AQUIS RESORT AT THE GREAT BARRIER REEF PTY LTD ENVIRONMENTAL IMPACT STATEMENT

VOLUME 2

CHAPTER 18 WASTE MANAGEMENT





18. WASTE MANAGEMENT

18.1 EXISTING SITUATION

18.1.1 Waste Collection and Management

CRC (CRC) is responsible for the management of most solid waste generated in the region 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 well serviced by a broad range of commercial waste companies that operate both under contract to CRC and directly to commercial and industrial clients.

Figure 18-1 shows the location of key waste management infrastructure in Cairns and the surrounding region.



Source: Appendix T (Figure 3).





a) CRC Facilities

Existing key waste management facilities operated by CRC are summarised in Table 18-1.

FACILITY	WASTE TYPES	DISTANCE FROM Aquis	PROCESSED 2008/09	TOTAL CAPACITY
Waste Transfer Stations				
Smithfield Portsmith	All Domestic wastes Commercial – Greenwaste only	< 2 km 20 km	40 000 tonnes across all CRC facilities	Unknown
Material Recovery				
Portsmith	Domestic recyclable waste (plastics, paper/cardboard, glass, aluminium, steel)	20 km	10 000 tonnes	10 000 tonnes

TABLE 18-1 CRC WASTE MANAGEMENT FACILITIES

Source: Appendix T (Table 2).

Residual inert waste material collected by CRC at the Smithfield and Portsmith Transfer Stations and the Portsmith Material Recovery Facility (MERF) is disposed of at commercial inert waste landfill sites located in Cairns (refer to **Section 18.1.1e)**).

CRC advise that its existing waste management facilities are unlikely to be able to accept commercial waste from a major integrated development. There may, however, be opportunities for organisations that generate or manage large volumes of commercial waste to partner with CRC as it plans for, and implements, new infrastructure to manage an estimated 2% annual domestic waste volume increase resulting from projected future population growth.

b) SITA Australia ARRT Facility

SITA Australia Pty Ltd (SITA) is part of an international waste management company that is contracted by CRC, DSC and Mareeba Shire Council (MSC) until 2026 to operate an Advanced Resource Recovery Technology (ARRT). This facility 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 the process to increase the moisture content and assist in the composting process.

The CRC Waste Management Strategy provides the following information for the SITA 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). It is understood that 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 Mareeba Landfill (refer to **Section 18.1.1d)** below). During maintenance / breakdown periods, unprocessed waste is also disposed of at Mareeba Landfill, with limited use also being made of the Springmount Landfill (refer to **Section 18.1.1c)** below).

SITA advise that the facility can accept suitable waste material on a commercial basis outside its contact with CRC. It was noted, however, that existing contracts with CRC give Council first preference for use of the remaining capacity resulting from any growth in domestic waste quantities until 2026.

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 development company).

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

- constructed waste cells: approximately 600 000 m³
- preliminary regulatory approval: approximately 4 000 000 m³.

Although Springmount Landfill is currently approved to accept 75 000 tonnes to 100 000 tonnes of waste per annum, it also has preliminary approval to accept 100 000 to 200 000 tonnes annually.

SWMF operates independently of CRC and maintains a waste transfer station at Woree in Cairns to service a range of commercial clients from Cairns and the surrounding region.

Key sources of waste material managed at Springmount Landfill are summarised in Table 18-2.

TABLE 18-2 SWMF KEY WASTE SOURCES

SOURCE	PRIMARY WASTE TYPES	TRAVEL DISTANCE
Cairns-based commercial waste companies	Construction and demolition waste Commercial and industrial waste	90 km
Cassowary Coast Regional Council	Household and commercial kerbside collection (wet waste)	130 km
Cook Shire Council	Household and commercial kerbside collection	290 km
Tablelands Regional Council – Atherton only	Household and commercial kerbside collection	30 km
Townsville-base commercial waste companies	Treated industrial waste	380 km

Source: Appendix T (Table 3).





d) Mareeba Shire Council

MSC owns and operates a general waste landfill at Mareeba. This has been a fully-engineered facility since 2006 and is located approximately 55 km west of Cairns.

Mareeba Landfill is approved to accept to accept 75 000 tonnes to 100 000 tonnes of waste per annum. Key sources of waste material managed at Mareeba Landfill are summarised in **Table 18-3**.

TABLE 18-3 SWMF KEY WASTE SOURCES

SOURCE	PRIMARY WASTE TYPES	TRAVEL DISTANCE
SITA	Residual ARRT waste	55 km
Tablelands Council – former Eacham Shire	Household and commercial kerbside collection	60 km
Mareeba-based commercial waste companies	Construction and demolition waste Commercial and industrial waste	5 to 100 km

Source: Appendix T (Table 4).

Domestic waste generated within the MSC area is sent to the SITA ARRT facility in Cairns for processing.

MSC advise that, at existing waste disposal rates, Mareeba Landfill is expected to operate until approximately 2026.

e) Inert Waste Landfills

There are no operating private or Council-operated general waste landfills located within the local government boundary of CRC. There are, however, three relatively small inert waste landfills located within with Barron River delta in relatively close proximity to the Aquis Resort. These are non-engineered facilities at which defined inert materials (such as construction and demolition waste) are placed into operating and former commercial sand pit voids.

18.1.2 CRC Waste Management Strategy

CRC has prepared a Waste Management Strategy that sets out the principles, objectives, targets, programme areas and action plans for managing MSW for the five year period between 2010 and 2015. This strategy was developed based upon the following key information provided by CRC:

- 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 2080 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 Advanced Resource Recovery Technology (ARRT) facility in Cairns annually between in 2007/08 to 2008/09.
- Projected increase in households from 60 000 in 2010 to 75 000 in 2020.
- Projected population growth from 160 000 in 2010 to 220 000 in 2030.





Five scenarios used by CRC to estimate future domestic MSW growth are summarised in Figure 18-2.



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.

18.1.3 Statutory Framework for Protecting Environmental Values from Waste Emissions

The management of waste in Queensland is currently regulated under the following statutory framework:

- Environmental Protection Act 1994 (EP Act)
- Environmental Protection Regulation 2008
- Environmental Protection (Waste) Policy 2000
- Environmental Protection (Waste Management) Regulation 2000
- Waste Reduction and Recycling (WRR) Act 2011
- Waste Reduction and Recycling Regulation 2011.

Key elements of the statutory framework include:

- local government administration of waste management activities
- approval and control of waste management and disposal facilities
- waste management hierarchy to minimise, re-use, recycle various waste streams to limit disposal to landfill
- design standards for selected waste management infrastructure.





The *Environmental Protection (Waste Management) Regulation 2000* is due to expire on 1 September 2014 and is currently subject to review by EHP. CRC has adopted the following policy drivers and principles in the formulation of its 2010 to 2015 Waste Management Strategy (CRC 2009).

Policy drivers and principles

- Recognising waste as a material resource not a disposal problem.
- Waste management hierarchy (refer to figure opposite).
- Proximity principal 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 18-3 Waste management hierarchy and policy drivers and principles.

Source: Appendix T (Figure 2).

18.2 IMPACTS

18.2.1 Impact Avoidance / Minimisation

Solid waste produced by the Aquis Resort will need to be disposed of at external facilities available at the time. Aquis Resort has an obligation to reduce waste to the greatest extent possible and will enter into future negotiations with CRC and other operators regarding disposal arrangements.

Appendix T details the Aquis Resort Waste Management Strategy which follows the Queensland Government framework and how it will be applied to various waste streams. It also describes how indicators for monitoring waste management can be developed and environmental controls can be implemented.

Key aspects are as described below.

Waste Management Hierarchy

The Waste Management Strategy for the Aquis Resort is based around the Waste Management Hierarchy included within the *Environmental Protection (Waste) Policy 2000* which describes the order of priority in which waste materials are to be managed. The Waste Management Hierarchy, in order of most-preferred (avoid) to least-preferred (dispose) options, (refer **Figure 11-5**) will drive the Aquis Resort strategy.





Aquis Resort Waste Management Strategy

The objectives of the proposed Aquis Resort Waste Management Strategy are:

- Adoption of the principles of the Queensland Waste Management Hierarchy and align with the CRC waste management strategy where possible
- the measures adopted for waste management will meet current best practice, be in proportion to the potential environmental and health impacts the waste being managed, and be cost-effective
- minimise waste and negotiate supply of goods with minimal packaging
- securely contain waste in bins and skips for the shortest period of time possible (this also has implications for the reduction of bird strike risk)
- ensure responsible management and disposal through considering waste streams as a whole and the final destination before sending waste off-site
- comply with statutory requirements
- ensure that waste management options do not place unreasonable burden on existing CRC infrastructure
- consult with CRC and commercial waste contractors to identify opportunities for introduction of new best practice waste management services that will benefit the Cairns region.

While no current co-generation opportunities for power have been identified with the development, Aquis Resort is committed to exploring any opportunities that may be identified during the detailed project planning and design stages.

Waste management controls that can be implemented during the construction and operation phases are detailed in **Appendix T** and will be expanded on in the Waste Management Strategy (see also **Table 23-2**).

18.2.2 Construction Phase

a) Nature and Quantities of Waste

Expected waste streams produced during the construction phase are as follows:

- organic wastes (food waste, green waste such as vegetation)
- recyclable wastes (construction and packaging materials and other materials such as newspaper, office paper, cardboard, paperboard, milk cartons, glass, recyclable metal cans (steel and aluminium), recyclable plastics, scrap metal, plasterboard, oils, textiles, and hydraulic fluids)
- regulated wastes (paints, oil, unused pesticides, household chemicals, cleaning chemicals, car batteries, and other domestic waste materials prohibited from landfill)
- general wastes (non-recyclable packaging, personal sanitary items, non-recyclable plastics, small broken items such as crockery, non-compostable food waste (meat, cheese) and bulky items such as broken appliances, pieces of furniture not in repairable condition, and large items from maintenance or repair of buildings).

Estimated quantities are shown in **Table 18-4**. Uncertainty factors listed in the table for the volume of each material included and from these figures minimum and maximum volumes of material and waste have been derived. The volumes of additional waste materials including plastics, non-ferrous metals, organics, and paper are calculated based on their proportions in construction and demolition activities, sourced from the Australian Bureau of Statistics (2006).





The percentages of waste that may be generated from the total ordered volumes of materials are assumed to be 3%. This is at the lower end of published ranges of proportion of construction materials becoming waste on the basis that waste minimisation methods will be utilised and the project will adopt best practice procurement systems.

TABLE 18-4 ESTIMATED CONSTRUCTION WASTE QUANTITIES

WASTE MATERIAL	UNCERTAINTY FACTOR (%)	ESTIMATED CONSTRUCTION WASTE QUANTITIES	
		Minimum (tonnes)	Maximum (tonnes)
Stages 1 & 2 Combined			
Asphalt	20%	745	1115
Concrete	25%	19 240	32 065
Glass	30%	125	230
Miscellaneous	100%	65	5400
Plasterboard	30%	425	790
Precast pipes	Unknown	205	3865
Quarry materials	25%	11 655	19 425
Reinforcement	25%	1975	3295
Steel (ferrous)	50%	150	450
Timber	50%	90	270
Plastics	N/A	9	9
Non-ferrous metals	N/A	300	300
Organics	N/A	40	40
Paper	N/A	4	4
Other	N/A	270	270
Total		35 225	63 865

Source: Appendix T (Table 5).

The figures are for the ultimate (i.e. Stage 1 plus Stage 2 development). **Appendix T** includes a breakdown by stage.

b) Resource Recovery

The national average recycling rate for construction waste presented in the Environment Protection and Heritage Council's *National Waste Report 2010* (SEWPaC 2010) is 58%. The Green Building Council of Australia's report, *The Value of Green Star – a Decade of Environmental Benefits* (2013), presents project Green Star examples with average recycling rates of construction and demolition waste of 96%, which exceeded original commitments for an average of 75% recycling rates.





Estimates of residual waste material requiring disposal to landfill based upon a range of recovery rate scenarios are provided in **Table 18-5**.

TABLE 18-5 ESTIMATED CONSTRUCTION RESIDUAL WAS	STE DISPOSAL QUANTITIES
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SCENARIO	RESOURCE RECOVERY	ESTIMATED CONSTRUCTION WASTE LANDFILL DISPOSAL QUANTITIES	
		Minimum (tonnes)	Maximum (tonnes)
A – No resource recovery	0%	35 225	63 865
B – Normal practice	50%	17 650	32 620
C – Green Star standard	75%	8825	16 310
D – Best practice	95%	1765	3260

Source: Appendix T (Table 6).

Recycled waste and landfill waste will be removed from Aquis Resort through arrangements entered into with a commercial waste operator that will have facilities and land fill capacity to receive and process the waste stream from the resort.

Existing commercial landfills located within the Cairns Region currently have the capacity to accept the estimated residual construction waste quantities for each of the resource recovery scenarios presented in **Table 18-5**. Scenarios A and B, with low or no resource recovery are likely to be outside the capacity of existing local inert landfills located within the Barron River flood plain area. Most residual waste would need to be transported to Springmount Landfill which would need to bring forward the final approval and installation of new waste storage capacity.

c) Summary

- Waste generation quantities during the construction phase are estimated to be:
 - Between approximately 23 745 tonnes and 42 355 tonnes for Stage 1
 - Between approximately 11 480 tonnes and 21 515 tonnes for Stage 2.
 - A total volume for Stages 1 and 2 of between 35 225 tonnes and 63 865 tonnes.
- Adopting the current industry targets of 75 percent recovery, the volume of waste requiring disposal to landfill during construction will be:
 - Less than 10 600 tonnes for Stage 1
 - Less than 5400 tonnes for Stage 2
 - Less than 16 000 tonnes for both stages combined.
- Adopting best practice waste management systems of 95 percent recovery during the planning, design and procurement of Aquis Resort presents the opportunity to reduce waste requiring disposal to landfill during construction to:
 - Less than 2150 tonnes for Stage 1
 - Less than 1050 tonnes for Stage 2
 - Less than 3200 tonnes for both stages combined.
- The range (based on upper estimates of waste generation) of a total of 3200 to 16 000 tonnes of construction waste for both Stages 1 and 2 requiring disposal to landfill is considered to be well within the capacity of existing commercial contractors and infrastructure.





18.2.3 Operation Phase

a) Nature and Quantities of Waste

Expected waste streams produced during the operation phase are:

- organic wastes (food waste, garden waste, grease trap waste)
- re-usable wastes (clothing, unwanted furniture, out-dated appliances (e-waste), and bulky items such as broken appliances, pieces of furniture not in repairable condition)
- recyclable wastes (newspaper, office paper, cardboard, paperboard milk cartons, glass bottles and jars, recyclable metal cans (steel and aluminium), recyclable plastics)
- regulated wastes (household chemicals, unwanted medicines, syringes, car batteries, oils and other domestic waste materials prohibited from landfill, plus waste materials from maintenance activities, including cleaning chemicals, leftover paints and unused pesticides)
- general wastes (non-recyclable packaging, personal sanitary items, non-recyclable plastics, non-useable clothing, small broken items such as crockery, non-compostable food waste, diseased plant material non suitable for green recycling and non-recoverable items from maintenance or repair of buildings).

The volumes of waste generated per visitor, employee, or square metre for each development has been estimated (refer **Appendix T**). Total annual volumes are summarised in **Table** 18-6.

WASTE GROUP	WASTE TYPE	ANNUAL QUANTITIES (t)
	Food	5840
Organic wastes	Garden	520
	Grease	165
De ueeble weetee	E-waste	30
Re-usable wastes	Textiles and carpets	130
	Glass bottles	645
	Glass other	55
	Aluminium cans	40
Recyclable wastes	Metals	375
	Paper and cardboard	5340
	Recyclable plastics	780
	Tyres	20
Degulated wastes	Hazardous and chemical	10
Regulated wastes	Medical waste	0.10
General waste	Plastic film	505
Totals		14 455

TABLE 18-6 ESTIMATED ANNUAL OPERATION PHASE WASTE QUANTITIES

Source: Appendix T (Table 7).

These figures are for the ultimate (i.e. Stage 1 plus Stage 2 development). **Appendix T** includes a breakdown by stage.





b) Resource Recovery

Recycled waste and landfill waste will be removed from the Aquis Resort through arrangements entered into with a commercial waste operator that will have facilities and land fill capacity to receive and process the waste stream from the resort.

Best practice source separation of waste will be undertaken, and recovery/re-use targets adopted for each of the nominated waste types, for each stage, are summarised in **Table 18-7**.

WASTE TYPE	ESTIMATED QUANTITIES (TONNES)	RECOVERY/REUSE TARGET	ESTIMATED OPERATIONS LANDFILL DISPOSAL QUANTITIES (TONNES)
Stage 1			
Organic Waste	3460	90%	345
Re-usable Waste	85	80%	15
Recyclable Waste	3875	90%	390
Regulated Waste	5.05	20%	4
General Waste	270	7.5%	250
Totals	7695	90%	770
Stage 2			
Organic Waste	2905	90%	310
Re-usable Waste	75	80%	15
Recyclable Waste	4305	90%	340
Regulated Waste	5.05	20%	4
General Waste	325	7.5%	220
Totals	7615	90%	670
Stages 1 & 2			
Organic Waste	6345	90%	655
Re-usable Waste	160	80%	30
Recyclable Waste	8160	90%	725
Regulated Waste	10	20%	8
General Waste	590	7.5%	465
Totals	15 265	90%	1885

TABLE 18-7 AQUIS RESORT OPERATIONAL WASTE RECOVERY SUMMARY

Source: Appendix T (Table 9).

Adoption of best practice waste management systems for the operation of Aquis Resort should result in the following quantities of operation phase waste that require disposal to landfill within the Cairns Region:

- Stage 1 770 tonnes/annum
- Stage 2 670 tonnes/annum
- Stages 1 and 2 combined 1885 tonnes/annum.

Existing commercial landfills located within the Cairns Region currently have the capacity to accept the estimated residual operation waste quantities presented in **Table 18-6**.





c) Summary

- Waste generation quantities during the operations phase are estimated to be in the order of 7695 tonnes per year during the operation of Stage 1 alone and 14 455 tonnes per year during the operation of both Stages 1 and 2.
- Adoption of best practice waste management systems during the planning, design and operation of Aquis Resort presents the opportunity to reduce ongoing waste disposal to landfill to approximately 770 tonnes per year during the operation of Stage 1 alone and 1885 tonnes per year during the operation of both Stages 1 and 2. This is well within the capacity of existing commercial contractors and infrastructure.

18.3 MITIGATION AND MANAGEMENT

18.3.1 Waste Management Strategy

In addition to the design-related waste minimisation actions described above, the Aquis Resort Waste Management Strategy **Appendix T** contains other recommendations for mitigation and management. Relevant aspects are consolidated into the suite of management strategies (**Table 23-2**) and include:

- litter management
- pest and vermin management
- bird strike management
- odour management
- surface water management
- training and awareness
- complaints and incidents response.

Controls that can be implemented during the construction and operation phases are detailed in **Appendix T** and expanded on in the Waste Management Strategy (**Table 23-2**).

Given the estimated volume of wastes to be generated during the operation phase, particularly organic and recyclable wastes, there are opportunities to seek partnerships with CRC and commercial operators to enhance existing waste management infrastructure to provide improved resource recovery outcomes for the Cairns Region.

18.3.2 Monitoring and Auditing

A comprehensive waste management and auditing program will be developed during the detailed planning and design stage of the project, which will incorporate the following:

- monitor and report internally on waste volumes generated at the site
- site employees must report incidents and non-conformances with established standards or procedures to the assigned manager.

The following records will be maintained:

- waste volume records
- regulated / hazardous waste transport records
- Complaints and incidents response register.

EHP has worksheets available that can be utilised to track the quantities of various waste streams generated. A commercial software system to record and track waste materials and volumes, and associated carbon units will be implemented.





18.4 RESIDUAL IMPACTS

Adopting the current construction industry waste reduction targets, the volume of waste requiring disposal to landfill is expected to be as follows:

- Construction less than 16 000 tonnes. Adoption of best practice waste management systems during the planning, design and procurement of Aquis Resort presents the opportunity to further reduce construction waste requiring disposal to landfill in the Cairns Region to less than 3200 tonnes.
- Operation in the order of 14 455 tonnes per year (combined Stage 1 and Stage 2). Adoption of best practice waste management systems during the planning, design and operation of Aquis Resort presents the opportunity to reduce ongoing waste disposal to landfill in the Cairns Region to approximately 1885 tonnes per year.

In terms of current waste capacity:

- CRC has limited capacity to accept the estimated waste material quantities that will be generated by the Aquis Resort during both construction and operational phases. Discussions with CRC suggest that it would be interested in working with the proponent to identify opportunities to support the development of new cost-effective infrastructure and technologies that achieve the waste management hierarchy objectives of increased waste recovery / recycling and minimising waste disposal to landfill.
- Existing commercial facilities have relatively large existing waste management capacity and should be able to accept the estimated waste material quantities that will be generated by the Aquis Resort during both construction and operational phases.

The estimated amounts of both construction and ongoing operations waste generated within the Aquis Resort at The Great Barrier Reef is considered to be well within the capacity of existing commercial waste service providers and their waste management infrastructure that services the Cairns region.

Adoption of best practice solid waste management systems for both the construction and operation of the Aquis at The Great Barrier Reef Resort will significantly reduce the amount of waste disposed of to landfill, with estimated quantities well within the existing capacity of commercial waste providers that service Cairns and the surrounding region. The Aquis Resort at The Great Barrier Reef should not impact upon the current and future waste management responsibilities of CRC, however, there are potential opportunities to work together to support the development of new cost effective waste management infrastructure and technologies.