4.3.b DMPA Project Areas

Dredged sediment from the capital dredging works associated with the channel expansion will be placed at the two DMPA Project Areas. This is not considered a waste and 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 work on both DMPAs (including construction of the bunds at the Northern Sands DMPA), construction of the pumpout facility (and marine booster if required), delivery pipeline, pumps and pump stations, and construction of the tailwater discharge pipeline and temporary storages.

Table B15-13 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.

Overall, the unmitigated risk of construction waste at the DMPA Project Areas is considered to be Negligible to Medium.

TABLE B15-12 LANDSIDE PROJECT AREA CONSTRUCTION WASTE SOURCES AND IMPACT ASSESSMENT

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	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. (See las item in table for demotion of Wharf 6 timber)	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 general, 1300 tonnes from Wharf 6 demolition	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
			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

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
Sewage & greywater	Sewage will be generated during construction by construction staff.	4000 L	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	Highly Unlikely	Moderate	Low
			Odour impacts	Temporary	Unlikely	Moderate	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 (see also **Chapter B12** (Landscape and Visual))	Temporary	Possible	Minor	Low

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
Office and other general waste	Site construction offices will generate general office waste. 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
			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
Wharf 6 demolition	Demolition of timber joists and bearers and timber piles.	1300 t timber	Estimated that half of the timber may be able to be recycled / reused	Temporary	Almost Certain	Minor	Beneficial

Source: Appendix BC (Table 11) except for final row.

TABLE B15-13 DMPA PROJECT AREA CONSTRUCTION WASTE SOURCES AND IMPACT ASSESSMENT

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	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
			Inappropriate disposal	Temporary	Unlikely	Minor	Low
			Impacts due to odour	Temporary	Possible	Negligible	Negligible

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
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 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.	<1000 L 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
			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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
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.	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.	5000 L	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	Highly Unlikely	Moderate	Low
			Odour impacts	Temporary	Possible	Minor	Low
			Risks to human health or other fauna or flora if spill occurs	Short-term	Highly Unlikely	Moderate	Low
			Reductions in visual amenity associated with mobile toilet facilities (see also **Chapter B12** (Landscape and Visual))	Temporary	Possible	Minor	Low

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED QUANTITY	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
Office and other general waste	Site construction offices will generate general office waste. 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
			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

Source: Appendix BC (Table 12).

B15.4.4 Operations and Maintenance

This section considers the wastes (and their management) associated with the operation and maintenance of the Landside Works 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. The discussion refers to and summarises the findings of the detailed analysis documented in **Appendix BC**.

B15.4.4.a Projected Demand

While the current sources of waste types are unlikely to change with the expansion of the port, 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. The material below 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 because Voyager class vessels are 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) and this considered the potential demand on the CCLT through the project, 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.

1. with or without development of a BCT expected to be in place by 2019
2. with or without home-porting
3. with or without channel modifications, expected to be in place for 2021
4. with or without availability of bunker fuels (IFO, HFO etc.).

Alternatives 3 and 4 were 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 home-porting, and no channel modifications), and even under the BaU 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.

Looking at the scenario of the BCT facility coming on-line, and the home-porting 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.

To enable an estimation of the total solid waste, sewage and greywater generated and subsequently requiring management at the CCLT due to the project, a number of assumptions were made as documented in **Appendix BC**. Baseline projections were 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. Passenger and crew populations were estimated by applying the projected vessel numbers against the conservative assumptions made regarding passengers and crew for each class of ship.

B15.4.4.b Ship Waste

Waste volumes may vary significantly from the estimated documented in **Appendix BC** due to influences outside the scope of the project. This may be due to variations in itinerary durations to products and 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 estimates in relation to ship waste volumes 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.

Appendix BC concludes that the Cairns waste economy has sufficient capacity, and diversity of waste management capability to manage variations in waste volumes from estimated volumes used in the assessment. Accordingly, the risk is assessed as negligible.

Solid Waste

By the year 2031, approximately 1230 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 946 tpa (77%) of this waste will be generated above the baseline scenario.

The discharge of incinerator ash at sea is prohibited under Annex V of MARPOL (see **Appendix BC** for a detailed review of the MARPOL legislation). 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 946 tonnes of incinerator waste above the baseline case. Applying a conservative 1 tonne : 1 m^3 weight-to-volume conversion for the incinerator waste, 946 tonnes of incinerator waste equates to 0.025% of the 4 Mm^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, approximately 1367 tpa of non-incinerable waste will require handling at the CCLT and subsequent management through local waste management facilities. It is predicted that approximately 1051 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 2598 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.

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 estimates 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 future general increase in waste generation across the community and industry within the Study Area.

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 future.

Based on port demand predictions, 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.

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 required by MARPOL and the Great Barrier Reef Marine Park Authority (GBRMPA 2011), ships operating in the Great Barrier Reef Marine Park (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 Act (see **Appendix BC**) 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) concludes 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).

Overall, the unmitigated risk of nutrient loads in aquatic environments is considered to be Negligible.

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 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 Study Area.

B15.4.4.c Landside Solid Waste Generation and Management

General garbage, sewerage and greywater generated at the terminal itself will also increase due to additional patronage. 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 landside 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 landside wastes cannot be received at the Springmount Landfill or Portsmith MRF.

Hazardous wastes and regulated wastes are not anticipated to be generated through landside 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.

B15.4.4.d Waste Management Impact Assessment

Predicted wastes generated by the project during its operations and maintenance are presented in **Table B15-14**, along with an assessment of potential associated risks.

TABLE B15-14 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 1230.5 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-combustible solid wastes generated at sea.	Estimated to be 1367.2 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
			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

WASTE TYPE	SOURCE	ESTIMATED VOLUME	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
			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 sewerage system via a buffering tank to manage acceptable inflows.	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
			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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED VOLUME	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
Greywater	Berthing vessels will discharge greywater at the CCLT. Unlike existing tanker pumpout 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
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

(Continued over)

WASTE TYPE	SOURCE	ESTIMATED VOLUME	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK
Landside 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 water quality if spills occur	Short-term	Highly Unlikely	Moderate	Low
			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

Source: Appendix BC (Table 19).

Overall, the unmitigated risk of operations and maintenance waste is considered to be Negligible to Medium, depending on the waste stream.

B15.4.5 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 EMPs.

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 CSD 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, demobilisation of the associated infrastructure supporting their construction will generate wastes that will require management. Demobilisation of the delivery 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 B15-15** below.

Overall, the unmitigated risk of demobilisation and decommissioning waste is considered to be Negligible to Low.

TABLE B15-15 DEMOBILISATION AND DECOMMISSIONING 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 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.	<1500 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 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
			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 (see also **Chapter B12** (Landscape and Visual))	Temporary	Possible	Minor	Low

Source: Appendix BC (Table 20).

B15.5 Recommended Mitigation Measures

B15.5.1 Introduction

In responding to the potential project risks identified in **Section B15.4** 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 Landside 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 on Figure B15-4, 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 Landside 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 Landside Project Area and DMPA Project Areas, with the effectiveness of these measures in ameliorating risks assessed later in **Section B15.6**.

B15.5.2 Pre-Construction and Construction

The mitigation and management measures outlined below have been incorporated into **Chapter C1** (DMPA Site Preparation and Post-placement Management Plan) where appropriate.

B15.5.2.a 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.
- Recycling Plan for Wharf Demolition materials.

B15.5.2.b Management of Environmental Impacts

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.

B15.5.2.c Waste Handling and Management

Specific waste management measures for each type of pre-construction and construction waste are presented **Table B15-16**.

TABLE B15-16 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.
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.

Source: Appendix BC (Table 21).

* The demolition of Wharf 6 will generate an estimated 1300 t of timber, 50% of which may be able to be recycled / reused.

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.

B15.5.3 Operations and Maintenance

Mitigation and management of wastes generated through the operations and maintenance of the Landside Project Area are primarily those to be generated by cruise-ship related activities at the CCLT, as described in **Section B15.4.4.b**. 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 who operate independently of Ports North.

B15.5.3.a Cruise Ship Wastes

Ports North propose that the measures and procedures that account for waste generated during the Operations and Maintenance phase will be included following revision of existing port procedures, the EMS and waste contracts. Management outcomes for the wastes generated by land-side operations of the CCLT are described in **Table B15-17** below.

TABLE B15-17 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.	• 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 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.

(Continued over)

TYPE / GENERATION	MANAGEMENT
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). 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, 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 water, and other oily mixtures that contain chemicals. It includes regulated, trackable and hazardous wastes.	• 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. • 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. • As per current operations, ship liquid wastes 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 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)).

(Continued over)

TYPE / GENERATION	MANAGEMENT
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.

Source: Appendix BC (Table 22).

B15.5.3.b Landside Wastes

Ports North proposes that the Operations and Maintenance WMP will include measures and procedures that account for the following intended management outcomes for the management of wastes generated by landside operations of the CCLT. **Table B15-18** describes the intended management of landside wastes.

TABLE B15-18 MANAGEMENT FOR WASTES FROM LANDSIDE 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. • 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.

Source: Appendix BC (Table 23).

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

B15.5.4 Demobilisation and Decommissioning

The mitigation and management measures outlined here and in **Section B15.4.5** 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.

B15.5.4.a 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 includes 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 demobilisation and decommissioning commencing.
- Designated lay-down areas for waste off-cuts will be defined prior to the commencement of demobilisation and 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.

B15.5.4.b Waste Handling and Management

Specific waste management measures for each type of waste generated through decommissioning are presented **Table B15-19**.

TABLE B15-19 SPECIFIC WASTE MANAGEMENT MEASURES FOR EACH TYPE OF DECOMMISSIONING 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.

Source: Appendix BC (Table 24).

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 (DSEWPaC 2012i)
- Guidelines to the Recycling Policy for Buildings and Civil Infrastructure (DPW 2009).

B15.5.5 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 of the DMPAs 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 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.

B15.6 Residual Impacts and Assessment Summary

B15.6.1 Introduction

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 above, the management of wastes generated during the pre-construction and construction phases of the projected is expected to have negligible impact on human health, ecological values and amenity.

B15.6.2 Pre-Construction and Construction

B15.6.2.a Landside Project Area Pre-construction Residual Impact Assessment

Table B15-20 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of pre-construction wastes in the Landside Project Area.

B15.6.2.b DMPA Project Areas Pre-construction Residual Impact Assessment

Table B15-21 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of pre-construction wastes in the DMPA Project Areas.

TABLE B15-20 LANDSIDE WORKS PROJECT AREA PRE-CONSTRUCTION WASTE RESIDUAL IMPACT

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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
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

Source: Appendix BC (Table 25).

TABLE B15-21 DMPA PROJECT AREA PRE-CONSTRUCTION WASTE RESIDUAL IMPACT

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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
		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

Source: Appendix BC (Table 26).

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

B15.6.3 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.

B15.6.3.a Landside Project Area Construction Residual Impact Assessment

Table B15-22 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of construction wastes in the Landside Project Area.

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

B15.6.3.b DMPA Project Areas Construction Residual Impact Assessment

Table B15-23 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of construction wastes in the DMPA Project Areas.

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

B15.6.4 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 landside facilities across the 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.

B15.6.4.a Assessment of Residual Impact

Table B15-24 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of wastes generated in the operation and maintenance of CCLT.

TABLE B15-22 LANDSIDE WORKS 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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
		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

(Continued over)

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
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	Highly Unlikely	Moderate	Low	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	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Reductions in visual amenity associated with mobile toilet facilities	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL 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.	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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
	The use and volumes of such substances are likely to be minimal during both construction and operation of the project.								
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
Wharf 6 demolition	Demolition of timber joists and bearers and timber piles.	Estimated that half of the timber may be able to be recycled / reused	Temporary	Almost Certain	Beneficial	Beneficial	Almost Certain	Beneficial	Beneficial

Source: Appendix BC (Table 27) except for final row.

TABLE B15-23 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

(Continued over)

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
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 maintenance 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
		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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
	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.	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

(Continued over)

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
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	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible
		Odour impacts	Temporary	Possible	Minor	Low	Highly Unlikely	Minor	Negligible
		Risks to human health or other fauna or flora if spill occurs	Short-term	Highly Unlikely	Moderate	Low	Highly Unlikely	Minor	Negligible

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
		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

Source: Appendix BC (Table 28).

TABLE B15-24 LANDSIDE 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	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
	wastes generated at sea.	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
		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	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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
	tank to manage acceptable inflows.	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,	Waste types, and waste volume not able to be managed by the Cairns waste management sector	Temporary	Unlikely	Negligible	Negligible	Highly Unlikely	Negligible	Negligible

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
	solvents, cleaning liquids, paints etc.	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
		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
Landside 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

WASTE TYPE	SOURCE	POTENTIAL IMPACTS	DURATION	LIKELIHOOD	CONSEQUENCE	UNMITIGATED RISK	LIKELIHOOD	CONSEQUENCE	RESIDUAL RISK
		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

Source: Appendix BC (Table 29).

B15.6.4.b 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) (see **Appendix BC**), 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. 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 above, 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 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.

B15.6.4.c Landside 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 landside 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.

B15.6.5 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 B15-25 below presents an assessment of the residual impacts following application of the mitigation measures described above targeted at the management of wastes generated through the demobilisation and decommissioning of the two DMPA Project Areas.

With the application of the proposed mitigation and management measures outlined above, residual risks to human health and ecological values of demobilisation and decommissioning were assessed as being negligible.

TABLE B15-25 DMPA PROJECT AREAS DEMOBILISATION AND DECOMMISSIONING 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.	<1500 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 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

Source: Appendix BC (Table 30).

B15.6.6 Conclusion

The preceding analysis concludes that the limited extent of landside 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 Landside Works Project Area. In reality, little work is required at this location and what is involved will generate wastes typical of a small construction site. These are readily managed by the measures listed above and incorporated into **Chapter C1** (DMPA Site Preparation and Post-placement Management Plan). With these measures applied, risks to human health and ecological values arising from 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 that location. 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. The assessment concludes that the operations and maintenance phase of the Landside Project Area (i.e. the CCLT) will allow for an increased volume of cruise ship visits at the CCLT, with a corresponding increase in liquid and solid waste volumes being generated from these vessels. However, 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 has proposed the installation of a buffer tank as part of the CSD 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, landside waste generated from patrons and staff at the CCLT will be minimal, and will continue to be collected by licensed waste contractors. It is anticipated that while the existing system and configuration of larger volume (front-lift) waste bins for general wastes and recyclables will remain, the frequency of collection of these front-lift bins will need to increase.

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

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