

Engineering and Technology Precinct (ETP) – Stage 1

Construction Waste Management Plan

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Terms and Definitions

The following terms, abbreviations and definitions are used in this plan:

Term	Description
CEMP	Construction Environmental Management Plan
HSEM	Health, Safety and Environmental Manager
EPA	Environmental Protection Authority
ERAP	Environmental Risk Action Plan
DECCW	Department of Environment, Climate Change and Water
CWMP	Construction Waste Management Plan

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1. Introduction

This CWMP has been developed to address the construction activities associated with the University's Engineering and Technology Precinct (ETP) – Stage 1 project. This CWMP has been prepared to fulfil the Conditions of Consent issued by the Department of Planning and Environment (DPE) for the Project, specifically Condition B21). It outlines the key management systems, procedures and controls that Laing O’Rourke will use to:

- Achieve all project objectives
- Deliver the University of Sydney (the University) value for money
- Maintain and keep record of waste disposal in compliance with the regulators, standards, university framework and conditions of development consent

This CWMP is a dynamic document and will be updated throughout the delivery of the project, as necessary.

1.1 Project overview

The University of Sydney is transforming its ETP into an environment that fosters scholarship at the highest standard possible and delivers a positive experience to all of its staff, students and stakeholders. Therefore the ETP Stage 1 works involve delivering high-quality infrastructure that accommodates maximum research opportunities while being flexible enough to respond to new education pathways in the future.

A new Micro Engineering Building (Building J03) will incorporate 11,000m² of new space and 6,000m² of refurbished facilities. The building will include research and teaching laboratories, office areas and teaching spaces. The project also involves the associated demolition works and infrastructure upgrades, as well as staging and decanting works in adjacent buildings.

1.2 Objective

The objective of this CWMP is to ensure that all risks associated with construction waste management are considered and managed effectively during construction. This CWMP seeks to ensure that construction waste is managed effectively to prevent any negative environmental impact on the surrounding environment or receiving resource recovery and waste facilities.

This CWMP aims to satisfy the following objectives:

- Address the requirements of the relevant environmental legislation as it applies to this project
- Summarise potential impacts on the environment from the proposed works
- Document environmental procedures to control potential environmental impacts.

1.3 Targets

The following waste management targets have been identified for the project:

- Recover and reuse waste products on-site where reasonable and practical
- Undertake recovery/recycling of all recyclable materials such as concrete, steel, aluminium, paper and plastics (may be undertaken on-site or at an off-site recovery facility)
- Send all residual waste products to appropriately licensed destinations for recycling, reuse, treatment or disposal
- Ensure no contamination incident occurs from waste storage, transport or disposal
- Ensure no rejection of loads by the receiving facility for non-compliant wastes
- Store, transport, track and dispose of regulated wastes in compliance with legislation
- Ensure no construction waste/litter leaves the site in an uncontrolled manner
- Document the intended management strategy (for example, avoid, reduce, reuse, recycle or dispose) to ensure waste is managed in accordance with accepted standards and appropriately implemented waste control measures
- Implement waste minimisation initiatives where practical.

2. Legislation

The waste legislation and regulatory framework is outlined in Table 1.

Act or regulation	Description
<i>Waste Avoidance and Resource Recovery Act 2001</i>	<p>Establishes the waste hierarchy to ensure that resource management options are considered against the following priorities:</p> <ul style="list-style-type: none"> • Avoidance which are actions to reduce the amount of waste generated and undertaking activities • Resource recovery which includes reuse, reprocessing, recycling and energy recovery, consistent with the most efficient use of the recovered resources • Disposal which is an end-of-pipe option that must be carefully undertaken to minimise any negative environmental outcomes. <p>The NSW Government's priority areas and actions for waste avoidance and resource recovery is outlined in the Waste Strategy 2007 (an update of the Waste Strategy 2003). The four identified key target areas in the strategy are:</p> <ul style="list-style-type: none"> • Preventing and avoiding waste

Act or regulation	Description
	<ul style="list-style-type: none"> Increasing recovery and use of secondary materials Reducing toxicity in products and materials Reducing litter and illegal dumping.
<i>Protection of the Environment Operations Act 1997</i>	All material that is imported to or exported from the project will be undertaken in strict accordance with the requirements of the Act including: <ul style="list-style-type: none"> Ensuring waste is classified appropriately and in accordance with relevant guidelines Disposing of waste materials correctly at the appropriately licensed facilities Removing other materials to facilities lawfully able to accept such materials.
Protection of the Environment Operations (Waste) Regulation 2005	The proposed works will be undertaken in accordance with this regulation.
Waste Classification Guidelines, Part 1: Classifying Waste (DECC 2008)	All wastes generated and proposed to be disposed off-site will be assessed, classified and managed in accordance with this guideline.
Asbestos regulations	Asbestos-containing materials will be undertaken in accordance with the requirements of the: <ul style="list-style-type: none"> <i>Work, Health and Safety Act 2011 (NSW)</i> <i>Work, Health and Safety Regulation 2011 (NSW)</i> Code of Practice – How to safely remove Asbestos, December 2011 Waste Classification Guidelines, Part 1: Classifying Waste (DECC 2008).

Table 1: Summary of waste legislation and regulatory framework

3. Waste classification

Waste is generally classified on the basis of its potential harm to the environment. A summary of NSW waste classification requirements is provided in Table 2. Further details on the classification of waste can be found in the Office of Environment and Heritage (OEH) Waste Classification Guidelines.

Waste classification	Description
Special waste	Special waste includes asbestos waste and waste tyres: <ul style="list-style-type: none"> Asbestos waste means any material or material that contains the fibrous form of mineral silicates Waste tyres is any used, rejected or unwanted tyres including shredded or tyre pieces.
Liquid waste	Liquid waste means any waste that: <ul style="list-style-type: none"> Has an angle of repose of less than 5°C Becomes free-flowing at or below 60°C or when it is transported Is not generally capable of being picked up by a spade or shovel.
General solid waste (putrescible)	Household waste that contains putrescible organics waste from litter bins collected by local councils:
General solid waste (non-putrescible)	<ul style="list-style-type: none"> Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal Paper or cardboard Grit, sediment, litter and gross pollutants from stormwater treatment devices, stormwater management systems that has no free liquids Garden and wood waste Containers previously containing dangerous goods, as defined under the Australian Code for the Transport of Dangerous Goods by Road and Rail, where residues have been appropriately removed by washing or vacuuming drained Oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and have no free liquids Drained motor oil containers that do not contain free liquids

Waste classification	Description
	<ul style="list-style-type: none"> • Synthetic fibre waste from fibreglass, polyesters and other plastics and is packaged securely to prevent dust emissions, that is confirmed as not being asbestos waste • Virgin excavated natural material • Building and demolition waste • Asphalt waste, including asphalt from road construction and waterproofing works • Cured concrete waste from batch plants • Fully cured and set thermosetting polymers and fibre-reinforcing resins, glues, paints, coatings and inks.
Hazardous waste	<ul style="list-style-type: none"> • Waste with pH \leq 2.0 or \geq pH 12.5 • Containers that have not been cleaned and that contained dangerous goods as described in the Australian Code for the Transport of Dangerous Goods by Road and Rail • Coal tar or coal tar pitch waste, which is the tarry residue from the heating, processing or burning of coal or coke, being materials comprising of more than 1% (by weight) of coal tar or coal tar pitch • Waste lead-acid or nickel-cadmium batteries, being waste generated or separately collected by activities carried out for business, other commercial or community services purposes • Lead paint waste other than solely from residential premises or educational or child care institutions.

Table 2: NSW waste classifications

4. Waste management

4.1 Waste sources

The following information outlines the anticipated waste and management options to address the generated waste. All waste will be removed progressively with minimal amount stored on-site.

Waste that is not removed immediately will be stored in designated areas in proprietary storage facilities until it is reused or removed.

Waste will be classified according to the OEH Waste Classification Guidelines (2008).

Waste category	Waste generated	Classification
Waste produced from the strip-out of the existing structures	<ul style="list-style-type: none"> • Carpet • Kitchen facilities • Appliances • Windows (glass) • Internal fittings 	General solid
Waste produced from the demolition of the existing structures	<ul style="list-style-type: none"> • Concrete • Steel • Brick 	General solid
Waste from on-site maintenance and servicing of plant and equipment – note minor servicing only. Major servicing to be completed off-site. (non-liquid)	<ul style="list-style-type: none"> • Drained and crushed oil filters and grease tubes • Used and defective parts • Oil soaked rags • Used oil absorbent materials • Tyres 	General solid
Waste from crib sheds and office areas	<ul style="list-style-type: none"> • Food scraps, waste wrappers, waste paper towels 	General solid putrescible
Office and packaging waste (non-liquid)	<ul style="list-style-type: none"> • Paper, cardboard, glass, plastic (no food scraps) 	General solid

Waste category	Waste generated	Classification
Any waste that meets the criteria for assessment as dangerous goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail	<ul style="list-style-type: none"> • Poisonous (toxic) substances and corrosive substances • Non sag epoxy mortar binder • Synthetic rubber based adhesive • Epoxy resins • Batteries 	Hazardous

Table 3: Waste sources

4.2 Waste minimisation and recycling

The following strategies will be implemented on-site to minimise the generation of waste:

- Include a project waste strategy in the project induction
- Establish a combined waste collection system by a reputable service provider
- Order appropriate quantities of materials to minimise wastage
- Control the quality of materials supplied to reduce rework and problems due to quality and additional material consumption
- Use prefabricated elements where practical and reasonable
- Establish co-mingled recycling receptacles for packaging and food container waste
- Separate waste steel and dispose in the steel recycling bin provided on-site
- Reuse form work as often as possible
- Send waste timber and formwork to a recycling facility
- Send waste concrete to a recycling facility
- Mulch and remove any green waste from site. Where possible depending on the species, reuse for landscaping purposes off-site
- Recycle general waste such as paper, cardboard, aluminium cans and similar materials from offices and site facilities. Source separation will be provided for these facilities as shown in Figure 1.



Figure 1 : Wheelie bins

4.3 Waste storage and handling

During demolition and excavation, waste will be removed by a suitably licensed contractor and sent to pre-approved waste and resource recovery facilities. The handling, storage and transport of hazardous materials and waste will be in accordance with the WHSMP, National Code of Practice, relevant SDS on the product, and hazardous materials management procedures.

During construction, Laing O'Rourke will provide 9.5m³ (11t capacity) skip bins on the ground floor. These bins will be provided daily for subcontractors to use. Laing O'Rourke will also supply 2m³ tipper bins, 1m³ wheelie bins and Otto bins throughout the duration of the project. A food scrap bin will be provided for putrescible waste products, separate from the general purpose bins.

The type of bin required for the various activities being carried out include:

- 2m³ bins during the structure phase on the decks and cores
- 1m³ bins during typical floor services and fit-out stages
- Otto bins during the finishes to completion.

Waste oils and chemicals will be stored in a purpose-built secured bunded area. The capacity of the bunded area will be at least 110% of the chemical stored within. An emergency response spill kit will be located adjacent to the bunded area. All storage containers and locations for the various waste streams will be clearly labelled to ensure that mixing of wastes is avoided.

All material removed during the de-silting of drainage structures and sediment structures will be disposed in an approved disposal area on-site. Where spoil material is to be removed for off-site disposal, Laing O'Rourke will ensure the waste is classified in accordance with the OEH Waste Classification Guidelines.

Records or a material register will be retained detailing the quantity and classification of spoil material removed from the site.

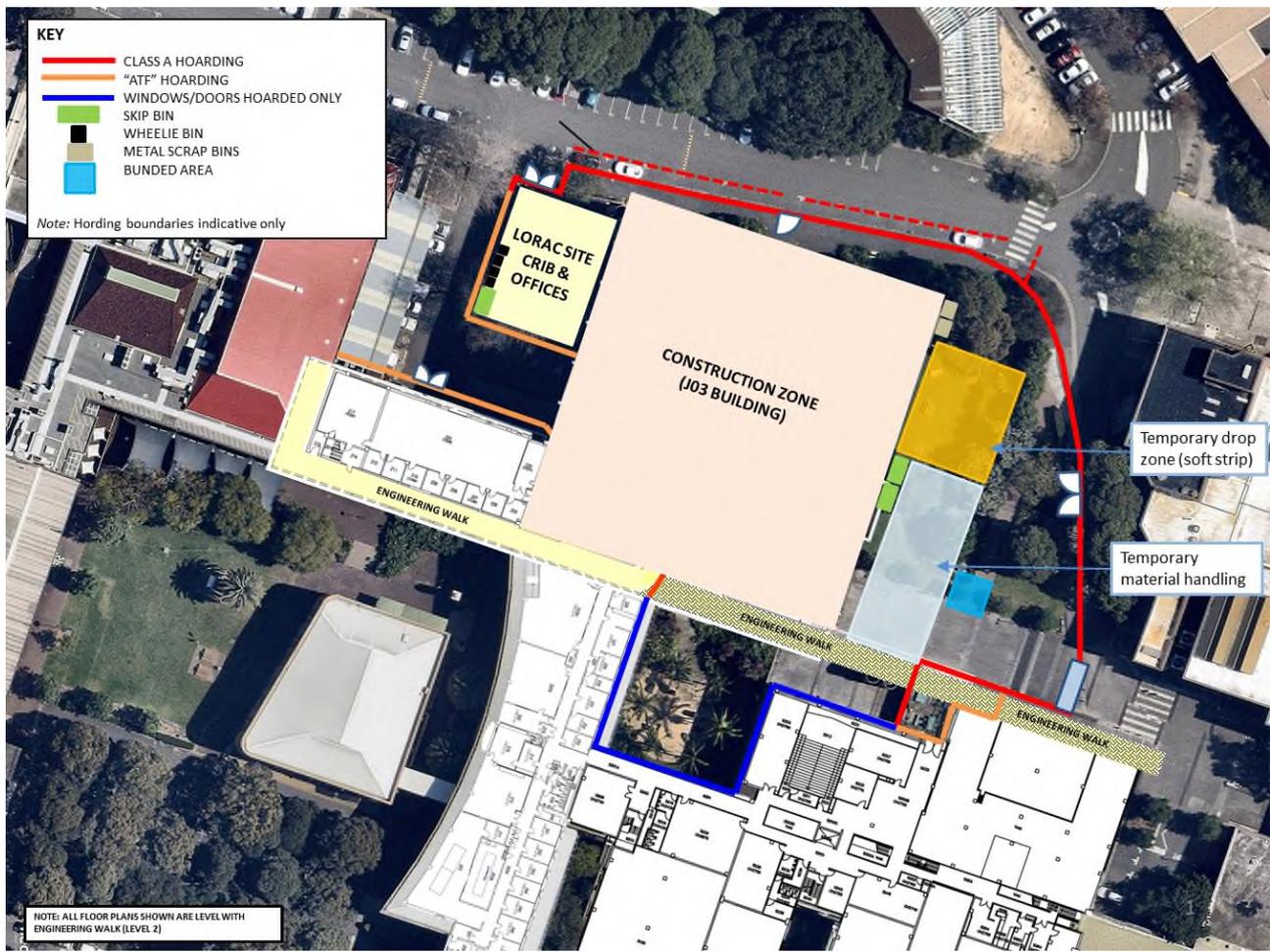


Figure 2 : Demolition works waste storage and recycling areas

4.3.1 Waste forecast – demolition phase

The waste management objectives during demolition are to:

- Reduce the demand for waste disposal during demolition
- Maximise resource recovery through reuse and recycling
- Assist in achieving Federal and local government waste minimisation targets in accordance with overarching regulations and plans
- Document wastes that may be generated as part of the demolition works (identification and proposed disposal method and destination)
- Recycle at least 85% of building demolition waste by weight.

This target will be achieved through maintained and consistent reuse and recycling efforts throughout the entire construction phase. Other construction and demolition-related issues such as impact of the development on surrounding land used and public streets are addressed in the Construction Management Plan

The following table serves to identify the types of waste generated from the demolition activity and provide an estimated forecast of quantities of recyclable waste and disposal locations.

<u>Waste Type</u>	<u>Tonne Approx</u>	<u>m3 Approx</u>	<u>Percentage (approx.)</u>	<u>Waste Facility*</u>	<u>Recycled on/off site</u>
Heavy Recyclable Materials: rubble, concrete	3500	1450	74%	Orange Recycling - Yennora	100% Recycled off site
Heavy Recyclable Materials: rubble, brick	700	290	15	Orange Recycling - Yennora	100% Recycled off site
Light Recyclable Materials: (cardboard, paper, plastic, plasterboard, timber)	225	810	5.5%	Bingo - Banksmeadow	Recycled off site
	25	90	0.5%	Bingo - Banksmeadow	Disposed of off site
Metals: (ferrous, non-ferrous)	50	300	1%	One Steel - Botany	100% Recycled off site
Green Waste	20	30	0.5%	Australian Native Landscapes - North Ryde	100% Recycled off site
Asbestos:	175	75	3.5%	Suez Waste - Kemps Creek	Disposed of off site
Approx Total Waste:	4695T	3045m3	100%		
Total Recycled	4495T	2880m3	96%		
Total Disposed	200T	165m3	4%		
*Note: Waste materials will be transported to the waste facility by Nass Excavations (Aust) Pty Ltd					

Table 4: Demolition Waste Disposal Forecast

4.3.2 Waste forecast – Construction phase

The waste management objectives during construction are to:

- Reduce the demand for waste disposal during construction
- Maximise resource recovery through reuse and recycling
- Assist in achieving Federal and local government waste minimisation targets in accordance with overarching regulations and plans
- Document wastes that may be generated as part of the construction works (identification of waste types and proposed disposal method and destination)
- Recycle at least 85% of construction waste by weight for non-hazardous materials.

This target will be achieved through maintained and consistent reuse and recycling efforts throughout the entire construction phase.

<u>Waste Type</u>	<u>Tonne Approx</u>	<u>Percentage (approx.)</u>	<u>Waste Facility*</u>	<u>Recycled on/off site</u>
Heavy Recyclable Materials: Concrete	400	26%	Returned to Concrete Plant	100% Recycled off site
Heavy Recyclable Materials: Masonry, tiles, etc.	150	10%	Bingo	100% Recycled off site
Light Recyclable Materials: (cardboard, paper, plastic, plasterboard, timber)	800	52%	Bingo - Banksmeadow	Recycled off site
	75	5%	Bingo - Banksmeadow	Disposed of to landfill
Metals: (ferrous, non-ferrous)	80	5%	One Steel - Botany	100% Recycled off site
Putrescible Waste	35	2%	Bingo	Disposed of to landfill
Approx Total Waste:	1540	100%		
Total Recycled	1430	93%		
Total Disposed	110	7%		

Table 5: Construction Waste Disposal Forecast

5. Waste records

Records of waste disposal must be maintained. All material that leaves the site must be classified and its disposal or recovery location recorded. Waste records are entered into Laing O'Rourke's online assurance application; Impact (<https://impact-au.info-exchange.com/Secure/Default.aspx>).

Where external waste contractors are used, a copy of the relevant environment protection licence and disposal forms will be obtained and verified.

All records will be filed, stored and archived in accordance with the project filing system and maintained for a minimum of four years.

6. Hazardous Material and Asbestos handling and removal

The removal of hazardous materials including asbestos, particularly the method of containment and control of emission of fibre to the air, and disposal at an approved waste disposal facility must be in accordance with the requirements of the relevant legislation, codes, standards and guidelines. Refer to Project specific Asbestos Works Management Plan submitted under Condition B24 for a comprehensive overview.

6.1 Method of Containment

The method of containment is identified as follows (Asbestos contaminated waste not identified by the Remedial Action Plan):

- The area must be barricaded (including appropriate signage) and all works which are potentially impacted by or which will potentially impact the area of concern must stop. The contaminated material is to be covered with plastic/geofabric or kept damp
- The contractor is to notify the University, HSEQ manager, environmental consultant and the occupational hygienist of the occurrence
- An environmental consultant is to assess the area of concern and provide advice on remediation works
- The contractor is to plan the detailed works required for remediation with the asbestos removal contractor
- The asbestos removal contractor is to notify SafeWork NSW five days in advance and obtain all necessary approvals prior to the commencement of remedial works
- The University is to be notified of the removal, and approval must be obtained prior to any remedial works commencing
- The contractor and asbestos contractor is to undertake remedial works in accordance with the provided plan

The environment consultant is to liaise with the Asbestos Contractor, Occupation Hygienist and others, as necessary, when undertaking remedial works. If friable asbestos has been identified, further air monitoring and clearance inspections must be undertaken by a Licensed Asbestos Assessor in accordance with the requirements of the WHS Regulations.

6.2 Control of emission of fibres

Contaminated materials are to be covered with plastic/geofabric or constantly kept damp to prevent air borne asbestos/hazardous materials.

During the remedial works, if friable asbestos has been identified, a constant low-pressure water supply is required for wetting down asbestos/asbestos impacted soils.

During working hours, water sprays are to be used to keep the surface of any works areas and stockpiled soils (which are to be kept to a minimum) reasonably damp, in order to suppress any dust. During non-working hours, all soil stockpiles impacted or potentially impacted by asbestos are to be covered with plastic and/or geofabric, securely weighted to ensure they are not blown away by strong winds.

Water used for dust suppression is to be kept at a minimum, enough to prevent dust generation and must not be allowed to escape the confines of the work areas.

Strict dust control procedures must be adhered to as necessary:

- Cease works during periods of high wind;
- Erection of dust screens around the perimeter of the site;
- Securely cover all loads entering or exiting the site;

- Use of water sprays across the site to suppress dust;
- Cover all excavated filling stockpiles remaining onsite more than 24 hours;
- Keep excavation and stockpile surfaces moist; and
- Regular checking of the fugitive dust to ensure compliance.

6.3 Disposal of Contaminated waste

All contaminated waste, including used disposable coveralls, respirators, plastic sheeting and items deemed contaminated with asbestos are to be kept damp until double-sealed and in 200 micron thick plastic sheeting, asbestos waste bags or other suitable receptacle. The sealed waste shall be appropriately labelled as containing asbestos and removed from site as soon as practicable.

Asbestos waste must be:

- Separated from other material for disposal where that is reasonably practicable;
- Wrapped or contained in a manner that prevents asbestos fibres entering the atmosphere during transportation; and
- Appropriately labelled to warn of the asbestos.

All copies of asbestos waste disposal certificates and receipts must be kept for record.

In the event that off-site disposal of large volumes of asbestos waste is required, transport of all material to and from the site shall only be carried out by an appropriately licensed contractor holding all relevant permits, consents and approvals. The licensed waste disposal contractor is to ensure all vehicles:

- Conduct deliveries during the specified hours of works, or in accordance with Roads and Maritime Services Traffic Management Centre as appropriate;
- Are securely sealed to prevent any dust or odour emissions during transportation;
- Are decontaminated prior to leaving the site to ensure spoil is not tracked/spilled onto public roads or footpaths;
- Exit the site in a forward direction
- Tracking of all asbestos waste is to be in accordance with the NSW EPA asbestos waste monitoring requirements.

Details of all soils removed from the site shall be documented by the Contractor in accordance with regulatory requirements.

All off-site disposal of waste must be classified and confirmed by the environmental consultant in accordance with the NSW EPA Waste Classification Guidelines 2014 prior to any removal of soil waste from site.

All materials removed from site shall be tracked and disposed to a location legally allowed to receive them in accordance with the POEO Act. Documentation is to be obtained and recorded in accordance with regulatory requirements and is to be provided to the receiving site prior to transport or acceptance of the materials.

For asbestos waste or asbestos impacted soil transported in NSW weighing more than 100kg or consisting of more than 10m² of asbestos sheeting in one load is required to be recorded utilising the NSW EPA tool, WasteLocate.