



Health Infrastructure
Waste Management Plan

RNA Pilot Research and Manufacturing Facility
Gymnasium Road,
Macquarie Park, NSW

21 July 2023

63920/148,654 (Rev 5)

JBS&G

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CONSULTANT DECLARATION


PROJECT DETAILS	
Project name	RNA Pilot Research and Manufacturing Facility
Application number	SSD-51811458
Address of subject land	Macquarie University
Lot / DP	Part of Lot 70 DP127681 (formerly Lot 220 DP1266103)
APPLICANT DETAILS	
Applicant name	Health Administration Corporation
Applicant address	1 Reserve Road, St Leonards, NSW 2065
REPORT DETAILS	
Name of report this declaration relates	Waste Management Plan
Report reference no.	148,654
Report date	21/07/2023
Company name (inc. ABN / ACN)	JBS&G Australia Pty Ltd ABN 62 100 220 479
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DECLARATION BY CONSULTANT	
Name	Juliette Willis
Registration no.	jwillis
Organisation registered with	JBS&G
Declaration	<p>The undersigned declares that the Waste Management Plan:</p> <ul style="list-style-type: none">• has been prepared in accordance with the following policy, guidelines, or legislative requirements:<ul style="list-style-type: none">- NSW Waste Avoidance and Resource Recovery Act 2001- NSW Protection of the Environment Operations Act 1997• contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates;• does not contain information that is false or misleading;• identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project;• identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments;• contains a consolidated summary of the proposed or necessary mitigation measures
Signature	
Date	21/07/2023

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1. Introduction

JBS&G Pty Ltd (JBS&G) has been engaged by Health Infrastructure (the client) to prepare a waste management plan for the redevelopment of B04 (Macquarie University Concept Plan), Macquarie Park, NSW 2113 (the site). The application associated with the waste management plan seeks consent for the construction of a Ribonucleic Acid (RNA) Pilot Research and Manufacturing Facility.

The site is located at the corner of Gymnasium Road and Culloden Road, approximately 13km from the Sydney CBD. The site is within a much larger development lot that is legally described as Lot 220 DP 1266103 and comprises a rectangular portion of the existing Macquarie University Campus.

This report accompanies a State Significant Development Application that seeks approval for Construction and operation of an RNA research and manufacturing facility, including:

- Site establishment
- Site preparation including earthworks, tree removal, cut and fill;
- Construction of internal road and car park alterations and upgrades
- Inground building services works and utility adjustments; including service diversions
- Building foundation works
- Signage, and
- Landscaping

For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

1.1 Scope

This WMP has been developed to address the industry-specific Secretary’s Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment. **Table 1.1** presents the SEARs required to be addressed to support the project:

Table 1.1: Relevant SEARs Requirements

Item	SEARs Requirement	Relevant Section of Report
18. Waste Management		
18.1	Identify, quantify and classify the likely waste streams to be generated during construction and operation.	Waste streams associated with the construction phase of the project are presented in Section 4 . Waste streams associated with the operation phase of the project are presented in Section 5 .
18.2	Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	Hazardous material handling, transport and disposal requirements are detailed in Section 4 and Section 5 .
18.3	Identify appropriate servicing arrangements for the site.	Servicing arrangements are presented in Section 4 and Section 5 .
18.4	If buildings are proposed to be demolished or altered, provide a hazardous material survey.	Hazardous building materials survey provided separate to this report.

In addition to the SEARs, the City of Ryde Development Control Plan (DCP) requires all development applications be accompanied by a Site Waste Minimisation and Management Plan (SWMMP), as per Part 7.2 Waste Minimisation and Management of the DCP.

In accordance with the DCP the SWMMP is written to address:

- Objectives of legislation in relation to waste obligations and minimisation (including Environmental Planning and Assessment Act 1979, Waste Avoidance and Resource Recovery Act 2001 and Protection of the Environment and Operations Act 1997).

- Principles of how to reduce and manage waste during demolition and construction phases.
- Requirements for on going waste minimisation and management during operation.

These DCP requirements are consistent to those in the SEARs and therefore this document will be referred to as Waste Management Plan (WMP).

1.2 Objectives

The key objectives of this WMP are to support the client in their project through identifying the types and quantities of potential waste streams and to establish management measures to prevent environmental harm, minimise waste and maximise resource preservation.

Specifically this WMP addresses the Secretary's Environmental Assessment Requirements (SEARs) as part of the State Significant Development (SSD) planning requirements has the following requirements associated with waste:

- SEARs Requirement 9.1, requires Ecological Sustainable Design (ESD) principles to be incorporated into the design, construction and ongoing operation of the development. Specifically in regards to "Intergenerational Equity" principles are demonstrated via:
 - Reduced waste to landfill
 - during demolition and construction by at least 90%
 - during building operation by provision of storage areas for recycling streams (paper and cardboard, glass, plastic) as well as at least one other stream such as e-waste, batteries, etc.
- SEARs Requirement 9.3, requires the development to minimise greenhouse gas emissions and minimisation of resources used by managing "Materials and Circular Economy" via:
 - Recycling waste streams (paper and cardboard, glass, plastic) as well as at least one other stream such as e-waste, batteries, etc.
 - At least 90% of construction and demolition waste to be diverted from landfill

In addition to the SEARs, the requirements from the City of Ryde DCP have been used as a guideline to inform this WMP and the associated waste management practices for this project. Although not necessary, this WMP specifically aims to address the following objectives from the DCP:

Waste minimisation:

1. To minimise resource requirements and construction waste through reuse and recycling and the efficient selection and use of resources.
2. To minimise demolition waste by promoting adaptability in building design and focussing upon end of life deconstruction.
3. To encourage building designs, construction and demolition techniques which minimise waste generation.
4. To maximise reuse and recycling of household waste and industrial/commercial waste.
5. To assist in achieving Federal and State Government waste minimisation targets in accordance with regional waste plans.
6. To minimise the overall environmental impacts of waste and foster the principles of ecologically sustainable development (ESD).

Waste management:

1. To assist applicants in planning for sustainable waste management, through the preparation of a site waste minimisation and management plan.
2. To assist applicants to develop systems for waste management that ensure waste is transported and disposed of in a lawful manner.
3. To require source separation, design and location standards which complement waste collection and management services offered by the relevant service providers.
4. To provide guidance in regards to space, storage, amenity and management of waste management facilities.
5. To ensure waste management systems are easy to use and access.
6. To minimise risks associated with waste management at all stages of development.

These objectives have been considered within this WMP.

2. Project Description

The site (noted as B04 in the Macquarie University Concept Plan) is currently an outdoor carpark. Planned works will result in the construction of a single-storey building with a mezzanine plant room to be used as an RNA Pilot Research and Manufacturing Facility

2.1 Location and Site Layout

Information relating to the site are provided in **Table 2.1** below. The site location is illustrated in **Figure 1**.

Table 2.1: Site Details

Site address	B04 (Macquarie University Concept Plan), Macquarie Park, NSW 2113
Local Government	City of Ryde
Zoning	B4 – Mixed Use City of Ryde Local Environmental Plan (LEP) 2014
Surrounding Land Use	The site is located within the campus of Macquarie University. Specifically, it is in the north-western portion of the campus, somewhat isolated from the main grouping of buildings that make up the campus. To the north-west of the site, directly across Culloden Road, is a residential area.

2.2 Project Scope of Works

The site will be transformed from its current state (carpark) to a medical facility (an RNA Pilot Research and Manufacturing Facility) with a gross floor area (GFA) of 2,195m². Construction works will include construction of a one-storey building with mezzanine including an office area, production lab and supporting amenities.

Detailed design drawings are included in **Appendix A**.

2.3 Existing Environment

2.3.1 Topography

A review of the regional topography (LPMA¹) identified that there is a gradient towards the northeast. The site has an elevation of between approximately 70 to 74 m Australian Height Datum (AHD).

2.3.2 Buildings, Structures and Roads

The site is located on Gymnasium Road in the north-western area of the Macquarie University main campus.

To the north-east of the site is the Macquarie University Observatory and further north beyond that the Macquarie University Bioscience Building. To the south of the site, across Gymnasium Road, is the Macquarie University Sport and Aquatic Centre with other Macquarie University buildings existing beyond that. A new Centre of Excellence for the Royal Institute for Deaf and Blind Children is currently in construction across Gymnasium Road from the site.

The entrance to the site is located on Gymnasium Road and is accessed from outside the campus via Culloden Road.

2.3.3 Vegetation

The area allocated to the site through the Macquarie University Precinct Masterplan is currently occupied by a carpark. This carpark occupies roughly half the site. Vegetation surrounding the carpark

¹ Land and Property Information, Spatial Information Exchange website, <http://maps.six.nsw.gov.au/> accessed 18 November 2022

largely occurs in the northern, southern, south-eastern and south-western regions of the site. From an aerial view, vegetation is largely limited to grass/lawn and trees.

2.3.4 Presence of Chemical Storage, Hazardous and Fill Material

Due to the nature of the previous use of the site (carpark) it is unlikely that hazardous chemicals etc. were contained onsite. A detailed site investigation (DSI) completed by JBS&G in 2022 found that fill material had been used to level the site. This DSI found no evidence of other contamination at the site.

3. Legislative Requirements and Guidelines

3.1 Legislation

This WMP has been prepared in accordance with the requirements of the *NSW Waste Avoidance and Resource Recovery Act 2001* (WARR Act), and the *NSW Protection of the Environment Operations Act 1997* (POEO Act). These and other key legislation relevant to waste management at the site are provided in **Table 3.1**.

Table 3.1: NSW Waste Legislation Summary

Legislation	Purpose
<i>Protection of the Environment Operations Act 1997</i> Protection of the Environment Operations (Waste) Regulation 2014 Protection of the Environment Operations (General) Regulation 2009	The Act is the key piece of environment protection legislation administered by the NSW Environment Protection Authority (EPA). The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment. The Act enables the Government to establish policy instruments for setting environmental standards, goals, protocols and guidelines.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	The WARR Act promotes waste avoidance and resource recovery to achieve a continual reduction in waste generation, provides for development of a state-wide Waste Strategy, and introduces a scheme to promote extended producer responsibility for the life cycle of a product. Objectives of the Act include: <ul style="list-style-type: none"> • To encourage the most efficient use of resources and to reduce environmental harm; • To ensure that resource management options are considered against the waste hierarchy (see Section 3.3); • Provide for the continual reduction in waste generation; • To minimise the consumption of natural resources and the final disposal of waste; • To ensure that industry shares with the community the responsibility for reducing and dealing with waste; and • To assist in the achievement of the objectives of the <i>POEO Act</i>.
<i>Environmental Planning and Assessment Act 1979</i> Environmental Planning and Assessment Regulation 2000	The Act and the Regulation provide the overarching structure for planning in NSW. They provide for a number of other statutory documents to support the planning structure, including State Environmental Planning Policies and Local Environmental Plans. The objectives include: <ul style="list-style-type: none"> • The proper management, development and conservation of natural and artificial resources; and • To encourage ecologically sustainable development.
<i>Environmentally Hazardous Chemicals Act 1985</i>	The Act provides for control of the effect on the environment of chemicals and chemical wastes. The EPA is responsible for administering this legislation, in partnership with other state government agencies. It is the primary legislation for specifically regulating environmentally hazardous chemicals throughout their life cycle. The Act sets out requirements for: <ul style="list-style-type: none"> • Chemical Control Orders (CCOs) which are used to manage specified hazardous chemicals and chemical wastes; • Technology assessments, which ensure that premises treating or destroying chemicals are safe and appropriate for their purpose; and • Licensing of individuals or industries who manage chemicals that are subject to a CCO.
<i>Contaminated Land Management Act 1997</i> Contaminated Land Management Regulation 2013	The Act establishes a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation.

3.2 Guidelines

Guidance documents and policies considered in the preparation of this WMP are included in **Table 3.2**.

Table 3.2: NSW Guidance Summary

Guideline	Purpose
NSW Environment Protection Authority (EPA) Waste Classification Guidelines 2014 (EPA 2014)	The Waste Classification Guidelines have been established by the NSW EPA to assist waste generators to classify wastes. Wastes are classified into groups that pose similar risks to environment and human health. Waste classifications are discussed further in Section 4.1 and Section 5.1 .
Building Code of Australia (BCA)	The BCA contains technical provisions for the design and construction of buildings and other structures, covering such matters as structure, fire resistance, access and egress, services and equipment, and energy efficiency as well as certain aspects of health and amenity.
NSW EPA's Waste and Sustainable Materials (WSM) Strategy 2041, Stage 1: 2021-2027	The WSM strategy aims to continually improve the state's policies and targets for waste reduction and landfill diversion. Stage 1 of the strategy sets the following targets: <ul style="list-style-type: none"> • reduce total waste generated by 10% per person by 2030; • have an 80% average recovery rate from all waste streams by 2030; • significantly increase the use of recycled content by governments and industry; • phase out problematic and unnecessary plastics by 2025; • halve the amount of organic waste sent to landfill by 2030.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The guide provides advice to assist architects, developers, council staff and building managers to incorporate better waste management practice into the design, establishment, operation and ongoing management of waste services in commercial and industrial developments.
How to manage and control asbestos in the workplace, SafeWork NSW Code of Practice, 2016 (NSW Government)	The Code of Practice is an approved code of practice under the <i>Work Health and Safety Act 2011</i> . The code provides guidance on how to manage risks associated with asbestos and asbestos containing material at the workplace and thereby minimise the incidence of asbestos-related diseases such as mesothelioma, asbestosis and lung cancer.
How to safely remove asbestos, SafeWork NSW Code of Practice, 2016 (NSW Government)	The Code of Practice is an approved code of practice under the <i>Work Health and Safety Act 2011</i> . The code provides practical guidance on how to safely remove asbestos from all workplaces including structures, plant and equipment and is to be read in conjunction with <i>How to manage and control asbestos in the workplace</i> Code of Practice.
Australian Government Construction and Demolition Waste Guide, 2011	The aim of the guide is to help develop effective markets for materials diverted or derived from the construction and demolition waste stream.
Australian Government Sustainable Procurement Guide, 2018.	The guide aims to reduce the adverse environmental, social and economic impacts of purchased products and services throughout their life through considerations such as waste disposal and the cost of operation and maintenance over the life of the goods. The guide was developed to assist Australian Government purchasers to include sustainability considerations in all stages of the procurement process, from identifying the business need to disposal of goods.
Sampling Design Guidelines – Contaminated Sites. NSW EPA, 1995	The Sampling Design Guidelines were established by the NSW EPA to: <ul style="list-style-type: none"> • Encourage the use of a statistically based approach to the design and sampling for contaminated sites and the interpretation of these samples for assessing and validating contaminated sites; and • Provide a convenient summary of statistical methods.

3.3 Waste Hierarchy

Waste management for the project will be undertaken in accordance with the waste hierarchy, which underpins the objectives of the *Waste Avoidance and Resource Recovery Act 2001*. The waste hierarchy shown in the following figure demonstrates preferred approaches to waste management to ensure sustainable development and use of resources.



The hierarchy also aims to maximise efficiency and avoid unnecessary consumption of resources. This WMP seeks to implement the waste hierarchy to minimise waste disposal and promote waste reduction in order of preference:

- Reduce or avoid waste through selection of items and design;
- Reuse materials without further processing;
- Recycle and process waste for reuse as a new product;
- Recover energy through combustion of materials where acceptable and in accordance EPA Regulations;
- Treat waste to stabilise the waste product for disposal or reuse; and
- Dispose of waste when no other management options are appropriate.

4. Construction

4.1 Waste Streams and Classification

4.1.1 EPA Waste Classification

The NSW EPA Waste Classification Guidelines (EPA 2014) provides for the classification of wastes into groups that pose similar risks to the environment and human health, which are defined in the POEO Act. Classes of waste described in the guideline are described in **Table 4.1**.

Table 4.1: Summary of NSW EPA Waste classifications

Waste Classification	Description
Special waste	Special wastes are wastes that pose specific regulatory requirements due to the risks of harm to the environment and human health. These wastes include clinical and related waste, asbestos waste, waste tyres, and anything classified as special waste under an EPA gazettal notice.
Liquid waste	Liquid waste is classified as any waste (other than special waste) that meets the following criteria: <ul style="list-style-type: none"> • Has an angle of repose of less than 5 degrees above horizontal; • Becomes free flowing at or below 60 degrees Celsius or when it is transported; • Is generally not capable of being picked up by a spade or shovel; and/or • Is classified as liquid waste under an EPA gazettal notice.
Pre-classified waste: <ul style="list-style-type: none"> • Hazardous waste • Restricted solid waste • General solid waste (putrescible) • General solid waste (non-putrescible). 	Where the waste is neither liquid nor special waste; the EPA has pre-classified other commonly generated waste types, as defined in Schedule 1 of the POEO Act. This includes hazardous waste, restricted solid waste, general solid (putrescible) and general solid (non-putrescible) waste. Putrescible waste is the component of the waste stream that is liable to become putrid, and usually refers to vegetative, food and animal products. A list of all currently gazetted waste classifications is provided on the EPA website at: www.epa.nsw.gov.au/waste/wastetypes.htm . Where material is classified as hazardous waste, it is noted that such materials cannot be directly disposed of and must be treated prior to disposal by an appropriately licensed facility/operator.
Wastes classified via chemical assessment: <ul style="list-style-type: none"> • Hazardous waste • Restricted solid waste • General solid waste (putrescible) • General solid waste (non-putrescible). 	Where the waste does not fall into one of the above categories, chemical assessment of the material is required to finalise a waste classification as per the procedures outlined in detail in EPA (2014) and/or consideration of General or Specific Waste immobilisation approvals as approved under the <i>Protection of the Environmental Operations (Waste) Regulation (2014)</i> .

4.1.2 Waste Streams and Classification

A variety of waste types are expected be generated during the construction phase of the project. Potential waste types and corresponding EPA classifications for the proposed site are summarised in **Table 4.2**.

Table 4.2: Potential Waste Types and Classification during Construction

Waste Type	EPA Classification	Generated
Fill material (soil)	General solid waste (non-putrescible)	✓
Metals (including from packaging)	General solid waste (non-putrescible)	✓
Wood waste (including partitions and joinery offcuts)	General solid waste (non-putrescible)	✓
Blockwork	General solid waste (non-putrescible)	✓
Glazed bricks	General solid waste (non-putrescible)	Potential
Concrete (including building frames, cores & roof; external works; slab)	General solid waste (non-putrescible)	✓
Plasterboard	General solid waste (non-putrescible)	✓
Glass	General solid waste (non-putrescible)	✓
Carpet tiles	General solid waste (non-putrescible)	Potential
Vinyl flooring	General solid waste (non-putrescible)	Potential
Plastic and foam packaging	General solid waste (non-putrescible)	✓

Waste Type	EPA Classification	Generated
General refuse	General solid waste (putrescible), and General solid waste (non-putrescible)	✓
Electrical (HV and LV)	General solid waste (non-putrescible)	✓
Optic fibre wiring	General solid waste (non-putrescible)	Potential
Fluorescent light bulbs	Hazardous waste	✓
Batteries	Hazardous waste	Potential
Asbestos	Hazardous waste	Unlikely
PVC pipes (water, electrical, optic fibre)	General solid waste (non-putrescible)	Potential

4.1.3 Waste Quantities

4.1.3.1 Construction

Indicative waste volumes have been provided for context based on benchmark data developed by the UK Building Research Establishment Group (BRE 2012²), see **Table 4.3**, which is based on waste generation at various construction projects including healthcare, commercial, industrial and public buildings.

A value of 19.1m³ per 100m² has been adopted to estimate waste generation for the construction phase of this project.

Indicative waste composition information shown in the **Table 4.4** below (derived from the Sustainability Victoria Waste Wise Tool Kit (2013³)) provides an estimate of quantities for each waste stream during construction of a healthcare building. **Table 4.5** shows approximate quantities of each waste type to be produced during the construction phase of the project, based on the Sustainability Victoria Waste Wise Tool Kit (2013) values. These values are an estimation and may vary from actual amounts of waste produced during construction.

Strategies that will be implemented to minimise waste generation and maximise reuse and recycling are outlined in **Section 4.2**.

Table 4.3: Average Volumes of Waste Produced during Construction by Different Project Types

Project Type	Average volume (m ³) of waste per 100m ²
Residential	18.1
Public buildings	20.9
Leisure	14.4
Industrial Buildings	13.0
Healthcare	19.1
Education	20.7
Commercial Other	17.4
Commercial Offices	19.8
Commercial Retail	20.9

Source: BRE (2012)

² Building Research Establishment Group. *Smartwaste - BRE Waste Benchmark Data* (BRE 2012)

³ Sustainability Victoria Waste Wise Tool Kit (2013)

Table 4.4: Guide to Waste Composition and Volumes – Construction

Material	Estimated Waste %	Conversion Factor (Density) (tonne per m ³)
Hard material	32%	1.2
Timber	24%	0.3
Plastics	15%	0.13
Cement sheet	9%	0.5
Gypsum material	6%	0.2
Metals	6%	0.9
Paper / card	4%	0.1
Vegetation	3%	0.15
Soil	1%	1.6
Other	0.3%	0.3

Source: Sustainability Victoria Waste Wise Tool Kit (2013)

Table 4.5: Approximate Quantities of Waste Generated During Construction Phase

Waste Type	Approximate quantity (m ³)
Hard material	161.0
Timber	30.2
Plastics	8.2
Cement sheet	18.9
Gypsum material	5.0
Metals	22.6
Paper / card	1.7
Vegetation	1.9
Soil	6.7
Other	0.4
TOTAL	257

Source: Sustainability Victoria Waste Wise Tool Kit (2013)

4.2 Waste Management

Site specific waste management measures have been developed in line with the waste hierarchy outlined in **Section 3.3** and in accordance with the relevant legislative requirements and guidelines.

The implementation of the following measures will provide the principles of the development achieving its waste targets of 90% reduction of waste to landfill during construction as required for planning (refer to Section 1.2).

4.2.1 Avoidance and Reduction of Waste

The construction contractor will be required to avoid waste generation, and endeavour to reuse materials where possible, thereby minimising waste generation.

During the construction phase, waste generation will be avoided through strategic selection of materials during design and purchasing, considering options to reduce waste generation for the project. This includes consideration of procurement of materials which are prefabricated, use minimal packaging, and are suitable for reuse. Selection of construction materials will also consider the use of recycled items where practicable.

Opportunities to avoid wastes generated by construction include:

- Demolition is to be carried out in a manner that deconstruction (strip out) works are carefully dismantled and sorted.
- Develop a procurement policy which considers waste avoidance measures such as:
 - Order site specific or prefabricated items where practicable to minimise surplus material;
 - Consider packaging material provided by suppliers during purchasing and reduce this requirement where possible, or consider returnable packaging;
 - Material selection to consider recycled items;

- Refine waste stream estimates to ensure adequate on-site storage and segregation; and
- Refine estimated volumes of materials for construction.

4.2.2 Reuse and Recycling

For waste materials onsite, measures to separate waste streams will be implemented. This includes segregating wastes into appropriate dedicated bins or areas for reclamation on site or transportation to a designated recycling facility.

If material containing asbestos is identified and cannot be safely removed/encapsulated, then off-site disposal is the most appropriate option. The construction contractor will then liaise with a licensed asbestos removalist to determine a suitable disposal facility. Measures for dealing with hazardous waste (including asbestos) are discussed in **Table 4.6**.

Procedures to manage the reuse and recycling of waste materials during construction include:

- Incorporation of waste management into development staging to promote reuse of materials across the site;
- Ensure areas for waste segregation are easily accessible and clearly defined;
- Ensure contractors are familiar with onsite waste storage areas for appropriate waste segregation; and
- Consider opportunities for materials reuse in areas in proximity to the site or local construction activities where practicable.

4.2.3 Treatment and Disposal

Project wastes may require treatment to stabilise them for appropriate disposal to reduce the risk of harm to human health or the environment. These materials are not suitable for reuse or recycling and must be segregated and disposed of via a suitably qualified contractor.

Wastes will only be sent to landfill or disposal facilities where the prioritised management methods in the hierarchy cannot be effectively implemented. The construction contractor will liaise with the local council to determine appropriate disposal locations for potential waste streams.

Measures to manage the treatment and disposal of waste materials during construction include:

- Ensure wastes which cannot be reused or recycled and require disposal are clearly segregated from those which have the potential to be reused.
- Provide segregated bins for subcontractors to dispose of construction waste (i.e., metal, plastics and cardboard).
- Contractors and staff to be inducted into site waste management practices.
- Hazardous materials including asbestos (if identified) to be disposed of in accordance with the handling and disposal requirements of SafeWork NSW and NSW EPA.
- General wastes to be disposed of in accordance with NSW EPA/local council requirements.
- Toilet facilities must be regularly serviced and emptied by a licensed contractor.

4.2.4 Waste Stream Management Options

The waste management measures outlined in **Table 4.6** will be implemented for each waste stream generated as part of the project. Key waste streams identified for this project have been discussed in more detail in this section to ensure appropriate waste handling for each type of waste.

Each waste stream will be separated and stored appropriately to ensure each type of waste is handled in the most appropriate and efficient way. The numbers and size of waste storage bins, containers, stockpile areas and loading zones on site will be determined by the construction contractor.

The construction contractor appointed by the client may implement their own waste management systems but will align with this plan.

Table 4.6: Construction Waste Stream Management

Waste Stream	Project Phase	Management
Fill/Soil	Construction	<p>Fill material may need to be disposed of off site during the construction of the RNA Pilot Facility. Disposal off site will be minimised wherever possible using the methods outlined in Section 4.2.1.</p> <p>Options for re-use of fill on site should be investigated. If disposal off site is required then the appropriate waste classification is required for disposal at a licensed waste facility.</p>
Concrete/Masonry	Construction	<p>Concrete and masonry waste may be generated from construction of the RNA Pilot Facility, although this will be minimised wherever possible using the methods outlined in Section 4.2.1.</p> <p>Concrete can be reprocessed and re-used on site but general practice is to break up/crush the concrete and arrange for disposal to a recycling facility or disposal offsite.</p>
Metals	Construction	<p>There is a possibility that metal waste may be generated from excess materials purchased for the site as part of construction work, although this will be minimised wherever possible using the methods outlined in Section 4.2.1.</p> <p>Construction contractor appointed by the client will investigate and determine appropriate storage and recycling of metals to reduce waste, including location and signage of skip bins onsite.</p> <p>Where recycling of metal is not feasible the contractor will organise disposal to a licensed waste facility.</p>
Wood Waste	Construction	<p>It is possible that wood waste (timber) may be generated from excess materials purchased as part of construction works, although this will be minimised wherever possible using the methods outlined in Section 4.2.1.</p> <p>Construction contractor appointed by the client will investigate and determine appropriate storage and recycling of timber to reduce waste, including location and signage of skip bins onsite.</p>
Plasterboard	Construction	<p>Plasterboard will possibly be generated during the construction of the RNA Pilot Facility (e.g. new partitions and infill walls), although this will be minimised wherever possible using the methods outlined in Section 4.2.1.</p> <p>Construction contractor appointed by the client will investigate and determine appropriate storage and recycling of plasterboard to reduce waste, including location and signage of skip bins onsite.</p> <p>Uncontaminated plasterboard (e.g. offcuts) or material with low levels of contamination such as nails and screws is completely recyclable and can be recycled for use in new plasterboard or the gypsum used in agricultural soil conditioners.</p>
Plastics	Construction	<p>Plastic wastes associated with packaging for construction materials can be recycled or in some cases returned to the supplier of the materials for reuse. Where possible, plastic (non-durable) wastes will be reduced using the methods outlined in Section 4.2.1.</p>

Waste Stream	Project Phase	Management
General Waste	Construction	<p>Wastes such as food waste, organics and biodegradable material will be created as a result of worker activity on site. Non-putrescible wastes are generally inert, or solid, and are not able to be composted, recycled, reprocessed or reused.</p> <p>Construction contractor appointed by the client will ensure adequate bins are provided on site for putrescible waste. This is particularly important around worker congregation areas, site office areas and toilet facilities.</p> <p>It is likely that general waste will increase at times of internal and service fit out during construction, primarily associated with excess packaging materials and workers on site. Construction contractor will determine the location of skip bins and specify waste stream separation measures across the site.</p> <p>Where possible, co-mingled recycling bins will be provided in common areas at work sites for plastic and glass bottles, soft drink cans, aluminium and tin cans to avoid these items being disposed to landfill. Specialised bins for cigarette butts will also be provided in designated smoking areas.</p>
Hazardous Waste – General	Construction	<p>Hazardous waste could be generated during construction of new facilities at the site (e.g. light bulbs, batteries, chemicals or paint).</p> <p>Separate containers for the safe storage of these wastes will be provided where applicable, prior to removal offsite by an appropriately licensed contractor for recycling or disposal at a licensed facility.</p> <p>If identified in soil, asbestos containing materials should be removed and disposed of by a suitably licenced contractor.</p>

4.3 Roles and Responsibilities

This WMP forms the basis of waste management on site for the construction phase of the redevelopment works.

It is expected that all construction personnel will commit to the WMP and be responsible for their own actions in adhering the waste management objectives. Waste management criteria (such as those contained in this report) is to be contractually binding for all contractors working on the site.

A Construction Site Manager will be the key person responsible for implementation of the WMP and adherence to applicable legislation, guidelines, licensing and project conditions outlined herein.

Table 4.7 presents suggested responsibilities for waste management.

Table 4.7: Roles and Responsibilities

Role	Responsibility
Environmental Management Representative	<ul style="list-style-type: none"> Compliance with applicable environmental licences, legislation and project conditions. Ensure environmental management plan(s) across the site are adhered to and accurate to site conditions. Undertake inspections to ensure compliance.
Construction Site Manager	<ul style="list-style-type: none"> Ensuring workers and subcontractors are inducted into the WMP along with other applicable management plans. Responsible for undertaking procurement of construction materials in accordance with the waste management hierarchy. Segregation of waste streams where required to ensure appropriate use, treatment and/or disposal.
Health and Safety Manager	<ul style="list-style-type: none"> Safety inductions for all staff, workers and visitors. Work with Construction Site Manager to determine safe handling of asbestos waste (if found) in compliance with regulatory requirements.
Site Workers	<ul style="list-style-type: none"> Responsible for acting in accordance with the WMP and site inductions. Informing the Construction Site Manager of any waste management incidences and Health and Safety Manager of any safety issues associated with on-site activities.

4.3.1 Training and Awareness

Staff present on site during the construction stage of the project will be required to undertake induction and awareness training inclusive of the WMP and site-specific waste management. This includes:

- Induction to the waste management hierarchy and use across the site; and
- Details of responsibilities for waste management and key personnel;
- Site specific waste management practices relevant to the project stage such as:
 - Waste storage and stockpiling locations;
 - Waste disposal requirements;
 - Hazardous or special wastes;
 - Record of waste disposal details and receipts; and
- Knowledge of emergency response procedures and contacts; and
- Asbestos Awareness Training.

Signage will be provided on site to ensure waste management measures are communicated across the subject site, particularly for contractors and visitors who are not regularly on site. Signage will highlight correct procedures for separating wastes where required, locations of bins and waste storage areas, labelling of designated bins, potential hazards associated with the waste streams and handling, and contact details should any issues be encountered.

Signage will be prepared and located on site in accordance with the Australian Standard (AS 1319) for safety signs, and the NSW EPA and Australian Standard for recycling signage.

4.4 Monitoring and Reporting

The following activities will be undertaken to inform future onsite waste management and to determine the success of the WMP:

- Ensure waste quantities generated are recorded, including tracking of receipts from waste recycling or disposal via the appointed waste contractor;
- Record waste classification and testing results;
- Review the WMP in light of any changes to construction activities or further information which may alter waste management practices;
- Undertake auditing of waste management across the site as a component of broader environmental site audits;
- Undertake visual inspections daily to ensure waste management controls are implemented and maintained across site; and
- Undertake final review of the WMP upon project completion to ensure information accurately reflects site activities, and to assist future waste management.

Outcomes of audits and waste tracking will be reported to the client or the construction contractor, potentially through weekly or monthly reporting to ensure waste management objectives are adhered to.

4.4.1 Corrective Action

Where formal auditing, daily visual inspections or incident reporting identify incorrect storage or disposal procedures, or maintenance or waste management issues, observations will be promptly reported to the Construction Site Manager and recorded. The Construction Site Manager will determine appropriate measures to rectify the issues in a timely manner in consultation with the Environmental Management Representative and Health and Safety Manager where required.

5. Operation

5.1 Waste Stream and Classification

5.1.1 Site Specific Waste Streams

Potential waste types and corresponding EPA classifications for the operation of facilities constructed on the site are summarised in **Table 5.1**.

Table 5.1: Potential Waste Types and Classifications During Operation

Waste Type	EPA Classification	Waste Stream
Paper including all types of recyclable paper but excluding paper towels, toilet paper and tissues.	General solid waste (non-putrescible)	Paper recycling
Cardboard, excluding waxed cardboard.	General solid waste (non-putrescible)	Cardboard recycling
Metals (steel, aluminium, stainless steel, and copper piping or wire)	General solid waste (non-putrescible)	Co-mingled recycling, specific recycling or general waste
Wood (timber, wooden pallets)	General solid waste (non-putrescible)	Specific recycling or general waste
Plastics (recyclables)	General solid waste (non-putrescible)	Co-mingled recycling
Plastics (non-recyclables)	General solid waste (non-putrescible)	General waste
Soft plastics	General solid waste (non-putrescible)	Soft plastic recycling
Glass including bottles and containers.	General solid waste (non-putrescible)	Co-mingled recycling
Light bulbs, batteries, e-waste	Potentially hazardous waste	Specific recycling
General refuse such as food scraps and non-recyclable plastics.	General solid waste (putrescible) or General solid waste (non-putrescible)	General waste
Clinical/Medical waste	Special waste	Special waste

5.2 Waste Generation Quantities

5.2.1 Estimated Waste Quantities during Operation

The gross internal floor area of the operational site is 2,195m². However, much of the GFA consists of room uses that are unlikely to produce waste, e.g. rainwater tanks, air compressors, fire pumps, plant etc. For the purposes of waste estimates during operation, only areas that are likely to produce waste have been used in the calculation.

Schedule 3 of the Part: 7.2 Waste Minimisation and Management of the City of Ryde DCP does not have waste rates for the proposed premise type. Therefore, indicative waste generation quantities for the site are based on rates provided in Appendix A of the EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities.

These rates are provided in in **Table 5.2** and uses "medical and optical" and "offices" as the primary premise types.

Table 5.2: Estimated Average Waste and Recycling Generation Rates during Operation

Premises Type	Average Waste Generation	Average Recycling Generation
Medical and optical	35 L / per day / per 100m ²	10 L / per day / per 100m ²
Offices	8 L / per day/ per 100m ²	6 L / per day / per 100m ²

As above, waste production during operation has been estimated based on occupied spaces as follows:

- Medical = 1,359m²
- Office = 417m²

From the rates in the table above, it is estimated that the site will produce approximately the following amount of waste:

- 2,546L of waste per week
- 805L of recycling per week

These calculations presume that the buildings are used Monday to Friday only (normal working and educational week) so are based on five days.

It is also assumed that up to half of the waste produced will be medical waste (1,273L per week) refer to **Table 5.3**.

Strategies that will be implemented to minimise waste generation and maximise reuse and recycling are outlined in **Section 5.3.1**

5.3 Waste Management during Operation

The implementation of the following measures will provide the principles of the development achieving its waste targets of 90% reduction of waste to landfill during operation as required for planning (refer to Section 1.2).

5.3.1 Reduction of Waste following the Waste Hierarchy

5.3.1.1 Avoidance and Reduction of Waste

The ongoing site users will be required to minimise waste generation, and endeavour to reuse waste where available. Waste will be avoided through strategic selection of materials during purchasing which takes into account options which may reduce waste generation during ongoing operation of the site. This includes considering procurement of materials which use minimal packaging and are suitable for reuse. Selection of operational materials will also consider the use of recycled items where practicable.

Opportunities to avoid wastes generated by operation include:

- Develop a procurement policy which considers waste avoidance measures such as:
 - Order site specific or prefabricated items where practicable to minimise surplus material.
 - Consider packaging material provided by suppliers during purchasing and reduce this requirement where possible or consider returnable packaging.
 - Material selection to consider recycled items.
- Refine waste stream estimates to ensure adequate on-site storage and waste segregation, and to inform future procurement policies.

5.3.1.2 Reuse and Recycling

Measures to separate waste streams will be implemented to maximize re-use and recycling. This includes segregating wastes into appropriate dedicated bins or areas for reclamation on site or transportation to a designated recycling facility.

Procedures to manage the reuse and recycling of waste materials during operation include:

- Incorporate waste management into site management procedures to promote reuse and/or recycling of materials.
- Ensure areas for waste segregation are easily accessible and clearly defined.
- Ensure staff are familiar with onsite waste storage areas for appropriate waste segregation.

- Consider opportunities for materials reuse and/or recycling where practicable.

5.3.1.3 Treatment and Disposal

Operational wastes may require treatment to stabilise them for appropriate disposal to reduce the risk of harm to human health or the environment. These materials may not be suitable for reuse or recycling and will be segregated and disposed of via a suitably qualified contractor for the waste stream.

All clinical and medical waste will be removed from site by a licenced contractor and incinerated at an approved facility.

Wastes will only be sent to landfill or disposal facilities where the prioritised management methods in the hierarchy cannot be implemented in a cost effective or practical manner. The site manager will liaise with the local council to determine appropriate disposal locations for potential waste streams.

Measures to manage the treatment and disposal of waste materials during operation include:

- Ensure wastes which cannot be reused or recycled and require disposal are clearly segregated from those which have the potential to be reused.
- Provision of segregated waste bins for each waste type.
- Maintenance staff to be inducted into site waste management practices.
- Hazardous materials to be disposed of in accordance with the handling and disposal requirements of SafeWork NSW and NSW EPA.
- General wastes to be disposed of in accordance with local council requirements.

5.3.2 Waste Storage Area

A centralised waste storage area is located on the ground floor of the building – refer to **Appendix A**.

The operational site will have localised bins for waste segregation (including general waste, recyclables and medical waste). It is expected that these will be emptied at least once a day and decanted into the centralised waste storage area.

All waste facilities must comply with the Building Code of Australia (BCA) and all relevant Australian Standards (AS) in accordance with the requirements of City of Ryde DCP. This will include a locally accessible tap at the centralised waste storage area for washing bins and cleaning the general area.

Clinical and medical waste bins will be routinely cleaned and sterilised. Gloves are to be worn when moving bins.

5.3.3 Waste Storage Systems

Based on the volumes of waste calculated in **Section 5.2.1**, it is estimated that as a minimum the following bins are required as provided in **Table 5.3**.

Table 5.3: Operational waste storage requirements

Type	Storage Vessels	Volume of Storage	Calculated Waste Volumes	Adequate Storage
General Waste	1 x 1,100 L mobile garbage bin (MGB) 1 x 240 L wheelie bin	1,100 L 240 L 1,340 L	1,273L	Yes
Medical Waste	1 x 1,100 L mobile garbage bin (MGB) 1 x 240 L wheelie bin	1,100 L 240 L 1,340 L	1,273L	Yes
Recycling	1 x 1,100 L mobile garbage bin (MGB)	1,100 L	805L	Yes

5.3.4 Waste Collection

Waste collection vehicles shall not obstruct access to adjacent premises, roadways or the footpath. In addition, waste collection must be carried out with due care for public safety including other road users, cyclists and pedestrians.

The centralised waste room is located on the ground floor of the building with an exit directly to the outside, allowing for bins to be easily wheeled out to an area accessible by vehicles. These bins are then emptied by the waste contractors into the collection vehicles and disposed of offsite.

A licensed waste contractor will need to be engaged in order to ensure waste is correctly removed from the facility. All potential waste streams must be accounted for when hiring a waste collection contractor. Written evidence of the contract with the licensed collector for waste and recycling collection is to be provided to the client and the City of Ryde Council and held on site.

5.4 Ongoing Management

Having suitable waste management systems in place is only one element of an effective waste management system at a large facility such as the one this site is located in. Compliance by the administrative manager, staff, cleaning contractors and waste collection contractor is essential to ensure the efficacy of the overall system.

5.4.1 Roles and Responsibilities

It is expected that all personnel will commit to the WMP and be responsible for their own actions in adhering to the waste management objectives.

An Administrative Manager will be the key person responsible for implementation of the WMP and adherence to applicable legislation, guidelines, licences and project conditions. The Administrative Manager will also be responsible for maintenance of the cleaning infrastructure such as the service doors, locks, lighting, signage, colour coding and repair/replacement of MGBs.

Table 5.4 below presents suggested responsibilities for waste management.

Table 5.4: Roles and Responsibilities

Role	Responsibility
Administrative Manager	<ul style="list-style-type: none"> Ensuring staff are inducted into the WMP and other applicable management plans. Responsible for undertaking procurement of operational materials in accordance with the waste management hierarchy. Segregation of waste streams where required to ensure appropriate use, treatment and/or disposal. Compliance with applicable environmental legislation and project conditions. Ensure environmental management plan(s) across the site are adhered to and accurate to site conditions. Undertake inspections to ensure compliance. Maintenance of waste-related signage, colour coding and MGBs. Security of waste storage areas during day-to-day business. Ensure no waste is placed on the public way.
Staff	<ul style="list-style-type: none"> Adherence to the WMP. Placement of waste/recycling within correct bins. Notify manager when bins are overfull and require transport to the MGBs. Informing the Administrative Manager of any waste management incidences.
Licensed Waste Collection Contractor	<ul style="list-style-type: none"> Responsible for collection, disposal and/or recycling of waste in accordance with contract and relevant legislation and guidance. Provide feedback on actual volumes of waste and recycling collected to enable waste volume evaluation by Administrative Manager.

5.4.2 Training and Awareness

All staff and contractors will undertake awareness training of the WMP and site-specific waste management. This includes:

- Induction to the waste management hierarchy and use across the site.
- Details of responsibilities for waste management and key personnel.
- Site specific waste management practices such as:
 - Waste storage and stockpiling locations;
 - Waste disposal requirements;
 - Hazardous or special wastes; and
 - Record of waste disposal details and receipts.
- Knowledge of emergency response procedures and contacts.

Signage will be provided on site to ensure waste management measures are communicated across the site. Signage will highlight correct procedures for separating wastes where required, locations of bins and waste storage areas, labelling of designated bins, potential hazards associated with the waste streams and handling, and contact details should any issues be encountered.

Signage will be prepared and located on site in accordance with the Australian Standard (AS 1319) for safety signs, and the NSW EPA and Australian Standard for recycling signage.

5.5 Monitoring and Reporting

The following activities will be undertaken to inform future onsite waste management and to improve the efficiency in achieving the outcomes of the WMP:

- Review of waste streams and waste quantities.
- Review the WMP in light of any changes to operational activities or further information which may alter waste management practices.
- Undertake auditing of waste management across the site as a component of broader environmental site audits.
- Undertake visual inspections to ensure waste management controls are implemented and maintained across site.
- Undertake annual review of the WMP to ensure information accurately reflects site activities, and to assist future waste management.

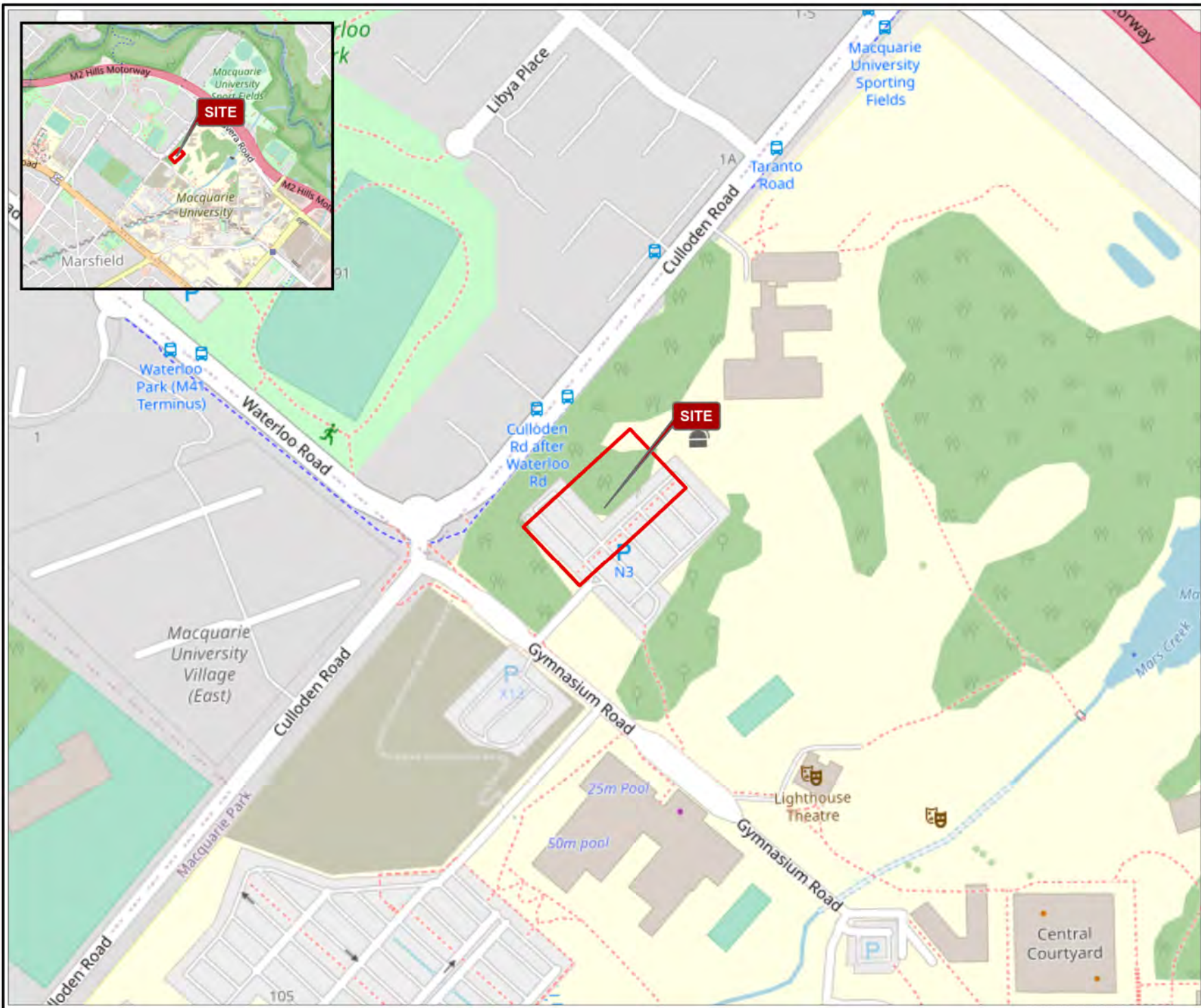
Where formal auditing, general inspections or incident reporting identify incorrect storage or disposal procedures, or maintenance or waste management issues, observations will be promptly reported to the Administrative Manager and recorded. The Administrative Manager will determine appropriate measures to rectify the issues in a timely manner.

6. Limitations

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Figures



Legend:
 Approximate Site Boundary

JBS&G

Job No: 63920

Client: Health Infrastructure

Version: R01 Rev A	Date 22/11/2022
Drawn By: LJ	Checked By: HM

Scale 1:3,500

Coord. Sys. GDA 1994 MGA Zone 56

Macquarie University mRNA Facility
 Gymnasium Road
 Macquarie Park, NSW

SITE LOCATION

FIGURE 1

File Name: N:\Projects\Health Infrastructure\63920 Macquarie Uni RNA Facility Contamination\GIS\02_MapProjects\63920_Macquarie Uni RNA Facility Contamination_R01_RevA.aprx
 Reference: © OpenStreetMap (and) contributors, CC-BY-SA



- Legend:**
- Approximate Site Boundary
 - NSW Cadastre (2022)



Job No: 63920

Client: Health Infrastructure

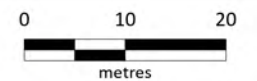
Version: R01 Rev A

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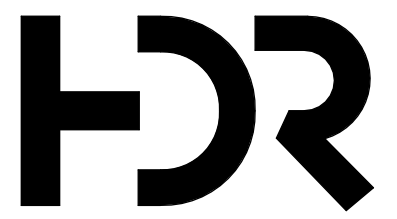
Coord. Sys. GDA 1994 MGA Zone 56

Macquarie University mRNA Facility
Gymnasium Road
Macquarie Park, NSW

SITE LAYOUT

FIGURE 2

Appendix A Design Drawings

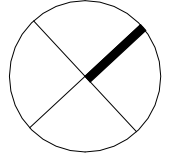


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B	SSDA SUBMISSION	14/06/23	AC	YZ

LEGEND

- EXISTING CARPARK
- AMENITIES
- BOH
- CLEAN ROOM
- GENERAL CORRIDOR & CIRCULATION
- MATERIAL/PACKING/FINISHES GOODS
- QA/QC LAB
- SERVICES
- STORAGE
- WORKPLACE

CLIENT



PROJECT

**RNA PILOT RESEARCH AND
 MANUFACTURING FACILITY**
 Macquarie University Campus
 Cnr Culloden Rd and Gymnasium Rd
 Macquarie Park, NSW 2109

DRAWING TITLE

**PROPOSED FLOOR PLAN -
 GROUND**

SCALE

1 : 200 @ A1

DRAWING NUMBER

HDR-AR-SSDA-2101

PROJECT STATUS
PRELIMINARY

PROJECT NUMBER

10354773

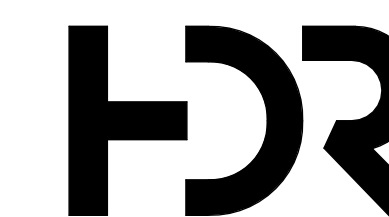
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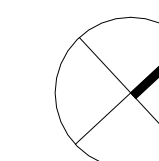
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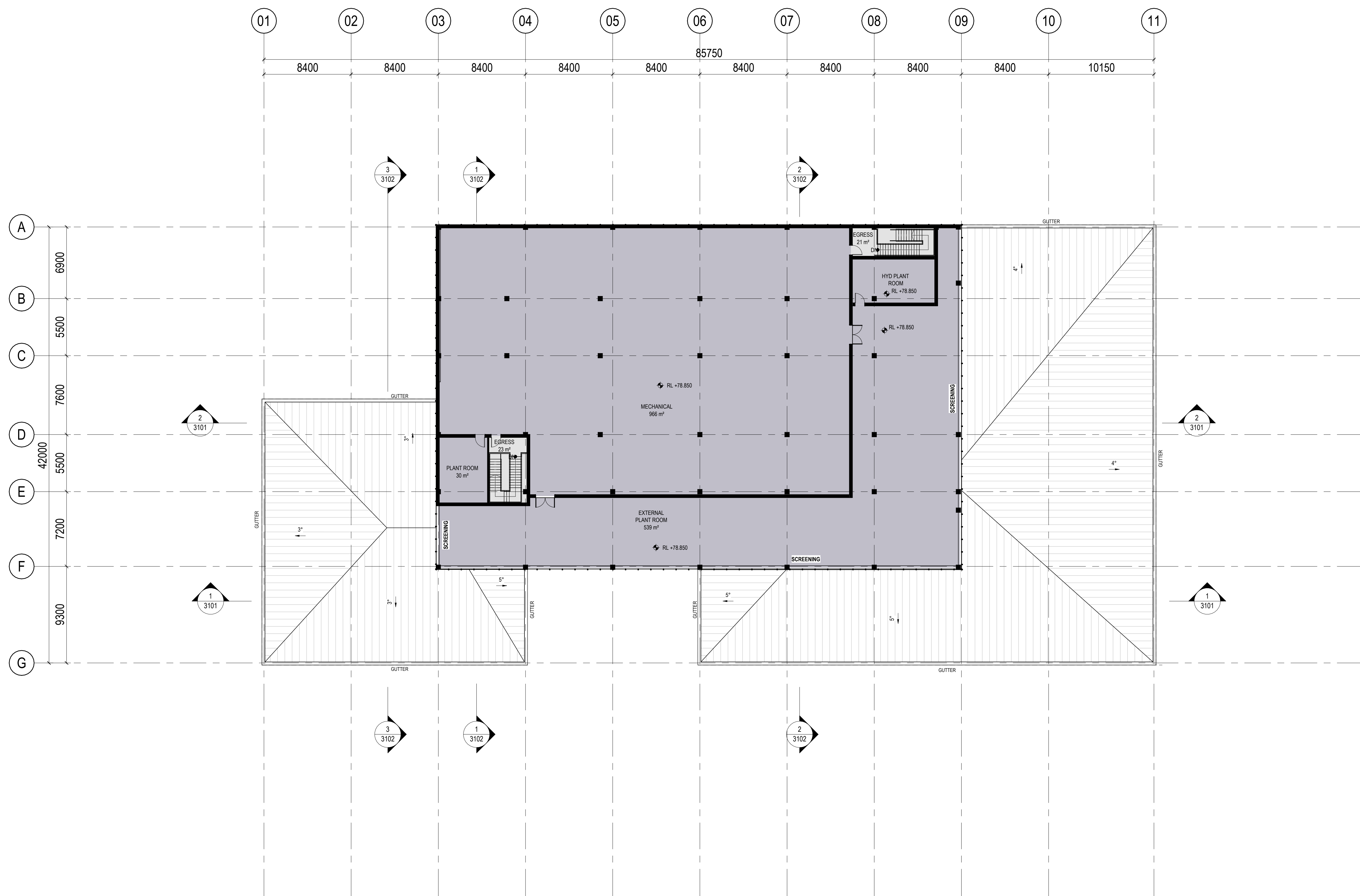


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B	SSDA SUBMISSION	14/06/23	AC	YZ

LEGEND

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- GENERAL CORRIDOR & CIRCULATION
- SERVICES



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PROJECT
**RNA PILOT RESEARCH AND
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 Macquarie University Campus
 Cnr Culloden Rd and Gymnasium Rd
 Macquarie Park, NSW 2109

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 MEZZANINE**

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