



APPENDIX B7

Construction Waste and Energy Management Plan

Early Works – Wave 1 & 3 (part)

Woolgoolga to Ballina

Pacific Highway Upgrade

SEPTEMBER 2015



Document control

File name	RMS00031-121 B7_CWEMP_3.0.doc
Report name	W2B Early Works – Wave 1 & 3 (part): Construction Waste and Energy Management Plan
Revision number	3.0 (Greenhill Cutting addition)

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Revision history

Revision	Date	Description	Approval
This document supersedes 'RMS00031-2429-1014 Appendix B7 CWEMP'			
1.0	17/08/2015	First controlled issue	Rob Blyth
2.0	24/08/2015	Revised for Final Submission	Rob Blyth
3.0	13/10/2015	Greenhill Cutting addition	Rob Blyth

Distribution of controlled copies

Copy no.	Issued to	Version
1	Dean Gregory	1.0
2	Dean Gregory	2.0
3	Jeff Boylan	3.0
4		
5		

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Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CWEMP	Construction Waste and Energy Management Plan
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
FM Act	<i>Fisheries Management Act 1994</i>
Golding	Golding Contractors Pty Ltd
Minister, the	Minister for Planning
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
Project, the	Early Works – Wave 1 & 3 (part), Woolgoolga to Ballina, Pacific Highway Upgrade
RMS, Roads and Maritime Services	Roads and Maritime
SPIR	Submissions / Preferred Infrastructure Report November 2013
Secretary	Secretary of the Department of Planning and Environment (formerly known as the Director General)
SoC	Revised Statement of Commitments included in the Submissions Report
VENM	Virgin Excavated Natural Material
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
CWEMP	Construction Waste and Energy Management Plan
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 Early Works - Wave 1 and part of Wave 3 Project, which is part of the Construction of the Woolgoolga to Ballina Pacific Highway Upgrade.

This CWEMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the mitigation measures listed in the *Pacific Highway Upgrade: Woolgoolga to Ballina Environmental Impact Statement December 2012* (the EIS), the *Submissions / Preferred Infrastructure Report November 2013* (SPIR), the requirements of the Project Specifications, and applicable legislation.

This Plan has been prepared for Wave 1 and 3 (part) of the Project which broadly includes:

- Ground treatment and preparatory earthworks (soft soils treatments) between approximate STN 83400 and 91200.
- Excavation of material taken from a highway cutting at Tyndale (at approximate STN 69000 to 69500) for the soft soil treatments.
- Excavation of material taken from highway cuttings North of McIntyres Lane, Gulmarrad (at approximate STN 77500 to 78400) for the soft soil treatments.
- Excavation of material south of McIntyres Lane, Gulmarrad - Greenhills cutting (at approximate STN 76000 to 77075) for the soft soil treatments. McIntyres Lane would be widened to support truck movements from this cutting.
- Relocation of utility services at various locations throughout STN 67200 to 95100.

These works would be located within Sections 4 and 5 of the Approved Project.

1.2 Background

The EIS assessed the impacts of construction in terms of waste generation/management and resource use, within chapter 18.3. Greenhouse gas emissions and energy issues were assessed in the EIS in chapter 18.1.

The EIS identified the various waste streams that will be generated during the construction of the Project, including construction and demolition waste, vegetation waste, packaging materials and liquid wastes. It also identified opportunities to avoid, reduce and recycle waste.

The EIS identified potential impacts in regards to greenhouse gas emissions. Measures to help address greenhouse gas emissions in construction were identified.

Additional management measures were provided within the SPIR, with applicable management measures from that report included as part of this CWEMP.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The CWEMP is part of the environmental management framework for the Project, as described in *Section 4.1 of the CEMP*. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS).

EWMS will be developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by Golding personnel and contractors.

The review and document control processes for this Plan are described in *Section 1.6 and Section 10 of the CEMP*

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how Golding 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 for disposal and energy use are minimised. To achieve this objective, Golding 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 CoA outlined in Table 3-1, and the mitigation measures detailed in the EIS.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

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.
- Achieve the waste re-use / recycling targets nominated in Table 2-1.

In the event that the utility owner indicates it has no interest in redundant materials they will become the property of the contractor for disposal/reuse/recycling. As far as possible reuse/recycle targets remain, irrespective of ownership.

Table 2-1 Construction waste streams and targets

Construction Activity	Waste Type	Waste Classification	Likely quantity	Disposal methods	Reuse / Recycle Target
Demolition	Asphalt, concrete, brick, gravel, and road base	General Solid (non-putrescible)	1-50t	Crushed and reused as road base and sub base, surface layer of road shoulders and unsealed roads, use as engineering	100%

Construction Activity	Waste Type	Waste Classification	Likely quantity	Disposal methods	Reuse / Recycle Target		
				backfill, sent off-site for recycling			
	Scrap metal	General Solid (non-putrescible)	1-10t	Off-site recycling	100%		
	Building demolition waste	General Solid (non-putrescible)	10-100t	Off-site recycling or disposal at an approved facility	5%		
	Hazardous and contaminated waste	Hazardous waste	unknown	Offsite disposal at an approved facility	0%		
Earthworks	Virgin Excavated Natural Material (VENM)	Classification based on preconstruction soil tests and in accordance with EPA Waste Classification Guidelines: Parts 1 (EPA 2014)	200,000t	Beneficial reuse onsite such as for surcharge. Balance cut and fill earthworks, where possible, to optimise reuse.	100%		
	Excavated Natural Material (ENM)						
	Potentially contaminated soils				Unknown	Off-site disposal at an approved facility	0%
	Wastewater from dewatering and surcharge				Liquid – low pH , sediment	Unknown	On-site treatment and reuse
Vegetation clearance	Vegetation (logs, mulched timber and foliage)	General Solid (non-putrescible)	10-100t	Reuse as mulch or compost for topsoil, or dispose off site	100%		
	Weeds	General Solid (non-putrescible)	1-10t	Off-site disposal	0%		
Construction	Steel reinforcing	General Solid (non-putrescible)	1-10t	Off-site recycling	100%		
	Conduits and pipes	General Solid (non-putrescible)	1-10t	Off-site disposal at an approved facility	0%		
	Concrete (solid and washouts) and asphalt	General Solid (non-putrescible)	1-10t	Crushed and reused as backfill or road base or sent off-site for recycling	100%		
	Timber formwork	General Solid (non-putrescible)	1-10t	Reuse on site where possible or off-site recycling	100%		
	Packaging materials, including wood,	General Solid (non-putrescible)	1-10t	Off-site recycling	100%		

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Construction Activity	Waste Type	Waste Classification	Likely quantity	Disposal methods	Reuse Recycle Target
	plastic, cardboard and metals.				
	Empty oil and other drums	General Solid (non-putrescible)	<1t	Off-site disposal at an approved facility	0%
	Pesticides, herbicides, spill cleans ups, paints and other chemicals	Hazardous waste	<1t	Off-site disposal at an approved facility	0%
	Metals and bulk electrical cabling	General Solid (non-putrescible)	<1t	Off-site recycling	100%
Compounds and workshop operation	Tyres	Special waste	1-10t	Off-site disposal at an approved facility	100%
	Waste generated by the maintenance of equipment including air and oil filters and rags	General Solid (non-putrescible)	<1t	Off-site disposal at an approved facility	0%
	Oil, grease, fuel, chemicals and other fluids	Liquid	<1kL	Off-site disposal, approved facility	0%
	Batteries	Hazardous waste	<1t	Off-site disposal, approved facility	0%
	Radiator Fluid	Hazardous waste	<1kL	Offsite disposal, approved facility	0%
	Hydraulic Fluid	Hazardous waste	<1kL	Offsite disposal, approved facility	0%
	Domestic waste generated by workers	General Solid (putrescible)	10-100t	Off-site disposal at an approved facility	0%
	Sewage	General Solid (putrescible)	10-100kL	Off-site disposal, approved facility	0%
Office Operation	Paper, cardboard and plastic	General Solid (non-putrescible)	1-10t	Off-site recycling	100%
	Glass bottles and aluminium cans	General Solid (non-putrescible)	10-100t	Off-site recycling	100%
	Ink cartridges	General Solid (non-putrescible)	<1t	Off-site recycling	100%

Table 2-2 Energy consumption and greenhouse gas generation

Construction Activity	Emission Source
Demolition	Demolition equipment is operated by the burning of fossil fuels which creates greenhouse gas emissions.
Excavation	Excavation equipment is operated by the burning of fossil fuels which creates greenhouse gas emissions.
Vegetation clearance	The breakdown of organic matter as waste material directly releases stored carbon dioxide to the atmosphere. Vegetation absorbs carbon dioxide from the atmosphere (by photosynthesis); where vegetation has been removed, this ability to act as a carbon sink is lost.
Construction	Construction equipment is operated by the burning of fossil fuels which creates greenhouse gas emissions.
Compounds and workshop operation	Electricity is consumed for various uses, including lighting, air conditioning and charging power tools.
Office operation	Electricity is consumed for various uses, including lighting, refrigeration and air conditioning.

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.*
- 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.*

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:

- Waste Classification Guidelines 2014 (EPA Publication).
- Best Practice Waste Reduction Guidelines for the Construction and Demolition Industry (tools for Practice), Natural Heritage Trust, 2000.
- Environmental Procedure, Management Of Wastes On Roads And Maritime Services Land (RMS 2014)
- NSW Government Waste Reduction and Purchasing Policy (WRAPP)
- WRAPP reporting Guidelines 2011 (OEH)
- RMS Waste Fact Sheets: Virgin Excavated Natural Material (VENM); Excavated Natural Material (ENM); Excavated Public Road Materials; Recovered Aggregates; Asbestos Waste; Waste Sampling.

3.2 Minister's Conditions of Approval

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

Table 3-1 Conditions of Approval relevant to the CWEMP

CoA No.	Condition Requirements	Document Reference
B68.	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 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.	Chapter 6
B69.	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.	Chapter 6
B70.	All liquid and/or non-liquid waste generated on the site shall be assessed and classified in accordance with <i>Waste Classification Guidelines</i> (Department of Environment, Climate Change and Water, 2009)	Chapter 6
B71.	All waste materials removed from the site shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.	Chapter 6
D25(d) (viii)	Monitor and manage waste generated during construction including 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; and measures for reducing demand on water resources.	Section 5.6

4 Environmental aspects and impacts

4.1 Construction waste streams and energy use

The following construction related waste streams have been identified:

- Excavation wastes
- Timber and green wastes
- Demolition wastes
- Construction wastes including:
 - Waste generated from chemical/spill clean-up or remediation.
 - Waste generated from remediation of contaminated material.
 - Waste generated from Acid Sulfate Soil treatment (Appendix B11 – Construction Acid Sulfate Materials Management Plan.
 - Sediment removed from erosion and sediment controls.
 - Waste water from tannin affected water and water captured in excavations.
- Packaging materials.
- Waste produced from the maintenance of construction vehicles and plant, which might include oils, fluids, fuels, tyres.
- Sewage and general waste from construction compounds.
- Miscellaneous wastes.
- General waste from office and compounds.

The following sources of construction related energy consumption (fuel and power) have been identified:

- Procurement and delivery of materials to site.
- Vegetation removal.
- Site establishment, including compound set up.
- Relocation and protection of services.
- Earthworks.
- Removal, relocation and compaction of excavated material in fill embankments.
- Construction of pavements and culverts.
- Demolition of structures and pavements.
- Operation of site compounds and lighting.
- Construction plant including cranes, rollers, excavators, bulldozers, graders and water trucks.
- Removal of waste from the site.

4.2 Impacts

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

- Generation of large volumes of excavated materials.
- Weed infestation from dispersion of seeds and so forth during clearing and access upgrading activities.
- 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.
- Consumption of non-renewable resources such as energy, diesel and other chemicals.
- Greenhouse gas emissions due to consumption of energy from non-renewable resources.

The mismanagement of waste streams has the potential to result in the following impacts;

- Excessive waste being directed to landfill.
- Various type of waste being generated and stored onsite, with the potential for misclassification.
- Water pollution.
- Land contamination.

Earthworks would potentially generate the greatest amount of waste. To ensure the amount of waste is minimised, the construction contractor would manage earthworks requirements across the entire project, with construction staging taking into account efficient resource use and opportunities for reusing materials to limit waste generation. Roads and Maritime would also investigate whether unused resources could be used on other Pacific Highway projects.

A full list of management measures relating to construction waste and energy management are included in Section 6 of this Plan.

5 Waste and energy management

5.1 Classification of waste streams

Where waste cannot be avoided, reused or recycled it will be classified and appropriate disposal will then occur. The classification of waste is undertaken in accordance with the EPA *Waste Classification Guidelines Part 1: Classifying Waste* (2014). 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. That 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. 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.

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 or is classified as liquid waste under an EPA gazettal notice.

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
- 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).

5.2 Waste exemptions

The resource recovery exemption clauses (Clause 91-96) of the Protection of the Environment Operations (Waste) Regulation 2014 provides for the NSW Environment Authority (EPA) to issue resource recovery orders for waste suppliers and resource recovery exemptions for waste consumers. Current resource recovery orders and exemptions issued by the EPA are published on the EPA website (www.epa.nsw.gov.au).

The EPA has issued orders and 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 Orders and Exemptions' that may be applicable to materials on this project are defined in Table 5-1 below. These are general gazette exemptions that do not require approval. A specific orders and exemption may be granted where an application is made to the EPA. Orders and exemptions include specific record keeping, notification and reporting requirements that are detailed in the issued orders and exemptions.

Table 5-1 Resource recovery

Material	General Conditions
Effluent	<p>The effluent can only be applied to land as a soil amendment or for the purposes of irrigation.</p> <p>The consumer must ensure that any application of effluent to land must occur within a reasonable period of time after its receipt..</p>
Excavated Natural Material	<p>The chemical concentration or other attributes of the excavated natural material listed in the Excavated Natural Material Exemption must not be exceeded.</p> <p>The excavated natural material can only be applied to land as engineering fill or used in earthworks.</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> <p>ENM handling, processing, recording and testing requirements are outlined in detail in the exemption</p>
Excavated Public Road Material	<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>
Pasteurised Garden Organics	<p>This order applies to pasteurised garden organics, which includes raw mulch and/or garden organics that have undergone the process of pasteurisation as a minimum.</p>

Material	General Conditions
	<p>Pasteurisation means a process to significantly reduce the numbers of plant and animal pathogens and plant propagules which can be achieved by subjecting the material to sustained temperature as specified in the pasteurised garden organics order and exemption 2014.</p> <p>The processor must ensure that the pasteurised garden organics are ready for land application as a soil amendment prior to transport to a consumer if supplied under this order.</p> <p>Sampling plan must include a description of sample preparation and storage procedures for the pasteurised garden organics and testing in accordance with the order. Material must be tested and not exceed maximum contaminant values.</p>
Raw Mulch	<p>At the time the raw mulch is received at the premises, the material must meet all material requirements for raw mulch which are required on or before the supply of raw mulch under 'the raw mulch order 2014'.</p> <p>The raw mulch can only be applied to land as a soil amendment.</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 raw mulch at the land application site.</p> <p>The consumer must ensure that any application of raw mulch to land occurs within a reasonable period of time after its receipt.</p>
Reclaimed Asphalt Pavement	<p>The requirements in this order apply in relation to the supply of reclaimed asphalt pavement for application to land for road maintenance activities, being use as a road base and sub base, applied as a surface layer on road shoulders and unsealed roads, and use as an engineering fill. The requirements in this order also apply to the supply of reclaimed asphalt pavement for use as an alternative raw material in the manufacture of asphalt.</p> <p>The processor must implement procedures to minimise the potential to receive or process reclaimed asphalt pavement containing asbestos or detectable quantities of coal tar. These procedures must be formally documented and the records of compliance must be kept for a period of six years.</p> <p>The processor must provide the following to each person to whom the processor supplies the reclaimed asphalt pavement:</p> <ul style="list-style-type: none"> • a written statement of compliance certifying that all the requirements set out in this order have been met • a copy of the reclaimed asphalt pavement exemption • a copy of the reclaimed asphalt pavement order. <p>The processor 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 reclaimed asphalt pavement supplied • the name and address of each person to whom the processor supplied the reclaimed asphalt pavement, or the registration details of the vehicle used to transport the reclaimed asphalt pavement.
Recovered Aggregate	<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.

Material	General Conditions
	<ul style="list-style-type: none"> • Raising or reshaping of land used for agriculture. • Construction of roads on private land unless: <ul style="list-style-type: none"> - the recovered aggregate is applied only to the minimum extent necessary for the construction of the road, and - a development consent has been granted under the relevant Environmental Planning Instrument (EPI), or - it is to provide access (temporary or permanent) to a development approved by a Council, or - the works are either exempt or complying development <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>Recovered aggregate handling, processing, recording and testing requirements are outlined in detail in the exemption</p>
Treated Drilling Mud	<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>Treated drilling mud handling, processing, recording and testing requirements are outlined in detail in the exemption</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>

5.3 Classification of potential waste streams

The construction activities and types of wastes, which may be generated during construction, are outlined with classifications in Table 2-1.

5.4

5.4 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 transport to offsite facilities.

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.

Where sections of the existing Pacific Highway or local roads are excavated, the re-use of this material will be done in accordance with the conditions attached to the general resource recovery exemption, Excavated Public Road Material Exemption 2014 (EPA). Where this material has not been subjected to potentially contaminating sources, it can be reused within the road corridor without further testing or any specific licensing requirements. Where this material is suspected of being subject to contamination (e.g. section of road is adjacent to a service station, or an old sheep dip), testing and classification of this material will be undertaken.

Where materials cannot be reused and recycled, all waste would be handled and disposed in accordance with the *Protection of the Environment Operations Act 1997*.

Roads and Maritime would also investigate whether unused resources could be used on other Pacific Highway projects.

5.5 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 Air Quality Management Plan and the Soil and Water Management Plan.
- Liquid wastes are to be stored in appropriate containers in bunded areas until transported offsite. Bunded areas will have the capacity to hold 110 per cent of the liquid waste volume for bulk storage or 120 per cent 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.
- 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.
- It is estimated that mulching of timber and green wastes for the project will generate significant quantities of mulch. Mulch has the potential of creating tannin affected water, which in turn has the potential of causing water pollution. Mulch stockpiles are to be managed in accordance with the Soil and Water Management Plan.

5.6 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 locations of waste management / disposal facilities are included in Appendix B. Details of waste types, volumes and destinations are to be recorded in the Waste Management Register (Appendix D).

Where possible, wastes will be removed off-site to a recycling facility. If this is not possible, wastes will be disposed of at a licensed waste facility. Burning off of waste is not permitted on the project.

5.7 Energy Conservation

The Project Team 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.
- Conducting awareness programs for all site personnel regarding energy conservation methods.

Details of conservation measures are presented in Table 6-1.

6 Environmental mitigation and management measures

A range of environmental requirements are identified in the various environmental documents, including the EIS, Submissions / Preferred Infrastructure Report, Statement of Commitments, supplementary assessments, Conditions of Approval and Roads and Maritime documents, and from recent experience on similar road projects. Specific measures and requirements to address waste management and energy use issues are outlined in Table 6-1.

Table 6-1 Management and mitigation measures

ID	Measure / Requirement	When to implement	Responsibility	Reference
GENERAL				
WE1	The NSW Governments Waste Management Hierarchy of “avoid-reduce-reuse- recycle- dispose” will be followed as the framework of waste management throughout the project. 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.	Pre-construction / Construction	Construction Manager / Environmental Site Representative	G36 CoA B69
WE2	Waste management measures from this CWEMP will be included in relevant Environmental Work Method Statements to be developed prior to the commencement of specific activities	Pre-construction / Construction	Site Engineer / Environmental Site Representative	Good practice
WE3	All staff and subcontractors will undergo a site induction and ongoing toolbox talks that will detail waste minimisation and reuse management measures, including the requirements of the waste management hierarchy. Waste minimisation training will include energy consumption awareness that promotes energy conservation methods including minimising energy use by switching off equipment when not in use.	Construction	Environmental Site Representative / Foreman	Good Practice
WE4	The contractor must arrange for a pre-construction land condition assessment of RMS land to be used for ancillary construction purposes and a post-construction land condition assessment is required to verify that no unauthorised wastes remains – environmental procedure, Management of Wastes on Roads and Maritime Services Land.	Construction	Environmental Site Representative / Foreman	G36,
WE5	Procurement of materials will be planned and managed to avoid the over-ordering of products and minimise excess packaging is to be carried out.	Construction	Site Engineer / Foreman	Good Practice
WE6	Recycled material will be considered for use in all aspects of the project where feasible and reasonable in accordance with the NSW Government’s Waste Reduction and Purchasing Policy.	Construction	Site Engineer / Environmental Site Representative	G36
WE7	Weeds will be managed, handled and disposed of in accordance with the Weed Management Strategy (refer to the FFMP). If	Construction	Foreman / Environmental Site Representative	G40, Good practice

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ID	Measure / Requirement	When to implement	Responsibility	Reference
	disposal is appropriate, the weed material will be transferred to a licensed waste facility (Appendix B).			
WE8	Sediment recovered from erosion and sediment control devices will be reused on site as general fill material or it will be incorporated within landscaping materials where possible.	Construction	Foreman / Site Engineer	Good Practice
WE9	The cut and fill balance of the project will be further refined to obtain as much material as possible for re-use on the project.	Pre-construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM1)
WE10	<p>A resource use management strategy will be prepared for construction of the project and will identify the hierarchy for sourcing and use of resources. This will include:</p> <ul style="list-style-type: none"> - Available project cutting material (including SMZ and verge material) will be used for the construction of the embankments, SMZ and verge within that section to the extent that it is suitable. - Project sections with a deficit in material will import surplus 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, notwithstanding the above two requirements. - 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. - Contractors will reduce the amount of unsuitable waste generated during excavations, where feasible (eg 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 - subcontracts will require compliance with regulatory requirement 	Pre-construction and construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM2)

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ID	Measure / Requirement	When to implement	Responsibility	Reference
WE11	Resource use management strategy will also identify: - Details on materials that will be sourced from the project (including location and type). - Viable material suppliers (including water) near the project. - Proposed sustainable material sources practices (such as recycled materials or use of waste water). - Materials that could be recycled and re-used on-site or transferred to other project sections.	Pre-construction and construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM3)
WE12	Where possible, materials will be bought in bulk to minimise the amount of packaging required. Sources of material that have sustainable packaging design, recycled and recyclable packaging will be favoured over other material sources where cost effective.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM4)
WE13	All waste material generated on-site will be dealt with in accordance with the <i>Protection of the Environment Operations Act 1997</i> and <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (EPA, 2014), or any superseding document. 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 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.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM5) CoA B68, CoA B70
WE14	Waste minimisation and management measures will be developed based on the principles in the <i>Waste Avoidance and Resource Recovery Act 2001</i> , the NSW Government's <i>Waste Reduction and Purchasing Policy</i> , and EPA resource recovery orders and exemptions (2014) including for: - Excavated Natural Material - Excavated Public Road Material - Pasteurised Garden Organics - Raw Mulch - Reclaimed Asphalt Pavement - Recovered Aggregate - Stormwater Exemption - Treated Drilling Mud Measures will seek to avoid, minimise, re-use, recycle, treat or dispose of waste streams during construction and address transport and disposal arrangements.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM6)

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ID	Measure / Requirement	When to implement	Responsibility	Reference
WE15	Millable timber will be harvested for reuse off site. All other felled timber will be reused on-site in the form of habitat recreation or mulch in landscaping and erosion and sedimentation controls. Where mulch cannot be reused on-site, consideration will be given to making the mulch available to the public in accordance with EPA resource recovery orders and exemptions (2014) for Raw Mulch and pasteurised garden organics.	Construction	Foreman / Environmental Site Representative	W2B Submissions / PIR (WM7)
WE16	Sediment removed from sedimentation basins will, where appropriate, be used on-site in landscaping and/or flattening of batters.	Construction	Foreman / Environmental Site Representative	W2B Submissions / PIR (WM8)
WE17	Where feasible, the contractor will be required to re-use materials. This could include, but is not limited to concrete formwork or surplus concrete pours.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM9)
WE18	Site inductions on waste minimisation principles and measures will be developed.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM10)
WE19	At site compounds, on-site recycling facilities will be provided for recycling paper, plastic, glass and other re-useable materials.	Construction	Construction Manager / Environmental Site Representative	W2B Submissions / PIR (WM11)
WE20	Regular visual inspections (including subcontractor facilities) will be conducted to ensure that work sites are kept tidy and to identify opportunities for reuse and recycling.	Construction	Foreman / Environmental Site Representative	W2B Submissions / PIR (WM12)
WE21	Water captured in excavations will be required to be either: - Managed in accordance with the construction Soil and Water Management Plan - Transferred to a licensed sediment basin, treated and discharged in accordance with any licence conditions that apply to the discharge of water, or - Re-used for construction water or dust suppression.	Construction	Construction Manager / Environmental Site Representative	G38, W2B Submissions / PIR (WM13)
WE22	Topsoil (weed free) will be stockpiled in accordance with RMS criteria in allocated areas and reused for landscaping.	Construction	Foreman / Environmental Site Representative	G36
WE23	Any contaminated waste will be handled, separated, contained, managed and disposed of to prevent migration and further contamination.	Construction	Foreman / Environmental Site Representative	CLM Act G36

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ID	Measure / Requirement	When to implement	Responsibility	Reference
WE24	If potentially contaminated material is encountered the Unexpected Discovery of Contaminated Land Procedure (CEMP Appendix B10 CCLMP) will be followed. Works in the vicinity will be stopped or modified and will not recommence until the material has been analysed and management measures developed.	Construction	Project Manager / / Construction Manager /Superintendent/ Environmental Site Representative	G36, Good practice
WASTE DISPOSAL				
WE25	A waste register (Appendix D) will be maintained, detailing types of waste collected, amounts, date/time and details of disposal. Where waste is hazardous, industrial and/or liquid waste, obtain relevant licence numbers for both transporters and receivers of this waste type and include on the waste management register. Reporting requirements outlined in the Waste Reduction and Purchasing Policy will be followed and reporting will be consistent with the requirements of the WRAPP reporting Guidelines (OEH, June 2011).	Construction	Environmental Site Representative	W2B Submissions / PIR (WM3)
WE26	Submit the Waste Avoidance and Resource Recovery report by 31 July for preceding financial year and by Actual Completion Date.	Construction	Site Engineer	G36/F
WE27	Waste will be managed and disposed of in accordance with the PoEO Act and the WRAPP. Wastes that are unable to be reused or recycled will be disposed of offsite at a licensed waste management facility, or premises lawfully permitted to accept the materials following classification (Appendix B).	Construction	Site Engineer / Environmental Site Representative	G36 CoA B71
WE28	Oils and other hazardous liquids will be labelled and stored in a sealed container within a bunded area. Material collected from within bunded areas will be disposed off site at a waste facility approved by the EPA.	Construction	Foreman / Environmental Site Representative	G36
WE29	A s143 notice under the PoEO Act will be completed should the off site (on private property) disposal of road construction waste material, ENM or VENM be deemed necessary.	Construction	Foreman / Environmental Site Representative	PoEO Act G36

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ID	Measure / Requirement	When to implement	Responsibility	Reference
WE30	The relevant licences of waste facilities utilised for the disposal of project waste will be obtained (on a regular basis if necessary) to ensure they are legally able to accept that waste (Appendix B).	Construction	Foreman	G36
WE31	The disposal of chemical, fuel and lubricant containers, solid and liquid wastes must be in accordance with the requirements of the local Council or the EPA.	Construction	Foreman / Environmental Site Representative	G36
WE32	All trucks transporting wastes off site will be appropriately licensed to carry the materials to appropriately licensed waste facilities – more than 200kg of Category 1 trackable waste.	Construction	Site Engineer / Foreman	G36, POEO (Waste) Reg 2005
WE33	The handling and storage of asbestos waste at worksites is regulated by WorkCover NSW under the provisions of the Work Health and Safety Regulation 2011. The <i>Environment Operations (Waste) Regulation 2014</i> provides requirements of monitoring movement of asbestos.	Construction	Site Engineer / Environmental Site Representative	G36, WHS Reg 2011. EO(Waste Reg 2014.
GREENHOUSE GAS AND ENERGY CONSERVATION				
WE34	Flyash content within concrete will be specified where feasible. Contractors will be required to propose recycled content construction materials where they are cost, quality and performance competitive.	Pre-construction and construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG1)
WE35	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).	Pre-construction and construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG2)
WE36	Steel with high recycled content will be specified where feasible where they are cost, quality and performance competitive. Contractors will be required to propose recycled content construction materials where they are cost, quality and performance competitive.	Pre-construction and construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG3)
WE37	The feasibility of using biofuels (biodiesel, ethanol, or blends such as E10 or B80) will be investigated by the 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.	Construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG4)

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ID	Measure / Requirement	When to implement	Responsibility	Reference
WE38	An energy management plan will be developed during the construction of the project. The plan will include a commitment to monitor on-site energy consumption and identify and address on-site energy waste.	Pre-construction and construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG5)
WE39	Onsite energy consumption is to be monitored as part of the implementation of the CWEMP during construction.	Construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG5)
WE40	Inefficient use of energy is to be identified via monitoring of fuel consumption and haul efficiency, and measures are to be taken to address on-site energy waste.	Construction	Site Engineer / Environmental Site Representative	W2B Submissions / PIR (GHG5)
WE41	Roads and Maritime will investigate the use of LED lighting in place of incandescent lamps as part of the project's detailed design, and use them where practicable to reduce electrical energy consumption. Any energy-efficient alternatives will have to meet lighting standards for major roads.	Pre-construction	Environmental Site Representative	W2B Submissions / PIR (GHG6)
WE42	An education program will be developed and delivered to the construction personnel to promote energy-efficient work practices.	Construction	Environmental Site Representative	W2B Submissions / PIR (GHG7)

7 Compliance management

7.1 Roles and responsibilities

The Project Team's 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 Table 6-1 of this Plan.

7.2 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 sub-plan.
- 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.

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

7.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction.

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*.

7.4 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*.

7.5 Reporting

Reporting requirements and responsibilities are documented in *Sections 8.4 and 8.5 of the CEMP*.

8 Review and improvement

8.1 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.
- Make comparisons with objectives and targets.

8.2 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 the CWEMP will be in accordance with the process outlined in *Section 1.6 of the CEMP*.

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*.

Appendix A
Waste contact list

Table A-1 Contact List of Potential Waste Contractors and Recyclers

Name	Details	Contact Details	Waste Services	Waste Recycled
JR Richards & Sons	Waste Reduction & Disposal Services	Grafton NSW 0408 663758 or 66 424737	Waste Management, Recycling, Liquid Waste	Bottle, Glass, Paper Aluminium, Brass, Cardboard, Copper, Lead etc.
Grafton Metal Recyclers	Waste Reduction & Disposal Services	14 Swallow Road South Grafton NSW 2460 (02) 6642 8828	Metal Recyclers	Metal
Grafton Skip Hire	Waste Reduction & Disposal Services	Lillypool Rd, South Grafton NSW 2460 0418 660 408	Rubbish Removal & Skip Bins	N/A
North Coast Metal Recyclers	Waste Reduction & Disposal Services	6 Ryan Street South Grafton 2460	Metal Recyclers	Metal
Riverside Recycling	Waste Reduction & Disposal Services	Cnr Duke & Kirchner Sts, Grafton NSW 2460 02 6642 6428	Recyclers	Bottle, Glass, Paper Aluminium, Brass, Cardboard, Copper, Lead etc.

Appendix B

Location of waste facilities

Table B-2 Location of waste facilities

Name	Details	Address	Waste Accepted	Waste Recycled
Grafton Regional Landfill	Waste Management Facility EPL 7186 - Clarence Valley Council. Status: Issued Renewal: 03/16	704 Armidale Road, South Grafton Ph: 6641 4980 Opening Hours: 7.00am - 4.00pm Monday to Friday 8.30am - 1.00pm Saturday 10.30am - 1.00pm Sunday	General waste, eWaste (at no cost), scrap metal and concrete, recyclables, oil waste, drums, organics composting, asbestos (subject to restrictions)	scrap metal, concrete, paper and cardboard, glass and plastics
Maclean Waste Transfer and Recycling Centre	Waste Transfer and Recycling Station	Paperbark Drive, Townsend Ph: 6645 5225 Opening Hours: 8.00am -4:30pm 7 Days	Small vehicle general waste disposal facility and a recycling centre General waste, recyclables, green waste, scrap metal, concrete, eWaste, drums	scrap metal, concrete, paper and cardboard, glass and plastics

Appendix C

Surplus material management plan

NOTE: This appendix is not applicable to the project and therefore has been intentionally omitted.

Appendix D
Example waste management register

