



W&RMP Enfield ILC (inclusive of MOD 14) Waste & Recycling Management Plan

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Goodman Property Services (Aust) Pty Ltd
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W&RMP Enfield ILC (inclusive of MOD 14)

Waste & Recycling Management Plan

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) was engaged by Goodman Property Services (Client) to prepare a Waste and Recycling Management Plan (W&RMP) in support of a Modification to Approval (MOD 14) to the NSW Department of Planning concerning modifications to the built form and operational aspects of the Enfield Intermodal Logistics Centre (ILC). The major project approval MP05_0147 (the Approval) was issued on 5 September 2007 under Part 3A of the *Environmental Planning & Assessment Act 1979* (the Act) and granted initial development approval to the ILC.

It is understood the Enfield ILC masterplan involves the development of nine Precincts (seven of which are intended for warehouse development) and a modification to operational aspects by extending the warehouse operating hours to 24 hours per day and seven days per week for two of the seven proposed warehouse precincts (Precincts C and E). Furthermore, it is understood the Enfield ILC masterplan involves the demolition of former railway buildings / structures, specifically the demolition of the existing building situated on the proposed Precinct D2 / D3. Further details of the Enfield ILC, MOD 14 and the masterplan are provided in **Section 4**.

This W&RMP applies to waste generated from site preparation works (demolition and excavation), construction and operations of the warehouses located within the proposed Precincts A, B, C, D, E, F and H at Enfield ILC.

This W&RMP has been prepared using architectural drawings provided by the Client. A demolition quantity survey has not been provided for preparation of this W&RMP. SLR has therefore made a number of assumptions regarding the quantities and waste types provided herein associated with demolition works.

Waste management for the site preparation and construction stages is described in **Section 5**. Waste management for the operational stage is described in **Section 6**.

1.1 Site Identification

The Enfield ILC is located within Strathfield South NSW, is within the local government area of Strathfield Council (Council) and comprises real property titles Lots 1 - 23 on DP 1183316. The Enfield ILC is bound by Cosgrove Road to the east, Punchbowl Road to the south, the Port Botany Freight Rail Line to the west and Roberts Road to the north (**Figure 1**).

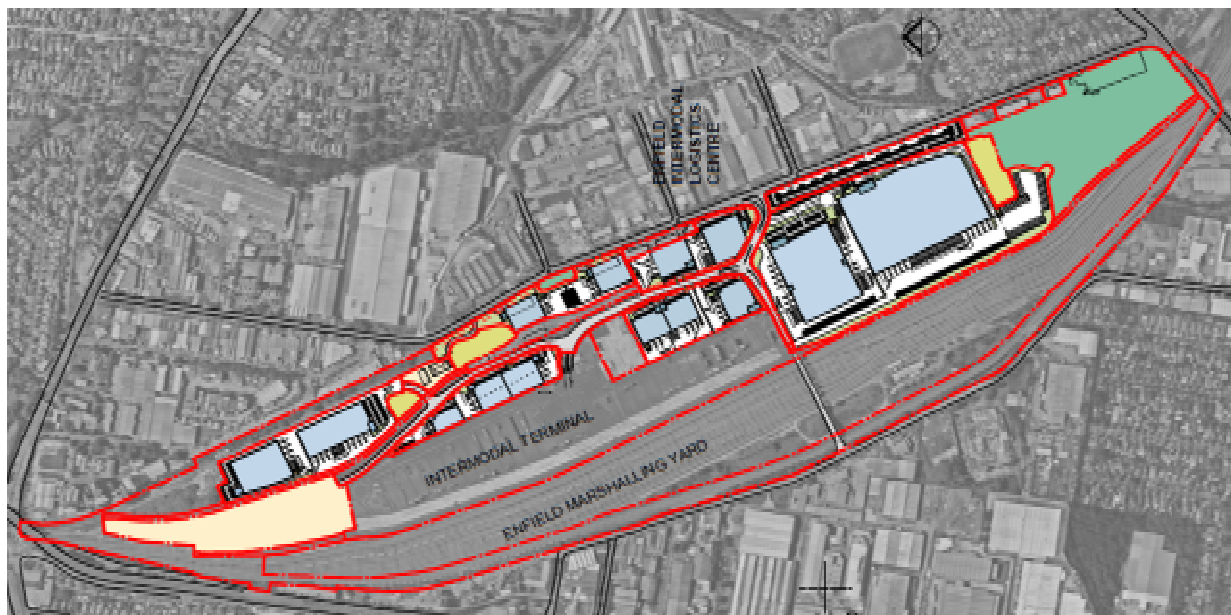


Figure 1 ILC Location & Subdivision Plan¹

¹ Request for Secretary's Environmental Assessment Requirements MP05_0417 Enfield Intermodal Logistics Centre (MOD 14), URBIS 2017

1.2 Objectives

The Client requires a waste and recycling management plan for Enfield ILC that satisfies the SEARs and is suitable for inclusion into the Modification Report. As such, the objectives of this W&RMP are:

- To address the SEARs Key Issues pertaining to waste for Enfield ILC (refer to **Appendix A**), which are:
 - Assess predicted waste generated from the project during construction and operation, including:
 - Classification of the waste in accordance with the current guidelines;
 - Estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance;
 - Handling of waste including measures to facilitate segregation and prevent cross contamination;
 - Management of waste including estimated location and volume of stockpiles;
 - Waste minimisation and reuse;
 - Lawful recycling or disposal locations for each type of waste; and
 - Contingencies for the above, including managing unexpected waste volumes.
 - Assess potential environmental impacts from the excavation, handling, storage on site and transport of waste particularly with relation to contamination sediment / leachate control, noise and dust;
- To provide advice on how the classified wastes should be handled, processed and disposed of (or re-used / recycled) in accordance with the above SEARs, Council requirements and better practice waste minimisation principles;
- To assist the Enfield ILC with achieving Federal and State Government waste minimisation targets;
- To facilitate safe and practical collection options of the Enfield ILC for Council collection staff and / or private contractors.

2 BETTER PRACTICE FOR WASTE MANAGEMENT AND RECYCLING

2.1 Waste Management Hierarchy

This W&RMP has been prepared in line with the waste management hierarchy (**Figure 2**), which summarises the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

The waste management hierarchy comprises the following principles, from most to least preferable (with respect to waste minimisation):

1. Waste **avoidance**, through prevention or reduction of waste generation. Waste avoidance is best achieved through better design and purchasing choices;
2. Waste **reuse**, without substantially changing the form of the waste;
3. Waste **recycling**, through the treatment of waste that is no longer usable in its current form to produce new products;
4. Energy **recovery**, through processing of residual waste materials;
5. Waste **treatment**; and
6. Waste **disposal**, in a manner that causes the least harm to the natural environment.

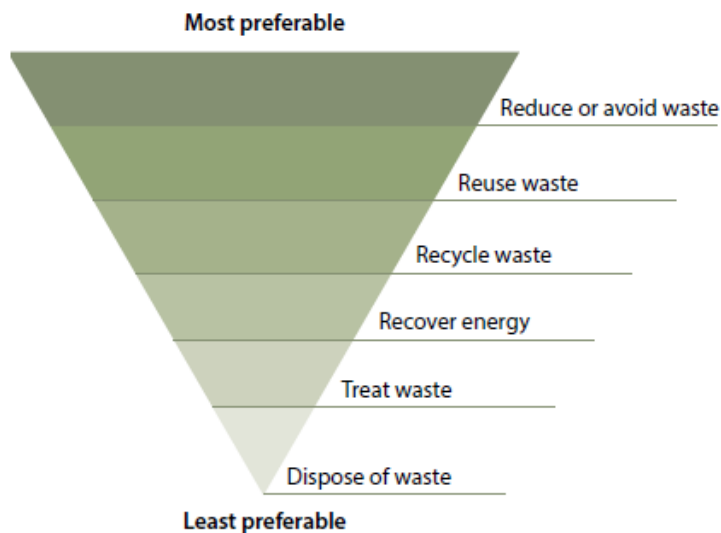


Image from NSW EPA (2014) *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

Figure 2 Waste management hierarchy

2.2 Benefits of Adopting Better Practice

Adopting better practice principles in waste minimisation offers significant benefits for organisations, stakeholders and the wider community. Benefits from better practice waste minimisation include:

- Enhances social and environmental reputation of an organisation;
- Reduces consumption of non-renewable resources;
- Reduces pollution generated from materials manufacturing and waste treatment;
- Reduces financial burden associated with waste disposal; and
- Provides opportunities for additional revenue streams through beneficial reuse.

2.3 Waste Avoidance, Re-use and Recycling

2.3.1 Waste Avoidance

Waste avoidance measures may include:

- Provision of take-back services to clients to reduce waste further along the supply chain;
- Re-work/re-packaging of products prior to local distribution to reduce waste arising;
- Review of packaging design to reduce waste but maintain 'fit for purpose';
- Providing ceramic cups, mugs, crockery and cutlery rather than disposable items;
- Presenting all waste reduction initiatives to staff as part of their induction program; and
- Investigating leased office equipment and machinery rather than purchase and disposal.

2.3.2 Re-use

Establish systems with in-house and supply chain stakeholders to transport products in re-useable packaging where possible.

2.3.3 Recycling

Recycling opportunities include:

- Plastic film (usually in the form of shrink pallet wrap) is light weight and compactable. If kept clean and separated from other plastics it is potentially recyclable and can be used to make items such as outdoor furniture;
- Flatten or bale cardboard to minimise storage space requirements;
- Paper recycling trays provided in office areas for scrap paper collection and recycling;
- Printer toners / ink cartridges are collected in allocated bins for appropriate contractor disposal;
- Development of 'buy recycled' purchasing policy; and
- Providing recycling collections within each of the offices (e.g plastics, cans and glass).

3 WASTE LEGISLATION AND GUIDANCE

Legislation and guidance documents outlined in **Table 1** should be referred to during all stages of the development.

Table 1 Waste legislation and guidance

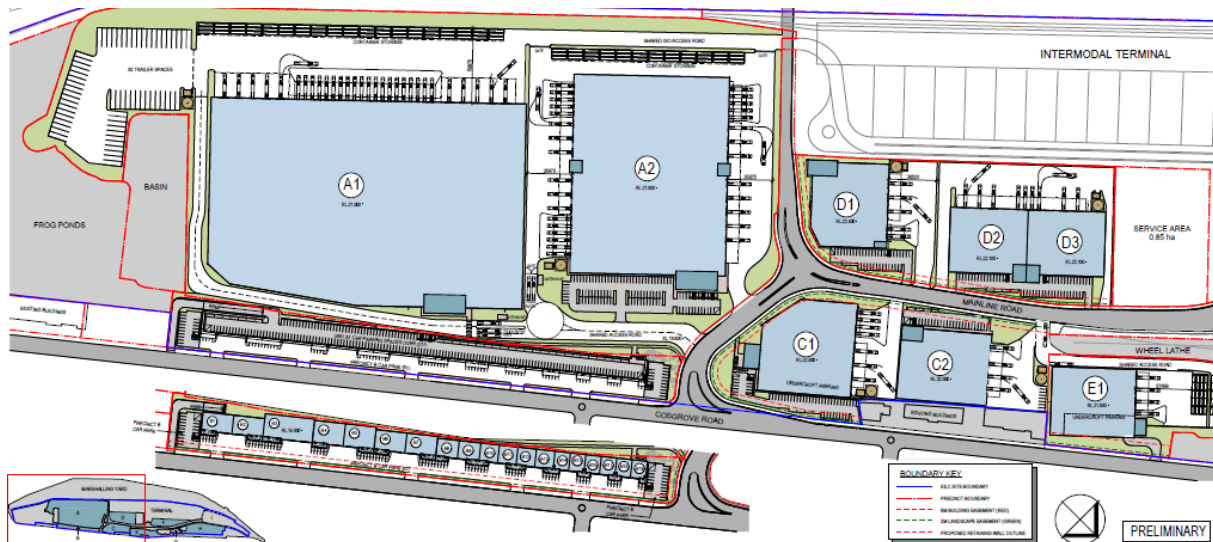
Legislation / Guidance	Objectives
MP 05_0147 MOD 14, Secretary's Environmental Assessment Requirements (SEARs), Planning & Environment 2017	Section 75W of the Environmental Planning and Assessment Act 1979, SEARs pertaining to the Proposed Enfield Intermodal Logistics Centre (MOD) 14 (issued 9 November 2017) pertaining to the site specific planning requirements. This W&RMP specifically addresses the Key Issues pertaining to Waste.
Strathfield Council's Consolidated Development Control Plan (SCDCP) 2005	<p>The Strathfield Council's Consolidated Development Control Plan (SCDCP) 2005 commenced on 3 May 2006 and supports the provisions of the SLEP planning controls by providing detailed planning and design guidelines.</p> <p>Council's SCDCP has been prepared in accordance with section 74C of the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000.</p> <p>This W&RMP specifically addresses the General Introduction, Part D, H and I of the DCP and sets out the waste management and servicing requirements for industrial buildings proposed to be developed within Council's Local Government Area. The waste management requirements focus on four key features:</p> <ul style="list-style-type: none"> • Part 1: Introduction to the waste legislative and policy context for waste minimisation and management; • Part 2: General introduction to a Waste Management Plan (WMP) and its requirements for different types of development (e.g Development Applications, Complying Development Certificates and in some instances, Construction and Occupation Certificate Applications); • Part 3: Specific advice for particular uses and scale of development such as multi dwelling housing, residential flat buildings and mixed-use development, commercial and industrial uses; and • Part 4: Series of appendices which provide detailed guidance on meeting the relevant development controls for certain types of development. These provide information on calculating waste generation rates, storage and collection area design requirements, Council services and standard notices for display.
Strathfield Local Environmental Plan (SLEP) 2012	The Strathfield Local Environmental Plan (SLEP) 2012 commenced on 29 March 2013, provisions within the SLEP 2012 relate to the conservation of Strathfield's heritage, preservation of trees and vegetation, development within the Strathfield Town Centre and within the Parramatta Road Corridor, and protection of environmentally sensitive areas.
Strathfield Community Strategic Plan 2025	<p>Details Councils and the community's shared long-term vision, priorities and strategies to 2025, ensuring a well maintained local area by:</p> <ul style="list-style-type: none"> • Clean and attractive town centres and neighbourhoods; • Reduced litter and dumping and taking action on pollution e.g air, noise, water etc; • Well maintained public areas, open spaces and parks; and • Little tolerance for offenders. <p>And a focus on Local environment by:</p> <ul style="list-style-type: none"> • High quality and well-designed developments; • Sustainable developments; and • Protecting natural environment including air and water quality.
National Waste Policy: Less Waste, More Resources 2009	<p>The National Waste Policy is the current document that provides a guidance framework to all jurisdictions for managing waste through to 2020 and has the following aims;</p> <ul style="list-style-type: none"> • Avoid the generation of waste, reduce the amount of waste (including hazardous waste) for disposal; • Manage waste as a resource; • Ensure that waste treatment, disposal, recovery and re-use is undertaken in a safe, scientific and environmentally sound manner; and • Contribute to the reduction in greenhouse gas emissions, energy conservation and production, water efficiency and the productivity of the land. <p>The National Waste Policy establishes 6 key areas and identifies 16 strategies across these areas for all government jurisdictions to work towards waste minimisation and resource recovery.</p>

Legislation / Guidance	Objectives
Waste Avoidance and Resource Recovery Act 2001	<p>To promote extended producer responsibility in place of industry waste reduction plans. Specific objectives include:</p> <ul style="list-style-type: none"> • To encourage efficient use of resources; • To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste; • Ensuring industry and the community share responsibility in reducing / dealing with waste; and • Efficient funding of waste / resource management planning, programs and service delivery.
Protection of the Environment Operations Act (POEO) 1997 & Amendment Act 2011	<p>Administered by the Environmental Protection Authority (EPA) to enable the Government to establish instruments for setting environmental standards, goals, protocols and guidelines.</p> <p>The owner of a premise, the employer or any person carrying on the activity which causes a pollution incident is to <i>immediately</i> notify the relevant authorities when material harm to the environment is caused or threatened. A list of each relevant authority is provided in the POEO Amendment Act and will be noted in the Site's incident register.</p>
POEO (Waste) Regulation 2014 (previously POEO (Waste) Regulation 2005)	Contains provisions relating to the waste levy, waste tracking and management requirements for certain waste types, payment schemes for local councils, consumer packaging recycling and other miscellaneous provisions.
NSW EPA's Waste Classification Guidelines (Part 1) 2014	To assist waste generators to effectively manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the POEO Act and its associated regulations.
Council of Australian Governments National Construction Code 2016	The National Construction Code 2016 sets the minimum requirements for the design, construction and performance of buildings throughout Australia.
EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The EPA's Better Practice Guidelines (2012) encourage efficient waste minimisation and resource recovery for commercial and industrial facilities and is used as a benchmark document when assessing waste production rates within Australia and details a range of waste management provisions.
NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21	A key component of the State Government's vision for the environmental and economic future of the state that will be supported financially by the <i>Waste Less, Recycle More</i> funding initiative providing long-term targets for six key result areas including reduced illegal dumping.

4 PROJECT DESCRIPTION

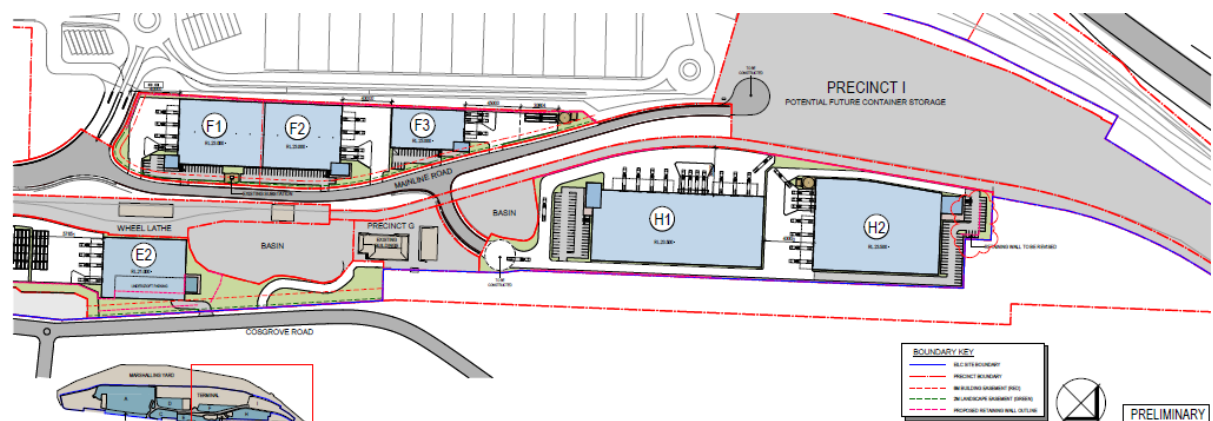
The site is currently occupied by an existing warehouse / office building (which predates the Approval) situated on the proposed Precinct D2 and D3. The proposed work for the Enfield ILC comprises:

- Site preparation (including demolition of an existing warehouse building / structure);
- Bulk earthworks (excavation);
- Construction across Precinct A, B, C, D, E, F and H (as demonstrated in **Figure 3** and **Figure 4**);
- Extension of Precincts C and E operational hours to 24 hours, 7 days a week.



Adapted from Drawing EILC MP03 (P17) dated 22nd December 2017.

Figure 3 Enfield Intermodal Logistics Centre, Precinct A, B, C, D and E.



Adapted from Drawing EILC MP04 (P14) dated 22nd December 2017.

Figure 4 Enfield Intermodal Logistics Centre, Precinct E, F, G, H & I.

5 DEMOLITION AND CONSTRUCTION WASTE AND RECYCLING MANAGEMENT

5.1 Targets for Recycling

The performance of each development should contribute to the following target in accordance with Council's DCP and the NSW EPA (2014) *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*:

- 80% of total construction and demolition waste diverted for reuse and recycled (with receipts sufficient in demonstrating the achieved target).

It is anticipated that the waste minimisation measures in the following sections will assist the development to meet this target. Waste reporting and audits are required to determine the actual percentage of wastes that are being / have been recycled during the site preparation and construction stages of the development.

5.2 Key Activities

Key demolition and construction activities at the Site are expected to comprise:

- Demolition of the warehouse within the proposed Precinct D2 and D3;
- Construction of warehouse / office buildings;
- Construction of two gatehouses;
- Construction of an empty container storage area;
- Construction of 807 car parking areas² (469 on-ground, 121 undercroft and 217 level one parking atop the B Units);
- Construction of 62 trailer parking areas and
- Construction of 19 awnings and 13 hardstand areas.

5.3 Waste Streams and Classifications

The demolition and construction activities are anticipated to generate the following broad waste streams:

- Site clearance and excavation wastes, including excavated fill, soil and / or rock³;
- Demolition wastes, including hazardous waste;
- Construction waste;
- Plant maintenance waste;
- Packaging waste;
- Work compound (on-site employees) waste; and
- Wastewater (from dewatering of excavations, plant maintenance and construction activities).

A summary of likely waste types arising from site preparation and construction activities, along with their waste classifications and proposed management methods, is provided in **Table 2**.

² Light duty area denotes car parking areas.

³ SLR has been advised that excavated materials are intended to remain onsite and be used for site leveling and will not be a removed waste.

For further information on how to determine a waste's classification refer to the NSW EPA (2014) *Waste Classification Guidelines*⁴. Further information on managing industrial wastes is also available from the NSW EPA website⁵.

Table 2 Potential waste types, classifications and management methods

Waste Types	NSW EPA Waste Classification	Proposed Reuse / Recycling / Disposal Method
Site Preparation		
Fill material	Solid waste (non-putrescible) requiring classification	Reuse on site if possible, off-site recycling or, if required, disposal to landfill
Excavated natural material (ENM)	General solid waste (non-putrescible)	Reuse on site if possible or off-site beneficial re-use
Virgin excavated natural material (VENM)	General solid waste (non-putrescible)	Reuse on site if possible or off-site beneficial re-use
Healthy Trees	General solid waste (non-putrescible) (garden waste)	On / off-site recycling (relocated either on-site or off-site)
Demolition and Construction		
Sediment fencing, geotextile materials (if applicable)	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Off-site recycling (for filling, levelling or road base)
Bricks and pavers	General solid waste (non-putrescible)	Off-site recycling (cleaned for reuse, rendered over or crushed for landscaping / driveway use)
Gyprock / plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier
Sand / soil	General solid waste (non-putrescible)	Off-site recycling
Metals (fittings, appliances etc) and bulk electrical cabling	General solid waste (non-putrescible)	Off-site recycling
Timber	General solid waste (non-putrescible)	Off-site recycling (<i>Treated</i> : reused for formwork, bridging, blocking, propping or second hand supplier. <i>Untreated</i> : reused for floorboards, fencing, furniture, mulched second hand supplier)
Doors, Windows, Fittings	General solid waste (non-putrescible)	Off-site recycling (second hand supplier)
Insulation material	General solid waste (non-putrescible)	Off-site disposal
Glass	General solid waste (non-putrescible)	Off-site recycling (glazing or aggregate for concrete production)
Asbestos	Hazardous waste	Off-site disposal
Fluorescent light fittings / bulbs	Hazardous waste	Off-site recycling or disposal (contact <i>FluoroCycle</i> for more information ⁶)
Lead paint	Hazardous waste	Off-site disposal
Synthetic Rubber (carpet underlay)	General solid waste (non-putrescible)	Off-site recycling (reprocessed and used in safety devices and speed humps)
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal (reused for landscaping or equestrian uses)
Plant Maintenance		

⁴ Available online from <http://www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm>

⁵ <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste>

⁶ <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

Waste Types	NSW EPA Waste Classification	Proposed Reuse / Recycling / Disposal Method
Empty oil and other drums / tins (e.g. fuel, chemicals, paints, spill clean ups)	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): Containers have been cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility (Note: Discharge to sewer subject to Trade Waste Agreement with local Council.)
Air filters and rags	General solid waste (non-putrescible)	Disposal at landfill
Oil filters	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling Contact the <i>Australian Battery Recycling Initiative</i> for more information ⁷
Packaging		
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates / pallets	General solid waste (non-putrescible)	Reused for similar projects, returned to suppliers, or off-site recycling. Contact <i>Business Recycling</i> for more information ⁸
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Donate (if suitable) ⁹ or compost on site. Alternatively dispose to landfill with general garbage
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or at a local NSW container deposit scheme "Return and Earn" off-site licensed facility ¹⁰
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers (soiled paper and cardboard, food stuffs, polystyrene)	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at landfill
Wastewater, pump-out waste and septage (sewage)	Liquid (trade) waste	Off-site disposal at licensed facility or disposal direct to sewer where arranged with Council

5.4 Site Preparation Waste Types and Quantities

Site preparation waste would be primarily excavated fill, soil and / or rock. In the absence of Council published sources, the estimated quantities of site preparation waste (**Table 3**) are based on:

- Area estimation obtained from the Masterplan architectural drawing EILC MP01 (P12); and
- An assumed, average excavation depth of 500 mm across the extent of the entire site.

In accordance with Council's DCP, care should be taken to minimise site disturbance and limit unnecessary excavation.

Given the site has a history of industrial land-use, there is the potential for excavation works to encounter contaminated materials and / or unexpected finds. The contractor is directed to refer to their relevant Site Management plan(s), including **Sections 5.10** and **5.13** of this Waste Management Plan, for management of contaminated materials and / or unexpected finds.

⁷ <http://www.batteryrecycling.org.au/home>

⁸ <http://businessrecycling.com.au/search/>

⁹ <http://www.ozharvest.org/>, <https://www.foodbank.org.au/>, <https://www.secondbite.org/> or <https://www.exodusfoundation.org.au/>

¹⁰ <http://returnandearn.org.au/>

All excavated spoil is to be classified by an appropriately experienced environmental consultant and separated into contaminated materials (if any), uncontaminated fill, ENM or VENM (refer to **Section 5.13** for management of stockpiles). Uncontaminated fill, ENM and VENM should be retained on site and managed appropriately for beneficial re-use. Contaminated material, if any, should be treated on-site if feasible. Disposal of contaminated fill to off-site landfills is to be considered as a last resort.

Table 3 Estimated quantities of site preparation waste

Spoil Type	Area (m ²)	Depth (m)	Density (tonnes / m ³)	Quantity (tonnes) ¹
Fill, ENM or VENM	593,200	0.5	1.9 ²	563,600

1. Tonnage estimates rounded to the nearest 100 tonnes.

2. Low range bulk density of 1.9 tonnes / m³ for “medium-dense sands and gravels” (Table 6-1-1 from Tomlinson (1986)¹¹).

5.5 Demolition Waste Types and Quantities

The absence of detailed floor plans for the existing building on the Site precludes the provision of information on the types and quantities of demolition waste beyond the general information presented below.

Aerial imaging suggests the demolition of the existing building located within the proposed Precinct D2 and D3 is anticipated to generate demolition waste comprising predominantly of the materials listed in **Table 4**.

Table 4 Anticipated types and estimated quantities of demolition waste

	Estimated Waste Material (tonnes) ¹					
	Floor Area (m ²)	Concrete	Bricks	Timber / Gyprock	Steel	Other
“Office” demolition rates ²	1000	448	205	4	23	18
Building within D2 / D3	2,350 ³	1,100	500	10	60	50

1. Waste estimates have been rounded up to the nearest 100 tonnes or up to the nearest 10 tonnes if less than 100.

2. Tonnes per 1,000 m² from Appendix A of *The Hills DCP 2012*, using the “Factory” demolition rates.

3. Floor areas for demolition were estimated by SLR from SixMaps <https://maps.six.nsw.gov.au/>.

Although the existing Building across the proposed Precinct D2 / D3 appears to be of brick and steel construction, there is a potential for asbestos¹² and / or asbestos containing materials to be present among the waste generated from demolition of the building. As such, it is recommended that a pre-demolition hazardous materials survey be conducted by a qualified professional on the existing building across the proposed Precinct D2 / D3 to identify potential hazardous wastes likely to arise from demolition of these buildings.

SLR also recommends that a demolition quantities survey be conducted by a qualified professional of the building across the proposed Precinct D2 / D3 to provide further information on types and quantities of demolition waste.

5.6 Construction Waste Types and Quantities

In the absence of readily available construction waste generation rates from Council, SLR have adopted the “Office” and “Factory” waste generation rates (**Table 5**) from Appendix A of *The Hills Development Control Plan (DCP) 2012* for estimating the type and quantities of waste generated from construction of the Enfield ILC (**Table 6**).

“Office” rates have been applied to the construction of offices, warehouse offices and gatehouses. “Factory” rates have been applied to the construction of warehouses, awnings and container storages.

¹¹ Tomlinson M.J. (1986) *Foundation design and construction*. John Wiley & Sons.

¹² Please also refer to the EPA NSW asbestos information below <http://www.epa.nsw.gov.au/your-environment/household-building-and-renovation/dealing-with-household-asbestos>, <http://www.epa.nsw.gov.au/your-environment/waste/tracking-transporting-hazardous-waste/transporting-asbestos-waste-tyres/tracking-asbestos-waste-locate> and <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/asbestos-waste>.

In the absence of readily available published information for “Carpark” construction waste generation rates, SLR have developed “Carpark” construction rates based on the “Office” rates (**Table 5**) by:

- Removing timber, bricks and gyprock (as these materials are unlikely to be present in significant quantities in a modern carpark structure); and
- Increasing the rates for concrete, sand / soil, metal and “other”, in proportion, to maintain the total assumed tonnage per 1000 m² of construction.

“Carpark” rates have been applied to the construction of car parking spaces (i.e. light duty areas), hardstand areas and trailer parking areas.

Table 5 Construction waste generation rates

	Waste Material (tonnes)							
	Floor Area (m ²)	Timber	Concrete	Bricks	Gyprock	Sand / Soil	Metal	Other
Office	1,000	5.1	18.8	8.5	8.6	8.8	2.75	5
Factory	1,000	0.25	2.1	1.65	0.45	4.8	0.6	0.5
Carpark	1,000	--	30.6	--	--	14.3	4.5	8.1

Rates for “Factory” and “Office” are from Appendix A of *The Hills DCP 2012*. Rates for “Carpark” have been derived by SLR (see text for derivation description).

Table 6 Anticipated types and estimated quantities of construction waste

Precinct - Unit	Waste Material (tonnes)							
	Floor Area (m ²)	Timber	Concrete	Bricks	Gyprock	Sand / Soil	Metal	Other
A1	73,725	45	975	110	60	650	185	280
A2	40,675	40	575	70	45	380	125	180
B1 / 2	996	15	15	15	15	15	15	15
B3	916	15	15	15	15	15	15	15
B4 / 5	1,146	15	15	15	15	15	15	15
B6 / 7	1,046	15	15	15	15	15	15	15
B8 / 9	706	15	15	15	15	15	15	15
B10 / 11 / 12 / 13	1,164	15	15	15	15	15	15	15
B14 / 15 / 16 / 17 / 18 / 19	1,410	15	15	15	15	20	15	15
C1	10,959	30	175	35	30	120	55	70
C2	7,673	20	115	25	20	80	35	50
D1	9,110	25	170	30	25	105	45	65
D2 / 3	14,885	35	260	45	35	175	70	95
E1	7,835	20	140	25	20	90	45	50
E2	7,865	20	150	25	20	95	45	55
F1 / 2	13,776	40	230	50	40	155	70	95
F3	4,591	25	85	25	25	60	40	40
H1	16,807	25	270	35	25	170	65	90
H2	13,771	25	205	35	25	140	50	75
Total	228,824	455	3,455	615	475	2,330	935	1,250

Floor areas from architectural drawings 17169_GM Enfield_EILC A DA10_P8, 17169_GM Enfield_EILC C DA10_P7, 17169_GM Enfield_EILC D DA10_P5, 17169_GM Enfield_EILC E DA11_P7, 17169_GM Enfield_EILC F DA11_P8 and 17169_GM Enfield_EILC H DA11_P5. Waste estimates have been rounded up to the nearest 5 tonnes.

5.7 Waste Avoidance

The **Building Designer** is to consider:

- Using prefabricated components and recycled materials (e.g recycled steel);
- Reducing the use of PVC;
- Preferentially using paints, floor coverings and adhesives with low VOC (volatile organic compound) content;
- Using low formaldehyde wood products, post-consumer reused timber and / or Forest Stewardship Council (FSC) certified timber;
- Using fittings and furnishings that have been recycled, are made from or incorporate recycled materials and have been certified as sustainable or environmentally friendly by a recognised third party certification scheme; and
- Preferentially using building materials, fittings and furnishings (including structural framing, roofing and façade cladding) that have longer life and better re-use and / or recycling potential.

The **Site Manager** is to consider:

- Arrange delivery of materials “as needed” to mitigate material degradation by weathering or moisture damage;
- Sort and segregate site preparation and construction wastes to ensure efficient recycling of wastes (see also **Section 5.9.1**);
- Store wastes on site appropriately to prevent cross-contamination and / or mixing of different waste types (see also **Sections 5.9.1** and **5.9.2**);
- Reduce packaging waste by:
 - Returning packaging to suppliers where possible and practicable;
 - Purchasing in bulk;
 - Requesting cardboard or metal drums rather than plastics;
 - Requesting metal straps rather than shrink wrap; and
 - Using returnable packaging such as pallets and reels.

The **Building Contractor / Construction Environmental Manager** (or equivalent) is to consider:

- Apply practical building designs and construction techniques;
- Estimate required volumes of materials to reduce over-purchasing (and excess materials);
- Exercise a preference for long lifespan and / or high potential for re-use in selecting construction materials;
- Re-use formwork where appropriate; and
- Ensure subcontractors are informed of and implement site waste management procedures.

5.8 Re-use, Recycling and Disposal

The building contractor is to (where feasible) implement the following with respect to re-use, recycling and disposal of site preparation and construction waste:

- Provide separate waste bins for recyclable and non-recyclable general wastes;
- Assess excavation spoil for contamination status and beneficial re-use;
- Recycle / dispose of waste oil in an appropriate manner;
- Retain roofing material cut-offs for re-use;

- Retain used crates for storage purposes unless damaged;
- Recycle cardboard, glass and metal wastes;
- Return packaging to suppliers where possible / practicable;
- Recycle / dispose of solid waste timber, brick, concrete, tiles, asphalt and rock (where such waste cannot be re-used on site) to an appropriately licenced construction and demolition (C&D) waste recycling facility or an appropriately licenced landfill;
- Dispose of all asbestos, hazardous and / or intractable wastes in accordance with WorkCover NSW and NSW EPA requirements; and
- Deliver batteries to drop off-site recycling facility / centre.

5.9 Waste Segregation, Storage and Servicing

5.9.1 Waste Segregation and Storage

Waste materials produced from site preparation and construction activities are to be segregated and stored separately on site. Waste and recycling storage areas should be selected having considered its slope, drainage and location relative to waterways / stormwater outlets / vegetation.

It is anticipated that the site will provide allowances for separate storage (e.g separate skip bins and / or appropriately managed stockpiles) of the following waste types:

- Bricks, roof tiles, concrete and scrap metal;
- Metal / steel (if any, in a condition suitable for recycling at metal recycling facilities);
- Timber;
- Glass;
- Hardstand rubble;
- Excavation spoil (uncontaminated, if present);
- Contaminated excavation spoil (if present);
- Hazardous waste (if present);
- Paper / cardboard;
- Recyclable general waste; and
- Non-recyclable general waste.

If there is insufficient space onsite for full segregation of waste types, the building contractor should consult with waste / recycling collection facilities to confirm which waste types may be co-mingled prior to removal from the site.

5.9.2 Waste Storage Areas

Areas designated for waste storage should:

- Allow unimpeded access by site personnel and waste disposal contractors;
- Employ adequate environmental management controls to prevent off-site migration of waste materials and / or contamination from the waste; and
- Not present hazards to human health or the environment.

5.9.3 Waste Servicing and Transport Off-site

The building contractor is to:

- Arrange for suitable waste collection contractors to remove site preparation and construction waste from site;
- Ensure waste bins are not filled beyond recommended filling levels;
- Ensure that all bins and loads of waste materials leaving site are covered;
- Maintain waste disposal documentation detailing, at a minimum:
 - Descriptions and estimated amounts of all waste materials removed from site;
 - Details of the waste / recycling collection contractor(s) and facilities receiving the waste / recyclables;
 - Records of waste / recycling collection vehicle movements (e.g date and time of loads removed, licence plate of collection vehicles, tip dockets from receiving facility); and
 - Waste classification documentation for materials disposed to off-site recycling or landfill facilities.
- Ensure lawful waste disposal records are readily accessible for inspection by regulatory authorities such as Council, WorkCover NSW or NSW EPA;
- Remove waste during hours approved by Council.

5.10 Contaminated / Hazardous Waste

Contaminated fill material and / or soils should be assessed by an appropriately qualified and experienced environmental consultant for remediation and / or management options. Preference is to be given to on-site remediation options to render the material suitable for beneficial re-use. Where on-site remediation is unfeasible, options for on-site management (including encapsulation) are to be assessed.

Off-site disposal of contaminated fill materials and / or soils is to be considered as a last resort and may only be carried out if it is demonstrated that all other on-site remediation and management options are unfeasible.

Where unexpected materials are encountered which are, or are suspected of being, contaminated or hazardous, the following shall be undertaken as a minimum:

- Work in the vicinity of the suspect material is to stop immediately and access to the area restricted;
- Site manager is to contact a qualified hazardous materials assessor and / or environmental consultant (as necessary) to arrange an assessment of the suspect material and advise on subsequent management procedures; and
- The building contractor's unexpected finds protocol, if available, shall be implemented.

It is anticipated that management of contaminated / hazardous waste will also be subject to relevant requirements as set out in the Construction Environmental Management Plan (to be prepared by the building contractor). It is anticipated that management of contaminated / hazardous waste (including asbestos special waste) will also be subject to relevant requirements as set out in the relevant Site Management Plan(s) (to be prepared by the building contractor).

5.11 Liquid Waste Management

Wastewater or liquid waste generated from site preparation or construction activities is not permitted to enter the stormwater system or migrate off-site.

Areas, if any, designated on site for wash-down of equipment plant or machinery are to be appropriately bunded and isolated from the local stormwater system and groundwater.

Liquid waste / wastewater are to be removed by a suitably qualified liquid waste contractor and transported to an appropriately licenced facility for treatment and / or disposal in accordance with NSW EPA regulations. Alternatively, liquid waste may be discharged to sewer under a Trade Waste Agreement with Sydney Water Corporation

Refer also to the building contractor's Soil and Erosion Management Plan and the Construction Environmental Management Plan for further site-specific details on wastewater and liquid waste management, treatment and / or disposal.

5.12 Spills Management

Spillages are to be contained immediately (if safe to do so) and the site manager notified as soon as possible.

Spill containment kits and spill control equipment are to be provided and maintained in sufficient numbers and at appropriate locations to allow ready and rapid access by site personnel. Safety Data Sheets (SDSs) should also be available to provide advice on spill clean-up and disposal.

Refer also to the building contractor's Construction Environmental Management Plan for further site-specific details on spills management.

5.13 Additional Environmental Controls

Site preparation for, and construction of, Enfield ILC infrastructures will likely require excavation into existing ground which may contain contaminated fill materials. In addition to the environmental controls mentioned in this W&RMP, the following control measures should be implemented by the construction contractor during site establishment, site preparation and construction works:

- Work area(s) to be securely fenced using temporary fencing and access restricted to authorised persons;
- Appropriate work site signage to be erected. Signage is to conform with Australian Standard AS13191994 Safety Signs for the Occupational Environment;
- Silt fencing, drain protection, hay bales, diversion drains and other runoff controls installed as appropriate to prevent uncontrolled off-site discharge of surface water and / or runoff;
- Dust suppression equipment (e.g water cart) is to be available at all times and used when appropriate to minimise dust emissions;
- Transport vehicles and cars are to remain on designated haul roads while on site and keep within the site speed limit;
- A wheel wash is to be installed at each site exit. All vehicles must travel through a wheel wash immediately prior to leaving site;
- Any excess excavation spoil intended for disposal off-site must be waste classified in accordance with the NSW DECCW (2009) *Waste Classification Guidelines* prior to disposal;
- All loads in vehicles leaving the site are to be adequately and securely covered prior to leaving site;
- Should visible debris of asbestos containing materials (or materials suspected of containing asbestos) be encountered, work should cease immediately and the procedure for Contaminated / Hazardous Waste followed (see above);
- Should suspect material be encountered, the Unexpected Finds Protocol should be followed (see below);
- Should on-site stockpiling of excavated soils or fill material be required (as a contingency):
 - Stockpiles are to be placed within a securely fenced area;
 - Stockpiles should be located on hardstand where possible. If hardstand areas are not available for stockpiling, stockpiles should be placed on heavy duty plastic sheeting;

- Stockpiles of fill material must be separated from stockpiles of natural soil / bedrock;
- Contaminated material must be stockpiled separately from uncontaminated material;
- Stockpiles are to be compacted and battered;
- The height of individual stockpiles is not to exceed 4 m;
- Sediment controls must be placed around each area containing stockpiles of a certain type (e.g stockpiles of contaminated material, stockpiles of uncontaminated material) such that:
 - No runoff from any other part of the site reaches the stockpiled material;
 - No uncontrolled runoff from stockpiles reaches any other part of the site; and
 - No uncontrolled runoff from any stockpile area reaches another stockpile area.
- Except when being worked on, stockpiles are to be adequately and appropriately covered to minimise the potential for wind erosion, infiltration of rainwater and generation of runoff.

5.13.1 Unexpected Finds Protocol

Should unexpected finds be encountered during excavation or other earthworks, work should stop in all appropriate areas and the site supervisor / foreman notified.

Work should not resume within the affected area until the unexpected finds have been appropriately assessed and any risks presented by the finds have been appropriately mitigated.

Typical unexpected finds include (but are not limited to):

- Fill or soils with visible contamination (e.g oily stains, unnatural discolouration) and / or are strongly malodorous;
- Uncontained liquids;
- Storage drums (e.g liquid storage drums);
- Buried services and infrastructure (e.g underground fuel storage tanks);
- Items of potential or actual Indigenous Heritage or archaeological significance.

Refer also to **Section 5.10**.

5.13.2 Construction Environmental Management Plan

In addition to this W&RMP, it is expected that the construction contractor shall prepare a Construction Environmental Management Plan (CEMP) detailing control measures and procedures to be followed during site preparation and construction work to mitigate the environmental impact of these works. The CEMP and this W&RMP are anticipated to be implemented in tandem during site preparation and construction works.

5.14 Signage

Standard signage is to be posted in all waste storage / collection areas to inform and educate users of waste storage / collection areas while promoting waste minimisation and resource recovery.

Signage must be located to ensure visibility and well-lit at all times. All waste containers / areas are required to be labelled correctly and clearly to identify stored materials. Bin lid stickers must be affixed to each bin, advising of the bin waste type.

Signs approved by the NSW EPA for labelling of waste materials are available online (<http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>) and should be used where applicable. A selection of signs prepared by NSW EPA is provided in **Figure 5**.



Figure 5 Examples of NSW EPA labels for waste skips / bins

Signage design should also be consistent with Council's requirements, inclusive of multi-lingual provision. To confirm correct signage, contact Council directly (as required).

5.15 Site Inductions

Waste management measures and procedures are to be included in the site induction for all personnel working at the site. With respect to waste management, the site induction is to include, at a minimum:

- An outline of this W&RMP and all Site Management Plans relating to management of contaminated (and potentially contaminated) materials;
- Legal obligations;
- Emergency response procedures on site;
- Waste storage locations and separation of waste;
- Litter management in transit and on site;
- Implications of poor waste management practices;
- Correct use of spill kits; and
- Responsibility and reporting (including identification of personnel responsible for onsite waste management and individual responsibilities).

5.16 Monitoring and Reporting

Records of volumes or tonnages of waste re-used, recycled or disposed to landfill are to be maintained by the building contractor. Additionally, dockets / receipts verifying recycling and / or disposal in accordance with the W&RMP must be retained and presented to the regulatory authorities such as Council, WorkCover NSW or NSW EPA if requested.

Daily visual inspections of waste storage areas will be undertaken by site personnel to identify and rectify any issues concerning waste management at the site, as well as identifying opportunities to improve waste management at the site. A written record of these inspections, which will include observations made and the results of any remedial actions taken, is to be undertaken and retained by the building contractor as part of the construction environmental management documentation.

Refer also to the building contractor's Construction Environmental Management Plan for further site-specific details on waste monitoring and reporting requirements.

5.17 Roles and Responsibilities

Suggested roles and responsibilities for waste management at the site are provided in **Table 7**. Where possible, a construction environmental manager should be appointed for the site preparation and construction work.

Table 7 Suggested roles and responsibilities for site preparation and construction waste management

Role	Responsibilities
Site Manager for Principal Contractor	<ul style="list-style-type: none">• Ensuring plant and equipment are well maintained;• Ordering only the required amount of materials;• Developing or identifying, and using, local commercial opportunities for re-use of materials where re-use on-site is impractical;• Keeping materials segregated to maximise reuse and recycling;• Ensuring that waste sorting and storage areas are sign posted correctly, maintained in a tidy and functional state and do no present hazards to human health or the environment;• Facilitate waste collection / manage waste collection and waste disposal contractors;• Ensure hazardous / contaminated materials are appropriately managed and disposed;• Ensure site records and documentation is kept and is complete;• Ensuring staff and contractors are aware of site requirements for waste management;• Maintain site environmental controls;• Ensure the CEMP and this W&RMP are implemented;• Liaise with the Principal as required;• Approval of off-site waste disposal locations and checking licensing requirements;• Arranging for the assessment of potentially hazardous and / or contaminated materials and liquid wastes;• Monitor site environmental controls; and• Other required monitoring, inspection and reporting requirements.

6 OPERATIONAL WASTE AND RECYCLING MANAGEMENT

6.1 Targets for Resource Recovery

The waste management performance of each development should contribute to the overall NSW State target for recycling, which is expected to increase from 52% (2010 to 2011) for municipal solid waste and 57% for commercial / industrial waste to 70% (by 2021 to 2022) of the total waste generation per capita (NSW EPA (2014) *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*).

6.2 Waste Streams and Classifications

Operations of the Enfield ILC are anticipated to generate the following broad waste streams:

- General waste and commingled recycling;
- Bulk packaging wastes, including polystyrene and cardboard boxes;
- Bulky waste items, such as furniture and e-waste; and
- Stores, plant and general maintenance wastes.

Potential waste types, their associated waste classifications, and management methods are provided in **Table 8**.

Table 8 Potential waste types, classifications and management methods – operational waste

Waste Types	NSW EPA Classification	Proposed Reuse / Recycling / Disposal Method
General		
General garbage (including non-recyclable plastics)	General solid (putrescible and non-putrescible) waste	Disposal at landfill
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid (non-putrescible) waste	NSW container deposit scheme "Return and Earn"; comingled recycling at off-site licensed facility
Food waste	General solid (putrescible) waste	Donate (if suitable) ¹³ or compost on site. Alternatively dispose to landfill with general garbage
Cardboard / bulky cardboard boxes	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Bulky polystyrene	General solid (non-putrescible) waste	Disposal at landfill
Furniture	General solid (non-putrescible) waste	Off-site reuse or disposal to landfill
E-waste, printer toners and ink cartridges	Hazardous waste	Off-site recycling (free disposal box / bags and pickup service exists for printer toners and ink cartridges)
Batteries	Hazardous waste	Off-site recycling (Contact the <i>Australian Battery Recycling Initiative</i> for more information ¹⁴)
Mobile Phones	Hazardous waste	Off-site recycling (Contact <i>MobileMuster</i> for more information) ¹⁵
Maintenance		
Spent smoke detectors ¹⁶	General solid (non-putrescible) waste OR Hazardous waste (some commercial varieties)	Disposal to landfill, or off-site disposal at licensed facility

¹³ <http://www.ozharvest.org/>, <https://www.foodbank.org.au/>, <https://www.secondbite.org/> or <https://www.exodusfoundation.org.au/>

¹⁴ <http://www.batteryrecycling.org.au/home>

¹⁵ <https://www.mobilemuster.com.au/>

Waste Types	NSW EPA Classification	Proposed Reuse / Recycling / Disposal Method
Glass (other than containers)	General solid (non-putrescible) waste	Off-site recycling
Light bulbs / fluorescent tubes	Hazardous waste	Off-site recycling or disposal (contact <i>FluoroCycle</i> for more information ¹⁷)
Cleaning chemicals, solvents, area wash downs, empty oil / paint drums / chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility. Discharge to sewer likely to be subject to Trade Waste Agreement with Sydney Water.

Source: <http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm>

For further information on how to determine a waste's classification, refer to the NSW EPA (2014) *Waste Classification Guidelines*.¹⁸

6.3 Waste Management Overview

Operational waste management is proposed to comprise:

- General waste is to be initially collected within each tenancy and placed (daily) in 4.5 m³ (i.e 4,500 L) capacity mobile garbage bins (MGBs) located within on-site waste storage areas;
- The 4.5 m³ bins storing waste or recyclable materials will be located within an area of hardstand adjacent to a loading dock / drive through (**Figures 6 and 7**) for collection by a private waste contractor; and
- Recyclable materials are recommended to be initially collected and bailed within each tenancy. Bales of recyclable material will be temporarily stored indoors until collection by a private recycling contractor. Immediately prior to collection, the bales are to be transported to the 4.5 m³ MGB waste collection area (if stored separately), ready for collection.

6.3.1 Precinct A, Unit A1

Part H, Section 2.6.6 of the *Strathfield Consolidated Development Control Plan 2005, Waste Minimisation and Management Plan (2015)*, delineates that Council does not generally support compaction due to the potential bin / equipment damage and overloading of bins / trucks.

Due to the anticipated volume of operational waste and recyclable materials generated from the proposed Precinct A, Unit A1 (**Table 10**), it is recommended that for Unit A1:

- Waste be compacted with at least a 2:1 ratio; or
- Waste and recycling be collected more frequently than once per week.

As the use of compaction facilities is at the discretion of Council, early engagement with Council is recommended to clarify the prospect of compaction utility.

6.3.2 Precinct B, Units B1 to B19

For servicing convenience and safety, it is suggested that Precinct B utilise a single, centralised waste storage area positioned between B6 and B7 (**Figure 6**).

¹⁶ The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste and the requirements of the National Health and Medical Research Council's *Code of practice for the near-surface disposal of radioactive waste in Australia (1992)* must be met. Contact ARPANSA for more information.
http://www.arpansa.gov.au/radiationprotection/factsheets/is_smokedetector.cfm

¹⁷ <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

¹⁸ Available online from <http://www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm>

6.3.3 Precinct D

Due to the proximity of Units D2 and D3, a single waste storage and servicing area is recommended for servicing convenience.

6.4 Estimated Quantities of Operational Waste

For the purposes of this assessment, SLR has adopted the general waste and recycling needs per *Offices* (for offices, warehouse offices and gatehouses) and *Showroom* (for warehouses) as presented in Appendix H of Council's *Waste Minimisation and Management Plan* (**Table 9**) to estimate the quantities of operational waste and recycling to be generated from the Enfield ILC (**Table 10**).

Table 9 Operational waste and recycling generation rates

Suite Type	Waste	Recycling
Offices	10L / 100m ² floor area / day	10L / 100m ² floor area / day
Showroom	40L / 100m ² floor area / day	10L / 100m ² floor area / day

The estimated quantities of operational waste and recycling generated by the Enfield ILC (**Table 10**) are based on:

- The number and type of Precinct Units as presented on the architectural drawings;
- The waste and recyclable material generation rates presented in **Table 9**;
- The use of 4.5 m³ MGBs for weekly waste storage in the respective unit's waste areas;
- MGB dimensions as per Appendix H of Council's *Waste Minimisation and Management Plan*;
- Once-a-week frequency of garbage and recycling collection; and
- Bales of recycling material typically have a volume of 1 m³ per bale.

Table 10 Estimated quantity of operational waste and recycling generated weekly

Precinct & Unit	Waste (L)	Recycling (L)	Number of Recycling Bales
A1	81,400	20,900	21
A2	40,400	10,700	11
Precinct A Total	121,800	31,600	32
B1	900	300	< 1
B2	900	300	< 1
B3	1700	500	< 1
B4	1100	400	< 1
B5	1100	400	< 1
B6	1000	400	< 1
B7	1000	400	< 1
B8	600	200	< 1
B9	600	200	< 1
B10	500	200	< 1
B11	500	200	< 1
B12	500	200	< 1
B13	500	200	< 1
B14	500	200	< 1
B15	500	200	< 1
B16	500	200	< 1

Precinct & Unit	Waste (L)	Recycling (L)	Number of Recycling Bales
B17	500	200	< 1
B18	500	200	< 1
B19	500	200	< 1
Precinct B Total	13,900	5,100	6
C1	16,100	4,400	5
C2	11,600	3,200	4
Precinct C Total	27,700	7,600	9
D1	8,200	2,500	3
D2	6,600	1,800	2
D3	6,600	1,800	2
Precinct D Total	21,400	6,100	7
E1	10,400	2,800	3
E2	9,600	2,600	3
Precinct E Total	20,000	5,400	6
F1	7,150	1,950	2
F2	7,150	1,950	2
F3	3,900	1,100	2
Precinct F Total	18,200	5,000	6
H1	16,400	4,400	5
H2	15,400	4,200	5
Precinct H Total	31,800	8,600	10
Total (Precincts A / B / C / D / E / F / H)	254,800	69,400	76

Waste estimates have been rounded up to the nearest 100 tonnes.

6.5 Waste Storage Areas

6.5.1 Waste Storage Size

In accordance with Council's *Waste Minimisation and Management Plan* the waste and recycling area must encompass the capacity to store the volume of operational waste and recycling between collections. The waste storage area must enable provision of sufficient bin storage area so that all waste bins can be collected in a single trip and emptied bins can be adequately manoeuvred.

Per Appendix H of Council's *Waste Minimisation and Management Plan*, 2-wheel, 4-wheel and bulk Mobile Garbage Bins (MGBs) are available for waste and recycling storage. After considerations to the estimated quantities of operational waste and recycling to be generated from each unit within the Enfield ILC (**Table 10**), it is recommended that the 4.5 m³ bulk MBG be used for efficiency of waste storage and that recycling is baled accordingly.

To allow for ready movement of bins into and out of the bin room(s), a bin / garbage room should provide a floor area of at least 150 % of the total minimum bin GFA. This also allows for provisional contingency in the event of a surplus of waste occurrence.

Bales of recycling material typically result in an area of 1 m² per bale but the Storage gross floor area (GFA) would be dependent on how the bales are stored (i.e. vertical verse horizontal) and as such have not been included in the recommended storage GFA.

The dimensions and GFA of a 4.5 m³ L MGB are:

- Height: 1,570 mm;

- Depth: 1,605 mm;
- Width: 1,805 mm;
- GFA of 2.89 m² (rounded to 3 m² for the purpose of the calculations listed in **Table 11** and **12**).

6.5.1.1 Precinct A

Without compaction, the proposed Precinct A, Unit A1 would require at least 19 of the 4.5 m³ capacity bulk bins for adequate storage of their operational wastes (**Table 11**). For efficiency of storage and operations, it is recommended that a waste compactor be utilised within Unit A1 with compaction of at least 2:1, decreasing the number of waste MGBs from 19 to 10 (**Table 12**).

Table 11 Minimum number 4.5 m³ MGBs required for weekly operational waste storage (if recycling baled) and associated minimum GFA for MGBs (without waste compaction)

Precinct & Unit	Total Number of 4.5 m ³ L MGBs	Min. MGBs GFA (m ²)	Recommended Waste Storage GFA (m ²)
A1	19	57	86
A2	9	27	41
Precinct A Total	28	84	127

Table 12 Minimum number 4.5 m³ MGBs required for weekly operational waste storage (if recycling baled) and associated minimum GFA for MGBs (with 2:1 waste compaction)

Precinct & Unit	Total Number of 4.5 m ³ L MGBs	Min. MGBs GFA (m ²)	Recommended Waste Storage GFA (m ²)
A1	10	30	45
A2	5	15	23
Precinct A Total	15	45	68

In addition to storage space for MGBs, sufficient allowance is to be provided for storage of recycling bales (see **Table 10** for estimated numbers of bales).

6.5.1.2 Precinct B, Units B1 to B19

With combined waste storage / servicing for Units B1 to B19, the combined waste is anticipated to require a minimum of **three 4.5 m³ L MGBs for waste** and an additional **one 4.5 m³ L MGB for non-baled recycling**. Four 4.5 m³ L MGBs have a minimum GFA of 12 m² and a recommended storage GFA of 18 m².

Alternatively, if each unit within Precinct B is to store their operational waste and recycling individually, the recommended MGB sizes would range between a combination of 360 L, 600 L and 1,100 L MGBs (**Table 14**). The dimensions and GFA of a 360 L, 600 L and 1,100 L MGB are detailed in **Table 13**.

Table 13 Dimensions and GFA of a 360 L, 600 L and 1,100 L MGB

MGB Size (L)	Height (mm)	Depth (mm)	Width (mm)	GFA (m ²)	Rounded GFA (m ²)
360	1,100	885	600	0.53	1
660	1,250	850	1,370	1.17	1.5
1,100	1,470	1,245	1,370	1.71	2

Rounded GFA used for calculations listed in **Table 13**.

Table 14 Minimum number of MGBs required for weekly operational waste and recycling storage with associated minimum GFA for MGBs

Precinct & Unit	Size of MGBs (L)		Total Number of MGBs		Min. MGBs GFA (m²)	Recommended Storage GFA (m²)
	Waste	Recycling	Waste	Recycling		
Combined Precinct B Units Waste & Recycling Storage						
Units B1 to B 19	4,500	4,500	4	2	13	23
Individual Precinct B Units Waste & Recycling Storage						
B1	1,100	360	1	1	3	4.5
B2	1,100	360	1	1	3	4.5
B3	1,100	360	2	1	3	4.5
B4	1,100	360	1	1	3	4.5
B5	1,100	360	1	1	3	4.5
B6	1,100	360	1	1	3	4.5
B7	1,100	360	1	1	3	4.5
B8	660	360	1	1	2.5	3.75
B9	660	360	1	1	2.5	3.75
B10	660	360	1	1	2.5	3.75
B11	660	360	1	1	2.5	3.75
B12	660	360	1	1	2.5	3.75
B13	660	360	1	1	2.5	3.75
B14	660	360	1	1	2.5	3.75
B15	660	360	1	1	2.5	3.75
B16	660	360	1	1	2.5	3.75
B17	660	360	1	1	2.5	3.75
B18	660	360	1	1	2.5	3.75
B19	660	360	1	1	2.5	3.75

6.5.1.3 Precinct C to H

Table 15 indicates the estimated minimum number of 4.5 m³ MGBs required without waste compaction.

Table 15 Minimum number 4.5 m³ MGBs required for weekly operational waste storage (if recycling baled) and associated minimum GFA for MGBs (without waste compaction)

Precinct & Unit	Total Number of 4.5 m ³ L MGBs	Min. MGBs GFA (m ²)	Recommended Waste Storage GFA (m ²)
C1	4	12	18
C2	3	9	14
Precinct C Total	7	21	32
D1	2	6	9
D2 / 3	3	9	14
Precinct D Total	5	15	23
E1	3	9	14
E2	3	9	14
Precinct E Total	6	18	28

Precinct & Unit	Total Number of 4.5 m ³ L MGBs	Min. MGBs GFA (m ²)	Recommended Waste Storage GFA (m ²)
F1	2	6	9
F2	2	6	9
F3	5	15	23
Precinct F Total	9	27	41
H1	5	15	23
H2	4	12	18
Precinct H Total	9	27	41
Total (Precincts A / B / C / D / E / F / H)	36	108	165

SLR has assumed a week as comprising seven days for Units in Precinct C and E and a five day week for all other Precincts.

In addition to storage space for MGBs, sufficient allowance is to be provided for storage of recycling bales (see Table 10 for estimated numbers of bales).

6.5.2 Waste Storage Locations

As all waste and recycling collection for the Enfield ILC is anticipated to be at-grade (i.e. not underground), in compliance with Council's DCP, the waste collection points are to be positioned behind the front line and along-side the driveway into the site. Appendix E: *Onsite Waste Collection Guidelines / Checklist* denote that Collection vehicles are to reverse into the driveway, exiting in a forward direction. It is recommended that Council is engaged to clarify if reversing into the driveway is applicable to the Enfield ILC.

Waste storage areas are to be integrated into the overall design of the development and should be situated so that:

- The area minimises adverse impacts with respect dwelling proximity, visibility and emanating odours;
- The area minimises adverse impacts of noise, specifically those arising from waste storage areas equipment, bin movement and collection vehicles;
- The waste collection point is not more than 15 m from the property boundary at the street;
- The area is safe and functional to users and servicing collection staff;
- Servicing can be efficiently conducted, limiting (or preferably avoiding) the need for reversing;
- The refuse storage and collection area and is level and without gradients / steps;
- The path for wheeling bins between storage and collection is step free and not exceeding a gradient of 1:5 (20%);
- Servicing vehicles exit the site in a forward direction; and
- Litter and contamination of the stormwater drainage system is avoided.

Waste storage locations have not been included in this report as they are intended to be determined prior to operations.

6.5.3 Waste Storage Design Considerations

In accordance with Council's DCP, driveway and access routes must be at least 3.6 m wide and vehicle standing areas must be at least 10 m long and 3.6 m wide. Waste and recycling storage areas must be constructed in accordance with the National Construction Code requirements (formally the Building Code of Australia, BCA) and should have the following features:

- Allow sufficient on-site space to store and manoeuvre MGBs;

- Graded in accordance with WorkCover NSW Work Health and Safety requirements allowing ease of MGB movement for emptying / servicing;
- Smooth / durable even surfaced finished floors constructed of concrete at least 75 mm thick or other approved material graded and drained to a Sydney Water Corporation approved drainage fitting. The drainage fitting is to be located within the storage area and have a fine grade drain cover sufficient to prevent coarse pollutants from entering the sewer;
- Hot and cold tap-based water supply with centralised missing values and at least one hose cock;
- Finished / impervious ceilings with rigid smooth faced, non-absorbent, easy to clean material;
- Finished walls, impervious floors and ceilings with light colour;
- Be designed to minimise negative impacts on amenity of buildings in the Development and neighbouring properties, with respect to noise and odours;
- Constructed to prevent vermin;
- Well ventilated by permanent, unobstructed natural direct ventilation (not less than 5% of the floor area) or a mechanical exhaust at a rate of at least 5 L / s per every square metre floor area;
- Furnished with lighting and switches inside and outside of the room;
- Close fitting, self-closing door (openable from within the room);
- Smoke detectors be installed in accordance with Australian Standards and connected to the fire prevention system of the building; and
- The bin storage area is to have adequate signage as appropriate.

If the Enfield ILC intends to affix locking shutters or roller doors for either site or waste collection points, a Council-approved master key is to be made available to Council.

Consideration should also be given to the structural capacity of all driveways so as to accommodate Council's contractor or a private contractor when at capacity. Council vehicles at capacity have a mass of approximately 16 tonnes.

Sufficient space for servicing vehicle access and turning is required and the Australian Standard AS 2890.2 *Parking Facilities: Off-street Commercial Vehicle Facilities for a medium rigid vehicle (MRV)* should be consulted for compliance. At a minimum, Council recommends a:

- 18 m kerb to kerb turning circle (plus additional for vehicle overhang if walls / columns occur);
- 3.6 m height clearance (for entire length of travel);
- 10 m length for vehicle standing area;
- 3.6 m width for vehicle standing area; and
- Maximum ramp gradient of 20% (1V:5H).

SLR recommends a private waste contractor be consulted to ascertain the optimum requirements for waste servicing vehicles for the site.

6.5.4 Recycling Bale Storage Design Considerations

Bales of recyclable material are susceptible to degradation by exposure to the elements and vermin. As such, it is recommended that recycling bales be stored indoors until immediately before they are due for collection by the private contractor. The indoor bale storage areas should:

- Be clean and well-maintained;
- Be of sufficient size to store the required number of bales (see **Table 10**);
- Be sufficiently lighted;
- Have appropriate security measures to prevent theft of bales;
- Be equipped with vermin control measures; and

- Be equipped with a high volume sprinkler system to retard the spread of fire.

The bales themselves should be stored with the following considerations:

- Bales should not be placed directly on the floor or ground. Instead, bales should be placed on storage pallets;
- Bales should be stacked and secured in accordance with relevant Safe Work Australia Codes of Practice, as well as with any other relevant legislation or guidance in preventing bales from presenting a risk of harm to workers;
- Bales should not be stacked too close to sprinkler systems to avoid compromising the effectiveness of the fire suppression system;
- The storage time for bales should be kept to the practical minimum, to minimise degradation of the material in the bales; and
- Bales stored outdoors should be covered with plastic sheeting, or similar, to protect bales from exposure to the elements.

6.5.5 Additional Storage

Considerations should be made for the provision of an additional bulky goods storage area, separately delineated and signposted from operational waste and recycling storage areas. This additional storage area can be utilised for:

- Recyclable electronic goods (e.g batteries, computers, televisions, fluorescent tubes and smoke detectors);
- Reusable, bulky items (e.g crates and pallets) to avoid public placing; and
- Liquid wastes (oils etc). Liquid waste storage areas are to be bunded and drained to a grease trap, in accordance with the requirements of Sydney Water.

Separated storage could be provided by installing heavy-duty, lockable steel storage cages / enclosures within a basement level.

Alternatively, the building manager may consider organising a skip bin to remove separated e-waste as required, or engage a contractor to collect and transport these items for recycling at a NSW EPA licensed facility.

6.6 Waste Separation and Storage

Operational waste from the Development should be separated into at least three streams, comprising:

- Paper and cardboard;
- Other recyclables; and
- General waste.

Separate, dedicated MGBs should be provided in the waste service rooms for collection of recyclables. MGBs should be appropriately colour-coded and labelled to enable users to easily identify which waste is to be placed into which bins.

The Standards Australia AS 4123.7-2006 (R2017) *Mobile waste containers Part 7: Colours, markings, and designation requirements* provides recommendations for designated colours for waste bins depending on the type of waste the bins are to receive. The colours anticipated to apply to operational waste generated by the Development are:

- Blue: Paper and cardboard;
- Yellow: Recyclables (other than paper and cardboard); and
- Red: General Waste.

Each MGB should also be labelled according to the waste they are to receive. Labels approved by the NSW EPA for labelling of waste materials are available online¹⁹ and should be used where applicable. A selection of labels prepared by NSW EPA and anticipated to be applicable to operational waste generated by the Development is provided in **Figure 9**.



Figure 6 Example of labels for MGBs for operational waste

6.7 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to building managers, tenants and cleaners. Benefits of providing this communication include:

- Improved satisfaction with services;
- Increased ability and willingness to participate in recycling;
- Improved amenity and safety;
- Improved knowledge and awareness through standardisation of services;
- Increased awareness or achievement of environmental goals and targets;
- Reduced contamination of recyclables stream;
- Increased recovery of recyclables and organics (where implemented) material; and
- Greater contribution to state-wide targets for waste reduction and resource recovery.

To realise the above benefits, the following communication strategies should be considered by the building managers:

- Use consistent signage and colour coding throughout the development;
- Ensure all tenants are informed of correct waste separation and management procedures;
- Provide directional signage to show locations / routes to waste storage areas;
- Clearly label general / comingled waste bins to ensure no cross contamination and to identify the types of waste that may be disposed of in each bin; and
- Educate all employees / contractors conducting work on the property ensuring they adhere to this W&RMP.

¹⁹ <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>

Signs approved by the NSW EPA for labelling of bins and waste storage areas are available online (<http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>).

6.8 Monitoring and Reporting

Auditing and visual monitoring of bins and bin rooms should be undertaken by the building manager at the following frequencies:

- Weekly, within the first two months of operation to ensure the waste management system is sufficient for the operation; and
- Every six months, to ensure waste is being managed appropriately.

Any deficiencies identified in the waste management system, including (but not limited to) unexpected waste volumes, should be rectified by the building manager as soon as practicable.

6.9 Roles and Responsibilities

It is the responsibility of the building manager to implement this W&RMP and a responsibility of all tenants and staff to follow the waste management procedures set out by the W&RMP. A summary of recommended roles and responsibilities is provided in **Table 16**.

Table 16 Suggested roles and responsibilities

Responsible Person	General Tasks
Building Manager	Ensure the W&RMP is implemented throughout the life of the operation.
	Update the W&RMP as needed to ensure the plan remains applicable.
	Undertake liaison with and management of waste and recycling collections by Council and / or contractors.
	Conduct inspections of bins and waste storage / service rooms on a regular basis for condition and cleanliness.
	Organise cleaning and maintenance requirements for all bins and waste storage / service rooms as required.
	Manage any complaints and non-compliances reported through waste audits etc.
	Ensure effective signage, communication and education is provided to alert new tenants, building management staff and visitors about the provisions of this W&RMP.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
	Manage unexpected waste volumes to mitigate waste overflow in storage areas.
Cleaners / Caretaker	Ensure all waste compactors (if applicable) are maintained and operational.
	Monitor bins to ensure no overfilling occurs.
	Ensure bins and waste storage / service rooms are kept tidy.
	Transfer waste from units to waste storage / service rooms as required.
	Transfer recycling from units into baler storage / service rooms as required
Tenants / Employees	Cleaning of bins and waste storage / service rooms per Building Manager direction.
	Maintain / operate compactors, ensuring no overfilling occurs.
Tenants / Employees	Adhere to all waste management directions as given by the Building Manager

Appendix A

MOD 14 SEARS KEY ISSUES (WASTE)

Table 17 lists the relevant sections within the W&RMP that specifically address each of the Waste Key Issues as specified by the NSW Planning & Environment's Secretary's Environmental Assessment Requirements (SEARs) for the Application Number MP05_0147 MOD 14.

Table 17 MOD 14 SEARs key issues pertaining to waste

Key Issue	Section Addressing Key Issue
Assess predicted waste generated from the project during construction and operation, including:	<i>Please refer to individual sections listed below</i>
a Classification of the waste in accordance with the current guidelines.	Sections 5.3 and 6.2
b Estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance.	Sections 5.4, 5.5 and 5.6
c Handling of waste including measures to facilitate segregation and prevent cross contamination.	Sections 5.9, 5.10 and 6.5
d Management of waste including estimated location and volume of stockpiles.	Sections 5.3, 5.5, 5.6, 5.7 and 6.5
e Waste minimisation and reuse	Section 2
f Lawful recycling or disposal locations for each type of waste.	Tables 2 and 8
g Contingencies for the above, including managing unexpected waste volumes.	Sections 5.3, 6.5.1, 6.8 and 6.9
Assess potential environmental impacts from the excavation, handling, storage on site and transport of waste particularly with relation to sediment / leachate control, noise and dust.	Section 5.3