

Waste Management Plan

Waste Management Plan

Client: The Trust Company Limited ACN 004 027 749 as custodian for Stockland Trust Management Limited ACN 001 900 741 as trustee for Advance Property Fund

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Table of Contents

1.0	Introduction	1
1.1	Objectives	1
2.0	Site location and characteristics	1
3.0	Project description	3
3.1	Overview and key components	3
3.2	Construction of the Project	4
3.2.1	Construction methodology	4
3.2.2	Materials, stockpiling and laydown areas	5
3.2.3	Construction plant and equipment	5
3.2.4	Construction hours	5
3.2.5	Water management	6
3.3	Operation of the Project	6
3.3.1	Operational hours	6
3.3.2	Employment	6
3.3.3	Operational activities	6
4.0	Legislation and policy	6
4.1	Protection of the Environment Operations Act	6
4.2	NSW EPA Waste Classification Guidelines 2014	7
4.3	NSW Waste Avoidance and Resource Recovery Strategy 2014 -21	7
4.4	City of Ryde DCP 2014 - Part: 7.2 Waste Minimisation and Management	8
5.0	Waste management	9
5.1	Waste hierarchy	9
5.2	Waste streams and classifications	9
5.3	Waste types and quantities	12
5.3.1	Site clearance and demolition	12
5.3.2	Construction	12
5.3.3	Operation	13
5.4	Management and mitigation	13
5.4.1	Waste avoidance	13
5.4.2	Re-use, recycling and disposal	14
5.4.3	Waste segregation, storage and servicing	15
5.4.4	Unexpected finds, contaminated and hazardous waste	17
5.4.5	Signage	17
5.4.6	Site inductions	17
6.0	Monitoring and reporting	17

1.0 Introduction

This Waste Management Plan (WMP) applies to the waste generated from the site preparation, construction and operational stages of the project and has been prepared using architectural drawings, prepared by AECOM and attached in in **Appendix A** of the EIS.

1.1 Objectives

The objectives of this WMP are to:

- Identify potential wastes likely to be generated during the site preparation, construction works and operation of the Project.
- Provide advice on how identified wastes should be handled, identified, processed, disposed of, reused or recycled in accordance with Council requirements, relevant Australian standards and waste minimisation principles.
- Encourage waste avoidance and minimisation through advice on design, ordering and planning.
- Help implement safe and practical options for waste collection from the Project by the City of Ryde Council or private waste servicing contractors.

2.0 Site location and characteristics

The Site is located on land legally designated as Lot 1 in DP 633221, local address 11-17 Khartoum Road and 33-39 Talavera Road, Macquarie Park (see **Figure 1**). The Site is located in the suburb of Macquarie Park, which is part of the City of Ryde Local Government Area (LGA).

The Site area (by title) is 3.003 ha, with a northwest frontage (181.05 m) facing Khartoum Road, and a northeast frontage (165.96 m) facing Talavera Road. The proposed development will only occupy the south eastern portion of the Site, to approximately 50% of the total Site area.

Vehicular access to the Site is currently provided off Khartoum Road and Talavera Road via two existing 8 m wide, dual direction crossings. An additional vehicular access point and service lane is provided on the south western corner of the site, also off Khartoum Road. This additional access point is approximately 6 m wide and provides singular vehicle direction around the southern boundary of the Site.

The Site is currently owned by Stockland and is occupied by two multi storey commercial and warehouse buildings, leasing floor space to several businesses. The two buildings are located towards the centre of the Site, in a campus fashion, and surrounded by at-grade car parking. The two buildings are similar in form and shape, featuring white and grey facades with external pillars. The largest footprint building is two storeys high, comprising office and warehouse spaces. The smallest footprint building is six storeys high containing mainly office spaces.

The Site slopes gently from west (high) to east (low), from a level of approximately 59 m AHD to approximately 48 m AHD with a constant slope gradient between these points. The surrounding land morphology generally slopes down towards the east and the Lane Cove River, which is located approximately 900 m northeast of the Site, measured along Khartoum Road. The car parking and external landscaped areas surrounding the buildings are dotted with mature landscaping trees and hedging. The trees form a buffer between the property and the adjacent roads, footpaths and cycle path.



SITE LOCATION



- Legend
- Site boundary and Road 22
 - Property boundary

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Figure 1 Site plan

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3.0 Project description

3.1 Overview and key components

Table 3-1 provides an overview of the key components proposed for the Project.

Table 3-1 – Details of the Project

Proposed use	Storage of data
Built form	Five storey concrete structure with associated vehicular circulation and landscaping areas The main structure would not exceed 45 metres in height.
Proposed development	Data centre, including: <ul style="list-style-type: none"> • Construction of Road 22 as per the Concept Development consent • Earthworks, excavation and retaining walls • Construction of the main building and façade • Ancillary offices and staff amenities • Car parking • Loading dock • Security guard house • New vehicular access to Road 22 • Service infrastructure • Mechanical and electrical infrastructure • Cooling and air conditioning • Diesel backup generators • Fire water tanks and fire pump room • Landscaping • Fit out of all data halls in a staged manner based on need.
Operations and management	The facility would be constructed by Stockland and operated by a lessee. The Site would be operated on a 24-hour, 7 day a week basis.
Gross floor area	12,069.70 m ²
Utility redundancy	The data centre will include 19 diesel generators, and approximately 360 kilolitres of diesel storage in underground tanks. The data halls will include lithium ion batteries for all server racks to provide further redundancy.
Access	The Site would be accessed by cars on a daily basis. Articulated and non-articulated trucks would also be required to access the Site from time to time. Operational vehicular access to the Site would be via proposed Road 22, which runs broadly east-west off Talavera Road according to Section 4.5 of the <i>City of Ryde Development Control Plan (DCP) 2014 (Macquarie Park Corridor)</i> . This road would be developed by Stockland prior to the commencement of operation of the Data Centre.

Car parking	The Proposal provides for 48 car spaces, located outside the building footprint and within the Site boundary.
Employment	The data centre will accommodate up to 50 staff during normal operations
Services and infrastructure	Existing services and utility infrastructure in the nearby vicinity will be extended, adapted and augmented to meet the demands of the Proposal

3.2 Construction of the Project

The construction methodology is based on preliminary designs and would be further refined during the detailed design phase.

3.2.1 Construction methodology

The construction of the Project would include:

- The data centre
- Access road around the data centre and associated parking
- Road 22 (a public road)
- Earthworks, excavation and retaining walls
- All other ancillary facilities outlined in **Table 3-1**.

Following construction, the Project would undergo commissioning and testing. Stockland aims to commence construction in 2021, with operation to commence in 2022. Key construction activities are detailed in the following sections.

3.2.1.1 Enabling works

Enabling works for the Project would be carried out to prepare the site for construction and to provide protection to the surrounding public. Enabling works would include:

- **Site preparation:** establishing sediment and erosion control measures, establishing marked no go areas, site clearing, installing security fencing, establishing laydown areas, establishing construction amenities (including offices, lunchrooms, storage areas, and washrooms)
- **Provision of construction power:** installing on site generators until power can be sourced from the existing distribution system
- **Bulk earthworks:** levelling the site by cutting and filling as required.

3.2.1.2 Structural, civil, mechanical and electrical works

Following the enabling works the following would be completed:

- Site drainage and underground utilities would be installed
- Concrete foundations and slabs for the data centre and ancillary components such as the fire pumphouse and guard station would be formed
- Road 22 and ancillary infrastructure such as drainage and footpaths would be constructed
- Construction, installation and connection of aboveground civil, mechanical and electrical plant, equipment and structures, including the data centre and the road area around the data centre
- Internal fit out, which may progress in stages.

3.2.1.3 Commissioning

The commissioning phase will include any testing and defect rectification required to transition from construction to operational phase. Commissioning will include the operation of all elements of the Project along with safety, quality, and environmental management systems and processes.

3.2.1.4 Demobilisation and landscaping

At the completion of construction, all remaining temporary construction amenities and facilities would be removed from site. Landscaping would be undertaken in accordance with the site landscaping plan.

3.2.2 Materials, stockpiling and laydown areas

Materials, stockpiling and laydown areas would be designated during the detailed design and pre-construction phase along with:

- Spoil handling and storage
- Dangerous goods storage
- Workshop and equipment storage
- On-site parking
- Construction compounds with site offices and staff amenities
- Site access and egress.

The locations of these areas would be outlined with the CEMP to be prepared by the contractor prior to commencement of construction. All of these areas would be located within the boundaries of the site and would not disrupt public access to otherwise publicly accessible locations.

Construction laydown areas, hardstand and car parks would be compacted and sheeted as required. All areas would have adequate drainage and erosion controls installed.

3.2.3 Construction plant and equipment

The following is an indicative list of the plant and equipment that would be used to construct the Project. The equipment list would be further refined during detailed design.

Table 3-2 Indicative plant and equipment for construction

Equipment to be used during construction	
Compactors	Excavators
Concrete agitators	Graders
Concrete trucks	Hand tools
Delivery trucks	Line marking equipment
Diesel generators	Mobile cranes
Dump trucks	Vacuum trucks
Elevated work platforms	Welding equipment

(Drafting note: equipment to be confirmed)

3.2.4 Construction hours

The construction activities would be carried out during standard construction hours, as defined by the *Interim Construction Noise Guideline*:

- 7am to 6pm Monday to Friday
- 8am to 1pm Saturdays
- no work on Sundays or public holidays

Activities that may be undertaken outside of standard construction hours would be undertaken in accordance with an Out of Hours Works procedure and include:

- Transporting of oversized equipment to site
- Emergency situations where work is required to prevent harm to persons or property

- Commissioning and operational testing.

3.2.5 Water management

Construction would require water for excavation, dust suppression, revegetation, and materials preparation and use. Accessways and construction areas would be watered to suppress dust, with the frequency of watering dependent on weather conditions.

Surface water would be managed during construction through implementation of safeguards as discussed in Chapter 19 (Surface water, flooding and water use). These measures would be in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004). A site-specific Soil and Water Management Plan (SWMP) would be prepared prior to construction to minimise and manage potential impacts.

3.3 Operation of the Project

3.3.1 Operational hours

The Project would operate 24-hours, seven days a week for the carrying out of activities associated with a data centre facility. This includes loading and unloading of equipment and office operations.

3.3.2 Employment

On completion of the Project, it is estimated that the Project would accommodate up to 50 full-time staff.

3.3.3 Operational activities

The operation of the data centre would involve:

- Maintenance of data storage and management equipment
- General office activities
- Delivery of goods
- Waste removal.

4.0 Legislation and policy

4.1 Protection of the Environment Operations Act

The *Protection of the Environment Operations Act 1997* (POEO Act) is the primary legislation for waste management and recycling in NSW. The POEO Act establishes the procedures for environmental control, and for issuing environmental protection licences covering issues such as waste.

Schedule 5 of the POEO Act defines waste as:

- Any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment*
- Any discarded, rejected, unwanted, surplus or abandoned substance*
- Any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification by a separate operation from that which produced the substance*
- Any processed, recycled, reused or recovered substance produced wholly or partly from waste that is applied to land, or used as fuel, but only in the circumstances prescribed by the regulations*
- Any substance prescribed by the regulations to be waste.*

The *Protection of the Environment Operations (Waste) Regulation 2014* (POEO Waste Regulation) regulates matters such as the obligations of consignors (producers and agents), transporters, and receivers of waste, in relation to waste transport licensing and tracking requirements within NSW.

4.2 NSW EPA Waste Classification Guidelines 2014

In NSW, waste is classified in accordance with the *Waste Classification Guidelines 2014* (NSW EPA, 2014a) (the '*Waste Classification Guidelines*'). Waste classification helps those involved in the generation, treatment and disposal of waste, ensure the environmental and human health risks associated with their waste is appropriately managed in accordance with the POEO Act and its associated regulations.

Part 1 of the *Waste Classification Guidelines* provides advice and directions on classifying waste so that appropriate management of all waste types is achieved. Many waste types are pre-classified under the POEO Act and do not require testing. However, if a waste is not pre-classified, it may need to be tested to determine its classification.

Waste material generated from the Proposal would be classified in accordance with these guidelines. The following waste classifications are relevant to the Proposal:

- Special waste;
- Liquid waste; and
- Pre-classified waste, including:
 - General solid waste (putrescible)
 - General solid waste (non-putrescible)
 - Restricted solid waste
 - Hazardous waste.

Part 4 of the *Waste Classification Guidelines* deals with the management and disposal of acid sulfate soils, which would be relevant to the Project if acid sulfate soils are encountered.

4.3 NSW Waste Avoidance and Resource Recovery Strategy 2014 -21

The NSW Waste Avoidance and Resource Recovery Strategy 2014-21 is aimed at ultimately “improving environment and community well-being by reducing the environmental impact of waste and using resources more efficiently” by presenting a framework intended to avoid and reduce waste generation, increase recycling, divert more waste from landfill, manage problem wastes better, reduce litter and reduce illegal dumping. Targets established under this strategy include:

- Avoiding and reducing the amount of waste generated per person in NSW
- Increasing recycling rates to 70 percent for municipal solid waste, 70 percent for commercial and industrial waste, and 80 percent for construction and demolition waste
- Increasing waste diverted from landfill to 75 percent
- Managing problem wastes better and establishing 86 drop-off facilities and services across NSW.

The management strategies for the site have been prepared in accordance with the WARR Strategy and the City of Ryde requirements. As such, management strategies developed for each waste stream have been designed to be consistent with the waste management hierarchy, meet relevant legislation and policy, and achieve the environmental objectives of the operational works.

The following is the preferred order of adoption of waste management practices:

- Avoid the potential of waste by identifying appropriate materials and procuring them;
- Reduce waste by optimising operation;
- Re-use waste by identifying sources that can utilise the waste;

- Recycle waste by identifying facilities that are able to recycle waste;
- Recovery of waste materials; and
- Disposal of waste when there is no reuse or recycling potential at an appropriate facility

The NSW EPA have also made several Resource Recovery Orders and Resource Recovery Exemptions under the POEO Waste Regulation, which contain specific conditions for waste disposal. The orders and exemptions allow some wastes to be beneficially and safely re-used and can enable waste to be used as a fuel or enable the waste to undergo a process of thermal treatment.

4.4 City of Ryde DCP 2014 - Part: 7.2 Waste Minimisation and Management

Part 7.2 of the City of Ryde DCP aims to facilitate sustainable resource management and waste minimisation within the City of Ryde LGA; in a manner consistent with the principles of ecologically sustainable development (ESD). In this regard, this Part encourages an increase in avoidance, reuse and recycling of waste and a consequential reduction in the demand for waste disposal from construction, demolition and ongoing development activities.

Part 7.2 of the DCP applies to all development that generates waste including:

- Demolition, earthworks and engineering works
- Construction of buildings and structures (including alterations and additions)
- Use of premises and change in use in all residential development types, commercial, industrial and mixed developments.

The objectives of the City of Ryde's waste minimisation and management controls are provided in **Table 3**.

Table 3 Ryde Council's waste management objectives

Waste minimisation	Waste management
To minimise resource requirements and construction waste through reuse and recycling and the efficient selection and use of resources	To assist applicants in planning for sustainable waste management, through the preparation of a site waste minimisation and management plan.
To minimise demolition waste by promoting adaptability in building design and focussing upon end of life deconstruction.	To assist applications to develop systems for waste management that ensure waste is transported and disposed of in a lawful manner.
To encourage building designs, construction and demolition techniques which minimise waste generation.	To require source separation, design and location standards which complement waste collection and management services offered by the relevant service providers.
To maximise reuse and recycling of household waste and industrial/ commercial waste.	To provide guidance in regard to space, storage, amenity and management of waste management facilities.
To assist in achieving Federal and State government waste minimisation targets in accordance with regional waste plans.	To ensure waste management systems are easy to use and access.
To minimise the overall environmental impacts of waste and foster the principles of ecologically sustainable development (ESD).	To minimise risks associated with waste management at all stages of development.

5.0 Waste management

The construction and operation of the Project should aim to contribute to the following target in accordance with the *NSW Waste Avoidance and Resource Recover Strategy 2014-21* (refer to **Section 4.3**):

- 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 detailed in the following sections will assist the Project meet this target. Waste report and audits can be used to determine the actual percentage of wastes that are being, or have been, recycled during the site preparation and construction stages of the Project.

5.1 Waste hierarchy

Waste management for the project will be undertaken consistent with the waste management hierarchy, provided below in the following order of priority; from most desirable to least desirable. The hierarchy summaries the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

- **Avoid:** Waste avoidance by reducing the quantity of waste being generated. This is the simplest and most cost-effective way to minimise waste. It is the most preferred option in the waste management hierarchy.
- **Re-use:** Reuse occurs when a product is used again for the same or similar use with no reprocessing. Reusing a product more than once in its original form reduces the waste generated and the energy consumed, which would have been required to recycle.
- **Recycle:** Recycling involves processing waste into similar non-waste product consuming less energy than production from raw materials. Recycling spares the environment from further degradation, saves landfill space and saves resources.
- **Dispose:** Removing waste from worksites and delivering to licensed landfill site, or other appropriated licensed facility.

5.2 Waste streams and classifications

The construction phase of the Project is anticipated to generate the following broad waste streams:

- Site clearance and demolition wastes
- Construction waste
- Operational waste

A summary of the likely waste types generated from site preparation, construction and operational activities, along with their waste classifications and proposed management methods are provided in **Table 4**.

Table 4 Potential waste types, classification and management methods

Waste types	NSW EPA Waste Classification	Proposed Management Method
Site clearance and demolition		
Green waste including timber, pine and particle board	General solid waste (non-putrescible) (garden waste)	Separated, some chipped and stored on-site for landscaping, remainder to landscape suppliers or off-site recycling; Stumps and large trees to land fill.
Clean fill	General solid waste (non-putrescible)	On-site reuse

Waste types	NSW EPA Waste Classification	Proposed Management Method
Contaminated fill	To be classified subject to results of testing	Off-site treatment or disposal to landfill
Excavated natural material (ENM) or Virgin excavated natural material (VENM)	General solid waste (non-putrescible)	On-site reuse of topsoil for landscaping of the site; off-site beneficial re-use or send to landfill site.
Concrete	General solid waste (non-putrescible)	Off-site recycling for filling, levelling or road base.
Asbestos	Hazardous waste	Off-site disposal at licenced landfill facility.
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill.
General building materials (Gyprock or plasterboard, doors, windows, glass)	General solid waste (non-putrescible)	Off-site recycling and remainder to landfill.
Construction		
Sediment fencing, geotextile materials	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)	Cleaned for reuse as footings; broken bricks for internal walls; crushed for landscaping or driveway use; off-site recycling.
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier.
Sand or soil	General solid waste (non-putrescible)	Off-site recycling.
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill.
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling.
Timber	General solid waste (non-putrescible)	Off-site recycling; chip for landscaping; sell for firewood. <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, and remainder to landscape supplies.
Doors, windows and fittings	General solid waste (non-putrescible)	Off-site recycling at second-hand supplier.

Waste types	NSW EPA Waste Classification	Proposed Management Method
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 at a licenced landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal.
Paint	Hazardous waste	Off-site recycling or disposal.
Synthetic rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling; reprocessed and used in safety devices and speed humps.
Ceramics	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company.
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal; reused for landscaping or insulation.
Operation		
Empty oil and other drums or containers, such as 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 licenced facility.
Batteries	Hazardous waste	Off-site recycling or disposal to landfill
Electronic waste	Hazardous waste	Off-site recycling or disposal to landfill
Printer toners and ink cartridges	Hazardous waste	Off-site recycling
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 and pallets	General solid waste (non-putrescible)	Re-used for similar projects, returned to suppliers, or off-site recycling.
Food waste	General solid waste (putrescible)	Compost on-site or dispose to landfill with general garbage.
Recyclable beverage containers (glass and plastic bottles, aluminium cans), steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licenced facility.
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licenced facility.

Waste types	NSW EPA Waste Classification	Proposed Management Method
General domestic waste generated by workers (soiled paper and cardboard, food, stuffs, polystyrene).	General solid waste (non-putrescible) mixed with General solid waste (putrescible)	Disposal at landfill.

5.3 Waste types and quantities

5.3.1 Site clearance and demolition

The Site is currently owned by Stockland and is occupied by two multi storey commercial and warehouse buildings, leasing floor space to several businesses. In order to accommodate the Project, the existing built form will need to be demolished and the site prepared for a level foundation (subject to a separate DA). It is expected that the primary waste associated with these activities is to include building waste, hazardous waste, green waste, excavated fill, soil and or rock.

The site will be mostly in cut with perimeter retaining walls around the west, south and eastern boundaries. The volume between the existing surface and the proposed surface has been estimated to inform an earthworks strategy for the site. Further design development is required to inform the bulk earthworks volumes and the estimate provided for the concept design stage is indicative only. Approximate volume between existing surface and the proposed finished surface is:

- Unadjusted cut: 45,877 m³
- Unadjusted fill: 4 m³

Additional earthworks for specific Project components including (but not limited to) landscaping, building slab and fuel tanks would require an additional 4,017 m³ of material to be cut, resulting in a total cut of 48,890 m³.

5.3.2 Construction

The construction activities for the Project including the construction of the data centre, ancillary buildings, internal and access roads, as well as car parking, as detailed in **Section 3.1**.

The City of Ryde development guidelines do not provide waste generation rates for construction activities. In the absence of readily available construction waste generation rates from Council, AECOM has adopted similar rates that have been proposed and adopted for recent data centre development throughout Sydney. These rates are provided in **Table 5**.

Table 5 Waste generation rates applied to the Project's construction

Rate type	Floor area (m ²)	Waste types and quantities (m ³)					
		Timber	Concrete	Bricks	Gyprock	Metal	Other
Factory	1,000	0.25	2.10	1.65	0.45	0.60	0.50
Office	1,000	5.1	18.8	8.2	8.3	2.75	5

These waste generation rates have been used to estimate the waste generated from the construction of the Project. Whereby, the generation rates for 'Factory' is applied to calculate the waste quantities from the construction of the warehouses, plant areas, data halls, and the loading areas. Whereas, the rates for 'Office' is applied to calculate the waste quantities from the construction of the offices and security hut. The construction waste estimates are provided in **Table 6**.

Table 6 Anticipated types and estimated quantities of construction waste

Rate type	Floor area (m ²)	Waste types and quantities (m ³)					
		Timber	Concrete	Bricks	Gyprock	Metal	Other
Factory	22,713	5.7	47.7	37.5	10.2	13.6	11.4

Rate type	Floor area (m ²)	Waste types and quantities (m ³)					
		Timber	Concrete	Bricks	Gyprock	Metal	Other
Office	1,303	6.6	24.5	10.7	10.8	3.6	6.5

5.3.3 Operation

General and recycling waste generation will primarily occur in the office and amenities areas of the Project. Due to the expected operation of data centres, it is not anticipated that data centre rooms will produce any general or recycling waste. Waste that will be generated in the data halls and corridor areas including electronic waste and packaging waste. This will be handled either through a separate contract for e-waste collection and recycling or by returning packaging materials to the product suppliers.

The City of Ryde's guidelines do not provide waste generation rates for operation activities for data centres. In the absence of waste generation rates provided by Council, the adopted waste generation rates for 'Office' presented in Appendix A of the NSW EPA Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial facilities has been applied. This rate equates to 16 L of general waste and 12 L of recycling waste per 100 m² of floor area per day.

The estimated quantities of operational waste generated by the Project is provided in **Table 7**.

Table 7 Estimated quantities of operation waste and recycling

General waste (L/week)	Recycling (L/week)
208	156

In addition to the estimated quantities of waste and recycling listed in **Table 7**, the Project is anticipated to produce:

- Minimal quantities of green landscaping waste.
- Significant quantities of electronic waste or e-waste.
- Cardboard packaging waste from electronic products for the data halls.

Less than 100 L of green waste is estimated to be generated per week. This waste will be taken by a landscaping contractor who will dispose of it at a garden organics processing facility.

The Project is likely to generate a significant quantity of e-waste, which could exceed 240 L per week. For this reason, a waste collection and recycling contract should be established to collect all e-waste for recycling and ensure it is not disposed of to landfill. Waste may be stored in the waste storage room or in a room designated for bulky hazardous wastes.

5.4 Management measures

5.4.1 Waste avoidance

The Building contractor, building designer and. Or equivalent roles should follow better practice waste management and the principles of ecologically sustainable development. Recommendations for the building designer include:

- Using prefabricated components.
- Avoiding printing where possible.
- Using low formaldehyde wood products, post-consumer reused timber and/ or Forest Stewardship Council 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 part certification scheme.
- Preferentially using building materials, fittings and furnishings, including structural framing, roofing and façade cladding, that have longer life and better re-use and recycling potential.

- Reducing the use of polyvinyl chloride products.
- Preferentially using paints, floor coverings and adhesives with low volatile organic compound content.
- Avoiding unsustainable timber imports including western red cedar, Oregon, meranti, luan or merbau.
- Selecting materials based on low embodied energy properties that suit the Project, such as recycled materials including recycled steel and glass-wool insulation, or concrete with slag and fly ash content.
- Centralising wet areas together to minimise piping.
- Designing for deconstruction rather than demolition.

Recommendations for the building contractor include:

- Applying practical building designs and construction techniques.
- Minimising excavation works.
- Investigating leased equipment and machinery rather than purchase and disposal.
- Sorting and segregating site preparation and construction wastes to ensure efficient recycling of wastes.
- Preferentially selecting building materials, fittings and furnishings, including structural framing, roofing and façade cladding, that have longer life and better re-use and recycling potential.
- Store wastes on-site appropriately to prevent cross contamination and/ or mixing of different waste types.
- Reduce packaging wastes by:
 - Returning packaging to suppliers where practicable to reduce waste further along the supply chain.
 - Purchasing in bulk.
 - Requesting cardboard or metal drums rather than plastics.
 - Requesting metal straps rather than shrink wrap.
 - Using returnable packaging such as pallets and reels.
- Arranging deliveries 'as needed' to mitigate degradation, weathering or moisture damage.
- Ensure subcontractors are informed of and implement site waste minimisation and management procedures.

During operation the following waste avoidance measures include:

- Returning packaging materials like cardboard to the suppliers through the services of the supplier delivery trucks, allowing the reduction of waste further along the supply chain.
- Providing ceramic cups, mugs and cutlery rather than disposable items.
- Presenting all waste reduction initiatives to staff as part of their induction program.
- Leasing equipment and machinery rather than outright purchase and disposal.

5.4.2 Re-use, recycling and disposal

Effective management of construction materials and construction and demolition waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only wastes that cannot be cost effectively reused or recycled are to be sent to landfill or appropriately disposal facilities. Refer to **Table 4** for an outline of the proposed reuse, recycling and disposal methods for potential site preparation, construction and operation waste streams generated by the Project.

In accordance with the City of Ryde's DCP and best waste management, the following specific procedures should be implemented:

- Facilitate on-site source separation to ensure efficient recycling.
- Concrete, tiles and bricks will be reused or recycled off-site.
- Steel will be recycled off-site, and all other metals will be recycled where economically viable.
- Framing timber will be recycled off-site.
- Windows, doors and joinery will be recycled off-site, where possible.
- Waste oil will be recycled or disposed of in an appropriate manner.
- All glass that can be economically recycled will be recycled.
- All solid waste timber, brick, concrete, rock that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner.
- Facilitate reuse of materials on-site.
- Provide separate waste bins for recyclable and non-recyclable general wastes.
- Assess excavation spoil for contamination status and beneficial re-use.
- Retain used crates for storage purposes unless damaged.
- Recycled cardboard, glass and metal wastes.
- Provide sufficient space for storage of garden waste and other waste materials on-site.
- Dispose of all asbestos, hazardous waste in accordance with SafeWork and NSW EPA requirements.
- Deliver batteries to drop off-site recycling facility.
- Where source separation is utilised, materials are to be kept uncontaminated to guarantee the highest possible re-use value.

Additional recycling opportunities during operation of the project include:

- Collecting and recycling e-waste.
- Printer toners and ink cartridges, if purchased, are collected in allocated bins for appropriate contractor recycling.
- Paper recycling trays provided in communal and staff areas for scrap paper collection and recycling.
- Providing separate receptacles for general waste, recycling and paper and cardboard throughout public areas, as well as within staff areas, to encourage source-separation of waste streams.
- Separating, by reasonable distance, the storage areas for recyclable from the general waste storage areas to avoid cross contamination.

5.4.3 Waste segregation, storage and servicing

5.4.3.1 Waste segregation and storage

Waste materials produced from site preparation, demolition and construction activities are to be separated at the source and storage separately on-site. It is anticipated that the Project will provide enough space on-site for separate storage of the following waste types:

- Bricks, concrete and scrap metal.
- Metal and steel, in a condition suitable for recycling at metal recycling facilities.
- Timber.

- Glass.
- Hardstand rubble.
- Uncontaminated excavation spoil, if present.
- Contaminated excavation spoil, if present.
- Hazardous waste, if present.
- Paper and cardboard.
- General co-mingled recycling waste.
- Non-recyclable general waste.

If there is insufficient space on-site for full segregation of waste types, the principal contractor, or equivalent, should consult with the waste and recycling collection contractor to confirm which waste types may be co-mingled prior to removal from site.

5.4.3.2 Waste storage areas

Waste storage areas will be accessible and allow sufficient space for storage and servicing requirements. The storage areas will also be flexible in order to cater for change of use throughout the Project. Where space is restricted, dedicated stockpile areas are to be delineated on the site, with regular transfers to dedicated skip bins for sorting.

All waste placed in skips or bins for disposal or recycling will be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Waste containers and storage areas are to be kept clean and in good state of repair. Areas designated for waste storage should:

- Allow unimpeded access by site personnel and waste disposal contractors.
- Take into account environmental factors, which could potentially cause an impact to the waste storage, such as slope, drainage and the location of watercourses and native vegetation.
- Allow sufficient space for the storage of garden waste and other waste materials on-site.
- Employ adequate environmental management controls to prevent off-site migration of waste materials and contamination from the waste.
- Consider visual amenity, safety and accessibility in their selection.

During operation, the Project must contain a waste and recycling storage area large enough to adequately store all quantities of operation waste and recycling between collections. In addition, there should be adequate storage space for the safe and secure storage, or any additional e-waste generated as part of the Project.

5.4.3.3 Waste servicing and record keeping

The principal contractor or equivalent, is to:

- Arrange for suitable waste collection contractors to remove any demolition 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 and recycling collections contractors and facilities receiving the waste and recyclables.
 - Records of waste and recycling collection vehicle movements.

- 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.
- Remove waste during hours approved by Council.

If skips and bins are reaching capacity, removal and replacement should be organised as soon as possible. All site generated building waste collected in the skips and bins will leave the site and deposited in the approved site lawfully able to accept them.

During operation, general waste and recycling bins are to be collected from office and amenities areas at the end of each day and transferred by cleaners to each waste storage room. The collection point must be accessible for waste collection vehicles.

5.4.4 Unexpected finds, contaminated and hazardous waste

During the site preparation, demolition and construction phases, it is recommended that a qualified and certified contractor is engaged to remove all contaminated or hazardous waste at an appropriately licenced facility.

All asbestos and other hazardous waste must be handled according to appropriate legislation and regulation including the *Work Health and Safety Regulation 2011*.

5.4.5 Signage

For best practice, standard signage is to be posted in all waste storage and collection areas. All waste containers should be labelled correctly to identify stored materials.

5.4.6 Site inductions

All staff, including sub-contractors employed during the site preparation, demolition and construction and operation phases of the Project must undergo induction training regarding waste management for the Site. Induction training is to cover, as a minimum, an outline of the WMP including:

- Legal obligations and targets
- Emergency response procedures on-site.
- Waste priorities and opportunities for reduction, reuse and recycling.
- Waste storage locations and separation of waste.
- Procedures for suspected contaminated and hazardous waste.
- Waste related signage.
- The implications of poor waste management practices.
- Responsibilities and report, including identification of personnel responsible for waste management and individual responsibilities.

It is the responsibility of the principal contractor, site manager or equivalent to notify Council of the appointment of waste removal, transport or disposal contractors.

6.0 Monitoring and reporting

The following monitoring practices are to be undertaken to improve demolition and construction waste management and to obtain accurate waste generation figures:

1. Conduct waste audits of current projects, where feasible.
2. Note waste generated and disposal methods.
3. Look at past waste disposal receipts.

4. Record this information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained. Additionally, it is recommended that dockets or receipts verifying recycling and disposal in accordance with this WMP are kept and presented to regulatory bodies, when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists and logs recorded for reporting to the principal contractor (or equivalent) on a weekly basis, or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the principal contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling and reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

During operation, monitoring is recommended to ensure waste and recycling management arrangements and provisions for the Project are functional, practical and are maintained to the standard outlined in this plan, at a minimum.

Visual assessment of bins and bin storage areas should be conducted by the building manager (or equivalent), at minimum:

- Weekly, in 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 to the standards outlined in this document.

Quantities of waste and recycling associated with disposal of waste and recycling, including dockets, receipts and other physical records should be recorded. This is to allow reviews of the waste management arrangements and provisions at the site over time. Records of waste disposal should also be available to regulatory authorities such as the NSW EPA and SafeWork NSW, upon request.