

# NEOEN Solar Farm Project

## Waste and Energy Management Plan

Doc ID: PL-EV-08  
Rev No.: 2  
Rev Date: 18/04/2017



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**1 INTRODUCTION**

**1.1 Purpose**

The purpose of this Waste Management Plan (WMP) is to provide guidance for the management of waste generated during the construction phase of the Project.

This Plan outlines the controls to minimise potential impacts, providing guidance on efficient segregation, and approaches to waste minimisation to maintain a healthy, clean, and safe working environment, as well as ensuring waste management activities are aligned with Project policies, industry standards and legal responsibilities.

This Waste and Energy Management Plan shall be read in conjunction with the *PL-EV-01 Project Environmental Management Plan*.

**1.2 Document Responsibilities**

This Waste and Energy Management Plan must be in place and operational prior to commencement of construction work.

The project dedicated HSE Coordinator in conjunction with the Project Director, will ensure that the plan is monitored, reviewed, maintained and updated as necessary and kept up to date during the course of the project.

One hardcopy of the Waste and Energy Management Plan and associated plans will be maintained by the HSE Coordinator (document controlled revision) for the duration of the contract.

**1.3 Document Amendment and Distribution**

This document shall be reviewed as follows:

- As requested by Management Review
- When there is a change of method and/or technology that may affect the accuracy of this document; or
- When there has been a significant event to which this document was relevant; or
- As a result of a Non Conformance resulting from an audit

Document amendments and distribution will be conducted as per detailed in the *PL-CO-01 Project Management Plan and the PL-QA-02 Records Management Plan*.

New and amended documentation issued after the initial approval and distribution of this plan to controlled copy holders shall be identified in the *FS-QA-RG-06 Document Control Register*. Revision details shall be recorded in the *Revision Status Section* of this plan.

All changes to documents shall be reviewed and approved by the same function that performed the original review and approval and as per the cover of this plan, unless specifically designated otherwise.

### 1.3.1 Revision Status

Revision	Revision Date	Issued Date	Nature of modification
0	2016/11/22	YYYY/MM/DD	Issued to Tender
1	YYYY/MM/DD	YYYY/MM/DD	Contract Award revision
2			
3			
4			
5			
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10			

## 2 DEFINITIONS

BYCA	Bouygues Construction Australia Pty Ltd
EMP	Environmental Management Plan (PL-EV-01)
WEMP	Waste and Energy Management Plan (PL-EV-07)
WMH	Waste Management Hierarchy

## 3 ORGANISATION

### 3.1 Responsibilities and Authorities

The Project Organizational chart and overall roles and responsibilities are outlined in the EMP. The key responsibilities for Waste and Energy Management are as follows:

#### 3.1.1 Project Manager

- Ensuring appropriate resources are available for the implementation of the WEMP

### **3.1.2 General Superintendent**

- Responsible for developing/revising the construction schedule in consultation with the HSE Coordinator to allow optimal management of wastes and reuse of materials, and facilitating the implementation of energy saving measures at project sites
- Responsible for ensuring that material purchased for construction purposes are in accordance with the measures described in this Plan, and giving preference to purchasing items with recycled content

### **3.1.3 Design Manager**

- Responsible for the design of waste management and reuse facilities where relevant, and incorporating waste minimisation and reuse measures into detailed design where feasible

### **3.1.4 Commercial Manager**

- Assisting the HSE Coordinator in ensuring data is collected/reported and associated records maintained (e.g. delivery/waste docket)

### **3.1.5 HSE Coordinator**

- Responsible for providing assistance and advice to the Project Engineers and Environmental Coordinators to fulfil the requirements of this Plan, assessing data from inspections, monitoring and reporting, and providing project-wide advice to ensure consistent approach and outcomes are achieved
- Responsible for providing necessary training for project personnel to cover waste minimisation and reuse management issues



Ensuring data is collected/reported and associated records maintained (e.g. delivery/waste docket)

The HSE Coordinator is also responsible for the review and update of this Plan

### **3.2 Legal Requirements**

The following Acts, Regulations and Standards are applicable to this Project:

Legislation relevant to waste and resource management for this project includes:

- Protection of the Environment Operations Act 1997;
- Protection of the Environment Operations (Waste) Regulation 2014;
- Waste Avoidance and Resource Recovery Act 2001; and
- Work Health and Safety Act 2011

### **3.3 Contractual Requirements**

BYCA have identified the most critical Environmental Contractual requirements for the project, these are:

#### **PARKES & GRIFFITH - Development Consent**

- minimise the waste generated by the development;
- classify all waste on site in accordance with the EPA's Waste Classification Guidelines;
- appropriately store and handle all waste on site in accordance with its classification; and
- remove all waste from the site as soon as practicable, and ensure it is sent to appropriately licensed waste facilities for disposal

#### **DUBBO SOUTH KESWICK - Western Plains Regional Council Approval**

- All solid waste from construction and operation of the proposed development shall be assessed, classified and disposed of in accordance with the Department of Environment and Climate Change - Waste Classification Guidelines. Whilst recycling and reuse are preferable to landfill disposal, all disposal options (including recycling and reuse) must be undertaken with lawful authority as required under the Protection of the Environment Operations Act.
- A site rubbish container shall be provided on the site for the period of the construction works prior to commencement of any such work.
- The sanitary drainage and plumbing installation shall comply with the provisions of the Local Government (General) Regulation 2005 and the requirements of Council as the delegated regulatory authority
- The sanitary drainage associated with the proposed Site Maintenance building requires the separate approval of Council prior to being installed. In this regard a Sewage Management Facility Application form is available from Council, and must be completed and returned to Council with all associated design, installation details and fees. No drainage must be installed until Council has approved the proposed treatment and disposal method for the site and issued an approval to install the intended sewage management facility.
- All sanitary plumbing and drainage work associated with the sewage management facility shall be carried out by a licensed plumber and drainer.



#### **DUBBO NARROMINE - Western Plains Regional Council Approval**

- All building rubbish and debris, including that which can be wind-blown, shall be contained on site in a suitable container at all times prior to disposal at Council's Waste Management Facility. The container shall be erected on the building site prior to work commencing. Materials and sheds or machinery to be used in association with the construction shall not be stored or stacked on Council's road reserve or roadway. Any new connections/lines or infrastructure are to be supported by a final route option analysis Review of Environmental Factors (REF) in accordance with Essential Energy's Connection Process for Negotiated High Voltage.

## **4 COMPETENCE, TRAINING AND AWARENESS**

As stated in the EMP all project personnel, subcontractors and consultants will receive training in the group and personal environmental obligations during the *Site Inductions* and *Toolbox Talks*. From time-to-time staff may also attend specific training sessions, when necessary, by the HSE Coordinator.

Examples of topics that will be covered during project induction and toolboxes include:

- waste storage and segregation
- waste reporting
- roles of personnel in waste management and reporting
- actions to be taken if potential contamination is encountered
- energy efficient work practices
- energy use reporting

## **5 WASTE & ENERGY MANAGEMENT**

### **5.1 Objectives**

The environmental objectives with regard to waste and energy management during the construction phase are:

- Minimise and manage the generation of waste from construction activities of the Project by reducing waste streams and recycling material where possible
- Dispose of waste in an environmentally acceptable manner and consistent with the requirements of the relevant regulatory authority
- All waste contractors are to be certified
- Reduce energy consumption

### **5.2 Potential Environmental Impacts**

Waste streams anticipated to be generated from construction activities can be:

- Waste soils

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- Contaminated soils
- Wastewater
- Stormwater
- Sewerage waste
- Industrial wastes such as scrap metals
- Controlled wastes such as hydrocarbon waste and paint residues ➤ Domestic wastes

The potential impacts of the Project associated with poor waste and energy management during the construction phase are:

- Potential soil, groundwater/surface contamination through waste or leachate spills or leakage as a result of inappropriate storage and disposal
- Attraction of non-indigenous fauna and/or native animals through putrescible wastes
- Fire risk in waste storage areas
- The visual amenity impacted by litters
- Offensive odours from waste storage areas
- Excessive waste generation/inefficient use of resources
- Resource depletion
- Air emissions

### **5.3 Management and Contingency Mitigation Measures**

The following Waste Management measures will be implemented:

- This CWMP will be implemented, revised and updated as required
- All forms of waste from the construction of the Project will be minimised
- All wastes to be characterised and separated into categories and recycled / reused where possible
- Continuous improvement of waste avoidance, reduction and recovery throughout the Project
- Subcontractors will sort recycling and rubbish at their contractor area and place in the designated waste bins provided
- Report immediately to relevant authorities any incident where harmful waste material is released to the environment, as per the *PR-CO-04 Incident Management Procedure*
- Formalisation of a work procedure for all excavation works across the construction area of the site, detailing the safety procedures inclusive of personal protective equipment (PPE) to be worn, followed and adhered to by all site personnel
- Provision of waste laydown and transfer facility to sort and manage wastes generated onsite. Hazardous wastes to be stored within secured bounded containers, wastes to be segregated into labelled bins and disposed offsite
- Formalisation of a work procedure for any offsite disposal of uncontrolled fill to a suitably licensed landfill facility
- Regular inspection of the works to ensure procedures and precautions are in place to minimise risk to human health and the environment



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  - The development of a contingency response if monitoring indicates a risk to sensitive receptors or human health
  - Reporting of Greenhouse emissions and energy consumption
  - Implementation of Energy reduction programs

The success of management strategies will be reviewed on a regular basis to confirm its continued suitability for the site. Should the risk to the environment or to human health change during the construction period, management options will be reviewed.

## 6 IDENTIFY AND ASSESS

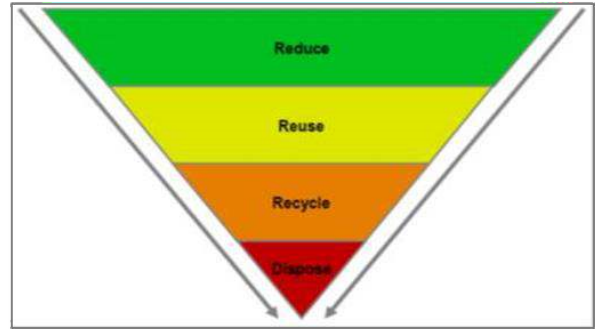
### 6.1 *Waste Management Hierarchy (WMH)*

The Waste Management Hierarchy (WMH) describes the approach to waste management, to ensure the most efficient use of resources to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of ecologically sustainable development.

For

the duration of the Project, BYCA will identify and implement strategies to reduce, reuse, recycle and dispose of material onsite.

The WMH, from most desirable to least desirable, is presented below:



- **Reduce:** Avoid waste by reducing the quantity of waste being generated. This is the simplest and most cost-effective way to minimise waste. It is the most preferred option in the WMH
- **Reuse:** Reuse is when a product is used again for the same or similar use, without reprocessing. Reusing a product more than once in its original form reduces the waste generation and energy consumption associated with recycling
- **Recycle:** Recycling involves processing waste into a similar non-waste product, which consumes less energy than production from raw materials. Recycling prevents further environmental degradation, and saves landfill space and resources
- **Dispose:** Removing waste from worksites, compounds and offices, and discarding the material in a licensed landfill site, or other appropriately licensed facility

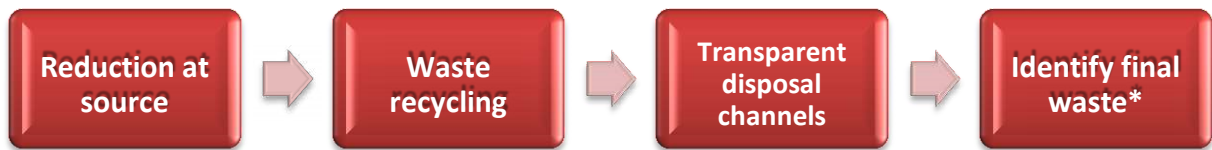


Figure 1 - Waste Management Hierarchy

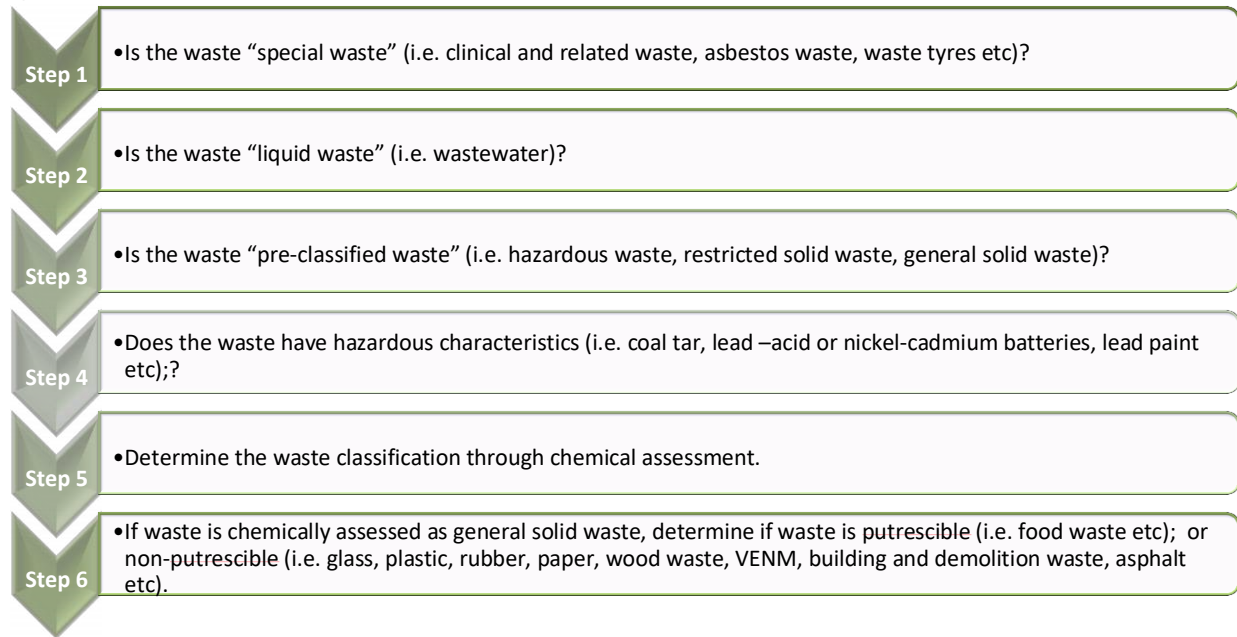
## 6.2 Waste Classification

Where waste cannot be avoided, reused or recycled it will be classified in accordance with the DECCW Guidelines “Waste Classification Guidelines” (DECC, 2009). These guidelines outline how to assess and classify waste, and set out management options for the disposal of classified waste. A brief outline of the waste classification steps, as summarised in the Waste Classification Guidelines, is as follows:

- Establish if the waste should be classified as special waste
- If not special waste, establish whether the waste should be classified as liquid waste
- If not special waste or liquid waste, establish whether the waste is of a type that has already been classified. To simplify this classification process, DECCW has ‘pre-classified’ a number of commonly generated wastes
- If the waste is not special waste, liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous waste
- If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine what class of waste it is. If the waste is not chemically assessed, it should be treated as hazardous waste

- If the waste is chemically assessed as general solid waste, a further test is available to determine whether the waste is putrescible or non-putrescible. This test determines whether the waste is capable of significant biological transformation. If the waste is not tested, it should be managed as general solid waste (putrescible)

**Figure 2 - Waste Classification**



Once the waste is classified, its appropriate management, transport and disposal shall be conducted in accordance with the relevant state Waste Management Legislation.

### 6.3 Potential Sources of Waste

Avoiding the generation of waste remains of highest importance to (project) when considering waste minimisation and management measures.

Waste management and reuse strategies will be considered and implemented where practical and cost-effective as outlined in Table 1 (below). On-site reuse opportunities will be maximised, with efforts made to implement reuse and recycling initiatives.

The below table lists the waste generating aspects and identifies the range of solid, hazardous, special and liquid wastes that are likely to be generated by construction. It also outlines the proposed reuse, recycling or disposal method.

**Table 1 - Potential Waste Streams**

Activity / Waste	Types	Classification	Proposed Reuse / Recycling / Disposal Method
Aspect			

Demolition / Site clearing	Vegetation (logs, mulched timber, weeds)	General Solid (nonputrescible)	Native Vegetation –Reuse as biodiversity measures such as habitat enhancement, compost for topsoil or soil conditioner, or modify mulching equipment to create woodchip  Weeds – Off-site disposal
	Concrete, brick asphalt and gravel	General Solid (nonputrescible)	Crushed and used as backfill or as road base
	Scrap metal	General Solid (nonputrescible)	Off-site recycling
Excavation	VENM (Virgin Excavated Natural)	Classification based on soil tests carried out pre-construction and in accordance with the DECCW document Waste Classification Guidelines: Parts 1 and 2 (DECC 2009)	Beneficial reuse onsite (such as noise mounds)  Balance cut and fill earthworks, where possible, to optimise reuse on the Project  Relocate VENM or ENM to another (Client) project
	Potentially contaminated soils		Off-site disposal at an approved facility
Building / construction waste	Steel reinforcing	General Solid (nonputrescible)	Off-site recycling
	Conduits and pipes	General Solid (nonputrescible)	Off-site recycling
	Concrete (solids and washouts) and asphalt	General Solid (nonputrescible)	Crushed and used as backfill or as road base
	Timber formwork	General Solid (nonputrescible)	Reuse onsite where possible or Off-site recycling
	Packaging materials, including wood, plastic, cardboard and metals	General Solid (nonputrescible)	Off-site disposal at an approved facility
	Empty oil and other drums	General Solid (nonputrescible)	Off-site recycling
	Pesticides, herbicides, spill clean ups, paints and other chemicals	Hazardous waste	Off-site disposal at an approved facility

	Metals and bulk electrical cabling	General Solid (nonputrescible)	Off-site recycling
	Sediment basin discharge and solids (sediment)	General Solid (nonputrescible)	Beneficial reuse onsite (such as noise mounds or offsite as per SWMP)
General waste from compounds	Tyres	Special waste	Off-site disposal at an approved facility
	Waste generated by the maintenance of equipment including air and oil filters, worn components and rags	General Solid (nonputrescible)	Off-site disposal at an approved facility
	Oil, grease, fuel, chemicals and other fluids	Liquid	Off-site disposal at an approved facility
	Batteries	Hazardous waste	Off-site disposal at an approved facility
	Domestic waste generated by workers	General solid (putrescibles)	Off-site disposal at an approved facility
	Sewage	General solid (putrescibles)	Off-site disposal at an approved facility
	Waste water / recycled water / stormwater	Liquid	Off-site disposal at an approved facility, or use of onsite sewer system
Office Waste	Paper, cardboard and plastic	General Solid (nonputrescible)	Off-site recycling
	Glass bottles and aluminium cans	General Solid (nonputrescible)	Off-site recycling
	Ink cartridges	General Solid (nonputrescible)	Off-site recycling
	Domestic waste generated by workers	General Solid (putrescible)	Off-site disposal at an approved facility

#### 6.4 *Potential Waste and Reuse Impacts*

The potential adverse impacts that could be caused during construction include:

- Excessive waste to landfill
- Not meeting (Client) environmental objectives

- Additional risks associated with inadequately controlling the process of classifying, storing and finally disposing of wastes, causing pollution and possibly exposing (Client) to future action to recover deposited materials, repatriate to an appropriate receiving location and remediate lands
- Life Cycle impacts associated with prematurely losing a recyclable resource to landfill

### 6.5 Waste Disposal Sub-Contractors and Waste Receiving Facilities

The following table outlines the potential waste subcontractors, licensed waste management facilities that may be used by the project - amend to suit local waste service providers details.

**Table 2 - List of Potential Waste Contractors and Waste Facilities**

Name	Service Details	Contact Details	Waste Accepted	Waste Recycled
Transpacific	Waste disposal and reduction services	0411 019 225	General, construction, industrial	Timber, oil
Leo Fardell Waste Management	Waste disposal and reduction services	(02) 6884 5166	General, construction, industrial	N/A
JR Richards & Sons	Waste and recycling services	(02) 6555 7007 <a href="mailto:info@jrrichards.com.au">info@jrrichards.com.au</a> <a href="#">u</a>	Grease, oil, effluent, septic, general, construction, industrial	Glass, plastic, steel and aluminium cans, paper and cardboard
MIA Quiksips & MIA Quik Waste	Waste disposal and reduction services	0429 627 717	Domestic, building, commercial, industrial waste	N/A

### 6.6 Water Conservation and Reuse

During the construction of the Project, BYCA will actively promote and ensure the responsible use of water and water efficient work practices, whilst achieving its other related environmental obligations (i.e. dust suppression).

The construction of the Project may require the use of substantial volumes of water, with the key water usage activities being the construction of roads and structures (i.e. for concrete and dust suppression).

The key mitigation strategy will include the collection and reuse of surface runoff (e.g. sedimentation basins) for dust suppression, wash down, and use in amenities or revegetation. Water use is discussed further in the *PL-EV-04 Soil and Water Management Plan*.

### 6.7 Energy usage

Energy will be consumed for the duration of the Project primarily in the form of fuel (petrol and diesel) and electricity. This energy usage will result in the emission of greenhouse gases.

The different aspects of the Project which will consume energy and emit greenhouse gases include:

- combustion of fuel in vehicles, plant and equipment operation - direct emissions

- electricity used at site compounds - indirect emissions
- use of construction materials, including concrete, hot mix, asphalt, aggregates and steel – indirect emissions (embodied energy)

### 6.7.1 National Greenhouse and Energy Reporting Act, 2007 (NGER Act)

The NGER Act 2007 introduces a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy consumption and energy production of corporations. The NGER Act requires that larger energy users and Greenhouse Gas (GHG) emitters that trigger a certain level of direct GHG emissions, or total energy produced or consumed must report on GHG emissions to the DECCW.

The NGER Act 2007 also requires reporting on the energy emissions resulting from various construction activities. There are three different scopes of emissions. The Project is required to report on Scope 1 and Scope 2 emissions under the NGER Act. Whilst reporting of Scope 3 emissions is voluntary it is anticipated that it will become a requirement in the future. Table 3 below outlines the three different scopes of emissions.

**Table 3 - Classification of the Sources of Greenhouse Gas Emissions**

Sources of Greenhouse Gas Emissions	
Scope 1 – Direct emissions	<p>Greenhouse gases emitted from sources within the boundary of a facility and as a result of that facility’s activities. These emissions arise from the following activities relevant to the Project:</p> <ul style="list-style-type: none"> <li>- Transportation of materials, products, waste and people (e.g. use of vehicles owned and operated by Reed);</li> <li>- Combustion of fossil fuels (e.g. diesel fuel in plant machinery);</li> <li>- Onsite vegetation clearing or soil disturbance; and</li> <li>- On-site waste management</li> </ul>
Scope 2 – Indirect emissions from the consumption of purchased electricity, heat or steam	<p>Greenhouse gases emitted from the production of electricity, heat or steam that a facility consumes, but are physically produced by another facility. Scope 2 emissions result from the combustion of fuel to generate the electricity, steam or heat and do not include steam emissions associated with the production of fuel.</p>

<p>Scope 3 – Other indirect emissions</p>	<p>Greenhouse gas emissions generated in the wider economy as a consequence of a facility’s activities, which are physically produced by another facility. Scope 3 emissions are those other indirect greenhouse gases that are a consequence of the Project but do not occur onsite or are more removed from the proponent’s direct control. During the construction phase examples include emissions from:</p> <ul style="list-style-type: none"> <li>- Disposal of waste generated</li> <li>- Employee business travel</li> <li>- Employees commuting to and from work</li> <li>- Extraction, production and transport of purchased fuels consumed</li> <li>- Extraction, production and transport of other purchased materials or goods</li> <li>- Generation of purchased electricity that is sold to end-users, e.g. subcontractors</li> <li>- Leased and outsourced activities</li> <li>- Transportation of products, materials and waste</li> </ul>
	<ul style="list-style-type: none"> <li>- Use of products manufactured and sold</li> </ul> <p>In the operational phase emissions may result from the downstream changes in emissions from traffic using the road that can be reasonably attributed to the Project. Traffic emissions may change as a result of changes in many factors, such as traffic volumes, average speed, congestion, stop-start operation, gradient and traffic composition.</p>

## 7 IMPLEMENT CONTROLS

### 7.1 Waste and Energy Management Control Measures

Project mitigation and management measures for waste and energy impacts during construction are outlined in the table below:

Control Measure	Responsible	Implementation Time	Records
A Waste Register ( <i>FS-EV-RG-04 Waste register</i> ) will be maintained to capture details of all waste collected for disposal and/or recycling; including amounts, date and time and details, and location of disposal.	HSE Coordinator	Whole of Project Life	FS-EV-RG-01 Waste register
Identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy.	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
Provision for recycling management onsite	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection



Complete the Environmental and Sustainability Report monthly or as required (energy and waste reporting)	HSE Coordinator	Whole of Project Life	FS-EV-RE-02 BYCA Environmental and Sustainability Report
Bins or skips will be used as temporary storage for waste generated and collection of these wastes will be periodic and dependent on levels of waste generation	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
Waste storage areas will be approved by the QSE department, sign posted, adequately bunded and located away from sensitive receptors/areas, drainage lines and watercourses	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
Waste streams will be appropriately segregated and stored as either General waste, Recyclables waste or Regulated wastes within appropriate vessels; dependent on disposal, treatment and recycling options	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
Cement or concrete water in solution, slurry or liquid form will be contained in an impervious concrete washout pit or receptacle whereby it cannot be released to waters	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
All temporary toilets shall be cleaned, maintained/serviced daily and be kept in a constant sanitary condition in accordance with all applicable health regulations. All portable toilets shall have an audible and visual alarm system installed to indicate when the septic/sewerage tanks are at full capacity	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
All waste streams will be collected and transported by a licensed waste contractor for recycling, reuse, treatment or disposal at approved licensed waste facilities. Only licensed regulated waste contractors will transport waste streams classified as regulated	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection
All waste hauled from site shall be covered	HSE Coordinator	Whole of Project Life	FS-EV-AT-01 Environmental Inspection

## 8 INSPECT AND TEST

### 8.1 *Monitoring, Inspection and Reporting*

Daily visual inspections of the construction site will be undertaken by the HSE Coordinator and construction personnel to identify any potential waste management issues. Any actions to be undertaken as a result of site inspections will be recorded in the *FS-QA-RG-02 Corrective & Preventative Actions Register*.

All inspections will be conducted as per the *PL-EV-01 Environmental Management Plan*.

### 8.2 *Waste Register*

A Waste Register (*FS-EV-RG-01 Waste register*) will be maintained by the Environmental Coordinator and Subcontractors to record the management of wastes from the Project Dockets / receipts /

manifests will also be retained for waste tracking to record the date of waste removal, and identify the waste transport contractor and destination of the wastes from the worksite.

Details of wastes removed from site will be included in monthly reports to BYCA, please refer to the *FS-EV-RE-02 BYCA Environmental and Sustainability Report*.

### **8.3 Waste Tracking**

The following wastes are subject to special monitoring and reporting requirements by DECCW under the waste tracking system:

- hazardous non-liquid waste (e.g. batteries)
- industrial non-liquid waste
- liquid wastes including non-recyclable oils, fuels, chemicals and paint

The Project has two options in order to comply with its waste tracking requirements, as follows:

- to deal directly with a licensed waste facility
- to enter into an agreement with an authorised contractor who can make the arrangements on behalf of the project

## **9 RECORDS**

A record shall be maintained as per *PR-QA-01 Document Control and Record Management Procedure*.