



Transport
Roads & Maritime
Services

APPENDIX B7

Construction Waste and Energy Management Plan

Additional Crossing of Clarence River at Grafton Project




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Glossary / Abbreviations

AQMP	Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CSWQMP	Construction Soil and Water Quality Management Plan
CT	Contaminant Threshold
CWEMP	Construction Waste and Energy Management Plan
EEO Act	Energy Efficiencies Opportunities Act
ENM	Excavated Natural Material
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environmental Protection Licence
EPI	Environmental Planning Instrument
EPRM	Excavated Public Road Material
EWMS	Environmental Work Method Statements
GHG	Greenhouse gas emissions
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
LED	Light-emitting diode (lighting)
Project, the	Additional Crossing of Clarence River at Grafton
RMS	Roads and Maritime Services
RTA	Roads and Traffic Authority (now RMS)
SCC	Specific Contaminant Concentrations
SSI	The state significant infrastructure as generally described in Schedule 1 (SSI-6103) of the Infrastructure Approval.
STP	Sewage Treatment Plant
TCLP	Toxicity Characteristics Leaching Procedure
VENM	Virgin Excavated Natural Material
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
WRAPP	Waste Reduction and Purchasing Policy

1 Introduction

1.1 Context

This Construction Waste and Energy Management Plan (CWEMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Additional Crossing of Clarence River at Grafton Project (the Project).

This CWEMP has been prepared to address the requirements of:

- the Infrastructure Approval;
- the environmental management measures listed in the *Additional Crossing of Clarence River at Grafton Environmental Impact Statement (EIS) (ARUP, 2014)* and the *Additional Crossing of Clarence River at Grafton Submissions Report (RMS, 2014)*; and
- all applicable legislation.

1.2 Background

Resource use and waste management, and greenhouse gas and climate change are discussed in Section 9.3 and Section 9.1 respectively of the *Additional Crossing of Clarence River at Grafton EIS (ARUP, 2014)*.

This CWEMP identifies and describes the waste streams that will be generated during the construction of the Project including construction and demolition waste, vegetation waste, packaging materials, liquid wastes and excavated material. Opportunities to avoid, reduce and recycle waste are also identified.

Estimates of the greenhouse gas emissions resulting from the Project are provided and measures to reduce energy consumption during construction identified.

1.3 Environmental management systems overview

The Project Environmental Management System is described in Section 4.1 the CEMP. The CWEMP is part of Fulton Hogan's environmental management framework for the Project.

Management measures identified in this CWEMP will be incorporated into site or activity specific Environmental Work Method Statements (EWMS). EWMSs will be developed and signed off by environment and management representatives prior to the commencement of the associated works. Construction personnel will undertake the works in accordance with the mitigation and management measures identified in the EWMS.

The combination of the CEMP, issue-specific plans strategies, procedures and EWMS identify the required environmental management actions for implementation by Fulton Hogan's personnel and contractors.

The review and document control processes for this Plan are described in Section 10.2 of the CEMP.

1.1 Consultation for preparation of this CWEMP

In accordance with CoA D45(d)(v), this CWEMP has been developed in consultation with the Environment Protection Authority (EPA).

A summary of consultation undertaken during the preparation of this CWEMP will be provided in Appendix A2 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how Fulton Hogan proposes to minimise the amount of waste for disposal, manage waste and reduce energy consumption during construction of the Project.

2.2 Objectives

The key objective of the CWEMP is to ensure that waste and energy are minimised. To achieve this objective, Fulton Hogan will undertake the following:

- ensure measures are identified and implemented to minimise waste, manage waste and conserve energy throughout the construction of the Project;
- ensure the preferred waste management hierarchy of avoidance, minimisation, reuse, recycling and finally disposal is followed;
- provide staff with an increased level of understanding and awareness of waste and resource use management issues;
- ensure appropriate measures are implemented to address the relevant CoAs outlined in Table 3-1 and the mitigation measures detailed in the EIS and the Submissions Report; and
- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this CWEMP.

2.3 Targets

The following targets have been established for the management of waste and energy consumption during the Project:

- avoid the unnecessary production of waste where practical to do so;
- dispose of waste materials in accordance with legislative requirements;
- minimise / reduce the quantities of resources to be used; and
- achieve the waste re-use / recycling targets nominated in Table 2-1.

Further details in relation to the targets for the management of waste and energy consumption are provided in Table 6-1.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation and regulations relevant to waste and energy management includes:

- *Protection of the Environment Operations Act 1997;*
- *Environmental Planning and Assessment Act 1979;*
- *Environmental Planning and Assessment Regulation 2000;*
- *Protection of the Environment Operations (General) Regulation 2009;*
- *Protection of the Environment Operations (Waste) Regulation 2005;*
- *Waste Avoidance and Resource Recovery Act 2001 (WARR Act);*
- *Contaminated Land Management Act 1997;*
- *National Greenhouse and Energy Reporting Act 2007;*
- *Noxious Weeds Act 1993;*
- *Environmentally Hazardous Chemicals Act 1985;*
- *Dangerous Goods (Road and Rail Transport) Act 2008;*
- *Dangerous Goods (Road and Rail Transport) Regulation 2014;*
- *Energy Efficiency Opportunities Act 2006 (EEO Act); and*
- *Clean Energy Future Legislation Package 2011 (including the Carbon Price).*

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan include:

- *RMS Specification D&C G36 – Environmental Protection (Management System) (G36)*
- *RMS Specification D&C R44 – Earthworks (R44)*
- *RMS Specification D&C R178 – Vegetation (R178)*
- *Waste Avoidance and Resource Recovery Strategy 2007 (DECC, 2007);*
- *Waste Reduction and Purchasing Policy (RTA, 2009);*
- *Waste Classification Guidelines (DECCW, 2008);*
- *Waste Classification Guidelines Part 1: Classifying Waste and Part 4: Acid Sulfate Soils;*
- *Best Practice Waste Reduction Guidelines for the Construction and Demolition Industry (tools for Practice), Natural Heritage Trust, 2000;*
- *NSW Government’s Waste Reduction and Purchasing Policy (WRAPP);*
- *NSW Government Resource Efficiency Policy 2014;*
- *NSW Office of Environment and Heritage Energy Efficiency Action Plan 2013; and*
- *NSW Office Environment and Heritage Energy Saver Program.*

In addition the following EPA resource recovery exemptions may apply:

- *The excavated natural material exemption 2014*
- *The excavated public road material exemption 2014*
- *The mulch exemption 2016*
- *The recovered aggregate exemption 2014*

- *The stormwater exemption 2014*
- *The treated drilling mud exemption 2014*

3.2 Minister's Conditions of Approval

The CoAs relevant to this Plan are listed in Table 3-1 below. A cross reference is also included to indicate where the condition is addressed in this CWEMP or other Project management documents.

Table 3-1: Conditions of Approval relevant to the CWEMP

CoA No.	Condition Requirements	Document Reference
D31	Waste generated outside the site shall not be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the <i>POEO Act</i> , if such a licence is required in relation to that waste.	Section 7
D32	The reuse and/or recycling of waste materials generated on site shall be maximised as far as practicable, to minimise the need for treatment or disposal of those materials off site.	Section 6.4 Section 7
D33	All liquid and/or non-liquid waste generated on the site shall be assessed and classified in accordance with <i>Waste Classification Guidelines</i> (DECCW, 2009), or any superseding document.	Section 6.2 Section 7
D34	All waste materials removed from the site shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.	Section 6.6 Section 7
D45(d)(iii)	...measures to minimise emissions from construction vehicles, plant and equipment;	Section 7 Annexure B – Example Waste Management Register
D45(d)(v)	...measures to monitor and manage waste generated during construction including but not necessarily limited to: general procedures for waste classification, handling, reuse, and disposal; use of secondary waste material in construction wherever feasible and reasonable; procedures or dealing with green waste including timber and mulch from clearing activities;	Section 6 Section 7 Annexure B – Example Waste Management Register
D45(d)(vi)	...measures for managing asbestos waste including its removal, handling, storage, transport and disposal;	Section 7 Annexure B– Example Waste Management Register CSWQMP

5 Environmental aspects and impacts

5.1 Construction waste streams

Waste generated during construction would primarily be from civil works associated with site preparation, relocation of utilities, demolition, flood levee works, bridge construction, construction of road upgrades, landscaping and ancillary works.

Construction of the Project will generate a number of waste streams, including:

- **Spoil and excavation waste** - predominantly soil with some clay. Small amounts of sandstone spoil may be generated from bridge piling work. The Project will have a net fill requirement, with the cut to fill amounts from roadworks (about 25,000 m³) to be beneficially reused on the Project where suitable in either earthworks for roadworks (100,000 m³ metres fill requirement) or levee raising works (84,000 m³ imported fill requirement).
- **Green waste** - from clearing small amounts of vegetation, mainly consisting of isolated trees and low-growing shrubs and grasses in areas along the Project alignment. Waste includes logs, green waste and weeds. Logs and green waste would be mulched (where not contaminated by weeds) and beneficially reused onsite for landscaping as a first preference, or offsite in the local area.
- **Demolition waste** – from the demolition and removal of structures, road pavement, old railway infrastructure and utilities resulting in bricks, concrete, timber, steel, glass and other types of building demolition waste. Redundant utilities associated with these properties will also require removal or demolition. Waste materials expected to be generated include asphalt, concrete, gravel, scrap metal, timber and plastics. There is the potential to uncover asbestos in structures for demolition.
- **Demolition waste from heritage listed items** - including various dwellings that have local heritage value. Some demolished waste from these items may be reused or salvaged.

Additional construction waste streams may include:

- excess building materials (concrete, asphalt, steel, timber, plastics, packaging materials);
- waste generated from concrete batching plants (excess concrete);
- waste produced from the maintenance of various construction equipment including liquid hazardous waste, fuel and oils;
- contaminated materials from the disturbance of existing contaminated soils. Material that is potentially contaminated is unlikely to be re-used and would be disposed off-site in accordance with the *NSW Waste Classification Guidelines* (DECCW, 2008) and the *Protection of the Environment Operations Act 1979*
- general waste, including packaging materials such as pallets, crates, cartons, plastics and wrapping materials;
- acid sulfate soil and treated acid sulfate soil;
- wastewater, such as from stockpiled materials, runoff from concrete bridge decks, water captured in excavations, and de-watering;
- sewage from ancillary sites.

5.2 Energy Use

Sources of construction-related energy consumption (fuel and power) for the Project include:

- procurement and delivery of materials to site;
- vegetation removal;
- site establishment, including compound set up;
- operation of concrete batching plant;
- relocation and protection of services;
- earthworks including earth and rock cuttings;
- removal, relocation and compaction of excavated material in fill embankments;
- construction of pavements and new bridge;
- demolition of structures and pavements;
- operation of site compounds and lighting;
- construction plant including cranes, rollers, excavators, bulldozers, graders and water trucks; and
- removal of waste from the site.

5.3 Greenhouse Gases

The scope of the greenhouse gas assessment in terms of greenhouse gas sources is provided in Table 5-1. The assessment is based on information provided in the *Australian National Greenhouse Accounts Factors* (Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education, 2013). The emissions from vegetation clearance were calculated using the *VicRoads Carbon Gauge Greenhouse Gas Calculator for Road Projects*.

Table 5-1: Greenhouse gas sources by scope for the project

Scope of emissions	Description	Greenhouse gas sources
1	Direct greenhouse gas emissions associated with emissions generated onsite.	Vegetation clearing: Vegetation absorbs carbon dioxide from the atmosphere (by photosynthesis), therefore where vegetation is removed the ability to act as a carbon sink is lost.
		Construction equipment: Most construction equipment is operated by the burning of fossil fuels, typically diesel, which creates greenhouse gas emissions.
		Generator use: Some small equipment and lighting for out of hours works require the use of an onsite generator, typically powered by diesel, which creates greenhouse gas emissions.
2	Indirect greenhouse gas emissions associated with electricity used on-site for lighting of the work site compounds, where actual emissions are generated elsewhere (generally at the source of the electricity generation).	Electricity: Electricity is generally consumed by site offices for lighting and security.

Scope of emissions	Description	Greenhouse gas sources
3	Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities and waste disposal.	<p>Construction materials: Different construction materials contain varying levels of embodied emissions for example; high-strength concrete contains a greater proportion of cement (which has a high level of embodied emissions), compared to concrete for lower-strength applications which contain fly-ash (which has a lower level of embodied emissions).</p> <p>Construction waste: Clearing of vegetation, disposal of contaminated soil and wood material from the demolition of acquired dwellings creates greenhouse gases, as the breakdown of organic matter as waste material directly releases stored carbon dioxide to the atmosphere.</p> <p>Construction transport: All construction-related transportation creates greenhouse gas emissions from the consumption and burning of fossil fuels.</p>

Scope 1, 2 and 3 emissions are defined as:

- **Scope 1** – Direct emissions: GHG emissions generated by sources owned or controlled by the Project, e.g. emissions generated by the use of diesel fuel by project-owned construction plant, equipment or vehicles.
- **Scope 2** – Indirect emissions: GHG emissions from the generation of purchased electricity in Project-owned or controlled equipment or operations. These GHG emissions are generated outside of the project's boundaries, e.g. the use of purchased electricity from the grid.
- **Scope 3** – Indirect upstream emissions: GHG emissions generated in the wider economy due to third party supply chains as a consequence of activity within the boundary of the Project, e.g. GHG emissions associated with the offsite mining, production and transport of materials used in the construction or maintenance of the road.

5.4 Impacts

5.4.1 Waste and Energy

The potential environmental impacts associated with construction waste and energy use include:

- excessive volumes of waste generated on-site;
- excessive volumes of waste sent to landfill from the inadequate collection, classification and disposal of waste;
- contamination of soil, surface water and groundwater from inadequate waste handling;
- odour impacts and increases in vermin from inappropriate general waste storage and disposal.
- generation or spread of contaminated waste / soils, e.g. groundwater, used or expired chemicals, or construction materials;
- water pollution due to sediment runoff from soil excavation and excess spoil storage;
- weed infestation from dispersion of seeds and so forth during clearing and access upgrading activities;
- consumption of non-renewable resources such as electricity, diesel and other chemicals;

- greenhouse gas emissions due to consumption of energy from non-renewable resources; and
- mixing of suitable and unsuitable material/contaminated material leading to materials that would have ordinarily been reused being rendered as waste.

Waste classification will be required during construction to determine appropriate soil management and disposal.

5.4.2 GHG emissions

Greenhouse gas emissions were calculated for a range of sources that make up the overall construction of the project. The estimated scope 1, scope 2 and scope 3 emissions from construction are presented in Table 5-2.

Table 5-2: Estimated greenhouse gas emissions by scope (construction stage)

Scope	Source	GHG emissions	
		(tCO _{2-e}) ¹	%
1	Vegetation clearing	7,016	13.0
	Construction plant and equipment	20,660	37.0
	Generator use	41	0.1
2	Electricity use on-site	79	0.1
3	Embodied emissions of construction materials	21,312	38.0
	Construction waste	4,294	7.8
	Construction transport	621	1.0
	Upstream fuel extraction, transmission and distribution	1,617	3.0
Total		55,641	100%

As shown in Table 5-2, embodied emissions and construction equipment contribute to the majority (75%) of the total greenhouse gas emissions for the construction stage of the project. This corresponds to around eight million litres of fuel that is expected to be used during construction. Other less significant sources of greenhouse gas emissions include vegetation clearance, construction waste and upstream fuel and electricity supply.

Due to the large quantities of construction materials such as concrete, heavy bound base materials and asphalt required, it is likely that the emissions embodied in these materials would be the greatest contributor to GHG emissions.

6 Waste and energy management

6.1 Management of surplus material approach

Surplus material excavated from the Project may consist of virgin excavated natural material (VENM) (being natural rock, soil, sand and clay), excavated natural material (at least 98% natural soil or rock material) or excavated public road materials (typically asphalt or concrete pavement materials).

The preferred approach to managing surplus material is to re-use or recycle the material on-site (with the exception of contaminated material) and within the Project boundary. The long-term management of surplus material may include landscaping or permanent stockpiles within each Project section, through backfilling of borrow sites, batter flattening, landscape mounds or stockpiles.

It is unlikely that any suitable surplus material will need to be removed from the Project site because the volume of fill needed to construct the Project is much greater than the volume of material that would be excavated.

Unsuitable material is surplus material that cannot be used beneficially elsewhere onsite. Areas of the Project where unsuitable material may be generated include the floodplain areas. Offsite disposal of unsuitable material will be required.

Disposal of surplus material offsite to other public land is permitted or to private land with the permission of the landholder. Before any surplus material is disposed offsite, it will be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying Waste* (DECCW, 2009) and the *Protection of the Environment Operations Act 1997* (refer Section 6.3 below).

6.2 Classification of waste streams

Where waste cannot be avoided, reused or recycled it will be classified and appropriately disposed of. The classification of waste is undertaken in accordance with the EPA *Waste Classification Guidelines Part 1: Classifying Waste* (2008). This document identifies six classes of waste: Special, Liquid, Hazardous, Restricted Solid, General Solid (putrescible) and General Solid (non-putrescible), and describes a six step process to classifying waste. This process is described below:

Step 1: Is it 'special waste'?

Establish if the waste should be classified as 'special waste'. 'Special wastes' are: clinical and related, asbestos, waste tyres. Further definitions are provided in the guidelines.

Note: Asbestos and clinical wastes must be managed in accordance with the requirements of Clauses 42 and 43 of the Protection of the Environment Operations (Waste) Regulation 2005 in addition to the relevant SafeWork NSW requirements under work, health and safety legislation.

Step 2: If not special, is it 'liquid waste'?

If it is established that the waste is not special waste it must be decided whether it is 'liquid waste'. 'Liquid waste' means any waste that: has an angle of repose of less than 5° above horizontal becomes free-flowing at or below 60° Celsius or when it is transported is generally not capable of being picked up by a spade or shovel.

Liquid wastes are sub-classified into:

- sewer and stormwater effluent;
- trackable liquid waste according to *Protection of the Environment Operations (Waste) Regulation 2005 Schedule 1 Waste* to which waste tracking requirements apply; and
- non-trackable liquid waste.

Step 3: If not liquid, has the waste already been pre-classified by the NSW EPA?

The EPA has pre-classified several commonly generated wastes in the categories of hazardous, general solid waste (putrescibles) and general solid waste (non-putrescibles). If a waste is listed as 'pre-classified', no further assessment is required.

Step 4: If not pre-classified, is the waste hazardous?

If the waste is not 'special waste' (other than asbestos waste), 'liquid waste' or 'pre-classified', establish if it has certain hazardous characteristics and can therefore be classified as 'hazardous waste'.

'Hazardous waste' includes items such as explosives, flammable solids, substances liable to spontaneous combustion, oxidizing agents, toxic substances and corrosive substances.

Step 5: If the waste does not have hazardous characteristics, undertake chemical assessment to determine classification.

If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-putrescible). If the waste is not chemically assessed, it must be treated as hazardous.

Waste is assessed by comparing Specific Contaminant Concentrations (SCC) of each chemical contaminant, and where required the leachable concentration using the Toxicity Characteristics Leaching Procedure (TCLP), against Contaminant Thresholds (CT).

Step 6: Is the general solid waste putrescible or non-putrescible?

If the waste is chemically assessed as general solid waste, a further assessment is available to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation. If this assessment is not undertaken, the waste must be managed as general solid waste (putrescible).

The construction aspects, the types of wastes that may be generated during construction of the Project and the resource use management strategies are outlined in Table 6-1.

Table 6-1: Potential waste streams and resource use management strategy

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
Geotechnical investigations and surveys	Drilling mud (that has been dewatered)	Subject to chemical assessment (if material is to be taken offsite)	304 m ³	Reuse onsite – Reincorporate drilling mud into the works. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014). Reuse offsite – Apply treated drilling mud to land at unlicensed premises where there is full compliance with 'The treated drilling mud exemption 2014'.	100%	In order for an exemption to apply, all the conditions of the exemption must be met. These conditions include, but are not limited to, sampling and testing requirements, chemical thresholds, use restrictions and record keeping requirements. The 'Approved Notice under Section 143' form must be completed where material is taken offsite to unlicensed premises in accordance with Section 143(3A) of the POEO Act.
	Drilling fluid (vegetable based)	Liquid waste (pre-classified by the EPA)	60,000 L (600L /drill hole x 100 holes)	Recycling onsite – recycle back into drill hole.	100%	In the event that disposal offsite is required, this will occur at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)
General demolition, including of houses	Concrete, bricks, ceramics	General solid waste (non-putrescible) (pre-classified by the EPA)	1,100 m ³	Reuse onsite - If suitable, crush and use as backfill/ road base. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014) Reuse offsite – Apply concrete to land at unlicensed premises where there is full compliance with 'The recovered aggregate exemption 2014'.	100%	In order for an exemption to apply, all the conditions of the exemption must be met. These conditions include, but are not limited to, sampling and testing requirements, chemical thresholds, use restrictions and record keeping requirements. The 'Approved Notice under Section 143' form must be completed where material is taken offsite to unlicensed premises in accordance with Section 143(3A) of the POEO Act.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
General demolition, including of houses (continued)	Asphalt (that contains no coal tar)	General solid waste (non-putrescible) (pre-classified by the EPA)	387 m ³	Reuse onsite - If suitable, use as backfill/ road base or for access roads. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014). Reuse offsite – Apply asphalt to land for road making activities, building, landscaping and construction works at an unlicensed premises where there is full compliance with 'The recovered aggregate exemption 2014'.	100%	As above.
	Scrap metal	General solid waste (non-putrescible) (pre-classified by the EPA)	32 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	100%	Nil.
	Glass	General solid waste (non-putrescible) (pre-classified by the EPA)	8 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	100%	Nil.
	Timber	General solid waste (non-putrescible) (pre-classified as 'building and demolition	110 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	100%	Nil.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
		waste' by the EPA)				
	Plasterboard	General solid waste (non-putrescible) (pre-classified by the EPA)	110 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	100%	Nil.
	Asbestos	Special waste (Asbestos) (pre-classified by the EPA)	69 tonnes	Disposal offsite – disposal at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	0%	Asbestos waste will be handled in accordance with the Fulton Hogan Work Health Safety Management Plan. If asbestos waste is encountered, SafeWork NSW licensed asbestos removalists will be engaged to handle, manage and remove the waste. Note - Only bonded asbestos may be received at some premises. There may also be limits on the quantity of asbestos that can be stored on some premises at any time. For example, Grafton Regional Landfill has strict requirements for the acceptance of asbestos waste (refer to Annexure C).
Clearing and grubbing	Native vegetation (branches, loppings, tree trunks, tree stumps)	General solid waste (non-putrescible) (pre-classified by the EPA as 'garden waste')	21 ha	Reuse onsite – Reuse felled habitat trees and woody debris in accordance with <i>Guide 5: Re-use of woody debris and bushrock</i> of the <i>RMS Biodiversity Guidelines</i> . Refer to the CFFMP for further details. Alternatively, mulch and stockpile for use onsite during landscape planting and in conjunction with soil erosion and sediment control measures.	100%	Nil.
	Topsoil	Subject to chemical assessment (if material is to be	5,385 m ³	Reuse onsite - stockpile onsite for treatment (as required) and later reuse in landscaping, once topsoil is weed-free in accordance with the Clearing and Grubbing	100%	If reuse is not feasible disposal offsite will occur at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
		taken offsite)		EWMS contained in Annexure A of the CFFMP.		
	Weeds	General solid waste (non-putrescible)	Unknown at this stage	Isolate weeds and either: encapsulate by deep burying onsite (refer R178); leave weeds to decompose; or dispose of weeds offsite at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence as directed by the Environment Manager/ EO.	0%	Nil.
Bulk earthworks	Excess uncontaminated spoil (Unsuitable material from floodplain areas for example)	Subject to chemical assessment (if material is to be taken offsite)	2,381 m ³	Reuse onsite – Reuse material unsuitable for construction in alternative foundation treatments or place it on the outside of embankments, or in levee raising works (not compromising the structural stability of the batters). Reuse offsite – Apply material to land as engineering fill or for use in earthworks at an unlicensed premises where there is full compliance with 'The excavated natural material exemption 2014'.	100%	In order for an exemption to apply, all the conditions of the exemption must be met. These conditions include, but are not limited to, sampling and testing requirements, chemical thresholds, use restrictions and record keeping requirements. The 'Approved Notice under Section 143' form must be completed where material is taken offsite to unlicensed premises in accordance with Section 143(3A) of the POEO Act. If reuse is not feasible disposal offsite will occur at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence.
	Contaminated soils	Subject to chemical assessment	210 m ³	Reuse onsite – Reuse onsite following remediation as required. Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the DECCW Waste Classification Guidelines (EPA, 2014).	100%	For soil remediation using landfarming, refer to the NSW EPA Guidelines: 'Best Practice Note: Landfarming' (April 2014).
	Acid sulfate soils	Subject to chemical assessment	1,200 m ³	Reuse onsite – Manage and reuse on site where possible in accordance with the Waste Classification Guidelines: Part 4: Acid sulfate soils (EPA, 2014).	100%	Nil.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
				Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).		
	Virgin excavated natural material (VENM)	General solid waste (non-putrescible) (pre-classified as by the EPA)	50,415 m ³	Reuse onsite – Balance cut and fill earthworks, where possible, to optimise reuse on the Project. Reuse offsite – Apply material to land at an unlicensed premises.	100%	The 'Approved Notice under Section 143' form must be completed where material is taken offsite to unlicensed premises in accordance with Section 143(3A) of the POEO Act.
Road and bridge construction	Steel reinforcing	General solid waste (non-putrescible)	134 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	100%	Nil.
	Conduits and pipes	General solid waste (non-putrescible)	7.5 tonnes	Reuse onsite - If suitable, crush and use as backfill/ road base. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014). Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	80%	Nil.
	Timber formwork	General solid waste (non-putrescible)	136 m ³	Reuse onsite - If suitable. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in	80%	Nil.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
		(pre-classified as 'building and demolition waste' by the EPA)		accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).		
	Packaging materials, including wood, plastic, cardboard and metals	General solid waste (non-putrescible)	94 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	100%	Nil.
	Concrete	Subject to chemical assessment (if material is to be taken offsite)	1, 909 m ³	Reuse onsite – Crush and reuse onsite as backfill or road base where compliant with RMS specifications. Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014). Reuse offsite – Apply concrete to land for road making activities, building, landscaping and construction works at an unlicensed premises where there is full compliance with 'The recovered aggregate exemption 2014'.	100%	In order for an exemption to apply, all the conditions of the exemption must be met. These conditions include, but are not limited to, sampling and testing requirements, chemical thresholds, use restrictions and record keeping requirements. The ' <i>Approved Notice under Section 143</i> ' form must be completed where material is taken offsite to unlicensed premises in accordance with Section 143(3A) of the POEO Act. If reuse is not feasible disposal offsite will occur at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence.
Erosion and sediment control maintenance	Geotextile	General solid waste (non-putrescible)	1 tonne Avoid use of geotextile where practicable	Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014)	0%	Nil.
	Sediment	General solid	3,100 m ³	Reuse onsite - Mix with existing spoil and	100%	Nil.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
	removed from sediment basins once they reach capacity.	waste (non-putrescible)		reuse onsite.		
	Sediment fence and sandbags	General solid waste (non-putrescible)	83 tonnes	Reuse onsite where possible based on condition, or dispose offsite at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	10%	Nil.
Site compounds/ equipment maintenance	Tyres	Special waste (pre-classified by the EPA)	26 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	100%	Nil.
	Drained oil filters, rags and oil-absorbent materials (i.e. spill kit materials) that only contain non-volatile petroleum hydrocarbons and do not contain free liquids.	General solid waste (non-putrescible) (pre-classified by the EPA)	8 tonnes	Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	0%	Nil.
	Containers, previously containing dangerous goods, from which residues	General solid waste (non-putrescible) (pre-classified	1.6 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA,	100%	Nil.

Aspect	Waste Type	Waste Classification	Approx. Volume/ Quantity ¹	Proposed reuse/ recycling/ disposal strategy	Reuse / Recycle Target	Comments
	have been removed by washing or vacuuming	by the EPA)		2014).		
	Waste oil	Liquid waste (pre-classified by the EPA)	3,200 L	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	100%	Nil.
Site compound and office operation	Food waste	General solid waste (putrescible) (pre-classified by the EPA)	1,404 tonnes	Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	0%	Nil.
	Sewage from amenities	General solid waste (putrescible) (pre-classified by the EPA)	5,187,000 L	Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	0%	Nil.
	Paper, cardboard and plastic, glass, aluminium cans	General solid waste (non-putrescible)	228 tonnes	Resource recovery offsite - Reuse, recycling, reprocessing or energy recovery at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	100%	Nil.
	Unwanted liquid chemicals	Liquid waste	200 L	Disposal offsite - at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).	0%	Nil.

6.3 Waste exemptions

Clause 51 of the *Protection of the Environment Operations (Waste) Regulation 2005* enables the EPA to grant exemptions to the licensing and payment of levies for the land application or use of waste. The EPA has issued general exemptions for a range of commonly recovered, high volume and well characterised waste materials that allow their use as fill or fertiliser at unlicensed, off-site facilities. The general 'Resource Recovery Exemptions' that may be applicable to this Project are identified in Table 6-2 below. These are general gazette exemptions that do not require approval. A specific exemption may be granted where an application is made to the EPA.

Table 6-2: Resource recovery exemptions

Exemption	General Conditions
The excavated natural material exemption 2014	<p>At the time the excavated natural material is received at the premises, the material must meet all chemical and other material requirements for excavated natural material which are required on or before the supply of excavated natural material under 'the excavated natural material order 2014'.</p> <p>The excavated natural material can only be applied to land as engineering fill or for use in earthworks.</p> <p>The consumer must keep a written record of the following for a period of six years:</p> <ul style="list-style-type: none"> • the quantity of any excavated natural material received; and • the name and address of the supplier of the excavated natural material received. <p>The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.</p> <p>The consumer must ensure that any application of excavated natural material to land must occur within a reasonable period of time after its receipt.</p>
The excavated public road material exemption 2014	<p>The excavated public road material can only be applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities.</p> <p>The excavated public road material can only be stored within the road corridor at the site where it is to be applied to land.</p> <p>The excavated public road material cannot be applied to private land.</p> <p>The consumer must ensure that any application of excavated public road material to land must occur within a reasonable period of time after its receipt.</p>
The mulch exemption 2016	<p>At the time mulch is received at the premises, the material must meet all requirements for mulch which are required on or before the supply of mulch under 'the mulch order 2016'.</p> <p>Where written measures for the land application of mulch are required under 'the mulch order 2016', a processor must provide these to the consumer. The consumer must apply the mulch to land in accordance with the written measures.</p> <p>The consumer must ensure that they do not cause or permit the migration of leachate from the land application site.</p> <p>The consumer must not undertake further processing of the mulch at the land application site.</p> <p>The consumer must ensure that any application of mulch to land occurs within a reasonable period of time after its receipt.</p> <p>NOTE:</p> <p>Mulch that meets the conditions of this exemption should be applied to land by the consumer within 2 weeks of being received. Where there are extenuating circumstances the mulch should be land applied within 4 weeks. The EPA considers that 6 weeks would be the absolute limit in all circumstances.</p>

Exemption	General Conditions
<p>The recovered aggregate exemption 2014</p>	<p>At the time the recovered aggregate is received at the premises, the material must meet all chemical and other material requirements for recovered aggregate which are required on or before the supply of recovered aggregate under 'the recovered aggregate order 2014'.</p> <p>The recovered aggregate can only be applied to land in road making activities, building, landscaping and construction works. This approval does not apply to any of the following applications:</p> <ul style="list-style-type: none"> • Construction of dams or related water storage infrastructure, • Mine site rehabilitation, • Quarry rehabilitation, • Sand dredge pond rehabilitation, • Back filling of quarry voids, • Raising or reshaping of land used for agriculture, and • Construction of roads on private land unless: <ul style="list-style-type: none"> (a) the recovered aggregate is applied only to the minimum extent necessary for the construction of the road, and (b) a development consent has been granted under the relevant Environmental Planning Instrument (EPI), or (c) it is to provide access (temporary or permanent) to a development approved by a Council, or (d) the works are either exempt or complying development. <p>The consumer must keep a written record of the following for a period of six years:</p> <ul style="list-style-type: none"> • the quantity of any recovered aggregate received; and • the name and address of the supplier of the recovered aggregate received. <p>The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.</p> <p>The consumer must ensure that any application of recovered aggregate to land must occur within a reasonable period of time after its receipt.</p>
<p>The stormwater exemption 2014</p>	<p>The stormwater can only be applied to land within the definitions of "application to land".</p> <p>The consumer must ensure that any application of stormwater to land must occur within a reasonable period of time after its receipt.</p>
<p>The treated drilling mud exemption 2014</p>	<p>At the time the treated drilling mud is received at the premises, the material must meet all chemical and other material requirements for treated drilling mud which are required on or before the supply of treated drilling mud under 'the treated drilling mud order 2014'.</p> <p>The treated drilling mud can only be applied to land as engineering fill or for use in earthworks.</p> <p>The consumer must keep a written record of the following for a period of six years:</p> <ul style="list-style-type: none"> • the quantity of any treated drilling mud received; and • the name and address of the supplier of the treated drilling mud received. <p>The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.</p> <p>The consumer must ensure that any application of treated drilling mud to land must occur within a reasonable period of time after its receipt.</p>

6.4 Reuse and recycling

Waste separation and segregation will be promoted on-site to facilitate reuse and recycling as a priority of the waste management program as follows:

- waste segregation onsite – waste materials, including spoil and demolition waste, will be separated onsite into dedicated bins / areas for either reuse onsite or collection by a waste contractor and transported to offsite facilities; and
- waste separation offsite – wastes to be deposited into one bin where space is not available for placement of multiple bins, and the waste is to be sorted offsite by a waste contractor.

6.5 Waste handling and storage

Where waste is required to be handled and stored onsite prior to onsite reuse or offsite recycling / disposal, the following measures apply:

- spoil, topsoil and mulch are to be stockpiled onsite in allocated areas, where appropriate, and mitigation measures for dust control and surface water management will be implemented as per the CAQMP and the CSWQMP;
- liquid wastes are to be stored in appropriate containers in bunded areas until transported offsite. Bunded areas will have the capacity to hold 110% of the liquid waste volume for bulk storage or 120% of the volume of the largest container for smaller packaged storage;
- hazardous waste will be managed by appropriately qualified and licensed contractors, in accordance with the requirements of the *Environmentally Hazardous Chemicals Act 1985* and the EPA waste disposal guidelines; and
- all other recyclable or non-recyclable wastes are to be stored in appropriate covered receptacles (e.g. bins or skips) in appropriate locations onsite and contractors commissioned to regularly remove / empty the bins to approved disposal or recycling facilities.

6.6 Waste disposal

Waste (and spoil) disposal is to be in accordance with the *Protection of the Environment Operations Act 1997* and the *Waste Avoidance and Resource Recovery Act 2001*. Wastes that are unable to be reused or recycled will be disposed of offsite to an EPA approved waste management facility following classification (refer to section 5.1). The waste contact list and locations of waste management / disposal facilities are included in Annexure A and Annexure B respectively. Details of waste types, volumes and destinations are to be recorded in the Waste Management Register in Annexure C.

6.7 Energy conservation

Fulton Hogan is dedicated to implementing energy conservation best practice and the reduction of greenhouse gases by adopting energy efficient work practices including:

- developing and implementing procedures to minimise energy use; and
- conducting awareness programs for all site personnel regarding energy conservation methods.

6.8 Greenhouse gas emissions

Opportunities to reduce greenhouse gas emissions during construction exist through investigating alternative, lower embodied carbon options for construction including:

- specifying lower embodied energy concrete, for example concrete that contains less Portland cement (which would be replaced with fly-ash) for lower strength concrete applications;
- specifying recycled steel which has about half the embodied emissions of virgin steel;
- using biofuels (biodiesel, ethanol, or blends such as E10 or B80) which can considerably reduce the greenhouse gas emissions for construction equipment
- limiting vegetation clearance where feasible and revegetating with native species.

7 Environmental management measures

A range of environmental requirements are identified in the EIS, Submissions Report, Conditions of Approval, RMS documents, and from recent experience on similar road projects. General and specific measures and requirements to address waste management and energy use issues are outlined in Table 7-1.

Table 7-1: Environmental management measures for minimisation of waste, energy usage and GHG

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
GREENHOUSE GASES					
Embodied emissions					
GG2	Fly-ash content within concrete will be utilised where feasible. Construction contractors will be required to propose recycled content construction materials where they are cost, quality and performance competitive.	EIS S10	Pre-construction, Construction	Contractor	G36 CWEMM22
GG3	Reuse of excavated road materials will be maximised as far as possible where they are cost, quality and performance competitive to reduce use of materials (with embedded energy).	EIS S10	Construction	Contractor	Table 6-1 Table 7-2
GG4	Steel with high recycled content will be utilised where feasible, for example where it is cost, quality and performance competitive. Contractors will be required to propose recycled content construction materials where they are cost, quality and performance competitive.	EIS S10	Pre-construction, Construction	Contractor	G36 Table 6-1 Table 7-2
Vehicle emissions					
GG5	The feasibility of using biofuels (biodiesel, ethanol, or blends such as E10 or B80) will be investigated by the construction contractor, taking into consideration the capacity of plant and equipment to use these fuels, ongoing maintenance issues and local sources. Works will be planned to minimise fuel use.	EIS S10	Construction	Contractor	G36 Table 7-2 CWEMM27, CWEMM28
Construction energy management plan					
GG6	A construction energy management plan will be developed as part of the project's construction environmental management plan. The plan will include a commitment to monitor on-site energy consumption and identify and address on-site energy waste.	EIS S10	Pre-construction	Contractor	This CWEMP

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
Vegetation clearance					
GG7	Vegetation clearance will be minimised, where feasible, in accordance with the approved project. Areas to be revegetated will be revegetated in accordance with the project landscape plan.	EIS S10	Construction	Contractor	CFFMP
Sustainability education					
GG8	The environmental induction developed for the project will include measures to promote energy-efficient work practices by construction personnel.	EIS S10	Pre-construction, Construction	Contractor	CEMP, Section 5.1
WASTE MINIMISATION AND MANAGEMENT					
General					
WM1	Rubbish bins will be located at strategic locations.	EIS S10	Construction	Contractor	G36 CWEMM21, CWEMM25
Demolition waste from heritage listed items					
WM2	Roads and Maritime will investigate options for reusing or salvaging demolition waste from heritage items.	EIS S10	Construction	Contractor and RMS	Table 6-1
General					
WM3	<p>A construction waste management plan will be prepared as part of the construction environmental management plan to identify measures for minimising and managing waste. The construction waste management plan will include:</p> <ul style="list-style-type: none"> The type and volume of all materials to be utilised during the project construction Destinations for each resource/waste type either for on-site reuse or recycling, off-site reuse or recycling, or disposal at a licensed waste facility Quantity and classification of excavated material generated as a result of the project Disposal strategies for each type of material Details of how waste will be stored and treated on-site 	EIS S10	Pre-construction	Contractor	G36 This CWEMP Annexure A- Proposed Waste Facilities Annexure B - Example Waste Management Register

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
	<ul style="list-style-type: none"> • Identification of all non-recyclable waste • Identification of strategies to 'avoid', 'reduce', 'reuse', and 'recycle' • Management of surplus material as documented in Section 9.3.2 of the EIS • Identification of available recycling facilities on and off-site • Identification of suitable methods and routes to transport waste • Procedures and disposal arrangements for unsuitable excavated material or contaminated material • Site clean-up for each stage. 				
WM4	<p>A resource use management strategy will be prepared as part of the construction waste management plan to identify the hierarchy for sourcing and use of resources. The strategy will include:</p> <ul style="list-style-type: none"> • Project areas with a deficit in material will import surplus material from other project sections in preference to external sources • Where possible, the distances that earthworks materials are moved across the project as a whole will be minimised • Any unsuitable material will be used for landscaping or disposed of within each project section, either for batter flattening or noise mounds or placed in stockpile • Construction contractors will reduce the amount of unsuitable waste generated during excavations, where feasible (e.g. treatment at source) • Other locations of disposal of unsuitable material will be considered including borrow source areas created as part of the project • The generation and management of unsuitable material during project earthworks will be monitored to ensure appropriate management of the issue • Details on materials that will be sourced from the project (including location and type) • Proposed sustainable material sourcing (such as recycled materials or use of waste water) 	EIS S10	Pre-construction	Contractor	<p>G36 This CWEMP Annexure A- Proposed Waste Facilities Annexure B - Example Waste Management Register</p>

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
	<ul style="list-style-type: none"> Materials that could be recycled and re-used on-site or transferred to other project sections. 				
Spills and accidents					
WM5	A risk assessment will be carried out to determine the need, location and size, of spill containment mechanisms.	EIS S10	Pre-construction	Contractor	CEMP Appendix A3 – Aspects, Impacts and Risk Assessment
Asbestos on demolished structures					
WM6	Asbestos surveys will be conducted for structures to be demolished as part of the project. An asbestos certified disposal service will be engaged for properties identified as having asbestos materials.	EIS S10	Pre-construction	Contractor	G36 Table 6-1
General					
WM7	The handling, storage and transport of hazardous materials and waste will be in accordance with the <i>National Code of Practice Storage and handling of dangerous goods</i> (Workcover, 2001) and the relevant material safety data sheet for the product.	EIS S10	Construction	Contractor	G36 This CWEMP
WM8	Regular visual inspections will be conducted to ensure that work sites are kept tidy and to identify opportunities for reuse and recycling.	EIS S10	Construction	Contractor	G36 Table 8-1.
WM9	Requirements for waste management will form part of site training and induction processes.	EIS S10	Pre-construction, Construction	Contractor	CEMP, Section 5.1
WM10	All generated waste will be managed and disposed of in accordance with relevant State legislation and government policies including the <i>Waste Avoidance and Resource Recovery Act 2001</i> , the <i>Waste Avoidance and Resource Recovery Strategy 2007</i> and the <i>Waste Reduction and Purchasing Policy</i> . The <i>Waste Classification Guidelines</i> (DECCW, 2008) will also be used to classify the different types of waste.	EIS S10	Construction	Contractor	This CWEMP

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
Beneficial reuse					
WM11	<p>The project will aim for the following:</p> <ul style="list-style-type: none"> • 100% beneficial reuse of usable spoil, recognising that there is likely to be a significant volume of excavated material that is potentially contaminated or otherwise unsuitable for reuse. Sampling and testing will confirm which excavated material is suitable for reuse • 95% beneficial reuse of construction and demolition waste • Minimising the need for extracting new material by reusing material from other nearby projects (e.g. the Woolgoolga to Ballina Pacific Highway upgrade) where feasible and reasonable. 	EIS S10	Construction	Contractor	G36 Table 6-1.
WM12	<p>For any surplus material the following beneficial re-use options will be considered :</p> <ul style="list-style-type: none"> • Construction of acoustic and visual mounds where there is a benefit to residents and other sensitive receivers • Flattening of road batters • Rehabilitation of borrow pits • Engineered fill • Improvements to flood prone land. 	EIS S10	Construction	Contractor	G36 Table 6-1.
Liquid wastes					
WM13	Liquid waste, including waste oil, will be collected and stored in appropriately bunded areas.	EIS S10	Construction	Contractor	This CWEMP
Records					
WM14	A waste register will be maintained for the construction site. It will detail the types of waste collected, amounts, date and time, and details of disposal.	EIS S10	Construction	Contractor	Annexure B - Example Waste Management Register
Materials and packaging					
WM15	Where feasible and reasonable, materials will be bought in bulk to minimise the amount of packaging required.	EIS S10	Pre-construction Construction	Contractor	G36 Table 7-2

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where Addressed
WM16	Sources of material that have sustainable packaging design, such as recycled and recyclable packaging, will be favoured over other material sources where cost effective.	EIS S10	Construction	Contractor	G36 Table 7-2.
WM17	The use of recycled products in construction work will be investigated.	EIS S10	Pre-construction Construction	Contractor	G36 Table 7-2
Demolition waste					
WM18	Where practicable, houses, redundant services and other structures will be deconstructed rather than demolished to allow as much material as possible to be re-used or recycled off-site.	EIS S10	Construction	Contractor	G36 Table 6-1
Green waste					
WM19	Logs and green waste will be mulched (where not contaminated by weeds) and beneficially reused onsite for rehabilitation and landscaping as a first preference, or offsite in the local area.	EIS S10	Construction	Contractor	G36 Table 6-1.

Additional management measures to address to address waste management and energy use issues are provided in Table 7-2.

Table 7-2: Additional management measures for waste management and energy use

ID	Management Measure	Timing		Responsibility
		PC ¹	C ²	
GENERAL				
CWEMM1	Adopt and promote the waste hierarchy (reduce or avoid waste, reuse waste, recycle waste, recover energy, treat waste, dispose of waste).	✓	✓	Environmental Manager Procurement Manager
CWEMM2	Keep site free of litter and maintain good housekeeping.		✓	Foreman
CWEMM3	Do not cause, permit or allow waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence or waste exemption under the <i>Protection of the Environment Operations Act 1997</i> , if such a licence is required in relation to that waste (refer to CoA D31).		✓	Foreman
REDUCE OR AVOID				
CWEMM4	Calculate precise estimates prior to placing orders.	✓	✓	Project Engineers
CWEMM5	Implement, where possible, agreements with suppliers to return excess construction materials or	✓	✓	Contracts Manager

ID	Management Measure	Timing		Responsibility
		PC ¹	C ²	
	packaging for future reuse.			
CWEMM6	Order materials in bulk to minimise the amount of packaging required where feasible and reasonable.	✓	✓	Project Engineers
CWEMM7	Order materials that have sustainable packaging design, such as recycled and recyclable packaging, over other materials where cost effective.	✓	✓	Project Engineers
CWEMM8	Reduce the amount of unsuitable waste generated during excavations by considering the following options (insofar as the RMS specifications allow): <ul style="list-style-type: none"> • placement of a bridging layer over the top of unsuitable material • in-situ stabilisation of unsuitable material. 	✓	✓	Project Engineers
RESOURCE RECOVERY (REUSE AND RECYCLE)				
CWEMM9	Establish a list of preferred suppliers for waste management services (e.g. waste oil recyclers, metal recyclers, etc.).	✓	✓	Contracts Manager Environmental Manager
CWEMM10	Include in waste contractor subcontract agreements requirements to comply with statutory requirements, report quantities, types, dates and destination of material removed from site.	✓	✓	Contracts Manager
CWEMM11	Classify all wastes generated on the site during construction in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014) prior to transporting waste off site.		✓	Site/ Project Engineers
CWEMM12	Obtain and provide receipts/ dockets for waste removed from site to the EO.		✓	Foreman
CWEMM13	Record all waste removed from site in the <i>Waste Register</i> .		✓	Environmental Officer
CWEMM14	Deconstruct houses, redundant services and other structures where practicable, rather than demolishing, to allow as much material as possible to be reused or recycled offsite.		✓	Contracts Manager Project Engineers
CWEMM15	Provide appropriate facilities to ensure that materials for recycling are separated from materials that are to be disposed of as wastes. Label facilities for the various waste streams to ensure easy recognition.		✓	Project Manager
CWEMM16	Collect and store waste oil in suitable containers and store in a bunded area until collected for recycling. Ensure all permanent bunded storage areas are covered.		✓	Superintendent
CWEMM17	Reuse surplus excavated spoil generated onsite wherever possible, considering the following options: <ul style="list-style-type: none"> • Construction of acoustic and visual earth mounds where there is a benefit to residents and other sensitive receivers • Flattening of road batters • Rehabilitation of borrow pits • Engineered fill • Improvements to flood prone land • Levee raising works. 		✓	Environmental Officer Foreman
CWEMM18	Reuse waste material generated onsite where possible, including topsoil and mulch for landscaping.		✓	Foreman

ID	Management Measure	Timing		Responsibility
		PC ¹	C ²	
CWEMM19	Reuse felled habitat trees and woody debris in accordance with <i>Guide 5: Re-use of woody debris and bushrock</i> of the <i>RMS Biodiversity Guidelines</i> . Alternatively, mulch and stockpile for beneficial use onsite during rehabilitation and landscaping and in conjunction with soil erosion and sediment control measures.		✓	Foreman Environmental Officer
CWEMM20	Ensure that an 'Approved Notice under Section 143' form has been completed prior to transporting material offsite to unlicensed premises.		✓	Foreman Environmental Officer
CWEMM21	Provide paper recycling bins/ boxes in all site offices. Send all paper waste to a recycling facility. Encourage all staff to separate paper waste.		✓	Receptionist Environmental Officer
CWEMM22	Use recycled products in construction to reduce demand on resources, where the use of the material is cost and performance competitive and RMS' specifications allow it. This may include the use of fly ash and slag within concrete mixes, or the use of steel with high recycled content.		✓	Project / Site Engineer
CWEMM23	Set printers at the site office to default to double sided and black and white printing. Encourage all staff to minimise paper use through use of electronic media, re-use of paper etc. Refill or return printer cartridges for recycling.		✓	Receptionist
CWEMM24	Where the Project is deficit in material, import surplus from other RMS projects in preference to consuming external natural resources where practicable.		✓	Project Manager
DISPOSAL				
CWEMM25	Store construction wastes which cannot be recycled in separate skips. Ensure skips are strategically located and collected by a licensed waste contractor on a regular basis and transported to a waste facility lawfully permitted to accept the waste materials.		✓	Superintendent
CWEMM26	Ensure portable toilets are regularly emptied and the contents disposed of at an appropriately licensed waste facility in accordance with the premises' Environment Protection Licence and the <i>Waste Classification Guidelines</i> (EPA, 2014).		✓	Superintendent
ENERGY USE AND GREENHOUSE GAS EMISSIONS				
CWEMM27	Select energy efficient plant, equipment and vehicles where feasible and reasonable, to reduce greenhouse gas emissions.	✓	✓	Procurement Manager Subcontractors
CWEMM28	Use biofuels (biodiesel, ethanol, or blends such as E10 or B80) where feasible and reasonable, taking into consideration the capacity of plant and equipment to use these fuels, ongoing maintenance issues and local sources.	✓	✓	Procurement Manager Subcontractors
CWEMM29	Ensure all vehicles, including trucks entering and leaving the site, and construction equipment are maintained in accordance with the manufacturer's specification to comply with all relevant legislation.		✓	Procurement Manager Foreman
CWEMM30	Procure locally produced goods and services where feasible and cost effective to reduce transport fuel emissions.	✓	✓	Procurement Manager
CWEMM31	Consider the procurement of renewable energy technologies (e.g. solar photovoltaic, wind power) for power generation onsite during the construction phase.	✓	✓	Procurement Manager Project Manager
CWEMM32	Turn machinery and vehicles off when not in use.		✓	Subcontractors Foreman
CWEMM33	Where possible, minimise earthworks haulage distances to minimise fuel use and the generation of greenhouse gas emissions.		✓	Project Manager Superintendent

8 Compliance management

8.1 Roles and responsibilities

Fulton Hogan's Project Team organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 6 of this CWEMP.

8.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to waste and energy management issues. The induction training will address elements including:

- existence and requirements of this CWEMP;
- relevant legislation;
- incident response, management and reporting;
- waste reporting requirements;
- requirements of the waste hierarchy;
- waste / recycle storage requirements;
- energy efficient best practices;
- other specific responsibilities for waste and reuse management; and
- other specific responsibilities for energy management.

Further details regarding staff induction and training are outlined in Chapter 5 of the CEMP.

8.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction in accordance with Table 8-1. Additional requirements and responsibilities in relation to inspections and monitoring are documented in Chapters 8 and 9 of the CEMP.

Table 8-1 Monitoring and inspections

Monitoring details	Record	Responsibility	Frequency
Track waste taken offsite to a licensed premises	<i>Waste Register</i>	Environmental Manager	When waste taken offsite. <i>Waste Register</i> to be updated regularly.
	Waste receipts/ dockets	Foreman	When waste taken offsite to a waste facility.
	Transportation dockets	Foreman	When EPA 'trackable' waste taken offsite.
Track waste taken offsite to an unlicensed premises (e.g. VENM, ENM)	'Approved Notice under Section 143' form completed.	Environmental Manager/ Project Engineer	Prior to transporting waste offsite to an unlicensed premises.
	Waste Register	Environmental Manager	When waste taken offsite. <i>Waste Register</i> to be updated regularly.
Inspections for litter, materials management,	Environmental Inspection Checklist	Environmental Manager	Weekly

Monitoring details	Record	Responsibility	Frequency
unauthorised disposal of construction waste, contamination of waste streams and adequacy of capacity of waste receptacles (as part of weekly environmental inspection).			

8.4 Non-conformances

Non-conformances will be dealt with and documented in accordance with Section 11.1 of the CEMP.

8.5 Complaints

Complaints will be recorded and addressed in accordance with Section 6.3 of the CEMP and the Community Communication Strategy (CCS).

Additional requirements and responsibilities in relation to inspections, in addition to those in Table 6-1 are documented in Section 8.2 of the CEMP.

8.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation and management measures, compliance with this plan, CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.4 of the CEMP.

8.7 Reporting

Reporting requirements and responsibilities are documented in Section 8.5 of the CEMP.

9 Review and improvement

9.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- identify areas of opportunity for improvement of environmental management and performance;
- determine the cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- verify the effectiveness of the corrective and preventative actions;
- document any changes in procedures resulting from process improvement; and
- make comparisons with objectives and targets.

9.2 CWEMP update and amendment

The processes described in Chapter 8 and Chapter 9 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to this Plan will be in accordance with the process outlined in Section 1.6 of the CEMP and as required, be provided to RMS, the agencies and other relevant stakeholders for review and comment and forwarded to the Secretary of DP&E for approval.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

Annexure A
Proposed Waste Facilities

Proposed Waste Facilities

EPL holder name	Premises	Scheduled activity	EPL No.	Waste Type	Contact Details
Clarence Valley Council	Grafton Regional Landfill 704 Armidale Road, South Grafton NSW 2460	Waste disposal (application to land) Waste processing (non-thermal treatment)	7186	<ul style="list-style-type: none"> • Acid Sulfate Soils (ASS) • General solid waste (putrescible) • General solid waste (non-putrescible) • Asbestos waste (also refer to Annexure C) • Waste tyres • Waste 	(02) 6643 0888 Opening Hours: 7.00am - 4.00pm Monday to Friday 8.30am - 1.00pm Saturday 10.30am -1pm Sunday
J.R. & E.G. Richards Pty Ltd Trading as: J.R. Richards & Sons	Grafton Resource Recovery Facility 704 Armidale Road, South Grafton NSW, 2460	Resource Recovery Waste storage	20589	<ul style="list-style-type: none"> • General solid waste (non-putrescible) – paper or cardboard • General solid waste (non-putrescible) – glass, plastic or metal 	As above
Samuel Campbell Trading as: North Coast Waste Oil Collection	North Coast Waste Oil Collection Old Glen Innes Road, South Grafton NSW 2460	Waste storage	11514	<ul style="list-style-type: none"> • General or Specific exempted waste - Any waste received onsite that is below licensing thresholds in Schedule 1 of the POEO Act, as in force from time to time. • General or Specific exempted waste - Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005. • Waste mineral oils unfit for their original intended use 	(02) 6644 9405 0419 033 968

Annexure B
Example Waste Management Register

Annexure C

Grafton Regional Landfill Requirements for the acceptance of asbestos

Procedure - Application for Disposal of Asbestos

Notification of each load for disposal must be lodged with the Grafton Regional Landfill weighbridge no later than 3.00pm on the previous working week day.

Notifications can be lodged by either:

1. Phone: Clarence Waste Solutions on 02 66430 888.
2. Email: cws@clarence.nsw.gov.au

Each application must include the persons name, contact phone number, quantity of waste and expected time of arrival.

WHO NEEDS TO APPLY?

An application for disposal of asbestos, contaminated soil or other special waste must be lodged for all commercial or domestic loads. This also includes state government and Council departments.

HOURS OF ACCEPTANCE FOR DISPOSAL.

Asbestos for disposal will only be completed between the hours of **8.00am & 2.00pm Monday to Friday**. Asbestos disposal will not be permitted on weekends or public holidays.

Asbestos disposal is also subject to weather conditions.

FEES: 2016 / 2017 FINANCIAL YEAR.

Current disposal fees are \$256.00 per tonne for asbestos & \$292.00 per tonne for asbestos pipe. These fees are inclusive of GST and the NSW State Government waste levy. There is a minimum fee of \$20.00 and there is also an after-hours loading of \$35.00 per tonne if disposal needs to be done outside normal acceptance hours.

ASBESTOS HANDLING SAFETY NOTES.

1. Asbestos must be lightly damped down and double wrapped in 200 kg parcels before transporting to the Landfill. The plastic wrapping must not rupture during the disposal process.
2. When wetting down the water spray should be light enough to ensure no fibres dislodge.
3. Appropriate safety equipment should be used during the removal process.
4. Tippers & ro-ro's maximum 4 tonne per load for sheeting. No load limit on soil.

Note 1: Customers with asbestos in an unacceptable condition may be refused entry and the matter referred to Workcover.

Note 2: All asbestos remains the property of the owner until it is deposited in the hole.

WEIGHBRIDGE.

1. Check that time, date and quantity are correct.
2. Enter booking details in weighbridge calendar.
3. Loads will be checked for double bagging & wetting of asbestos.
4. Grafton Regional Landfill does **NOT** provide an unloading service.

NOTE 1: FROM 31/01/2013 ASBESTOS SHEETING MUST BE WRAPPED IN INDIVIDUAL BUNDLES WEIGHING LESS THAN 200KG.

NOTE 2: FROM 31/01/2013 A MAXIMUM LOAD SIZE OF 4 TONNES FOR ASBESTOS SHEETING IN TIPPERS OR RO-RO BINS APPLIES.

NOTE 3: A HI-AB, CRANE OR OTHER LIFTING DEVICE MUST BE USED FOR UNLOADING ASBESTOS PIPE PRODUCTS WITH A DIAMETER GREATER THAN 200MM OR OVER 1.5 METRES IN LENGTH.