Nepean Hospital Redevelopment Stage 2 – Waste Management Plan

Prepared for the Blue Mountains Local Health District (LHD)

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MRA Consulting Group

Nepean Hospital Redevelopment Stage 2 –Waste Management Plan

A Submission to CBRE (ABN 98 000 893 667) on behalf of the Blue Mountains Local Health District (LHD)

Prepared by

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Glossary

Terminology	Definition
AS	Australian Standard
BOH	Back of House
C&D	Construction and Demolition
C&I	Commercial and Industrial
Council	Penrith City Council
DCP	Development Control Plan
DA	Development Application
EACS	Electronic Access Control System
ENM	Excavated Natural Material
EPA	Environment Protection Authority
FM	Facilities Management
PDCP	Penrith Development Control Plan 2014
PLEP	Penrith Local Environmental Plan 2010
HETI	Health Education and Training Institute NSW
LHD	Local Health District
LGA	Local Government Area
MGB	Mobile Garbage Bin
PPE	Personal Protective Equipment
WHS	Work Health and Safety
WMC	Waste Management Committee
WMP	Waste Management Plan
WMWG	Waste Management Working Group
WSP	Waste Service Provider
WSRA	Waste Storage and Recycling Area

Executive Summary

This Waste Management Plan (WMP) was prepared for CBRE on behalf of the Nepean Blue Mountains Local Health District (LHD). This Waste Management Plan satisfies the State Significant Development (SSD) Secretary's Environmental Assessment Requirements (SEARs), in addition to Green Star credit requirements for construction and operational components of the proposed development of the Stage 2 development. This WMP was also developed with specific consideration to the overall Nepean Campus precinct and is capable of being adapted for other LHD facilities, i.e. existing operational campus buildings and future stages of the hospital.

The operational aspect of the proposed development will involve the generation of a range of wastes as classified in the NSW EPA *Waste Classification Guidelines* (2014) and the *Protection of the Environment Operations (PoEO) Act 1997*. This includes the following "medical" and related wastes:

- Special waste;
- Liquid waste;
- Hazardous waste;
- Restricted solid waste;
- General solid waste (putrescible); and
- General solid waste (non-putrescible).

The LHD sustainability Waste Management Working Group (WMWG) has identified a range of major and minor waste streams that are or have the potential to be managed at the site. These include but are not limited to the following:

Table 1: Waste stream management

Will be managed	Potential to be managed
• General waste	• Pharmaceutical Waste
• Paper and cardboard	• Soft Plastics
• Commingled recycling	• Mixed metals
• Secure document recycling	• Containers
• Clinical (and related) waste	• Textiles
• Printer cartridges (Close the loop/Planet Ark – certain areas of the hospital, not all)	• Maintenance waste
• Food waste	

The Stage 2 Tower will incorporate a range of new and existing uses in comparison to the existing and Stage 1 aspects of the hospital and therefore, operational waste generation for the Stage 2 development is expected to be similar with regards to the type and relative volume of waste. Hospitals are a key generator of Commercial and Industrial (C&I) related wastes as defined by the NSW *Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021* and more recently the NSW (DPIE) *Waste and Sustainable Materials Strategy 2041*, of which the target recycling rate for waste generated by the sector is 70%. The recycling rate currently experienced by the existing Nepean Hospital Campus is approximately 8% on average across all departments (this includes clinical and related wastes). With reference to the above, efficiencies and strategies can be employed to reduce waste disposed as clinical and general waste, while improving recycling rates.

Management of waste for the Stage 2 development will be broken down into stages. Intermediate disposal rooms will be located on each floor nearby lift lobbies for the temporary storage of waste generated on each level and provide ease of access for regular transfer of full and empty bins between floors and the Stage 2

service/loading area. The main Stage 2 Back of House (BOH) is situated on Level 01 and will be redeveloped as part of Stage 2 works to improve BOH functions, including waste storage, management and loading. The Stage 2 BOH will be utilised for the temporary storage of waste generated from Stage 2 works and may also act as a hub for the consolidation of waste from Stage 1 and existing campus buildings. A designated space is proposed near the waste storage and loading area for the parking of bin tugs and trailers for use across the entire site.

Medical wastes generated at the site may include potentially hazardous materials (cytotoxic, sharp, anatomical or biohazard) and will therefore be disposed, stored and collected according to the Clinical and Related Waste Management for Health Services Guidelines, to minimise risks to medical, cleaning and waste service personnel.

Resource recovery and landfill diversion is a key focus of this WMP, with an emphasis on the recycling material streams that are generated in proportionally high in volumes and improving operational efficiencies to ensure waste is managed effectively for the Stage 2 Tower. This WMP also explores provisions for infrastructure and education for hospital operations, in addition to processes to audit and review the WMP to ensure are being achieved, determine areas of improvement and ensure relevance of operational waste management expectations for the site.

1 Introduction

MRA Consulting Group was engaged by CBRE on behalf of the Nepean Blue Mountains Local Health District (LHD), to prepare an Waste Management Plan (WMP) for the proposed Stage 2 redevelopment of the Nepean Hospital (hereafter referred to as "the Site"). The Site is in the Nepean health precinct, located on the corner of Greater Western Highway and Parker Street which is situated in the Penrith City Council (PCC) Local Government Area (LGA). The proposed development features a 9-storey tower and redevelopment of the North Building Back of House (BOH) area (Refer to Appendix A for the proposed Site Plans).

This WMP has been prepared to inform building design and operation in relation to the delivery of best practice waste management, in addition to promoting sustainable outcomes across each stage of development.

1.1 Waste Management Context

The proposed development is guided by the project Secretary's Environmental Assessment Requirements (SEARs). The Site is situated within the Penrith Local Environmental Plan (PLEP) 2010 and therefore, relevant sections of the Penrith Development Control Plan (PDCP) 2014 apply to this WMP. The PDCP (2014) outlines the following waste management objectives and guiding principles which have been considered through the preparation of this WMP:

a) To facilitate sustainable waste management within the City of Penrith in accordance with the principles of Ecologically Sustainable Development;

b) To manage waste in accordance with the 'Waste Hierarchy' to:

   i) Avoid producing waste in the first place;

   ii) Minimise the amount of waste produced;

   iii) Re-use items as many times as possible to minimise waste;

   iv) Recycle once re-use options have been exhausted; and

   v) Dispose of what is left, as a last resort, in a responsible way to appropriate waste disposal facilities.

c) To assist in achieving Federal and State Government waste minimisation targets as set out in the Waste Avoidance and Resource Recovery Act 2001 and NSW Waste Avoidance and Resource Recovery Strategy 2014-21;

d) To minimise the overall environmental impacts of waste by:

   i) Encouraging development that facilitates ongoing waste avoidance and complements waste services offered by both Council and/or private contractors;

   ii) Requiring on-site source separation and other design and siting standards which assist waste collection and management services offered by Council and/or the private sector;

   iii) Encouraging building designs and construction techniques that minimise waste generation;

   iv) Maximising opportunities to reuse and recycle building and construction materials as well as other wastes in the ongoing use of a premise; and

   v) Reducing the demand for waste disposal.

The following supplementary documents have also been directly relied upon in the preparation of this WMP:

- *Better practice Guidelines for Waste Management in Commercial and Industrial Developments (NSW EPA, 2012);*
- *Clinical and Related Waste Management for Health Services Policy Statement (NSW Ministry of Health, 2020);*
- *Generic Hospital Waste Management Plan (NSW Ministry of Health, 1999); and*
- *Waste Classification Guidelines (NSW EPA, 2014):*
  - *Part 1: Classification of Waste.*
- *NBMLHD (2020) Sustainability Plan 2019-2023 and NBMLHD "Waste Management & Recycling Programs" Focal Point Document.*

- *NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021).*

This WMP has been developed to comply with relevant Council's codes and with other statutory requirements.

1.2 Strategic Waste Targets

The NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021 and latest Waste and Sustainable Materials Strategy 2041 set targets for municipal, commercial and industrial (C&I), and construction and demolition waste (C&D). Hospitals are a key generator of C&I related wastes, of which the target recycling rate for waste generated by the sector is 70% (current rate is 53% in as of 2019). The recycling rate currently experienced by the existing Nepean Hospital Campus is 8% on average across all departments (this includes clinical and related wastes). While clinical wastes are typically not all recoverable for recycling, audit data from NSW and Victorian hospitals (NSW Health, 2020 and Victorian Department of Health and Human Services, 2018) indicates that up to 60% of material that is disposed as "clinical waste" consists of general waste or recyclable material and of this, 45% of general waste is recyclable. Additionally, operational efficiencies may be possible to reduce clinical waste generated and further efficiencies through the addition of key recycling streams may be able to reduce material being sent to landfill or treatment.

The Stage 2 Tower replicate many existing hospital campus departments or similar and therefore, can expect to generate similar types and volumes of waste. Hospitals represent some of the lowest percentage recycling rates in the commercial and industrial sector due to a range of factors including material types, scale of operations and resourcing for waste management. Therefore, the NSW state target of 70% is unlikely to be achievable by the existing campus or future development stages. As such, state targets should be used as a guide for best practice and improvements made to systems and strategies with the following focus in mind:

- Prioritise waste avoidance - reducing general waste and paper waste by 5-10% each year through:
    - Sustainable sourcing of recycled content and recyclable materials (such as a disposable curtain retrieval policy with supplier),
    - Mandate packaging waste removal / recycling policy to other consumable suppliers, and
    - Implement paper-less document and record process.
- Encourage waste segregation and recycling - to covert general waste to commingled and/or paper/cardboard waste by 5-10% each year through
    - Develop and implement effective waste management procedure,
    - Focus on recovering material streams that are generated in high volumes and are easiest/simplest to implement, for example:
        - Onsite processing or separation of food waste for collection and offsite processing as food waste represents approximately 30-50% of the general waste stream in the C&I sector when not separated.
        - Soft plastic and plastic film are common in general hospital operations including in theatres and patient wards.
    - Roll out and reinforce staff training and education in waste management and handling, and
    - Monitor, review and improve operational waste management practice.

1.3 Legislative Context

The following legislation, policies and guidelines are applicable to the appropriate functioning and management of waste at and generated from hospitals. These documents are used in referenced for the preparation of, and/or in conjunction with the use of this WMP and are current at the time of preparation of this version of the WMP.

State:

- Work Health and Safety (WHS) Act 2011;
- WHS Regulation 2017;
- Protection of the Environment Operations (POEO) Act 1997;
- POEO Waste Regulation 2014;
- POEO Amendment (Scheduled Activities and Waste) Regulation 2008;

- Notice of exemption under clause 16C Number 2001 E01, POEO Waste Regulation 2005;
- Radiation Control Act 1990;
- Radiation Control Regulation 2013;
- Gene Technology Act 2003;
- Dangerous Goods (Road and Rail Transport) Act 2008;
- Dangerous Goods (Road and Rail Transport) Regulation 2014;
- Poisons and Therapeutic Goods Act 1966; and
- Poisons and Therapeutic Goods Regulation 2008.

Federal:

- Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code) 2020 (given force in NSW via the NSW Dangerous Goods legislation)
- Gene Technology Act 2000; and
- Gene Technology Regulations 2001.

Policies and guidelines relevant to clinical and related waste include the following:

- AS/NZS 4031:1992 (Non-reusable containers for the collection of sharp medical items used in health care areas);
- AS/NZS 4261:1994 (Reusable containers for the collection of sharp items used in human and animal medical applications);
- AS/NZS 3816:2018 (Management of clinical and related waste);
- AS/NZS 2161.10 Parts 1-3:2005 (Occupational protective gloves);
- AS/NZS 4123 Parts 1-7:2008 (Mobile waste containers);
- AS/NZS 2243 Part 3:2010 (Safety in Laboratories);
- RPS G-4 Guide for Classification of Radioactive Waste (ARPANSA, 2020);
- Code for the Safe Transport of Radioactive Material (ARPANSA, 2019);
- Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (RPS14) (ARPANSA, 2008);
- Industry Code of Practice for the Management of Biohazardous Waste (including Clinical & Related Wastes) (WMAA, 2020);
- The Australian Council on Healthcare Standards (ACHS) EQuIPNational;
- Guidelines Standard 15 (ACHS, 2017) NSW whole of government guidelines and policies;
- Waste Classification Guidelines. Part 1: Classifying waste (EPA, 2014);
- Waste Classification Guidelines. Part 3: Waste containing radioactive material CLINICAL AND RELATED WASTE MANAGEMENT FOR HEALTH SERVICES PROCEDURES PD2017_026 Issue date: August-2017 Page 4 of 19 (EPA, 2014);
- NSW Government Resource Efficiency Policy (OEH, 2019);
- Model Code of Practice – Labelling of Workplace Hazardous Chemicals: Code of Practice (Saw Work Australia, 2020);
- Labelling of workplace hazardous chemicals: Code of Practice (SafeWork NSW, 2019);
- Code of Practice: Hazardous manual tasks (SafeWork NSW, 2019) NSW Health guidelines and policies;
- PD2008_004 Community Sharps Disposal by Area Health Services;
- PD2013_043 Medication Handling in NSW Public Health Facilities;
- Guideline for Approval of Method to Treat Clinical Waste;

- PD2017_013 Infection Prevention and Control Policy;
- PD2017_010 HIV, Hepatitis B and Hepatitis C - Management of Health Care Workers Potentially Exposed;
- GL2018_013 Work Health and Safety – Blood and Body Substances Occupational Exposure Prevention;
- PD2020_022 Cleaning of the Healthcare Environment;
- Work Health and Safety - Blood and Body Substances Occupational Exposure Prevention (Workplace Relations, 2018);
- PD2012_061 Environmental Cleaning Policy;
- Infection prevention and control practice handbook. Principles for NSW public health organisations (CEC, 2020);
- Cleaning of the Healthcare Environment (CEC, 2020);
- Environmental Cleaning Standard Operating Procedures. Module 3.4 Environment (CEC-HAI, 2012); and
- Environmental Cleaning Standard Operating Procedures. Module 6 Cleaning Agents (CEC-HAI, 2012).

1.4 Summary of Compliance

The following compliance table (Table 2) highlights relevant sections of this WMP that address the specific SSDA and Green Star credit requirements in relation to waste management.

Table 2: WMP table of compliance

Condition Number	Details	Section of WMP where addressed
SSD - 16928008		
(a)	Identify, quantify and classify the likely waste streams to be generated during construction and operation.	Section 3.1 - 3.3, 3.7
(b)	Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	Section 3.5, 3.6, 3.8
(c)	Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.	Section 3.3
(d)	Provide a hazardous materials survey of existing aboveground buildings that are proposed to be demolished or altered	Section 4.1 - 4.5 Hazardous Building Materials Survey prepared by JK Environments
Green Star Requirement – Point 8A: 1 point is available where a waste professional prepares and implements an Operational Waste Management Plan (WMP) for the project in accordance with best practice approaches and this is reflected in the building's design.		
(a)	Identify the site boundary, the waste streams relevant to the project, and the individual roles responsible for delivering and reviewing the WMP;	Sections 1.1, 3.3, 4.1.3 Appendix A
(b)	Set diversion from landfill targets and/or targets for reducing total materials generation (general waste materials and recyclable/reusable materials), as well as monitoring and measurement procedures for waste and recycling streams by weight;	Section 1.2
(c)	Outline methods for encouraging the separation of waste streams, such as bins, storage areas, or recycling facilities in public areas as required;	Section 3.5 and 3.6
(d)	Identify storage areas for all waste streams and outline best practice safety and access requirements for their collection;	Section 5
(e)	Identify safe methods for vehicle access and transfer of waste; and	Section 5
(f)	Incorporate a review process to assess the success of the WMP and make improvements, based on operational experience.	Section 4.6

1.5 Objectives

Waste management for the Site considers better practice, necessary equipment, and integration with other guidance documents including the NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021), and National Waste Policy: Less Waste, More Resources (EPHC, 2018). The key policy aims that are considered are:

- Avoidance (to prevent the generation of waste);

- Reduce the amount of waste (including hazardous waste) for disposal;
- Manage waste as a resource;
- Ensure that waste treatment, disposal, recovery and reuse are undertaken in a safe, scientific and environmentally sound manner; and
- Operational efficiency and financial outcome.

1.6 Assumptions

This report is a Waste Management Plan, forming part of the State Significant Development Application (SSDA) submission:

- Drawings and information that have been used in waste management planning for this WMP are the current design set for the development plan from the project architect, BVN Architecture, dated 12/11/2021;
- The waste streams and volumes expected to be generated during regular activities based on the following clinical and ancillary services delivered under Stage 2:
    - Kitchen.
    - Clinical support spaces.
    - Front of house.
    - Retail spaces.
    - Education space.
    - Medical imaging
    - Nuclear medicine.
    - Interventional Radiology.
    - Intensive Care.
    - Paediatric Active Enhanced Disease Surveillance.
    - Incentre Dialysis and Renal Inpatient Units.
- The Logistic Centre and Kitchen Facility form part of the Stage 2 Tower redevelopment;
- Waste generation volumes are based on data derived from existing Nepean Hospital and Stage 1 operations, with like for like or similar comparison of uses to the proposed Stage 2 development. Waste management equipment and infrastructure recommendations have been made according to estimated waste generation for the Site and guidance from supporting regulatory documents outlined above; and
- This WMP is a living document and therefore, waste management equipment and systems described in this report are subject to change based on changes to future operations and available technologies. It is the responsibility of the NBMLHD to review and update the WMP on a regular basis or as required, to ensure the document remains consistent with operations at the site.

2 C&D Waste Management

Demolition, excavation and construction activities related to the proposed development will generate a range of construction and demolition (C&D) wastes. The Site is occupied by several existing hospital buildings which will require demolition or deconstruction prior to the commencement of any redevelopment works. Existing buildings requiring demolition and/or alteration –

- Complete removal of the:
    - Pathology building;
    - North Block;
    - Maintenance and asset management building;
    - Population health building;
    - Hope Cottage / Doctors Accommodation;
    - Existing carparking area; and
    - Internal walkways.
- Internal demolition works to the:
    - Pharmacy;
    - Domestic services; and
    - Central Sterile Services Department (CSSD).

Throughout the development process, all materials will be reused and recycled where possible, minimising the disposal (landfilling) of materials other than those that are contaminated or otherwise unsuitable for reuse or recycling.

Waste storage during demolition, excavation and construction works will involve stockpiling of excavated and reusable material, as well as siting of skip bins for the separation of demolished and excess building materials for recycling. A skip bin (or bins) for residual waste and/or contaminated material will also be made available at the site for disposal where necessary. Skip bins may require alternative placement across C&D operations to facilitate the safe and efficient storage of materials and will be retained within property boundaries to avoid illegal dumping.

The quantities, densities and bulking factors for waste and recyclables has been determined based on provisions set out in the PDCP. A waste storage area shall be designated by the demolition and construction contractor and shall be sufficient to store the various waste streams expected to be generated during operations. Waste storage areas will be kept clear to maintain vehicular access and shall also be kept tidy to encourage separation of waste materials and for WHS reasons.

Waste management principles, management measures and facilities in use on the site shall be included as part of the site induction for all personnel working on the site.

2.1 Demolition Waste

Demolition works at the site will involve the demolition or deconstruction of existing buildings at the site. Table 3 below outlines waste streams and material quantities expected through the demolition phase, including potential reuse and recycling opportunities, and anticipated material diversion percentage.

Table 3: Demolition waste generation estimates

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Concrete	50-100m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: crushing and recycling for recovered products (aggregates).
Asphalt	50-100m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: crushing and recycling for recovered products (aggregates).
Bricks/pavers	50-100m^3	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.
Timber (treated & untreated)	20-30m^3	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Metal (ferrous)	10-20m^3	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: metals recovery and recycling.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Metal (non-ferrous)	10-20m^3	-	✓	-	Onsite: to be separated wherever possible to enhance resource recovery. C&D processor: metals recovery and recycling.
Glass	10-20m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Glass recycler: recovery and recycling.
Fixtures and fittings	5-10m^3	✓	✓	-	On site: reuse wherever possible or return to manufacturer. C&D processor: recovery and recycling.
Plasterboard	50-60m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor or plasterboard processor: for recovered plasterboard products.
Floor coverings	30-40m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: recovery and recycling.
Garden organics (Vegetation)	Minor	✓	✓	-	Removal or vegetation to make way for construction. Total to be determined by a qualified arborist. Organics processor: storage on-site (from minor excavations) processing for recovered product (e.g. mulch or other blended recovered fines) or organics treatment.
Residual waste (general refuse)	40-50m^3	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Hazardous/special waste (e.g. spills and contaminated wastes)	Per JK Environments Report	-	-	✓	Management by a licensed asbestos and site hygienist should hazardous or special waste be found to exist at the site. See Hazardous Building Materials Survey completed by JK Environments.

2.2 Excavation & Construction

Construction works associated with the proposed development would include the following:

- Excavation works for proposed new BOH and Stage 2 Tower facilities;
- Construction of internal access and hardstand;
- Construction of a 9-storey building envelope; and
- Sitewide landscaping.

Construction waste estimates provide a range for construction waste for new developments (PDCP). Low end figures from the below ranges have been applied to estimated waste generation during construction as best practice material ordering and use is proposed to be employed:

- Timber 5-7% of material ordered
- Plasterboard 5-20% of material ordered
- Concrete 3-5% of material ordered
- Bricks 5-10% of material ordered
- Tiles 2-5% of material ordered

Table 4 outlines the expected excavation and construction waste quantities to be generated at the site, in addition to the appropriate management methods for each material type. The information below presents multiple options for materials reuse, recycling and disposal where applicable (e.g. return to manufacturer, recycled at construction and demolition (C&D) processor, or disposed to landfill if contaminated).

Table 4: Construction waste generation estimates

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Excavation material	9,000-10,000m^3	✓	-	-	On site: testing (if necessary) for contamination and stockpiling of material for reuse as fill material. C&D processor: reuse/recycling of VENM and ENM Landfill if contaminated.
Concrete	300-400m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery.

Type of waste generated		Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
						C&D processor: crushing and recycling for recovered products (aggregates).
Bricks/pavers		10m^3	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.
Tiles	Roof	N/A	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.
	Floor and wall	10m^3	✓	✓	-	
Timber		10m^3	-	✓	-	Onsite: to be separated wherever possible to enhance resource recovery. C&D processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Metals		10m^3	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: metals recovery and recycling.
Plasterboard		50m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Glass	5-10m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse where possible. Glass recycler: recovery and recycling.
Fixtures and fittings	2-5m^3	✓	✓	-	On site: reuse wherever possible or return to manufacturer. Reuse: surplus and offcut material returned to manufacturer for reuse where possible. C&D processor: recovery and recycling.
Floor coverings	10-20m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse where possible. C&D processor: recovery and recycling.
Packaging (used pallets, pallet wrap)	50-100m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D processor: recycling of timbers and plastic.
Garden organics (Vegetation)	<10m^3	✓	✓	-	Minimal garden organic waste from landscaping. Organics processor: storage on-site (from minor excavations) processing for recovered product (e.g. mulch or other blended recovered fines) or organics treatment.
Paper/cardboard	25-50m^3	-	✓	-	Commercial contractor: segregation of paper, cardboard or other streams.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Residual waste (general refuse)	50-100m^3	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.
Hazardous/special waste (e.g. spills and contaminated wastes)	Unknown	-	-	✓	Management by a licensed asbestos and site hygienist should hazardous or special waste be found at the site.

2.3 Waste Contractors and Facilities

To ensure best practice waste management, appropriate contractors and facilities have been proposed based on their location and service offerings (Table 4).

Table 5: Waste service contractors and facilities

Role	Details
Recommended Waste Collection Contractor	The following are local skip bin operators for consideration in the management of site excavation and construction waste: • Bingo Industries; • Aussie Skip Bins; • JNS Skip Bins; • Matt's Skip Bins; Or another appropriate waste contractor as elected by the building or demolition contractor.
Principal Off-Site Recycler	The following are local C&D processing facilities for consideration in the management of C&D waste generated at the site: • Bingo St Marys; • Bingo Eastern Creek; Or another appropriate facility as elected by the waste management contractor.
Principal Licensed Landfill Site	The following are local landfills for consideration in the management of residual and contaminated wastes generated at the site: • Bingo Eastern Creek Landfill; Or another appropriate landfill or transfer station as elected by the waste management contractor.

2.4 Site documentation

This WMP will be retained on-site during the excavation and construction phases of the development, along with other waste management documentation (e.g. contracts with waste service provider). Responsibility for the WMP, waste documentation and processes during the excavation and construction phases will be with the site manager or building manager.

A logbook that records waste management and collection will be maintained on site, with entries including:

- Time and date of waste collections;
- Description of waste type and quantity;
- Waste/processing facility that will receive the waste; and
- Vehicle registration and company name of collection contractor.

Waste management documentation, the logbook and associated dockets and receipts must be made available for inspection by an authorised Council Officer at any time during site works.

3 Operational Waste Management Planning

3.1 Waste Classification

The NSW EPA *Waste Classification Guidelines* (2014) defines several types of waste, according to Schedule 1 of the *Protection of the Environment Operations (PoEO) Act 1997*. *Part 1: Classifying waste* outlines the following waste types:

- Special waste;
- Liquid waste;
- Hazardous waste;
- Restricted solid waste;
- General solid waste (putrescible); and
- General solid waste (non-putrescible).

From the above-mentioned waste classifications, Table 6 below details the specific waste types expected to be generated, under each of the classifications.

Table 6: Waste classification of hospital waste

Waste Classification	Waste Material	Additional Details

Special	Clinical and related waste:
	• Clinical, including:
	  ○ human tissue (other than hair, teeth and nails),
	  ○ bulk body fluids or blood,
	  ○ visibly blood-stained body fluids, materials or equipment,
	  ○ laboratory specimens or cultures, and
	  ○ animal tissue, carcasses or other waste from animals used for medical research.
	• Cytotoxic;
	• Pharmaceutical, drug or medicine (defined under Section 8 of the *Poisons and Therapeutic Goods Act 1966 (NSW Ministry of Health)*; and
	• Sharps, being those thigs that:
	  ○ Have sharp points or edges capable of cutting, piercing or penetrating the skin (such as needles, syringes with needles or surgical instruments),
	  ○ Are designed for the purpose of cutting, piercing or penetrating the skin, and
	  ○ Have the potential to cause injury or infection.
		An exception to this classification occurs when special waste is mixed with restricted solid or hazardous waste. In these circumstances, the waste must be classified as special waste and restricted solid or hazardous waste (as applicable) and managed as both of those classifications.

Liquid	Liquid waste means any waste (other than special waste) that: • Has an angle of repose of less than 5 degrees above horizontal;	If the waste meets the criteria outlined, it is classified as liquid waste, and no further assessment for classification is required.

Waste Classification	Waste Material	Additional Details
	• Becomes free-flowing at or below 60 degrees Celsius or when it is transported; • Is generally not capable of being picked up with a spade or shovel; and • Is classified as a liquid waste under an EPA gazettal notice.	
Hazardous	The following waste types (other than special waste or liquid waste) have been pre-classified by the EPA as 'hazardous waste', being containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the Transport of Dangerous Goods Code, or a substance to which Division 6.1 of the Transport of Dangerous Goods Code applies, from which residues have not been removed by washing or vacuuming. Classes defined as follows: • Class 1 – Explosives; • Class 3 – Flammable liquids; • Class 4 – Flammable solids; • Class 5 – Oxidising substances and organic peroxides; and • Class 8 – Corrosive substances.	Transport of Dangerous Goods Code means the document called the Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition), approved by the Ministerial Council for Road Transport and published by the Commonwealth Government from time to time.
Restricted Solid	N/A	N/A
General Solid (Putrescible)	The following wastes (other than special waste, liquid waste, hazardous waste or restricted solid waste) have been pre-classified by the EPA as 'general solid waste (putrescible)': • Disposable nappies, incontinence pads or sanitary napkins; • Food waste; and • Any mixture of waste referred to above.	Food waste means waste from the manufacture, preparation, sale or consumption of food but does not include grease-trap waste.
General Solid (Non-Putrescible)	The following wastes (other than special waste, liquid waste, hazardous waste, restricted solid waste or general solid waste (putrescible)) are pre-classified as 'general solid waste (non-putrescible)': • Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal; • Paper or cardboard; • Containers, previously containing dangerous goods, from which residues have been removed by washing or vacuuming; and • Any mixture of waste referred to above.	Any mixture of waste containing both putrescible and non-putrescible general solid waste is considered to be putrescible.
Containing Radioactive Material	Wastes containing any natural or artificial substance that emits ionising radiation.	Any waste of this nature must be classified on the basis of both their radioactive and other characteristics, according to the step-by-step procedure outlined in the *Waste classification guidelines Part 3:*

Waste Classification	Waste Material	Additional Details
		Waste containing radioactive material (NSW EPA, 2014).

Source: NSW EPA, 2014.

3.2 Medical Waste

For the purposes of this WMP, all clinical, cytotoxic, pharmaceutical, chemical and radioactive wastes are considered to be 'medical' related waste. Medical wastes are classified as hazardous wastes under the Waste Regulation. The hospital will be required to obtain the relevant licencing as required by the Waste Regulation. Table 7 below describes in detail the different medical wastes expected to be generated by the proposed hospital during operation and how they should be appropriately managed. Additional details with regards to specific management methods are outlined in Sections 2 and 3.

Table 7: Detailed description of medical waste streams

Waste Stream	Definition
Clinical Waste (incl. Pathological Waste)	Clinical waste with the potential to cause injury, infection or offence: • Unrecognisable human tissue (excluding hair, teeth, nails and anatomical waste); • Bulk blood or other body fluids (or body substances); • Material and equipment visibly stained by blood or body fluids (includes incontinence pads and disposable nappies that come from an infectious patient); • Lab specimens, cultures or other waste from lab investigations; • Waste from medical or veterinary research; and • Genetically Modified Organisms (GMOs).
Cytotoxic Waste	Material contaminated with residues or preparations containing materials toxic or otherwise harmful to cells. This includes any residual cytotoxic drug or laboratory chemical and any discarded material or clinical waste associated with the preparation or administration or excretion of cytotoxic drugs May include Genetically Modified Organisms (GMOs) or tissues containing GMOs.
Anatomical Waste	Identifiable human body parts such as limbs, organs, placenta and recognisable or large pathological specimens resulting from investigation or treatment of a patient It does not include deceased bodies.
Clinical Sharps Waste	Any clinical object capable of inflicting a penetrating injury which may or may not be contaminated with blood and or body substance. This includes needles, ampoules and any other sharp objects or instruments designed to perform penetrating procedures. May contain clinical material or Genetically Modified Organism (GMO) waste.
Pharmaceutical Waste	Pharmaceuticals or other chemical substances specified as regulated goods in the Poisons and Therapeutic Goods Act 2008. Includes any substance specified in a Schedule of the Poisons List under the Act, as well as any therapeutic good which is unscheduled Includes expired or discarded pharmaceuticals, filters or other material contaminated by pharmaceutical products.
Radioactive Waste	Any waste of this nature must be classified on the basis of both their radioactive and other characteristics, according to the step-by-step procedure outlined in the

Waste Stream	Definition
	Waste classification guidelines Part 3: Waste containing radioactive material (NSW EPA, 2014).

Source: NSW Ministry of Health, 2017.

Mobile bins, trolleys and waste bags will be utilised in conjunction with sharps containers to manage medical related waste as defined in Table 6. Detailed management requirements under relevant regulations and standards refer to Appendix B.

All clinical waste stream bags and storage receptacles should be in staff-only area to avoid unauthorised access.

3.3 Stage 2 Planned Waste Streams

Based on an understanding of the proposed uses of the Stage 2 development, the following key factors are considered in establishing the waste streams for operation of Stage 2:

- Legislative and government requirements;
- Existing waste practice and contract arrangements for the existing campus;
- Inspirational targets in LHD substantiality policy (draft) documents; and
- Operational efficiency under funding constraint.

3.3.1 Major Waste Streams

Major waste streams, which command the bulk of operational waste in Stage 2 and consistent with the existing campus, are recommended as follows:

- General Waste;
- Clinical Waste;
- Cytotoxic Waste;
- Anatomical Waste;
- Recycling 1 – Commingled (glass and containers);
- Recycling 2 - Paper & Cardboard; and
- Recycling 3 - Secure Paper.

3.3.2 Minor Waste Streams

Existing minor streams identified from the existing campus and Stage 1 development for continued management at the site include:

- Clinical Sharp waste – disposed into dedicated sharps bin in each patient care space as required, swapped with empty bins in Disposal Room for collection by the specialist waste contractors (it is noted that some materials currently disposed of as “clinical” waste may be able to be disposed of as general waste or a recycling stream and can be further reviewed through operations at the site to reduce the clinical waste disposal).
- Pharmaceutical Waste – disposed into dedicated pharmacy return bins in Medication Rooms, collected by the LHD Pharmacy staff.
- Batteries – Planet Ark, Close the Loop. LHD to expand program.
- Printer cartridges - Planet Ark, Close the Loop. LHD to expand program.

A number of waste streams generated at the site are currently not recycled at the existing hospital campus and have been identified for further consideration in Stage 1 and Stage 2 development of the site. The following list serves to demonstrate potential additional recycling streams through the addition of separate waste services either via the existing waste collection contractor, their sub-contractors or specialised services:

- Food Waste – Food waste potentially represents up to approximately 50% of the general waste stream generated. Food will be delivered from the Campus Kitchen to Stage 2 Tower in food trolleys and can generally be returned on food trays by the food trolley to the Campus Kitchen, for central processing. A separate food collection service or onsite primary processing (with a dehydrator or macerator, see Appendix G for examples) could significantly reduce waste sent to landfill and potentially reduce disposal costs for the site.
- Soft Plastics – consider one 240L in L03 Operating Theatre Deboxing room and one 240L bin in L04 CSSD Disposal Room.
- Metal (single use, e.g. from theatres) – Surgical trays and other metal implements that are typically single use may have the potential to be clean/treated and recycled, avoiding cost of clinical waste disposal. A single bin could be retained in the BOH area for this purpose, to be collected by the site waste contractor on a needs basis.
- Containers (CDS or glass) – after discussion with General Services, these shall be part of Com-mingled waste to be segregated in the Waste Facilities. The benefit of separate bin in Stage 2 is minimal and shall be considered at the South Main Entry and future Stage 2 FOH.
- Disposable curtain – consider removal and recycle by the supplier through procurement policy. Alternatively, if clean, disposable curtains may be able to be recycled with the soft plastics stream.
- Maintenance waste (light globes and etc) – to be collected and recycled by the FM team.

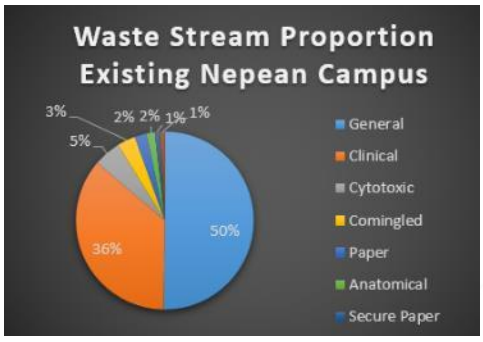
3.4 Operational Waste Projection

3.4.1 Existing Campus Waste Data

The LHD was able to provide detailed waste data from the existing campus operations which was utilised in the development of the waste management plan for Stage 1 of the redevelopment. Data provided insight into the typical waste streams and volumes expected from the expended services in the new Stage 2 development. Figure 1 below provides an overall highlight of the waste data for the existing Nepean Hospital Campus which forms the basis of waste generation expectations for the Stage 2 development.

Figure 1: Nepean Hospital Existing Campus Waste Data

Sum of Tonnes p.a.	Column				
Row Labels	East Block	North Block	South Block	West Block	Grand Total
General	312.732	305.834	41.391	252.945	912.902
Clinical	290.175	155.534	46.428	162.498	654.635
Cytotoxic	13.841		6.920	69.204	89.965
Comingled		15.768	15.768	28.908	60.444
Paper	4.380	8.760	4.380	21.900	39.420
Anatomical		20.761	6.920		27.682
Secure Paper	0.461	2.957	2.726	10.656	16.800
Cardboard - general			10.512	5.256	15.768
Grand Total	**621.589**	**509.613**	**135.046**	**551.367**	**1,817.615**



Some general observations from the above-mentioned data set are outlined as follows:

- General Waste and Clinical Waste make up approximately 86% of the total volume;
- Recyclable waste streams only make up 6% in departments that will operate in Stage 2 Tower;
- The recyclable waste volumes vary considerably among departments. Some departments currently do not recycle co-mingled waste or paper waste at all;
- Secure paper waste typically occurs in printing or administration areas, not in dirty utility or disposal room;
- Cytotoxic and Anatomical waste are only generated by certain departments; and
- Bin collection frequencies by General Services from the departments are often “as required” and independent to the collection frequency by the waste contractors from the campus loading dock.

3.4.2 Stage 2 Operation Waste Forecast

The following assumptions have been adopted for operational waste generation for the proposed Stage 2 development:

- The waste generation streams / rates of the departments in Stage 2 will be similar to that of exiting departments in the existing hospital campus;
- The waste volumes are assumed to be proportional to the clinical services capacity, i.e. treatment spaces / bed numbers, seating capacity, spatial capacity (area), etc;
- A growth factor of 1.1 is applied to the departments where the waste volume may increase over time;
- A possible increase of disposable PPE through Coivd-19 or similar events can be generally accommodated within the redundancy of the total bin capacity provided, subject to further monitoring;
- The bin collection frequencies will be generally similar to the existing operations, however with an attempt to reduce the bin lift frequency where practicable for efficiency. Data from both existing departments and forecasts are flattened to daily or weekly volumes for the purpose of comparison.

The analysis, mapping and forecast data are summarised in Table 8.

Table 8: Waste mapping and forecast data

Level	General Waste (L)	Clinical Waste (L)	Cytotoxic Waste (L)	Commingle (L)	Paper/ cardboard (L)	Secure document (L)	Food	Total
LV 00	858	0	0	528	528	396	3,564	5,874
LV 01	880	264	0	440	0	792	0	2,376
LV 02	3,421	858	0	1,166	528	792	0	6,765
LV 03	396	264	264	132	264	528	0	1,848
LV 04	264	0	0	0	0	528	0	792
LV 05	528	528	528	0	528	264	0	2,376
LV 06	660	528	528	264	528	792	0	3,300
LV 07	528	528	528	264	528	528	0	2,904
Total	**7,535**	**2,970**	**1,848**	**2,794**	**2,904**	**4,620**	**3,564**	**26,235**

The above operational waste generation figures serve as a guide only and are highly variable due to a range of factors such as seasonal variation, operational changes, and a variety of other factors. The waste forecast outlined in this report can only serve as a reasonable starting point, subject to audit and adjustments after the initial operation period. The Stage 2 BOH development presents as a well-considered canvas for the management of waste arisings from the Stage 2 development, as well as existing (including previous) hospital development features and future development at the site.

The LHD should review waste generation experienced at the site regularly as departments may produce less waste as recycling improves.

3.5 Waste Handling Equipment

3.5.1 Waste Bags/Liners

Waste bags should be used where applicable (e.g. IPU levels) for the interim storage of general waste and clinical waste prior to disposal in MGBs stored in disposal rooms for transfer and servicing from the main Stage 2 BOH area for servicing. The following methods should be applied when handling waste bags, especially when in relation to clinical waste:

- Waste bags must not be filled to more than two-thirds their total capacity;
- Contents are to be secured within the bag when closing;

- Excess air should be excluded without compaction (except for cytotoxic or related wastes which may result in the expulsion of hazardous aerosols), prior to closure at the point of waste generation;
- Handling should be kept to a minimum to avoid unnecessary risk of spillage, contamination or injury;
- When handling, all bags should be held away from the body by the closed top and placed directly into a bin appropriate to the waste type;
- Clinical waste bins should be handled with appropriate PPE which includes the following:
    - Puncture resistant (rubber) gloves;
    - Apron; and
    - Protective eyewear.
- Pathology specimens and associated materials must be double packaged;
- Anatomical waste must be packaged to minimise risk of spillage or puncturing; and
- Sharps or sharp objects that may cause punctures in waste bags must never be placed in waste bags.

3.5.2 Mobile Garbage Bins (MGBs) / Trolleys

MGBs are reusable rigid-walled containers which vary in size, used to contain and transport general and clinical wastes. Similarly, trolleys are used to collect and transfer wastes contained in waste bags or non-mobile containers.

MGBs and trolleys must be dedicated solely for collecting and transporting waste to decrease spills, minimise collector contact with waste and minimise manual handling. MGBs and trolleys must be washable, with a lid that is lockable. MGBs must be securely closed during movement but not necessarily locked, unless the MGB is a pharmaceutical waste bin. Refer to Section 2.8 for site specific waste and bin workflow.

MGBs and trolleys must never be overfilled, and the load should not be more than threequarters full (i.e. less than 55 kg). Waste collection rounds should be performed as often as necessary to minimise housekeeping hazards.

All MGBs are to be colour coded according to the intended waste stream to be handled/stored.

Table 9: Mobile garbage bin specifications

Bin Capacity	120L	240L	360L	660L	1,100L
Height (mm)	930	1080	1100	1250	1470
Depth (mm)	540	735	885	850	1245
Width (mm)	480	580	600	1370	1370
Footprint (m^2)	0.26	0.43	0.53	1.16	1.71

Source: NSW EPA Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities.

Detailed MGB sizes and specification are presented in Appendix E for reference.

3.6 Collection Points and Hubs

3.6.1 Individual Patient Care and Staff Support Spaces

Operational wastes are expected to be generated in clinical and staff support areas. Under AusHFG guideline, various smaller bins will be provided for immediate waste disposal. Bins smaller than 120L are typically retained for the localised generation of waste and are emptied by staff and/or cleaning staff into larger bins in the collection hubs on each floor.

In some dedicated treatment or administration areas, the local bins may be up to 120L or 240L. These MGBs will be directly swapped by site General Services.

3.6.2 Photocopy Rooms/Bays

Based on centralised printing / photocopy strategy, each floor is provided with one central Photocopy Room / Bay. Secure papers containing confidential information are expected to be predominantly generated here. A 240L Secure Paper bin and a 120L Recycle Paper bin are typically provided in Photocopy rooms / bays, to be directly swapped by the General Services for collection.

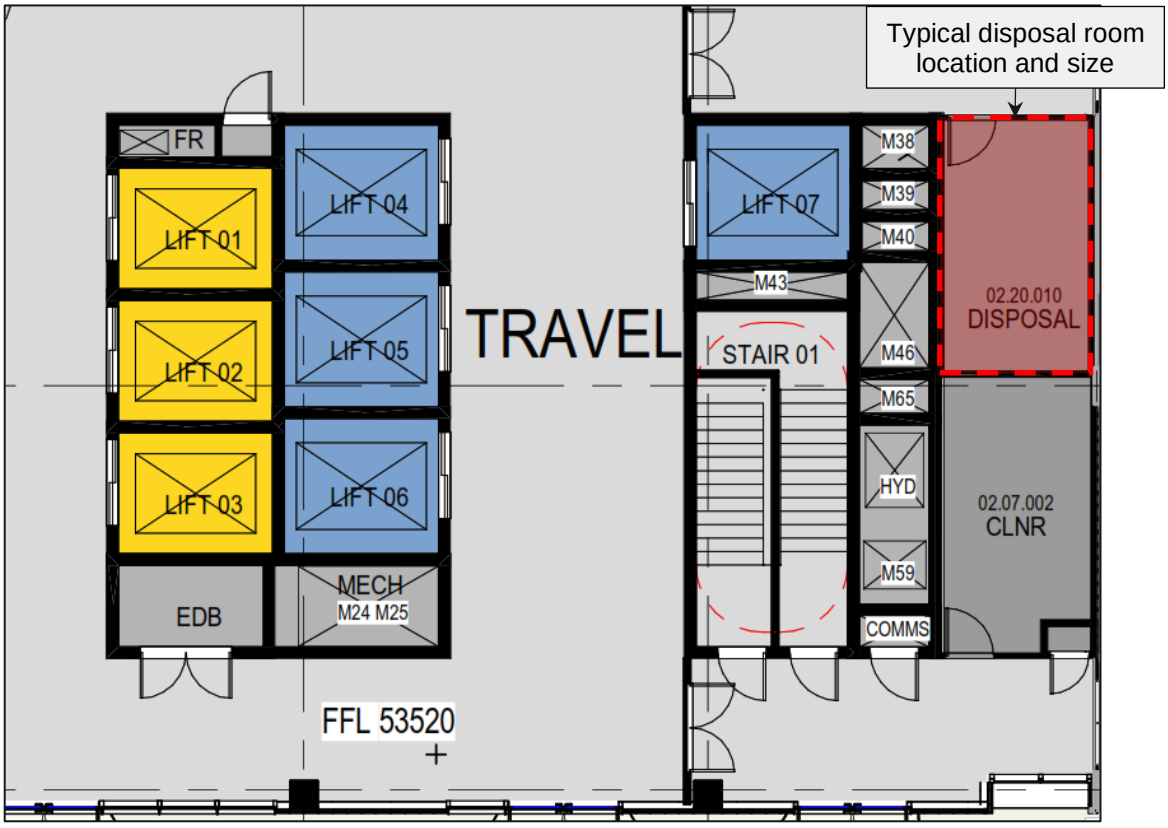
Despite the strategy being maintained by the LHD for bulk printing requirements, desktop printer(s) were added to clinical workrooms to facilitate casual printing in each Ward. Minor patient sensitive information generated from these decentralised printers are expected to be limited and managed by the department, where training shall be formulated/provided by the LHD based on relevant patient privacy and security policies as required.

3.6.3 Disposal Rooms

The Disposal Room is consistently located adjacent to lift lobbies on each floor for easy access and separate disposal rooms situated within specific clinical departments for ease of access. These areas act as the waste collection hub on each floor and are sized to accommodate the range of MGBs to serve the departmental operational waste requirements. MGBs in Disposal Rooms are typically sized between 120L and 660L for collection and transport efficiency. 660L bins are preferred for busy departments or for waste streams with high daily generation, such as clinical uses and food preparation (kitchen), to reduce the servicing frequency required by General Services.

Figure 2 shows an example of the typical location of a disposal room located on each floor near the main lift lobby but away from public access and view.

Figure 2: Typical Floor Disposal Room



Source: BVN, November 2021.

3.6.4 L01 Back of House (BOH)

It is proposed that the Stage 2 BOH space will be used for a range of functions, including temporary bin storage, overflow and swap.

A Design Brief for this area is detailed in Section 5 of this report. Additionally, the Stage 2 BOH space is likely to provide intermediate functions for waste management through development of the Stage 2 portion of the redevelopment and may undergo some repurposing based on outcomes of future development stages at the site.

3.7 Stage 2 Planned Bin Mix and Quantities

The current design contains the default bin types and quantities based on Australasian Health Facility Guidelines templates. Based on the mapping of existing department waste data and the resulting forecast, the MGB mix and numbers have been adjusted to meet the Stage 2 operational waste demand. Following commencement of operations for the Stage 2 Tower, the following factors will be considered in the ongoing provision of waste equipment and infrastructure for the management of waste for the site:

- An intent to increase the percentage of commingled, paper waste and other recycling streams to offset general waste, with the aim that bin mix in future can further reflect a gradual improvement in recycling and landfill diversion and over the years;
- Operational practices and training to better reduce the amount of clinical waste generated and/or disposed of;
- Garden waste generated as a result of communal green spaces is expected to be managed by an external contractor. Should management of this waste be the responsibility of general services, a minimal number of garden waste bins could be retained in the Stage 2 BOH or relevant floor disposal room if necessary;
- Based on fluctuations of waste generation identified by General Services personnel in weeks and months after Stage 2 is in operation, the collection frequency by General Services shall be flexibly adjusted to suit; and
- Interim audits to be carried out to review MGB mix and numbers provided.

The below summary (Table 10) highlights the MGB provision for each level and is also outlined in further detail with relevant background data in Table 8.

Table 10: Stage 2 Tower bin provision (per level)

Levels	660					240						
	General	Clinical	Commingle	Paper/Card	Food	General	Clinical	Cytotoxic	Anatomical	Comingle	Paper/card	Secure doc
LV 00	1		1	1	6	1						2
LV 01	1					1	1			2		3
LV 02	5	1	2	1		1	1					3
LV 03						2	1	1		1	1	2
LV 04						1						2
LV 05	1	1		1				3				1
LV 06	1	1		1				3		1		3
LV 07	1	1		1				3		1		2
Sub-total	**10**	**4**	**3**	**5**	**6**	**6**	**3**	**10**	**0**	**5**	**1**	**18**
Total	**28**					**43**						

Levels	120							Total Bins per floor
	General	Clinical	Cytotoxic	Anatomical	Comingle	Paper/card	Secure doc	
LV 00								12
LV 01		1					1	10
LV 02							1	15
LV 03		1	1			1	1	12
LV 04	1						1	5
LV 05							1	8
LV 06					1		1	12
LV 07					1		1	11
Sub-total	**1**	**2**	**1**	**0**	**2**	**1**	**7**	**85**
Total	**14**							85

3.8 Summary of Waste Handling Workflow

The table below (Table 11) briefly summaries how each MGB will be handled based on its stream and sizes, subject to further consultation with the LHD staff and General Services. In general, the flow of waste management at the site is as follows:

- Generation by department.
- Storage of general waste and recyclables in under-desk bins and deposited in disposal room available on each level.
- Disposal room bins monitored by site General Services and removed to the Stage 2 BOH space on Level 1 as required, or based on defined schedule.

- Empty bins placed in disposal room as full bins are removed to the Level 1 BOH Waste Storage Area for servicing.
- Once bins are emptied by the collection contractor (at present Bingo) or decanted into larger compactor units (general waste and recycling) for collection at the Stage 2 BOH loading dock, MGBs to be returned to the relevant Stage 2 Disposal Room on each floor of the Stage 2 tower.
- Bin washing and maintenance to occur within the provided area of the Stage 2 BOH area.

Table 11: Waste handling workflow

Major Streams: Bins </= 80L	From	Action	To	By	Comments
General waste	Individual rooms	emptied	Larger MGBs in disposal rooms	Cleaner	
Clinical Waste	Individual rooms	emptied	Larger MGBs in disposal rooms	General Services	
Recycling (Commingle)	Individual rooms	emptied	Larger MGBs in disposal rooms	Cleaer	
Recycling (Paper/Cardboard)	Individual rooms	emptied	Larger MGBs in disposal rooms	Staff	
Secure Docs	Individual rooms	emptied	Larger MGBs in disposal rooms	Staff	
Food Waste	Rooms, bays	returned	Stage 2 Kitchen or disposal room	Food service	on food trolley
Major Streams: Bins >/= 120L	**From**	**Action**	**To**	**By**	**Comments**
General Waste	Disposal rooms, cleanup	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Clinical Waste	Disposal rooms, treatment areas, cleanup	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Cytotoxic	Disposal rooms, cleanup	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Anatomical	Disposal rooms	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Recycling (Commingle)	Disposal rooms	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Recycling (Paper/Cardboard)	Disposal rooms	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Secure Docs	Disposal rooms, photocopy/print rooms	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Food Waste	Kitchen, disposal rooms	swapped	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH in batches
Minor Streams	**From**	**Action**	**To**	**By**	**Comments**
Sharps	Clinical areas	Retrieved	Disposal room	Staff	then General Services to Stage 2 BOH
Metal	Clinical areas	Retrieved	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH as required
Plastic Wrap	Clinical areas	Retrieved	Stage 2 BOH Waste Storage	General Services	transit to Stage 2 BOH as required
Dipsosable Curtains	Clinical areas	Retrieved	Off site by specialist contractor	Curtain Supplier	part of sustainable procurement
Batteries	Administration, FOH, clinical support	Retrieved	Off site by specialist contractor	LHD Initaitive Partner	
Printer Cartridgets	Photocopy/print rooms, FOH/reception areas	Retrieved	Off site by specialist contractor	LHD Initaitive Partner or supplier	

Based on the anticipated waste generation rates for Stage 2, the appointed contractors or waste service provider (WSP) will be required to collect waste generated from the proposed Stage 2 BOH Waste Loading Area. The waste handling and process in the Loading Dock are outlined in further detail in Section 5.

4 Waste Management Systems

4.1 Site Waste Management

4.1.1 Waste Management Systems

Site waste management systems are defined by the strategies, methodologies and responsibilities in place to effectively manage all waste streams generated by ongoing operation of the Stage 2 Tower. The following section outlines a range of proposed site waste management systems, including:

- High level strategic waste management goals derived from State and Federal government waste strategy and policy.
- Defines roles and responsibilities across various Hospital personnel, departments and management sectors;
- Identifies methodologies for reducing the generation of waste for the site;
- General practice for the effective and safe management of waste at the site including necessary signage, training, provision of information, management of hazards and maintenance of storage areas; and
- Process of reviewing the goals and strategies set out in the WMP on an ongoing basis to ensure its contents remain relevant and provide suitable guidance for further improvement in site waste management and recycling.

4.1.2 Waste Transport Tug and Trailer

Tugs and trailers will be used to transport MGBs from the Stage 1 BOH and potentially existing campus waste to the new proposed Waste Storage and Loading Area in the Stage 2 BOH space. There is space allocated in the Stage 2 BOH area for the permanent storage of tug and trailers for use around the hospital campus. The tug and trailer will be suitably fitted to carry the range of bins that will be utilised through operation of the Stage 2 Tower.

Specifications for the tug and trailer utilised for the site are provided by the LHD can be found in Appendix E.

4.1.3 Collection and Loading

The proposed Stage 2 BOH area will supplement the existing waste management systems for the entire hospital campus. The proposed Stage 2 BOH area will be accessible by waste and recycling trucks for the purpose of MGB, skip bin and compactor collections. The mix of collection types means that the loading dock has been designed to facilitate collections to be undertaken by a mix of collection vehicle types, most notably rear-lift (for MGBs) and hook-lift (for compactor and skip bins).

4.1.4 Roles & Responsibilities

NSW health activities have waste management responsibilities and need to operate in line with the minimum standards set out in the relevant policy directives. Health services are required to establish a Waste Management Committee (WMC) which is understood to be established with the existing hospital campus as the Waste Management Working Group (WMWG) and is responsible for implementing the Waste Management Plan (see below). The WMWG should have a clear term of reference and include representation from key areas/departments of the health service, other entities covered by the Waste Management Plan (WMP), WHS and include expertise in waste management. WMCs should regularly review contractors' reports regarding site waste stream management and collection data.

The WMWG and General Services will be responsible for the monitoring of site waste management systems and ensuring resource recovery and contamination reduction methods are employed. Should any issues impacting on the operational efficiency, safety and suitability of waste management be identified, site cleaning staff should inform hospital management and/or the WMC for appropriate actions to be taken.

Hospital Contracts and Procurement Team is responsible for:

- Using contracts to define the allocation of responsibilities for waste management contractors; and

- Holding a valid and current contract with licensed collector(s) for waste and recycling collection.

The WMWG is responsible for:

- Using this WMP to inform waste management operations, design and infrastructure;
- Providing educational materials and information to users outlining:
    - Waste management system and use/location of associated equipment,
    - Sorting methods for recycled waste, awareness of waste management procedures for waste minimisation, maximising recovery and reducing contamination of recyclables,
    - Improving facility management results (lessen equipment damage, reduce littering, and achieve cleanliness).
- Making information available to users, site staff and visitors about waste management procedures;
- Ensuring correct signage is installed and maintained in waste storage and service areas;
- Encouraging waste avoidance and achievement of resource recovery targets; and
- Providing operational management for delivery of waste objectives.

General services' duties include:

- Organising waste collections by elected contractor(s) for the Site.
- Ensuring contractors use loading areas correctly;
- Ensuring timing of waste collections does not clash with other deliveries or collections that may require use of the loading dock;
- Ensuring correct signage is installed and maintained in waste storage and service areas;
- Organising, maintaining and cleaning the waste storage and service areas;
- Arranging access to waste collection areas and bins on collection days;
- Cleaning and exchanging all bins;
- Monitoring any vermin and pest issues and arranging appropriate controls (traps or fumigating) and maintenance of doors or other points of potential entry; and
- Monitoring, cleaning of and arranging maintenance waste management equipment and related infrastructure (such as bin tug / trailer).

Individual departments and staff (champions) are responsible for:

- Allocating space for a dedicated and enclosed waste and recycling storage area for intermediate storage before disposal to designated waste storage areas;
- Separating and storing recyclables;
- Separating and appropriately disposing medical waste;
- Reusing materials where possible;
- Storage and management of liquid wastes (including fit-out i.e. bunding and grease trap, containers and appropriate collection); and
- Refrigerating waste prior to disposal if it may present an odour nuisance, so that storage of potential odorous waste is limited (where relevant, if at all).

4.1.5 Sustainable Procurement

Hospital supply and purchasing department and the product evaluation committee will be committed to waste avoidance and waste minimisation. Where the use of disposable products is unavoidable, their environmental impact should be assessed. In addition to infection control, occupational health & safety, and value for money, environmental concerns will also be taken into consideration when evaluating purchasing of products. Existing research and evaluation information from other hospitals will also be considered.

Preference shall be given to products and packaging (where possible and practicable) which are:

- Manufactured from recycled raw materials (provided they are cost/performance competitive);

- Manufactured from renewable resources;
- Reusable (particularly nonclinical products); and
- Totally or partially recyclable or with recyclable components.

Where appropriate, tender documents shall require manufacturers, suppliers and distributors to:

- Correctly specify the materials used, their origin, the recommended method of disposal/reuse/recycling, and the likely impact on the environment;
- Avoid the use of materials known to be toxic to the environment including chlorofluorocarbon products and/or by-products, phosphates and heavy metals;
- Keep packaging to the minimum necessary for the safe transport and delivery of the product;
- Specify whether packaging is recycled, recyclable, reusable or biodegradable;
- Accept return of used packaging; and
- Clearly specify the energy rating on appropriate appliances and fittings.
- As part of tender evaluation via weighting.

Where appropriate and cost effective, reusable items should be purchased in preference to non-reusable items. Items which are intended for reuse should be able to withstand the appropriate cleaning, disinfection or sterilisation process.

Products should be supplied with detailed manuals outlining cleaning procedures. When comparing reusable items with non-reusable items, a life cycle analysis should be conducted and should include (but not be limited to):

- Product cost;
- Product lifecycle analysis;
- Labour;
- Transport;
- Cleaning;
- Energy (gas, electricity, etc);
- Water;
- Disposal; and
- Maintenance.

4.2 Information and training

Management is responsible under the WHS legislation for providing appropriate information, training, instruction and supervision to ensure that safe systems of work are developed and maintained to minimise the risk of injury associated with waste handling and facilitate efficient waste management.

All workers need to know how to handle waste safely and notify incidents, including casual staff, contractors and volunteers. It is the responsibility of each health service to identify all workers that require training and ensure that the training is undertaken to the standards required by this policy. This includes providing a waste management education module as part of the orientation for all new relevant staff.

The Health Education and Training Institute NSW (HETI) offers online learning and training modules on waste processes through My Health Learning. Specific training in relevant procedures associated with the implementation of the WMP should be provided to:

- Waste generators;
- Handlers, collectors;
- Transporters; and
- Key management staff.

The current waste contractor and/or an independent qualified waste consultant can also be engaged to provide advice and training with regards to site waste management procedures and strategic goals. WMWG and General Services may benefit from training by the waste contractor or independent waste consultant to guide training programs for broader hospital departments and staff.

Training programs by the health service should aim to prevent injury and disease by ensuring the health services include:

- Infection control and hand hygiene procedures;
- Approved work practices, including specific waste handling and disposal, spill management, spill kit locations, etc;
- Regulatory requirements and methods of compliance;
- The provision and use of required PPE;
- WHS and public health information relating to the equipment and chemicals/drugs used in the health service, e.g. Hazardous chemicals, handling of hazardous goods, hazardous manual tasks, operating manuals for clinical devices, sharps injury prevention, etc;
- First aid and treatment for needle stick and blood and body fluid (or body substance) exposure;
- Emergency response procedures and facilities (e.g. Emergency showers, etc.); and
- Details of workplace vaccination program, post-incident counselling services with rights to privacy, etc.

Training programs must be revised as new equipment and work processes are introduced, or as technological change occurs, to ensure they do not introduce any new hazards.

Training and responsibility should also be provided around notifying incidents relevant to serious injury or illness. If a serious injury or illness, a death or a dangerous incident occurs, processes must be in place to ensure it is reported to SafeWork NSW immediately and the workers compensation insurer is notified within 48 hours. Staff must be made aware of and trained in processes for notifying incidents.

Waste management and recycling data gathered by the WMWG and General Services will be transparent and made available transparent to all staff on regular basis. Data gather should be used to inform departments how they are tracking in terms of waste management and recycling efficiency and goals, and provide a tangible incentive for departments to improve upon. The hospital may elect to provide some alternative incentives for best performers and focus system changes and training to departments with the least improvement.

4.3 Signage

Signage that promotes resource recovery, waste minimisation, safety and amenity follows the Australian Standard for safety signs for the occupational environment (Standards Australia 1994).

Signage will be designed to consider language and non-English speaking backgrounds, vision impairment and accessibility (see Appendix B and Appendix F). Illustrative graphics must form a minimum 50% of the area of the signage. Signage is to be prominently posted in each waste storage area indicating:

- Garbage is to be bagged and placed into waste bins;
- Details regarding acceptable recyclables and the location of their respective receptacles;
- Commingled recyclables are to be disposed of loose (not bagged);
- No standing and danger warnings applying to the area surrounding waste storage and collection areas;
- Contact details for arranging the disposal of bulky items; and
- Information on keeping the areas tidy.

4.4 Spill Management

Daily operation of the Stage 2 Tower, including management of general waste and potentially hazardous or contaminated materials (chemicals, contaminated clinical waste such as blood) may result in spills that require clean-up. Health services must manage waste spills as they occur in the facility, ensuring that:

- The WMP specifies procedures for waste spills;

- Personnel involved in spill management are trained in emergency procedures and handling requirements, including use of spill kits. Spill kits should be readily accessible throughout the health service and clearly labelled and mapped;
- Health services have personal protective equipment and emergency spill kits that are appropriate to the waste streams handled, so staff can safely and effectively clean spills and dispose of the waste;
- Spill kits should be disposed of with the relevant waste stream; and
- Spill kits are restocked with the necessary components immediately after use, returned to their locations and regularly inspected for malfunctioning or missing components.

The WMC or equivalent is responsible for identifying other types of spill kits that might be needed to address spills from other waste streams. A spill kit may be stored centrally in the Stage 2 BOH space for whole building use in the event of a spill.

4.5 Prevention of Pollution and Litter Reduction

To minimise dispersion of litter and prevent pollution (to water and land via contamination of runoff, dust and hazardous materials), the operator shall be responsible for the following:

- Maintenance of open and common site areas;
- Ensuring waste storage areas are well maintained and kept clean, including:
    - Prevention of overflow,
    - Keeping lids closed, and
    - Checking for bung leaks and damage bins.
- Securing the waste storage area from vandalism and the escape of litter;
- Identification and appropriate disposal of goods with hazardous material content (paints, fluorescent tubes, smoke detectors);
- Acting to prevent dumping and unauthorised use of waste areas; and
- Requiring contractors to clean up any spillage that may occur during waste servicing or other work.

The above will minimise the dispersion of site litter, reduce stormwater pollution and thus reduce the risk of impact to local amenity and the environment.

4.6 WMP Review

4.6.1 Overview

An Waste Management Plan (WMP) is a living document, meant to provide continuous guidance and further improvement of operational waste for the subject site use. As such, to ensure the WMP retains relevance to the site and continues to provide valuable operational guidance, the document and its contents should be reviewed on a regular basis. Since the WMP provides guidance and goals for the management of operational waste, there are several metrics with which to review the WMP and valuable data can therefore be gathered through the general overview and monitoring of site waste management systems by operational and management staff, in addition to professional audits of operational waste.

The following section outlines a review process for application at the site, to assess the success of operational waste management according to this WMP and ensure measures are put into place to achieve operation waste management goals of this WMP and GBCA Green Star requirements as set.

Review of onsite waste generation and management systems should be a continuous process conducted by the Sustainability Waste Working Group and General Services. Detailed review and auditing of the WMP should be conducted by a suitably qualified waste professional.

Regular Monitoring
General waste and recycling waste disposal can be monitored per department or level proposed for the Stage 2 Tower. Bin fullness and source separation effectiveness can be measured (visually) by General Service or WMWG personnel and compared over time. A comparison of bin fullness will give an indication of recycling

habits and visual characterisation of waste and recycling bins will give an indication of the proportion of material stream generation and the uptake of recycling methodologies.

Alternatively, methods of automatic monitoring of part or all of the Stage 2 Tower departments may be achievable with an RFID or similarly adapted system to track waste bins retained and managed at the site. It is not expected that an automated system such as RFID will pursued for Stage 2 and may be able to be implemented in future, in parallel with future development stage. Data gathered by such as system may include specific bin location/department, bin fullness, rate of filling and bin weight. This type of system would incur some capital and operational expenditure and may be subject to the service offerings of the contracted waste service provider for the site.

Auditing
In addition to the above, it is recommended that a waste audit be conducted at regular intervals following commencement of proposed operations, to measure the success of the WMP in more detail and identify specific areas for improvement. The key objectives of a bin audit are to:

- Identify baseline waste generation rates and disposal/recycling practices at commencement of operations at the site operations (within 6 months of project completion or nearing full use of the facility as developed);
- Identify typical operational waste generation rates and disposal/recycling practices sometime following baseline assessment to determine improvement or regression;
- Identify areas for improvement and opportunities for ongoing reductions in residual waste and improvement in the avoidance or diversion of recyclable materials;
- Monitor effectiveness of existing services (bin sizes, waste streams, etc.);
- Show compliance with Green Star obligations or identify areas for improvement to do so;
- Provide recommendations for implantation or further assessment; and
- To provide educational advice back to individual tenancies regarding the contents of recycling and general waste in order to reduce contamination (non-recyclables in recycling) and leakage (recyclables in general waste).

The following review processes are a guide only and should be reviewed with regard to performance and results. A detailed methodology will be prepared by the contracted waste auditor prior to any auditing or provision of any recommendations.

Recycling
Alternative methods of recycling (e.g. cardboard baling, bottle crushing, soft-plastic collection, food waste collection/processing, etc.) may be considered in terms of understanding the total recycling rates for the site. This can be achieved via visual inspection or collaboration with specific the building owner, waste contractors and waste auditor to determine their effectiveness.

4.6.2 Regular Monitoring

As outlined above, bins should be monitored regularly to ensure they are being used appropriately and to identify any misuse by department staff. Should any misuse of bins be identified (e.g. disposal of non-recyclable waste in recycling bins or disposal of recycling in general waste compactor), strategies may be put into place at this time to address the issue, including but not limited to further education of tenancies.

4.6.3 Waste Auditing

General Services, in conjunction with the WMWG, the waste contractor or an independent waste auditor, may elect to establish an auditing program. Auditing is important to establish benchmarks and determine if waste is being appropriately managed by site staff and other personnel. Waste auditing should be conducted by/on behalf of the waste contractor, or by an independent waste consultant at a frequency to be determined with the waste management contractor (for example, on a yearly basis). As a standard method, waste audits should include the following methodologies:

- Checking waste streams are appropriately used and managed;
- Checking that bags and MGBs/trolleys are not filled with loads more than two-thirds or three-quarters of their capacity, respectively;
- Review of WMP;
- Interview with key waste facility users and management staff; and

- Review of records.

Auditing of waste streams and bin use can be achieved through visual audits of bins, over several independent times and days. A visual audit of waste bins should detail the following:

- Bin type (waste stream);
- Bin size (volume);
- Bin fullness at the time (as a percentage, if overflowing this should be recorded as 110%);
- If the bin is in good working order (no compromising damage or excessive wear and tear); and
- Separate documentation of approximate waste distribution (based on visual assessment and minimal manipulation of waste, details should be recorded on the types of waste in the bin).

An example of information from the above auditing procedure is shown in Table 12 and Table 13 as follows:

Table 12: Visual waste audit data recording

Bin number	Waste Stream	Bin size (L)	Bin fullness	Bin condition	Other details
1	General waste	660L	90%	Damaged wheel	-
2	General waste	660L	80%	Good	Considerable amount of food waste
3	Commingled recycling	240L	80%	Cracked lid	-
4	Paper & cardboard	240L	110%	Good	Bin overflowing

Table 13: Visual waste audit waste distribution

Bin number	Waste Stream	Residual waste	recyclable containers	paper and cardboard	Organics	Other (specified)
1	General waste	60%	5%	10%	15%	10%
2	General waste	35%	10%	10%	40%	5%
3	Commingled recycling	10%	70%	5%	10%	5%
4	Paper & cardboard	5%	5%	80%	5%	5%

Hospital management should also work with waste management contractors engaged to service waste at the Site, to apply appropriate management measures according to the waste data gathered through the audit process.

Audit Timing

Waste audits should be conducted at regular intervals following commencement of operations at the site. As a point of reference, the approximate timing for site waste audits is as follows:

- Within 6 months of commencement of operations by all proposed departments (to determine a baseline);
- 12 months following initial audit (compare to baseline); and

- Yearly or other regular schedule to ensure consistency with goals.

Fieldwork for waste audits should be undertaken across several days/weeks to improve the sample accuracy of the audit.

Auditing Methodology
Waste audits may be conducted using all of the following / or combination of:

- WH&S Numerical Profile.
- Requirements of ACHS EQuIP Mandatory Criteria for Waste.
- Requirements of this Area Policy Directive that is based on current Codes of Practice.
- NSW Government Waste Reduction and Purchasing Policy (WRAPP).
- Victorian Government Health Services Waste Audit Guidelines.

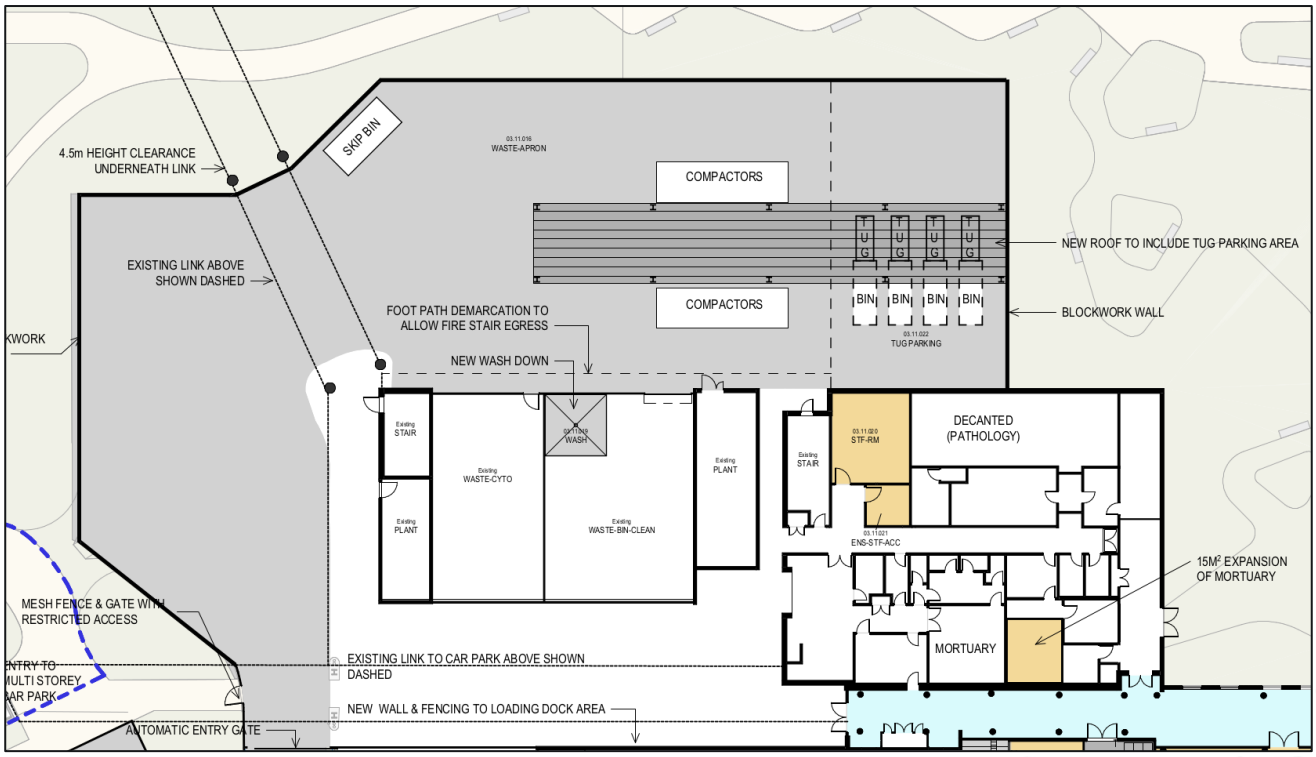
5 L01 BOH Space Design Brief

5.1 Background

In Stage 2, the main works likely to affect operational waste management for the site is with the redevelopment of the North Building BOH and loading areas, including development of a new comprehensive Waste Management Area on Level 1 (see Figure 3 and Appendix C) The waste management area will maintain the following key features associated with the management of waste for Stage 2 and across all Hospital campuses from completion of the Stage 2 BOH area:

- Approximately 130m^2 of space dedicate to waste storage, bin washing and decanting waste activities;
- Approximately 100m^2 space for the management of cytotoxic and clinical related waste materials;
- Two compact units, one each for general waste and recycling;
- Bin tug and trailer parking area; and
- Space for skip bins (for bulk and fitout related wastes).

Figure 3: Level 1 BOH Waste Storage Facilities



Source: BVN, November, 2021.

5.2 Required Functions

The BOH area will accommodate the following waste management requirements:

- Waste management equipment and infrastructure storage, including but not limited to:
  - Bin tug and trailers,
  - Waste and recycling compactors,
  - MGBs (clean and clinical), and
  - Skip bin for fitout/other bulky waste types.
- Overflow / transition / spare storage area for clean MGBs and dirty MGBs;

- The clean and dirty areas separately enclosed for infection control, roughly in even split;
- Crossover during transport shall be minimised however won't be completely avoided due frequency of waste management;
- Adequate circulation clearance for bin access and manoeuvre for MGB up to 660L;
- A tap and hose for floor cleaning in the bin store, with door threshold and slab fall to suit.
- Trafficable waterproofing dirty area and epoxy flooring in clean area;
- Wall vinyl protection 150~1500mm AFL with washable paint above;
- Moisture resistant ceiling tiles; and
- Adequate ventilation / exhaust provision by mechanical.

As evidenced by the MGB mix / quantities and the required footprint in Section 3.7, it's not possible for the BOH area to accommodate a single clean/dirty swap for the entire MGB fleet in the Tower. The General Services shall develop a process to swap clean and dirty MGBs by streams / levels in batches.

5.2.1 Other General Requirements

Other general requirements for the BOH area are as follows:

- Turning radius for cater for the largest MGB and clean machine in the specification;
- Wifi coverage for future implementation of any RFID monitoring technology;
- Mechanical engineer to confirm if the area requires independently ventilation / exhausted in lieu of return air mixed with other areas under the AS1668;
- Contingency space is available to accommodate any changes to waste management services required in future; and
- Coordination of all required disciplinary design and compliances, including operational signage.

5.3 Access from and to Departments

The transfer of MGBs between various departments and the L01 BOH area will utilise six patient/general purpose lifts as shown on site plans (Appendix A). Transfer of bins would be coordinated by General services and generally occur outside of peak periods (such as visiting hours) to avoid congestion general purpose lifts.

The circulation, access and workflow shall consider the following factors:

- Conservative estimate of bin transfers in accordance with maximum number of bins outlined in Table 10, i.e. movements double as full bins must be replaced by empty ones;
- Average 1 MGB in/out of the BOH area per 3 minutes, assume operates 8 hours a day (bins may be transferred in bulk with assistive equipment for efficiency where practicable); and
- Minimise the interface with clinical workflow where possible.

6 Conclusions

This WMP has been developed to comply with the relevant SSDA and Green Star requirements, other relevant guidelines, regulations and policies. The WMP identifies and addresses key details, strategic objectives, methodologies, responsibilities and processes for review associated with the management of waste for the Stage 2 Tower – these include (but are not limited to):

- Identifying the likely waste streams to be generated across each aspect of the Stage 2 Tower – General Solid Waste, Clinical (and related) and radioactive waste streams.
- Highlighting Strategic targets and goals for waste management and recycling at the site, focused high value waste/recycling streams first.
- Provision of General methods for the storage, handling, collection and servicing of waste streams expected to be generated at the site (including equipment and infrastructure requirements and recommendations).
- Highlighting key waste management areas and their function across the Stage 2 Tower.
- Outlining roles and responsibilities of various hospital personnel and management groups (including the delivery of training & education materials, monitoring of bins and improvement of systems).
- Detailing a review process with which the goals of this WMP can be monitored and revised as necessary, in future.

7 References

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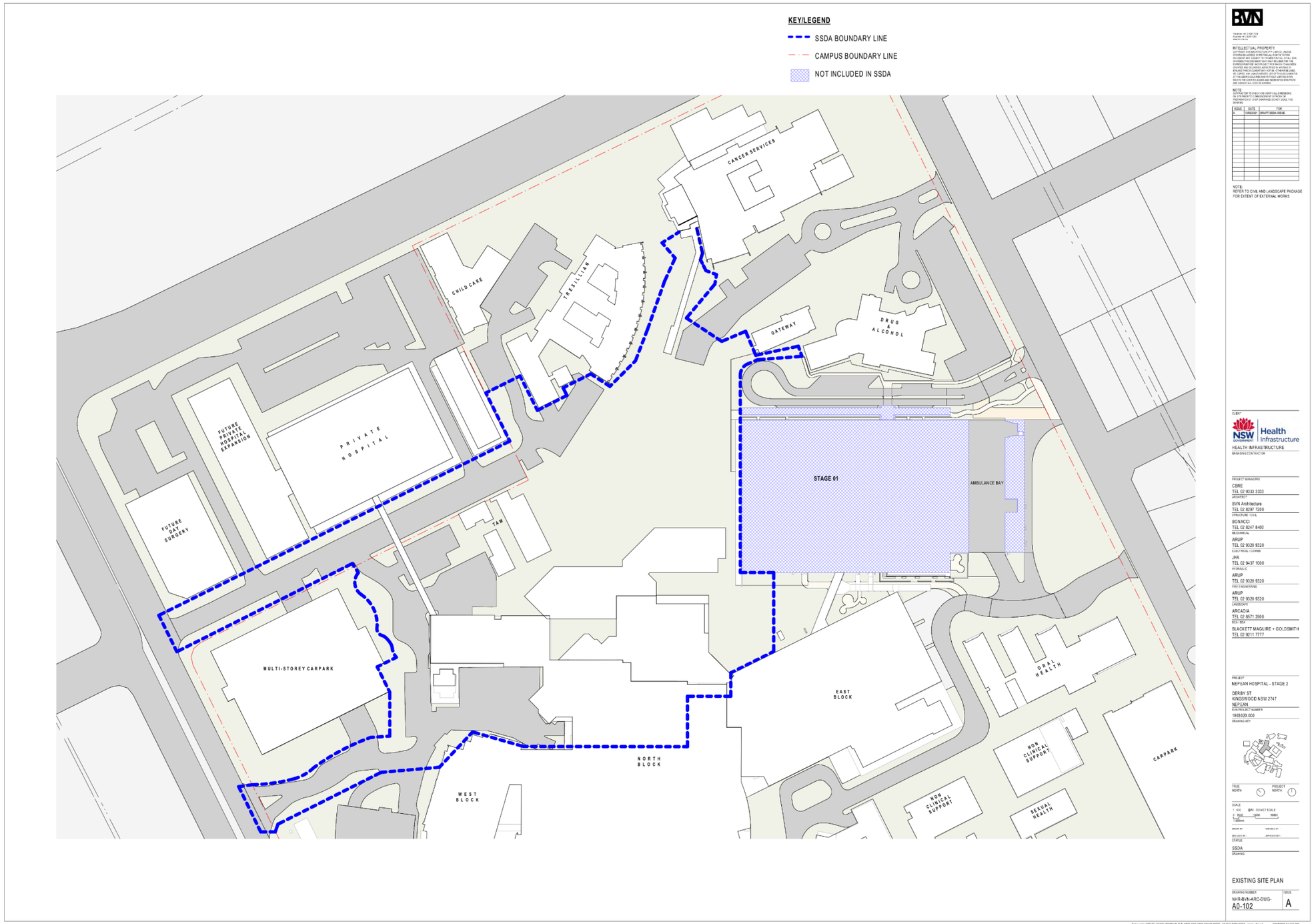
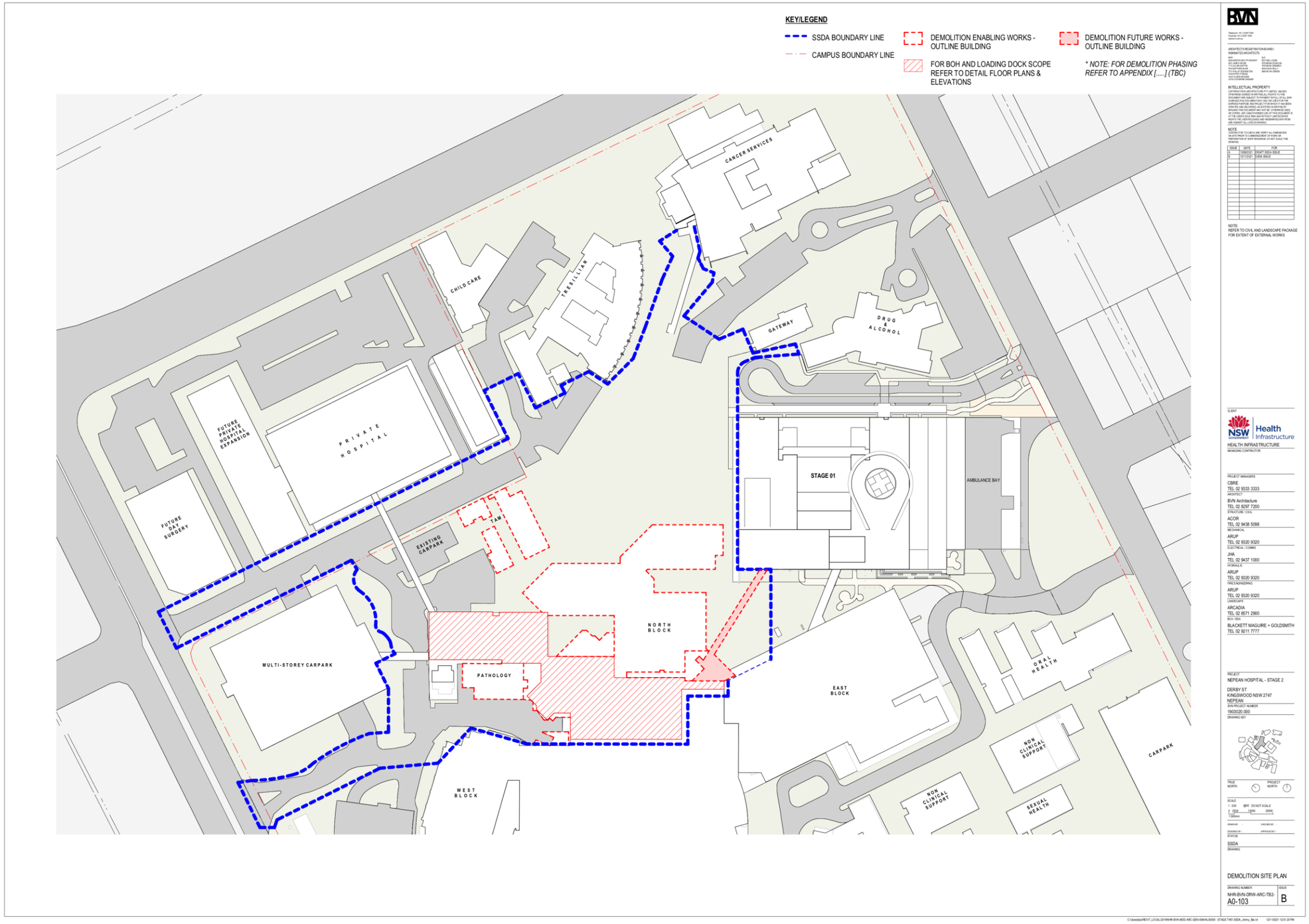
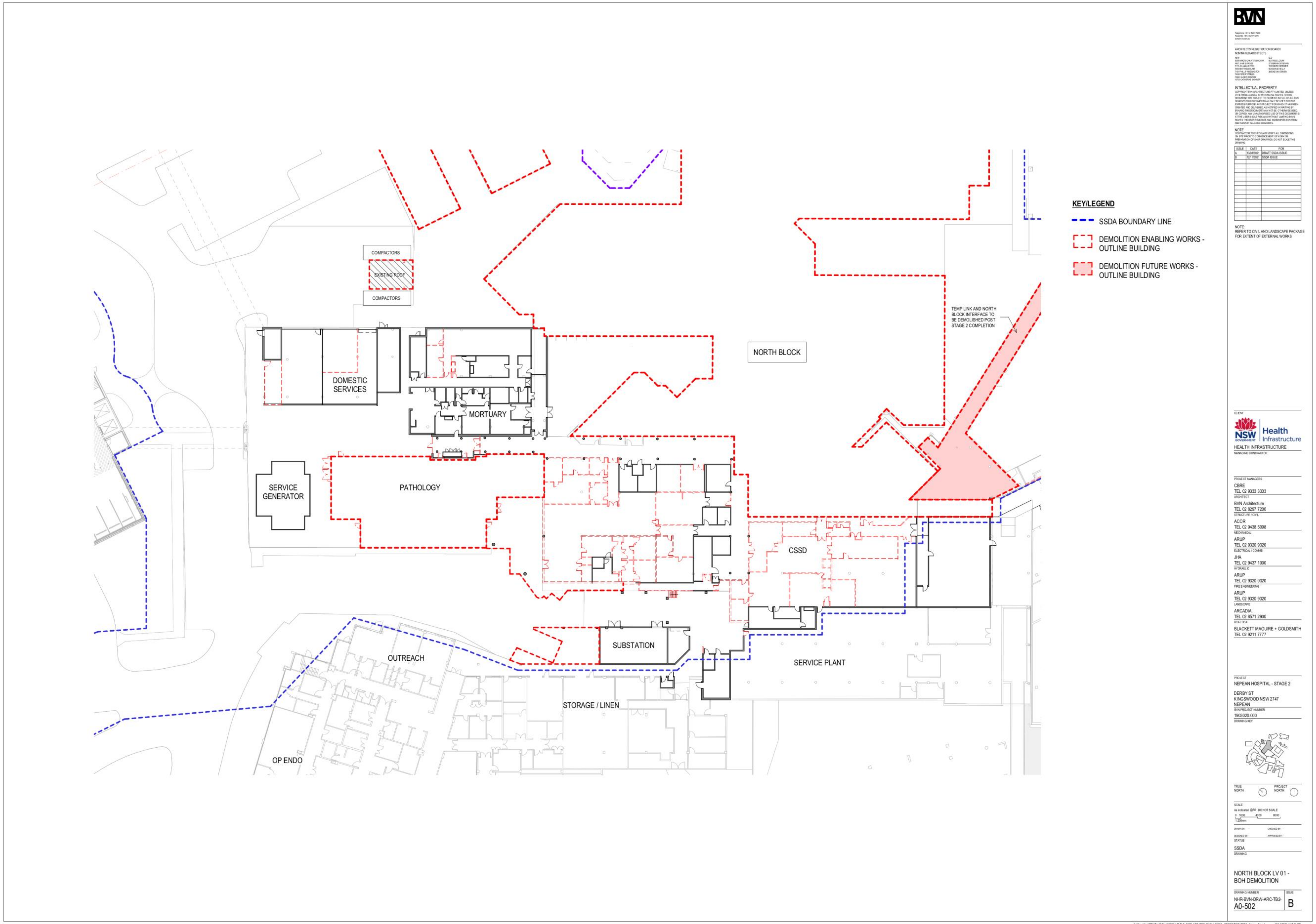
Appendix A Stage 2 Site Plans

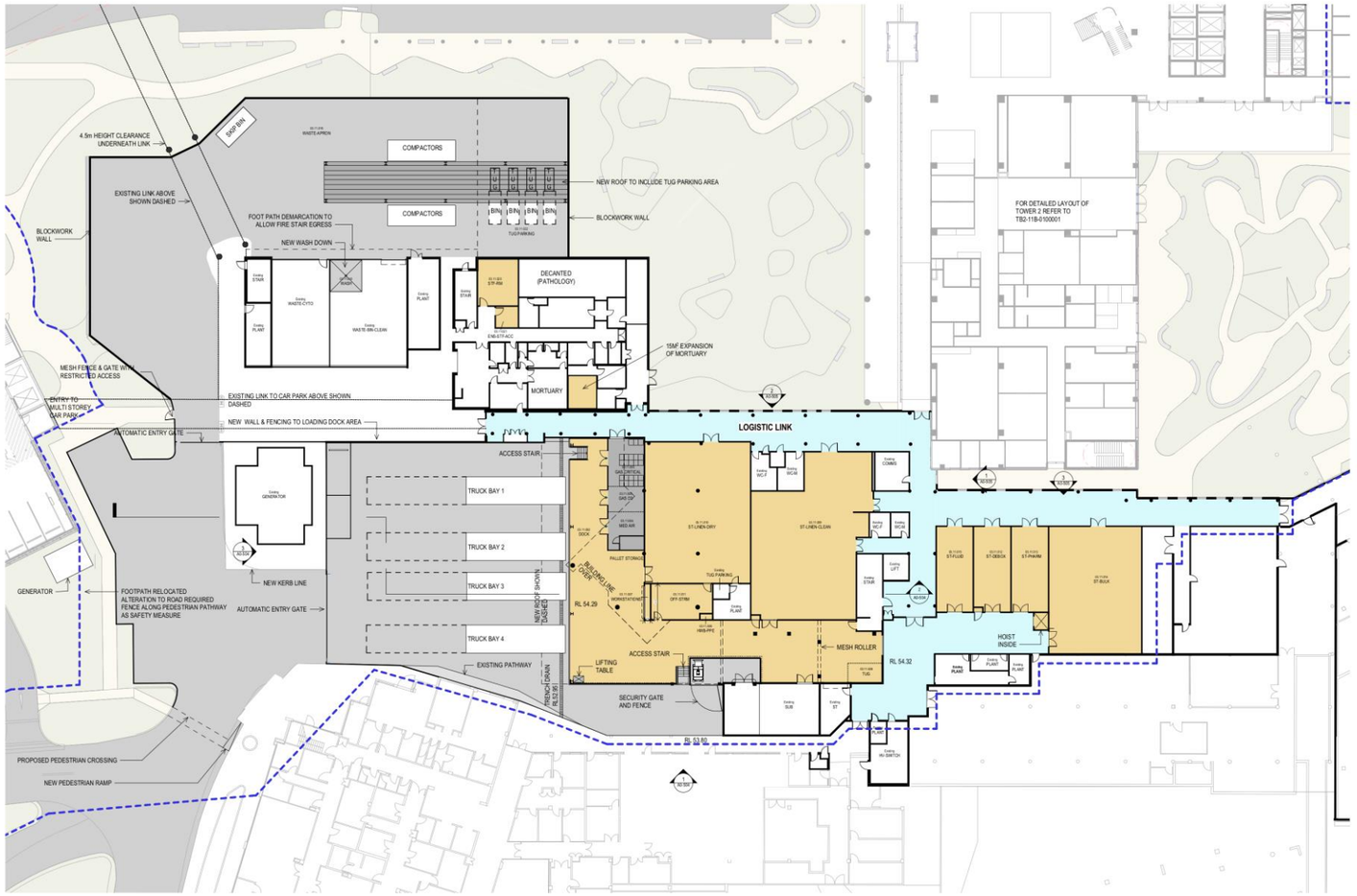


Appendix B Stage 2 Demolition Plans




KEY/LEGEND
SSDA BOUNDARY LINE
DEMOLITION ENABLING WORKS - OUTLINE BUILDING
DEMOLITION FUTURE WORKS - OUTLINE BUILDING
TEMP LINK AND NORTH BLOCK INTERFACE TO BE DEMOLISHED POST STAGE 2 COMPLETION
COMPACTORS
EXISTING ROOF
COMPACTORS
NORTH BLOCK
DOMESTIC SERVICES
MORTUARY
SERVICE GENERATOR
PATHOLOGY
CSSD
SUBSTATION
OUTREACH
SERVICE PLANT
STORAGE / LINEN
OP ENDO
BVN
Health Infrastructure
HEALTH INFRASTRUCTURE
CBRE
TEL 02 9333 3333
BVN Architecture
TEL 02 8297 7200
ACOR
TEL 02 9438 5098
ARUP
TEL 02 9320 9320
JHA
TEL 02 9437 1000
ARUP
TEL 02 9320 9320
ARUP
TEL 02 9320 9320
ARCADIA
TEL 02 8571 2900
BLACKETT MAGUIRE + GOLDSMITH
TEL 02 9211 7777
NEPEAN HOSPITAL - STAGE 2
DERBY ST
KINGSWOOD NSW 2747
NEPEAN
1903020.000
SSDA
NORTH BLOCK LV 01 - BOH DEMOLITION
NHR-BVN-DRW-ARC-TB3-
A0-502
B

Appendix C L01 BOH and Waste Management Areas



Appendix D Management Requirements of medical waste streams

Table 14: Management Requirements of medical waste streams

Waste Stream	Anatomical waste	Clinical sharps waste	Clinical waste (incl. Pathological Waste)	Cytotoxic waste	Pharmaceutical waste	Radioactive waste
Bin colour	Yellow	Yellow	Yellow	Purple	Red	Red
Lid colour of bin	Orange	Yellow	Yellow	Purple	N/A	Red
Plastic bin liners	Orange	N/A	Yellow	Purple	N/A	Red
Labelling of bin and liners	Anatomical waste	Clinical sharps	Clinical waste	Cytotoxic waste	Pharmaceutical waste	Radioactive waste plus specific requirements below
Symbol					Nil	
Symbol (description)	Black biological hazard	Black biological hazard	Black biological hazard	White telophase	Nil	Yellow background with distinctive ‘trefoil’ symbol in black and the lettering ‘CAUTION RADIATION’ in black
Label (PC1 or PC2 GMOs)	N/A	Contains GMOs	Contains GMOs	Contains GMOs	N/A	N/A
Specific requirements	For incineration only	For incineration or autoclaving and shredding Sharps containers must be rigid-walled and meet the requirements specified in AS/NZS 4031 and AS/NZS 4261. Autoclave tape and bag indicators must be used to show autoclaving has been completed.	For incineration or autoclaving and shredding. Autoclave tape and bag indicators must be used to show autoclaving has been completed. Fluid may be able to be discharged into sewer depending on Liquid Trade Agreement between the health service and water utility. All clinical waste once treated by a process acceptable to NSW Health may be reclassified in accordance with the Waste Classification Guidelines before recycling or disposal. There are special precautions regarding disposal of waste related to cases of viral haemorrhagic fever.	For incineration only Collection, transport and handling only by licensed and registered waste management companies.	Storage, destruction and disposal methods must comply with PD2013_043 Medication Handling in NSW Public Health Facilities. Pharmaceutical waste must be incinerated at a licensed controlled waste facility. Certain pharmaceuticals may only be destroyed by authorised persons under the Poisons and Therapeutic Goods Act 1966. Pharmaceutical waste bins must be lockable.	Radioactive material to be stored onsite in appropriate storage area until it decays to below the thresholds of a “radioactive substance” as defined under the Radiation Control Act and Regulation Waste is to be classified with reference to the Safety Guide for the Classification of Radioactive Waste and in accordance with the EPA Waste Classification Guidelines. Radioactive waste must be labelled with the substance, activity level and the date at which it is measured Handling and storage to comply with a Radiation Management Plan in accordance with the Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (ARPANSA 2008). When radioactive waste is to be transported, health services must comply with the Code of Practice for the Safe Transport of Radioactive Material (ARPANSA 2014).

Waste Stream	Anatomical waste	Clinical sharps waste	Clinical waste (incl. Pathological Waste)	Cytotoxic waste	Pharmaceutical waste	Radioactive waste
Relevant Act and Regulation	AS/NZS 3816:1998 Management of clinical and related waste. AS/NZS 4123:2008 Mobile Waste Containers.	AS/NZS 3816:1998 Management of clinical and related waste. AS/NZS 4123:2008 Mobile Waste Containers. Protection of the Environment Operations Act 1997. Protection of the Environment Operations (Waste) Regulation 2014.	AS/NZS 3816:1998 Management of clinical and related waste. AS/NZS 4123:2008 Mobile Waste Containers. Protection of the Environment Operations Act 1997. Protection of the Environment Operations (Waste) Regulation 2014.	AS/NZS 4123:2008 Mobile Waste Containers. Protection of the Environment Operations Act 1997. Protection of the Environment Operations (Waste) Regulation 2014.	Poisons and Therapeutic Goods Act 1966. Poisons and Therapeutic Goods Regulation 2008.	AS/NZS 4123:2008 Mobile Waste Containers. Radiation Control Act 1990. Radiation Control Regulation 2013.
EPA licence requirements	No	No	No	No	No	Yes – Waste Classification Guidelines: Waste containing radioactive material (EPA, 2014)

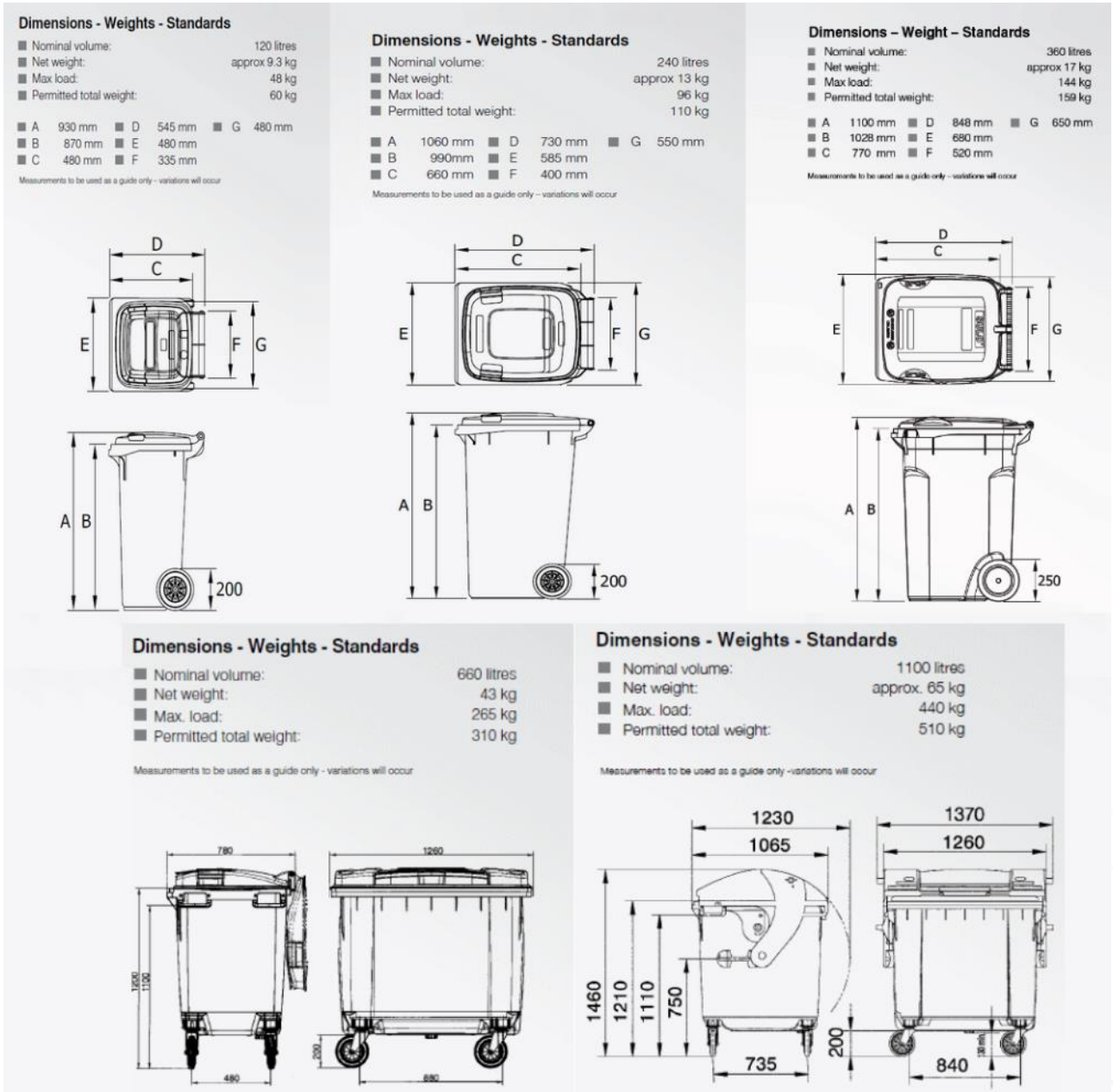
Source: NSW Ministry of Health, 2017.

Appendix E Waste Handling Equipment Specs

This WMP proposes the use of MGBs (rear-lift) and/or bulk (front-lift) bins. Each bin type is specific to each store as the bin size will impact on the vehicle access requirements. This section outlines the dimensions of each bin type. Some bin types below are not in the recommended bin types throughout the WMP, but may be useful for planning purposes should other options be preferred.

Rear-lift wheelie bins are ideal for sites with limited restrictions like specialty retail and small offices. Lightweight and easy to manoeuvre, these small-sized containers are easy to use and can be secured with lockable lids.

Figure 4: Rear-lift mobile bins (120L, 240L, 360L, 660L & 1,100L)*



**Sizes may vary with manufacturer or supplier.*

Figure 5: Existing Waste Transport Tug

CUSHMAN

MODEL: TITAN XD (4 PASSENGER)
TYPE: ELECTRIC 48 VOLT INDUSTRIAL BURDEN CARRIER
MODEL YEAR: 2019
Part No:. 671549

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

- Solid state continuously variable AC speed controller for increased efficiency
- Dash mounted multi-function display for SOC, speed, and hour meter
- 15.3 ft² of weather proof cargo deck, easily removable for service
- Fold down rear seat for added cargo or passengers
- Four wheel hydraulic brakes with Intellibrake
- E and EE type rating availalble

Battery Charger:	1000 Watt, 48VDC, 120/240 VAC 60/50 Hz. UL Listed
Motor:	48 Volt AC induction, solid copper windings. Non vented 16.8 hp (12.5 kW) (Peak)
Drive Train:	Direct motor shaft connected to transaxle pinion shaft
Electrical System:	48 Volt DC, eight, 6 volt deep cycle batteries (115 minute minimum @ 75 amps, 225 amp-hour @ 20 hr. discharge rate)
Transaxle:	Differential with helical gears
Brakes:	Front hydraulic disc brakes. Rear wheel hydraulic 160mm self-adjusting drum brakes. Intellibrake automatic parking brake
Cargo Bed:	Weather proof deck board, 75 in x 41 in (191 x 105 cm). Removable for access to powertrain.
Capacity:	Seating for 4 persons, 3000 pound vehicle capacity

PRODUCT OVERVIEW

Dimensions	
Overall Length	114.0 in (290 cm)
Overall Width	44.5 in (113 cm)
Overall Height (Steering Wheel)	47.5 in (120.6 cm)
Overall Height (Optional Cab)	72.0 in (183 cm)
Wheel Base	67 in (170 cm)
Front Wheel Track	38 in (96.5 cm)
Rear Wheel Track	38 in (96.5 cm)
Gnd Clearance @ Differential	4.75 in (12.1 cm)
Cargo Deck Width	41.5 in (105 cm)
Cargo Deck Length	53.5 in (136 cm)
Cargo Deck Load Height	29.0 in (74 cm)
Cargo Deck Material	Weather proof deck board

Vehicle Power	
Power Source	48 Volts DC
Motor Type	AC Induction
Horsepower (kW)	16.8 HP (12.5 kW) Peak
Electrical System	48 Volt
Batteries (Qty, Type)	Eight, 6 Volt Deep Cycle
Key or Pedal Start	Pedal Start
Battery Charger	48V On-Board, 120/240 VAC UL
Speed Controller	450 Amp AC
Drive Train	Motor Shaft Direct Drive
Transaxle	Differential with Helical Gears
Gear Selection	Dash Mounted Forward-Neutral-Reverse
Rear Axle Ratio	17:1

Performance	
Capacity	4 Persons
Dry Weight	1225.0 lb (560 kg) (Without Batteries)
Curb Weight	1720.0 lb (780 kg)
Cargo Deck Load Capacity	2200 lb (998 kg)
Vehicle load capacity	3000 lb (1361 kg)
Outside Clearance Circle	21.25 ft (6.47 m)
Intersecting Aisle Clearance	84.0 in (213 cm)
Speed (Level Ground)	Haul Mode: 14 mph ±.5 (21 kph ± 0.8) Tow Mode: 5 mph ± .5 (8.1 kph ± .8)
Drawbar	211 lb (96 kg) Normal, 1015 lb (460 kg) Max
Towing Capacity*	8000 lb (3628 kg)

Steering & Suspension	
Steering	Rack and Pinion
Front Suspension	Independent, Transverse Leaf Spring, Shocks
Rear Suspension	Leaf Springs & Shock Absorbers
Service Brake	Front hydraulic disc, Rear hydraulic drum
Parking Brake	Intellibrake Automatic Parking Brake
Front Tire	5.70 x 8 (Load Range C)
Rear Tires	5.70 x 8 (Load Range C)

Body & Chassis	
Frame & Body	Welded steel with DuraShield™ powder coat
Body & Finish	Diamond plate ptn. Polyester primer + acrylic
Standard Color	Yellow

Noise & Vibration	
Noise	Sound pressure; continued A-weighted =/< 70 db(A)
Vibration, WBV	Highest RMS value of weighted acceleration is less than 2.5 m/s²
Vibration, HAV	Highest RMS value of weighted acceleration is less than 2.5 m/s²

Measurement methods were applied per the ISO 2631 and ISO 5349 standards under conditons of typical vehicle surfaces.

2013 Titan XD (4 Passenger)
Released: 01/20/2013
Revised: 07/14/2017

Specifications are subject to change without notice
* Field installed accessories may require installation charges

1 of 2

CUSHMAN

OPTIONS & FIELD INSTALLED ACCESSORIES (Installation not included)*

Item	Std	Opt	Fld
TIRES & WHEELS:			
Front & Rear:			
5.70 x 8 (Load Range C)	●		
5.70 x 8 Solid		●	
5.70 x 8 Non-Marking Solid		●	
COLORS:			
Vehicle Color - Safety Yellow	●		
Vehicle Color - Hunter Green		●	
Vehicle Color - Artic White		●	
Vehicle Color - Flame Red		●	
Custom Vehicle Color		●	
WEATHER PROTECTION			
Sun Canopy - Short			●
Sun Canopy - Long			●
Windshield (Requires Long Sun Canopy)			●
Windshield, Fold Down (Requires Short Sun Canopy)			●
Weather Protection Enclosure (Lg Top & Windshld Reqd)			●
Black Cab with Clear Doors			●
CARGO AREA			
Box Sides & Tailgate			●
Cargo Deck (Steel)		●	
GUARDS AND TOWING			
Bumper - Front		●	
Bumper - Rear		●	
Hitch, Pintle (Requires Rear Bumper)		●	
Hitch, Clevis (Requires Rear Bumper)		●	

Item	Std	Opt	Fld
ELECTRICAL:			
Batteries			
T-105 Batteries	●		
T-145 Batteries		●	
Battery Fill System		●	
Battery Chargers			
48V On-Board, 1000 Watt	●		
48V On Board, 1500 Watt		●	
NEMA 5-15P Cord	●		
NEMA 6-15P Cord		●	
Lighting Package:			
LED Brake Lights/Tail Lights	●		
Headlights	●		
LED Headlights		●	
Turn Signals		●	
Miscellaneous:			
Hour Meter	●		
Operator Presence Switch	●		
State of Charge Meter	●		
USB Outlet	●		
Forward Motion Indicator		●	
Type 'E' Classification		●	
Type 'EE' Classification		●	
CE Certification		●	
Deck Lock		●	
Hand Brake		●	

From: "Dru Greig (Nepean Blue Mountains LHD)" <Dru.Greig@health.nsw.gov.au>
Date: 9 October 2020 at 2:24:59 pm AEDT
To: "Leanne Waters (Nepean Blue Mountains LHD)" <Leanne.Waters@health.nsw.gov.au>
Subject: RE: Sustainability meeting action

Hi Leanne,

Manual measurements below.

Waste Tug & Trailer

Width - 1.7m (1700 mm)
Length - 7.5m (7500 mm)
Turn - 10m (10000 mm)

Thanks,

Dru Greig

Operations Coordinator | **General Services, Nepean Hospital**
Parker Street, Kingswood, NSW 2747
PO Box 63 Penrith NSW 2751
Tel (02) 4734 1074 | Fax (02) 4734 3341 | Mob 0408425345

2013 Titan XD (4 Passenger)
Released: 01/20/2013
Revised: 07/14/2017

Specifications are subject to change without notice
* Field installed accessories may require installation charges

2 of 2

Figure 6: Existing Waste Transport Trailer

SITECRAFT
ABN 36 423 328 526

sitecraft.com.au
Phone 1300 363 152
sales@sitecraft.com.au

Quotation No: SQ-0139773 **Date:**8/1/2020

Prepared By: Simon McMurdo

To: Nepean Hospital - Nepean Blue Mountains LHD
Parker Street
Stores Back Dock
Kingswood NSW 2747 Australia

Phone: 02 4734 2000
Mobile: 0408 425 345
Email: dru.greig@health.nsw.gov.au

Attention: **Dru Greig**
We are pleased to submit our quotation for:

Sitecraft Fully Registered 8 x Bin Trailer
* Single axle Wheelie bin trailer suitable for moving 8 x 240, 4 x 660L or 3 x 1100 litre bins
* With torsion rubber suspensions
* 1500mm rear fully aluminium ramp complete with positive locking, spring assist and ramp lifting handle
* Mudguards with bracing to chassis rail
* 800mm long draw bar with swing out jockey wheel
* 50mm tow ball mounting height – 400mm off ground
* Side rail height – 900mm off deck
* Deck height: 250-280mm off ground
* Aluminium tread plate deck
* LED rear lights, side reflectors and 7 pin trailer plug
* Finished in aluminium color hammer-tone paint

Model:61921011
- Internal Dims: 3150L x 1200W mm
- External Dims: 4150L x 1500W mm
- Loading capacity: 1000kg

Qty 1 **Per Unit Price** AUD $7,900.00 + GST **Line Total:** AUD $7,900.00 + GST

Total Quotation Value: AUD $7,900.00 + GST
Terms: Net 30 Days
Delivery Cost: AUD $690 + GST
Estimated Delivery Time: 15-20 Business Days

Sitecraft's standard terms and conditions of trade (available here) apply to all goods / equipment and/or services referred to in this quotation. The quotation is valid for 30 days from the date of the Quotation. By placing an order for goods / equipment and/or services you agree that you have read, understood and accepted Sitecraft's standard terms and conditions of trade.

Yours faithfully, Sitecraft

Appendix F Standard Signage

Waste Signage

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the NSW Office of Environment and Heritage (NSW OEH 2008b). Standard symbols for use in signage, bin facade and educational materials are promoted through the NSW Environment Protection Authority. They are available for download from the NSW EPA website (NSW EPA 2016), in black and white and colour versions. The Australian Standard series AS 4123 (Part 7) details colours for mobile waste containers (Standards Australia 2008).

Figure 7: Examples of standard signage for bin uses

Safety Signs

The design and use of safety signs for waste and recycling rooms and enclosures should comply with AS 1319 (Standards Australia 1994). Safety signs should be used to regulate, and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Below are some examples. Clear and easy to read 'NO STANDING' and 'DANGER' warning signs must be fixed to the external face of each waste and recycling room where appropriate.

Figure 8: Example and layout of safety signage

(d) Horizontal

FIGURE D5 TYPICAL ARRANGEMENTS OF DANGER SIGNS

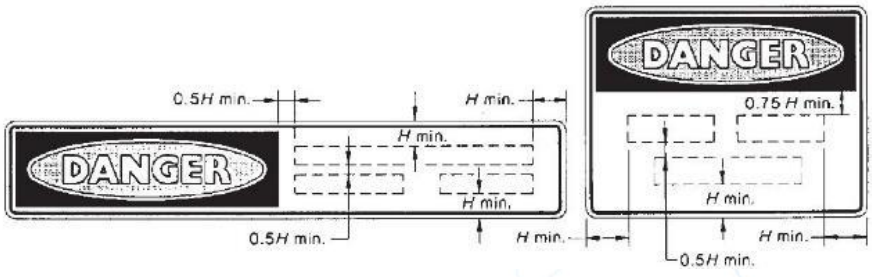


Figure 9: Example of additional recycling information signage for common and staff areas

Source: Planet Ark.

Appendix G Example Organics Processing Infrastructure

Figure 10: Example of equipment for on-site organics processing

Pulpmaster benefits:

- Cheaper than traditional waste removal
- Quicker than traditional waste removal systems
- Reduced exposure of OH&S risks – reduced need for staff to dispose of waste to outdoor bins
- Low contamination levels with other forms of recyclable waste
- Space saving – the unit is compact and efficient
- Clean and tidy – made of stainless steel, easy to clean and vermin proof
- Labour efficiency gains – less time taken to dispose of waste
- Great for the environment – food waste is diverted from landfill and converted to organic fertiliser and electricity

Suitable for:

- Commercial kitchens
- Fruit & Veg shops
- Clubs & Pubs
- Shopping Centres
- Food Processing Plants
- Nursing Homes
- Hospitals
- Education Facilities
- Accommodation Facilities

Source: Pulpmaster - https://pulpmaster.com.au/

CLOSED LOOP ORGANICS UNIT SPECIFICATIONS

Closed Loop's organic recycling units are fully contained, commercial aerobic on-site composting units that can reduce food waste by up to 90 per cent in 24 hours.

CLO10s

Capacity/day: 20kg
Electricity usage/month: 500kWh (maximum)
Electricity requirements: AC 240V
Power rating: 50Hz, 2.1kW
Overall footprint (mm): 1160 (w) x 620 (d) x 1030 (h)
Overall dry weight: 240kg

CLO30s

Capacity/day: 60kg
Touchscreen Controls | Automatic Operation
Electricity usage/month: 1100kWh (maximum)
Elec. requirements: AC 3 phase, 20 amp, 5 pin dedicated outlet
Power rating: 415V, 50Hz, 4kW
Overall footprint (mm): 1960 (w) x 870 (d) x 1250 (h)
Overall dry weight: 450kg

CLO50s

Capacity/day: 100kg
Touchscreen Controls | Automatic Operation
Electricity usage/month: 1700kWh (maximum)
Elec. requirements: AC 3 phase, 20 amp, 5 pin dedicated outlet
Power rating: 415V, 50Hz, 6kW
Overall footprint (mm): 2155 (w) x 1060 (d) x 1350 (h)
Overall dry weight: 660kg

CLO100s

Capacity/day: 200kg
Touchscreen Controls | Automatic Operation
Electricity usage/month: 3500kWh (maximum)
Elec. requirements: AC 3 phase, 20 amp, 5 pin dedicated outlet
Power rating: 415V, 50Hz, 13kW
Overall footprint (mm): 2584 (w) x 1250 (d) x 1580 (h)
Overall dry weight: 1100kg

OPTIONAL FEATURES

- Load cells for accurate measurements of inputs and outputs (CLO30 and above)
- Internet connection for SMS Alerts and remote connection (CLO30 and above)
- 120 Litre Bin Lifter (CLO100)

Source: Closed Loop organics unit specifications

Dehydrators

Dehydrators reduce the volume of food and garden organic waste by removing the majority of water held by the waste. The products from dehydrators include extracted water which can be re-used, as well as dehydrated organic material which can be used as a soil amendment or fuel. Dehydrators differ from composters as they only dehydrate waste and do not produce compost.

Typical materials

- ☒ Food organics

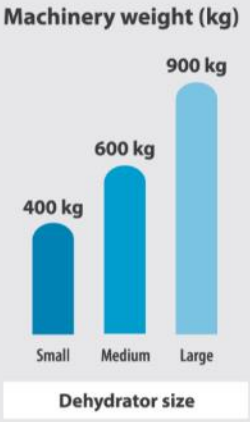
Specifications

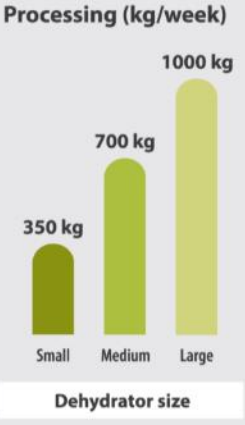
- **Loading:** Manual, Semi-Automatic (pump/hopper)
- **Unloading:** Manual
- **Consumables:** N/A
- **Working Life:** 10-20 Years
- **Power:** 415V
- Sewage/waste water hookup may be required to operate a dehydrator. This may require additional Council approval.
- Lateral and Overhead clearances need to be considered in some cases, and are variable.

Please note: Dehydrators will only be approved for a rebate when the outputs are sent to a commercial composting service or licensed facility or if the equipment has a resource recovery exemption.

Relevant standards

AS 4024.1 2006 Series: Safety of Machinery by Third Party Independent verification





Macerators

Macerators reduce the volume of food waste by turning the solid food waste into pulp. The pulp slurry is pumped to an exterior holding tank for collection by a licensed contractor. Macerators are usually a leased piece of equipment. Leased equipment is not eligible under the Bin Trim Rebate Program.

Typical materials

- ☒ Food organics
- ☒ NOT oyster and mussel shells

NOT fibrous material e.g. corn husks

Cost:
$50,000 – $60,000

Machinery weight:
140 kg

Processing:
2000 kg per hour

Specifications

- **Loading:** Manual
- **Unloading:** Semi-Automated
- **Consumables:** N/A
- **Working Life:** 15 Years
- **Power:** 415V
- Cold water hook up required
- Lateral and Overhead clearances need to be considered in some cases, and are variable.

Please note: Macerators will only be approved for a rebate when used in conjunction with a commercial collection service to a licensed organic recycling facility or a Resource Recovery Exemption compliant land application system.

Relevant standards

AS 4024.1 2006 Series: Safety of Machinery by Third Party Independent verification

Source: NSW EPA, Better Practice Guidelines for Waste Management in Commercial and Industrial Developments.

MRA Consulting Group

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