



Sydney Metro City & Southwest: Crows Nest Over Station Development

Waste Strategy Report

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Acronyms

Acronym	Definition
SSD	State Significant Development
OSD	Over Station Development
CSSI	Critical State Significant Infrastructure
EIS	Environment Impact Statement
SEARs	Secretary's Environmental Assessment Requirements
TfNSW	Transport for New South Wales
NSDCP	North Sydney Development Control Plan
WMP	Waste Management Plan
WARR	Waste Avoidance and Resource Recovery
CWSR	Central Waste Storage Room
WSR	Waste Storage Rooms
IRSR	Interim Recycling Storage Room
WCP	Waste Collection Point
MRV	Medium Rigid Vehicle
IRS	Interim Storage Room

Executive Summary

The concept State Significant Development Application (concept SSD Application) for the Crows Nest over station development, (OSD) will comprise of four new buildings for:

- Site A, separated into North and South buildings, consisting of residential and non-residential space (including community uses on the rooftop podium of the building)
- Site B consisting of either hotel or commercial use
- Site C consisting of commercial use activities.

The Waste Assessment report provides a strategy for waste management in the construction and operational phases of the Project, in alignment with the Secretary's Environmental Assessment Requirements issued for the concept SSD Application on 26 September 2018, the Conditions of Approval for Sydney Metro City and Southwest – Chatswood to Sydenham (SSI 15_7400), *North Sydney Local Environment Plan 2013* (NSLEP), *North Sydney Development Control Plan 2013* (NSDCP), *Green Star – Design & As Built v1.2* and other best practice waste management guidance. It includes the following scope:

- development of a Waste Strategy which addresses the waste management requirements relating to construction and operation including to demonstrate how the indicative design satisfies the requirements
- identify and quantify the various waste streams which may be generated from construction and operation
- provide relevant management strategies for effective storage, re-use/recovery, treatment and/or disposal of waste generated.

Construction

The objectives for the management of waste during the construction works are based on the broader objectives of the *Sydney Metro City and Southwest Sustainability Strategy* and the *Sydney Metro Construction Environmental Management Framework* prepared for the Sydney Metro City and Southwest project.

Quantitative estimates of construction materials associated with the construction of the OSD have not been developed at this stage and therefore, waste quantities are unknown.

The key waste types identified are concrete, bricks, tiles, timber, glass, plasterboard, plastics, cardboard, carpet, metals, hazardous and others. On-site reuse, office re-use, recycling and disposal pathways were identified for these key waste streams.

The document provides a strategy and framework for waste storage and access, and suggested measures to prevent contamination of recyclables and maximise diversion in order to align with the Project's broader sustainability objectives for waste minimisation. Suggestions for documentation, evaluation and communications during the construction phases are provided to facilitate reporting against the resource recovery targets for the Project.

Operations

Quantitative estimates of anticipated waste streams associated with the residential, non-residential, commercial and hotel functions of the Project are provided. Recommendations for waste storage areas, infrastructure and space requirements are tailored to the different building uses. Options for additional source separation are discussed, as well as safe access.

Manual handling is reduced by integrating a chute system for residual waste and recyclables. The scale of waste generated from the Project means that daily collection is required for the residential and hotel waste. Most waste streams will be managed in 1,100L bins and service by rear-lift collection vehicles. A summary of the proposed strategy is provided in Table 1 with reference to the indicative OSD design prepared by Sydney Metro

Table 1: Summary of operational waste servicing strategy

Site	Waste generating areas	Waste storage strategy	Waste collection strategy
A	Residential/ non-residential (retail, community centre and child care)	<p>Residential areas</p> <p>North and South Tower: residual waste and recycling chute system at levels.</p> <p>Recycling chute ends at Level 3 carpark while residual waste chute ends at the Central Waste Storage Room and is compacted.</p> <p>Recycling bulk bins need to be transported from Level 3 Interim Recycling Storage Rooms to the respective Central Waste Storage Rooms.</p> <p>Non-Residential Areas .</p> <p>Movement of waste from individual premises to the Central Waste Storage Room</p> <p>All bins where residual waste and recycling is aggregated in are 1,100 L.</p>	<p>Residential – collection daily</p> <p>Non-residential—collection five times a week</p> <p>Waste Collection Point located internal to building in Site A loading dock.</p>
B	Hotel / Commercial space (including mix of café, restaurants business centre)	Residual and recycling chute system which ends at the Interim Storage Room (ISR), with residual waste compacted. Bulk bins from	Collection daily Waste Collection Point located external to the building, in a separate loading lane on Clarke Lane.

Site	Waste generating areas	Waste storage strategy	Waste collection strategy
		<p>the ISR need to be transported to the Central Waste Storage Room daily</p> <p>All bins where residual waste and recycling is aggregated in are 1,100 L.</p>	
C	Commercial space	<p>Movement of bins from individual levels to the Central Waste Storage Room via lifts.</p> <p>All bins where residual waste and recycling is aggregated in are 1,100 L.</p>	<p>Collection twice weekly</p> <p>Waste Collection Point located external to the building, on Clarke Lane. Off peak servicing with minimal queuing impact expected from 5-10 minute stoppage of collection vehicle.</p>

1.0 Introduction

1.1 Purpose of this report

This report supports a concept State Significant Development application (concept SSD Application) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The concept SSD Application is made under Section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a mixed use development comprising four buildings above the Crows Nest Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for building envelopes and land uses, maximum building heights, maximum gross floor areas, pedestrian and vehicular access, circulation arrangements and associated car parking and the strategies and design parameters for the future detailed design of the development.

Sydney Metro proposes to procure the construction of the OSD as part of an Integrated Station Development package, which would result in the combined delivery of the station, OSD and public domain improvements. The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by DPE on 9 January 2017.

As the development is within a rail corridor, is associated with railway infrastructure and is for commercial premises and residential accommodation with a Capital Investment Value of more than \$30 million, the project is identified as State Significant Development (SSD) pursuant to Schedule 1, 19(2)(a) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The development is therefore, State significant development for the purposes of Section 4.36 of the EP&A Act.

This report has been prepared to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the concept SSD Application on 26 September 2018 which states that the Environmental Impact Statement (EIS) is to address the following requirements:

Reference	SEARs Requirement	Where Addressed in Report
8. Amenity	The EIS shall: Outline provisions to meet servicing requirements, including waste management, mechanical plant and vehicle accesses and identify any impacts to amenity.	Sections 6.1.4, 6.2.4, 6.3.4 and 6.4.4 identify the waste collection points for each building and servicing requirements, which have been designed to minimise amenity impacts.
13. Ecologically Sustainable Development	The EIS shall identify how ESD principles (as defined in clause 7(4) Schedule 2 of the EP&A Regulation 2000) will be incorporated in the	The waste management objectives upon which this report is based, as set out in

	design and operation of the development, including commitments to relevant industry benchmarks and best practice in waste and water management strategy.	5.1.1, are aligned with the waste hierarchy, prioritising avoidance and recovery over disposal. Chapter 7 also sets out additional strategies to reduce waste in the construction and operational phases in line with best practice.
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1.2 Overview of Sydney Metro in its context

Sydney Metro is Australia's biggest public transport project. A new standalone metro railway system, this 21st century network will deliver 31 metro stations and 66km of new metro rail for Australia's biggest city — revolutionising the way Sydney travels. Services start in the first half of 2019 on Australia's first fully-automated railway.

Sydney Metro was identified in *Sydney's Rail Future*, as an integral component of the *NSW Long Term Transport Master Plan*, a plan to transform and modernise Sydney's rail network so it can grow with the city's population and meet the future needs of customers. In early 2018, the *Future Transport Strategy 2056* was released as an update to the *NSW Long Term Transport Master Plan* and *Sydney's Rail Future*. Sydney Metro City & Southwest is identified as a committed initiative in the *Future Transport Strategy 2056*.

Sydney Metro is comprised of three projects, as illustrated in **Figure 1**:

- **Sydney Metro Northwest** — formerly the 36km North West Rail Link. This \$8.3 billion project is now under construction and will open in the first half of 2019 with a metro train every four minutes in the peak.
- **Sydney Metro City & Southwest** — a new 30km metro line extending the new metro network from the end of Sydney Metro Northwest at Chatswood, under Sydney Harbour, through the CBD and south west to Bankstown. It is due to open in 2024 with an ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.
- **Sydney Metro West** — a new underground railway connecting the Parramatta and Sydney central business districts. This once-in-a-century infrastructure investment will double the rail capacity of the Parramatta to Sydney CBD corridor and will establish future capacity for Sydney's fast growing west. Sydney Metro West will serve five key precincts at Westmead, Parramatta, Sydney Olympic Park, The Bays and the Sydney CBD. The project will also provide an interchange with the T1 Northern Line to allow faster connections for customers from the Central Coast and Sydney's north to Parramatta and the Sydney CBD.

Sydney's new metro, together with signalling and infrastructure upgrades across the existing Sydney suburban rail network, will increase the capacity of train services entering the Sydney CBD – from about 120 an hour currently to up to 200 services beyond 2024. That's an increase of up to 60 per cent capacity across the network to meet demand.

Sydney Metro City & Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney's CBD to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of six (6) new metro stations, including at Crows Nest, together with new underground platforms at Central. Once completed, Sydney Metro will have the ultimate capacity for a train every two minutes through the CBD in each direction - a level of service never seen before in Sydney.



Figure 1: Sydney Metro alignment map

On 9 January 2017, the Minister for Planning (the Minister) approved the Sydney Metro City & Southwest - Chatswood to Sydenham application lodged by TfNSW as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval.

The CSSI Approval includes all physical work required to construct the CSSI, including the demolition of existing buildings and structures on each site. Importantly, the CSSI Approval also includes provision for the construction of below and above ground structures and other components of the future OSD (including building infrastructure and space for future lift cores, plant rooms, access, parking and building services, as relevant to each site). The rationale for this delivery approach, as identified within the CSSI application is to enable the OSD to be more efficiently built and appropriately integrated into the metro station structure.

The EIS for the Chatswood to Sydenham alignment of the City & Southwest project identified that the OSD would be subject to a separate assessment process.

Since the CSSI Approval was issued, Sydney Metro has lodged five modification applications to amend the CSSI Approval as outlined below:

- **Modification 1** - Victoria Cross and Artarmon Substation which involves the relocation of the Victoria Cross northern services building from 194-196A Miller Street to 50 McLaren Street together with the inclusion of a new station entrance at this location referred to as Victoria Cross North. The modification also involves the relocation of the substation at Artarmon from Butchers Lane to 98 – 104 Reserve Road. This modification application was approved on 18 October 2017.
- **Modification 2** - Central Walk which involves additional works at Central Railway Station including construction of a new eastern concourse, a new eastern entry, and upgrades to suburban platforms. This modification application was approved on 21 December 2017.
- **Modification 3** - Martin Place Station which involves changes to the Sydney Metro Martin Place Station to align with the Unsolicited Proposal by Macquarie Group Limited (Macquarie) for the development of the station precinct. The proposed modification involves a larger reconfigured station layout, provision of a new unpaid concourse link and retention of the existing MLC pedestrian link and works to connect into the Sydney Metro Martin Place Station. It is noted that if the Macquarie proposal does not proceed, the original station design remains approved. This modification application was approved on 22 March 2018.
- **Modification 4** - Sydenham Station and Sydney Metro Trains Facility South which incorporated Sydenham Station and precinct works, the Sydney Metro Trains Facility South, works to Sydney Water's Sydenham Pit and Drainage Pumping Station and ancillary infrastructure and track and signalling works into the approved project. This modification application was approved on 13 December 2017.
- **Modification 5** - Blues Point acoustic shed modification which involves the installation of a temporary acoustic shed at Blues Point construction site and retrieval of all parts of the tunnel boring machines driven from the Chatswood dive site and Barangaroo through the shaft at the Blues Point temporary site. This modification application was approved on 2 November 2018.

The CSSI Approval as modified allows for all works to deliver Sydney Metro between Chatswood and Sydenham Stations and also includes upgrade of Sydenham Station.

The remainder of the City & Southwest alignment (Sydenham to Bankstown) proposes the conversion of the existing heavy rail line from west of Sydenham Station to Bankstown to metro standards. This part of the project, referred to as the Sydenham to Bankstown upgrade, is the subject of a separate CSSI Application (Application No. SSI 17_8256) for which an EIS was exhibited between September and November 2017, and a Submissions and Preferred Infrastructure Report was exhibited in June and July 2018. This application is currently being assessed by DPE.

1.3 Planning relationship between Crows Nest Station and the OSD

While Crows Nest Station and the OSD will form an Integrated Station Development, the planning pathways defined under the *Environmental Planning & Assessment Act 1979* require separate approval for each component of the development. In this regard, the approved station works (CSSI Approval) are subject to the provisions of Part 5.1 of the EP&A Act (now referred to as Division 5.2) and the OSD component is subject to the provisions of Part 4 of the EP&A Act.

For clarity, the approved station works under the CSSI Approval included the construction of below and above ground structures necessary for delivering the station and also enabling construction of the integrated OSD. This includes but is not limited to:

- demolition of existing development
- excavation
- integrated station and OSD structure (including concourse and platforms)
- lobbies
- retail spaces within the station building
- public domain improvements
- pedestrian through-site link
- access arrangements including vertical transport such as escalators and lifts
- space provisioning and service elements necessary to enable the future development of the OSD, such as lift cores, plant rooms, access, parking, retail, utilities connections and building services.

The vertical extent of the approved station works above ground level is defined by the 'transfer level' level, above which would sit the OSD. This delineation is illustrated in **Figure 2**.

The CSSI Approval also establishes the general concept for the ground plane of Crows Nest Station including access strategies for commuters, pedestrians, workers, visitors and residents.

Since the issue of the CSSI Approval, Sydney Metro has undertaken sufficient design work to determine the space planning and general layout for the station and identification of those

spaces within the station area that would be available for the OSD. In addition, design work has been undertaken to determine the technical requirements for the structural integration of the OSD with the station. This level of design work has informed the concept proposal for the Crows Nest OSD. It is noted that ongoing design development of the works to be delivered under the CSSI Approval would continue with a view to developing an Interchange Access Plan (IAP) and Station Design Precinct Plan (SDPP) for Crows Nest Station to satisfy Conditions E92 and E101 of the CSSI Approval.

All public domain improvement works around the site would be delivered as part of the CSSI Approval.

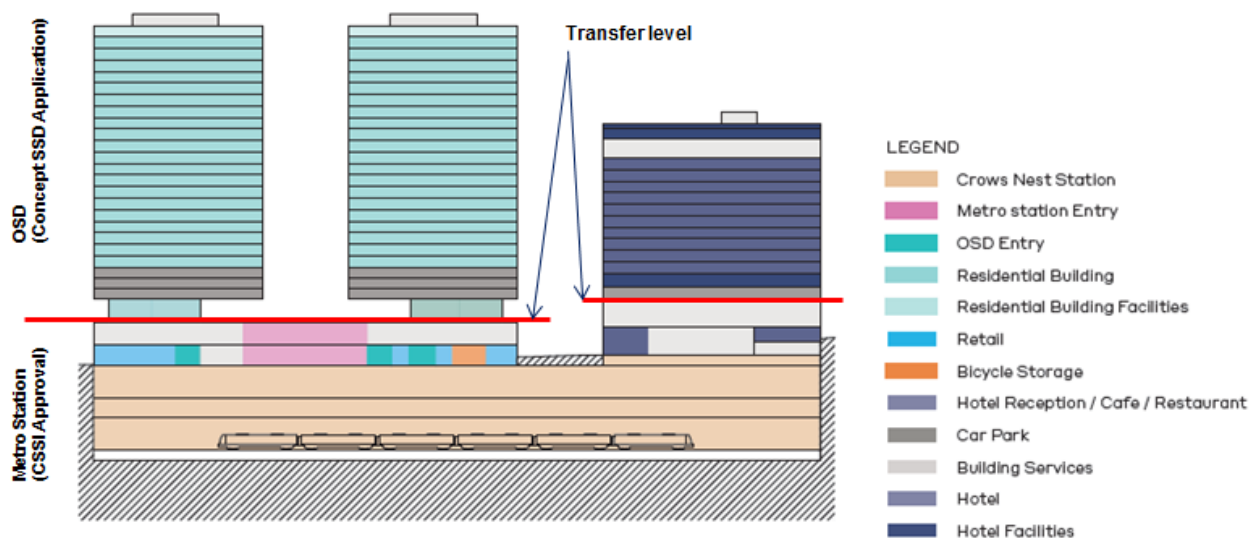


Figure 2: Delineation between the Metro station and OSD (based on indicative OSD design)

1.4 The strategic planning context

DPE is currently undertaking strategic planning investigations into revitalising the area surrounding St Leonards railway station and the metro station at Crows Nest. In August 2017, DPE released the *St Leonards and Crows Nest Station Precinct Interim Statement* and in October 2018 DPE released the *St Leonards and Crows Nest 2036 Draft Plan* (2036 Draft Plan) and supporting documents which detail recommended changes to land use controls in the precinct. These documents recommend new developments be centred around the Pacific Highway corridor and the Crows Nest Station while protecting the amenity of Willoughby Road.

In October 2018, DPE also placed on public exhibition the *Crows Nest Sydney Metro Site Rezoning Proposal* (Planning Proposal). The Planning Proposal outlines the State led

rezoning of the subject site, on the basis that the current planning controls in the *North Sydney Local Environmental Plan 2013* do not reflect the opportunities for improved accessibility associated with the new metro station enabling people to live, work and spend time close to public transport. This concept SSD Application is aligned with the planning controls proposed in the Planning Proposal.

1.5 The site

Crows Nest Station precinct is located between the Pacific Highway and Clarke Street (eastern side of the Pacific Highway) and Oxley Street and south of Hume Street, Crows Nest (Figure 3).

The site is located within the North Sydney Local Government Area.

The Crows Nest Station precinct is divided into three separate sites as illustrated in Figure 4 and described below:

Site A: Six lots in the block bound by the Pacific Highway, Hume Street, Oxley Street and Clarke Lane (497-521 Pacific Highway, Crows Nest)

Site B: Three lots on the southern corner of Hume Street and Pacific Highway (477-495 Pacific Highway, Crows Nest)

Site C: One lot on the north-western corner of Hume Street and Clarke Street (14 Clarke Street, Crows Nest).

Sites A, B and C have a combined site area of 6,356 square metres.

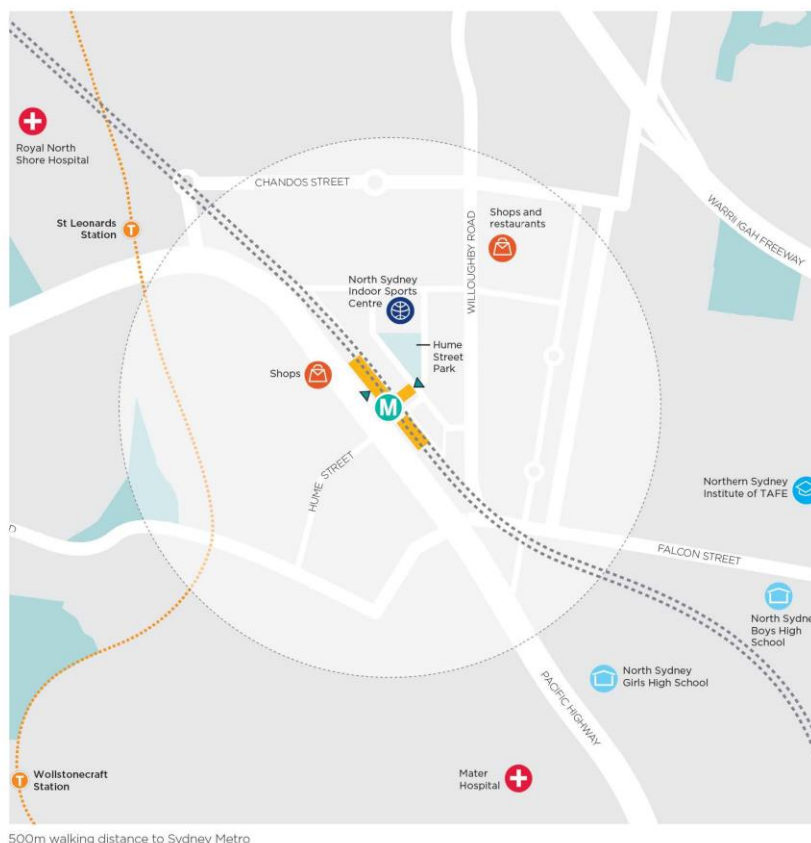


Figure 3: Crows Nest Station location plan



Figure 4: The subject site

The site comprises the following properties:

- **Site A:**
 - 497 Pacific Highway (Lot 2 in DP 575046)
 - 501 Pacific Highway (Lot 1 in DP 575046)
 - 503-505 Pacific Highway (Lot 3 in DP 655677)
 - 507-509 Pacific Highway (Lot 4 in DP 1096359)
 - 511-519 Pacific Highway (SP 71539)
 - 521-543 Pacific Highway (Lot A and Lot B in DP 374468)
- **Site B:**
 - 477 Pacific Highway (Lot 100 in DP 747672)
 - 479 Pacific Highway (Lot 101 in DP 747672)
 - 491-495 Pacific Highway (Lot 100 in DP 442804)
- **Site C:**
 - 14 Clarke Street (Lot 1 in SP 52547)

1.6 Overview of the proposed development

This concept SSD Application comprises the first stage in the Crows Nest OSD project. It will be followed by a detailed SSD Application for the design and construction of the OSD to be lodged by the successful contractor who is awarded the contract to deliver the Integrated Station Development.

This concept SSD Application seeks approval for the planning and development framework and strategies to inform the future detailed design of the Crows Nest OSD.

The concept SSD Application specifically seeks approval for the following:

- maximum building envelopes for Sites A, B and C, including street wall heights and setbacks as illustrated in the plans prepared by Foster + Partners for Sydney Metro
- maximum building heights:
 - **Site A:** RL 183 metres or equivalent of 27 storeys (includes two station levels and conceptual OSD space in the podium approved under the CSSI Approval)
 - **Site B:** RL 155 metres or equivalent of 17 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval)
 - **Site C:** RL 127 metres or 8 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval)

Note 1: the maximum building heights defined above are measured to the top of the roof slab and exclude building parapets which will be resolved as part of future detailed SSD Application(s)

- maximum height for a building services zone on top of each building to accommodate lift overruns, rooftop plant and services:

Site A: RL 188 or 5 metres

Site B: RL 158 or 3 metres

Site C: RL 132 or 5 metres

Note 1: the use of the space within the building services zone is restricted to non-habitable floor space.

Note 2: for the purposes of the concept SSD Application, the maximum height of the building envelope does not make provision for the following items, which will be resolved as part of the future detailed SSD Application(s):

- communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like, which are excluded from the calculation of building height pursuant to the standard definition in NSLEP 2013
 - architectural roof features, which are subject to compliance with the provisions in Clause 5.6 of NSLEP 2013, and may exceed the maximum building height, subject to development consent.
- maximum gross floor area (GFA) of 55,400sqm for the OSD comprising the following based on the proposed land uses:
 - **Site A:** Residential accommodation - maximum 37,500 square metres (approximately 350 apartments)
 - **Site B:** Hotel / tourist accommodation and associated conference facilities or commercial office premises GFA - maximum of 15,200 square metres (approximately 250 hotel rooms)
 - **Site C:** Commercial office premises GFA - maximum of 2,700 square metres
 - **Site A or C:** social infrastructure GFA inclusive of the GFA figures nominated above for each site, with provision optional as follows:

Site A: podium rooftop (approximately 2,700 square metres)

Site C: three floors and rooftop (approximately 1,400 square metres)

Note 1: GFA figures exclude GFA attributed to the station and station retail space approved under the CSSI Approval

a minimum non-residential floor space ratio (FSR) for the OSD across combined Sites A, B and C of 2.81:1 or the equivalent of 17,900 square metres

- the use of approximate conceptual areas associated with the OSD which have been provisioned for in the Crows Nest station box (CSSI Approval) including areas above ground level (i.e. OSD lobbies and associated spaces)
- a maximum of 150 car parking spaces on Sites A and B associated with the proposed commercial, hotel and residential uses
- loading, vehicular and pedestrian access arrangements
- strategies for utilities and services provision
- strategies for managing stormwater and drainage
- a strategy for the achievement of ecological sustainable development
- a public art strategy
- indicative signage zones
- a design excellence framework
- the future subdivision of parts of the OSD footprint, if required.

As this is a staged development pursuant to section 4.22 of the EP&A Act, future approval would be sought for the detailed design and construction of the OSD.

The proposed location of the buildings on the site is illustrated in the location plan provided at **Figure 5**.

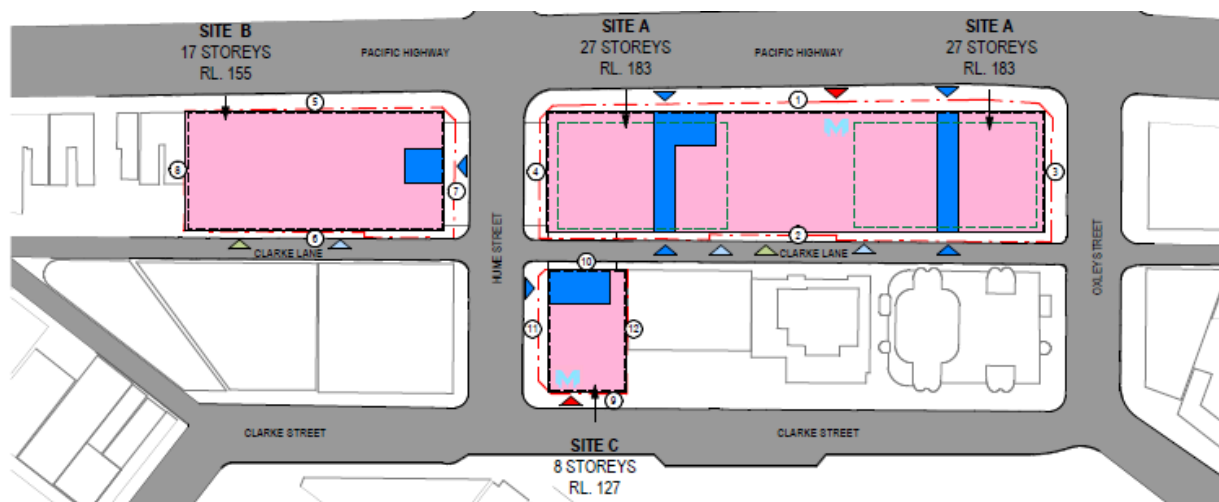


Figure 5: Proposed location of buildings on the

The total GFA for the integrated station development, including the station GFA (i.e. retail, station circulation and associated facilities) and the OSD GFA is 60,400 square metres, equivalent to a floor space ratio (FSR) of 9.5:1.

The concept proposal includes opportunities for community uses in the development on either Site A or Site C. This space has the potential to be used for a range of uses including community facilities, child care centre, recreational area/s, library, co-working space, which can take advantage of the sites accessibility above the metro station.

Through design development post the CSSI Approval, pedestrian access to the metro station is proposed from the Pacific Highway and from Clarke Street, opposite the Hume Street Park. Vehicular access to the site including separate access to the loading docks and parking is proposed from Clarke Lane.

Public domain works around the site would be delivered as part of the CSSI Approval. Notwithstanding, the OSD will be appropriately designed to complement the station and activate the public domain. Provision for retail tenancies to activate the public domain are included in the ground floor of Sites A, B and C, as part of the CSSI Approval. Future detailed development applications will seek approval for the fitout and specific use of this retail space.

Drawings illustrating the proposed building envelopes are provided in Figures 6A and 6B. The concept SSD Application includes an indicative design for the OSD to demonstrate one potential design solution within the proposed building envelope (refer to Figure 7).

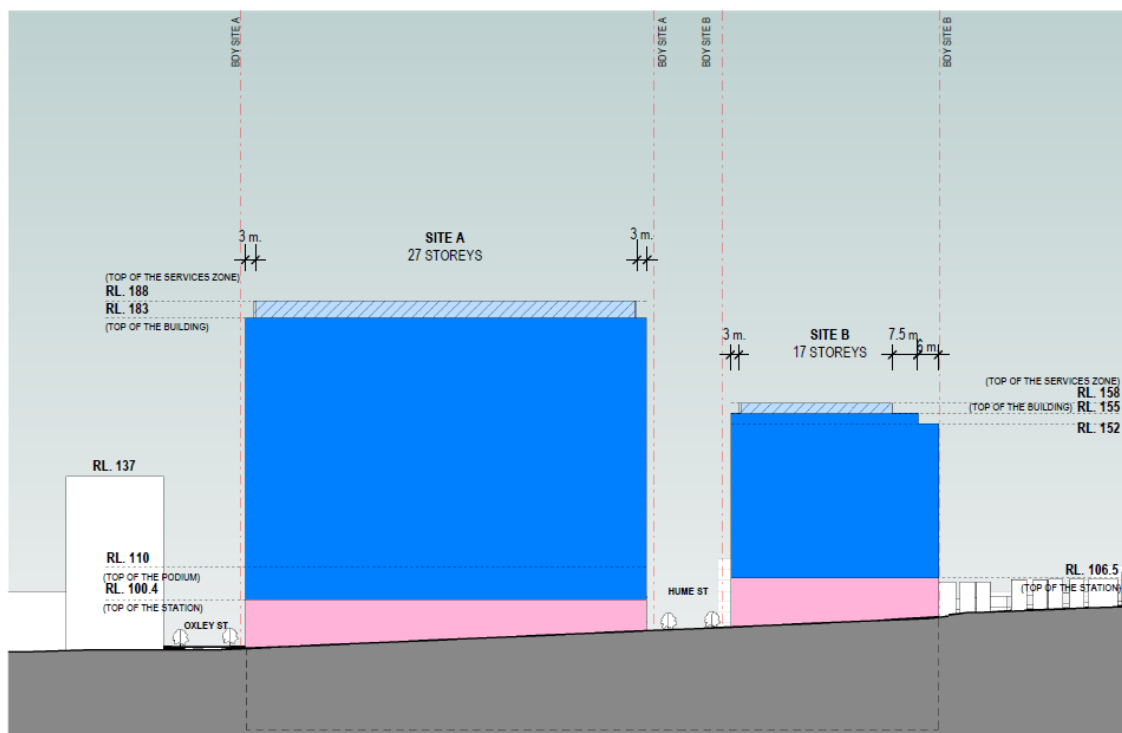


Figure 6A: Proposed Crows Nest OSD building envelopes – west elevation (Pacific Highway)

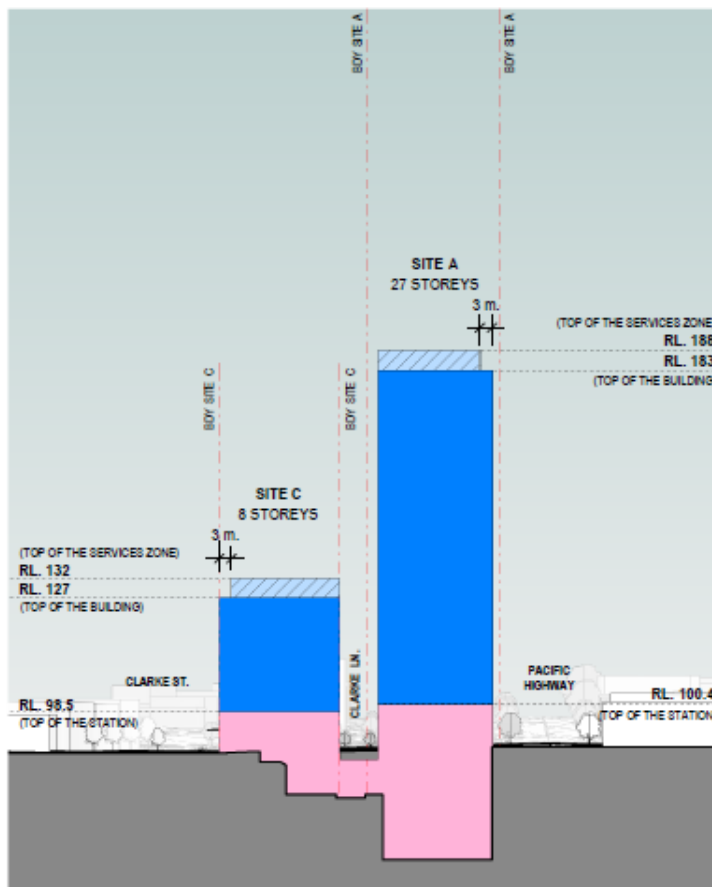


Figure 6B: Proposed Crows Nest OSD building envelopes – cross section through the site (east-west)



Figure 7: Crows Nest OSD indicative design

2.0 Scope of Assessment

The waste strategy documented in this report reflects the concept proposal described in Chapter 1 of this report and where relevant, references the indicative OSD design prepared by Sydney Metro. The built area schedule and development mix (i.e proposed composition of residential, commercial and other land uses) based on the indicative OSD design are provided in Appendix B. This schedule has been used to assess the waste requirements of the site. However, it is noted that approval is only being sought for the concept SSD Application and the waste requirements for the final development should be considered during the future detailed design phase once the precise mix of land uses within the development is known.

The report presents an assessment of waste management requirements relating to the construction and operation of the indicative OSD design. Relevant management strategies for effective storage, re-use/recovery, treatment and/or disposal of waste generated from the Indicative OSD design have been proposed, in accordance with applicable guidelines and regulatory requirements specifically to address the requirements of the Secretary's Environmental Assessment Requirements issued for the concept SSD Application on 26 September 2018, which state that the Environmental Impact Statement (EIS) should be accompanied by a waste strategy which outline provisions to meet servicing requirements for the development. Demolition works will be undertaken as part of the Critical State Significant Infrastructure approval, therefore have not been included in this plan.

As per the SEARs, this waste strategy is required to document the likely waste streams, indicative quantities, and management strategies for the storage, re-use/recovery, treatment and/or disposal of waste generated at each of the buildings proposed in the indicative OSD design, which specifically includes Site A, B and C.

This preliminary waste strategy forms the framework for the waste management measures for the future detailed design and planning stages of the Project:

The following tasks were undertaken as part of this Report:

- review of relevant legislation, policies and guidelines associated with waste management
- identification of waste streams that may be generated during the construction and operation of the OSD
- estimation of indicative waste volumes which may be generated during the construction and operation of the OSD
- recommendations for management strategies and mitigation measures, including methods for source separation of different waste streams and methods for storing, collecting and transporting waste streams

- completion of preliminary details required for a Waste Management Plan (WMP) in accordance with the North Sydney Development Control Plan (NSDCP).

It is noted that the scope of work outlined above does not cover waste management measures within the proposed Crows Nest Station. However, this report does include a waste management strategy for the retail spaces which have been conceptually approved in the CSSI Approval.

2.1 References

The following standards and guidelines are considered applicable to this Project and have been utilised or referenced as appropriate within this scope of assessment:

- Conditions of CSSI approval for Sydney Metro City and Southwest – Chatswood to Sydenham, January 2017
- *North Sydney Local Environment Plan 2013 (NSLEP)* and the *North Sydney Development Control Plan 2013 (NSDCP)*
- *Green Star Design & As Built Manual v1.2*
- *Sydney Metro, Construction Environmental Management Framework*
- *Sydney Metro City & Southwest Sustainability Strategy 2017-24*

3.0 Relevant Regulations, Standards and Guidelines

The regulatory framework, standards and guidelines relevant to this aspect of the Project are provided in this section.

3.1 National and State Regulatory Framework

The Project will take place within the framework of legislation relating to waste management, which includes the following:

- *Protection of the Environment Operations Act 1997 (POEO Act)*
- *Protection of the Environment Operations (Waste) Regulation 2005*
- *Waste Avoidance and Resource Recovery Act 2001 (WARR Act)*
- *Contaminated Land Management Act 1997 (CLM Act)*
- *Commonwealth Hazardous Wastes (Regulation of Exports and Imports) Act 1989*
- *Environmentally Hazardous Chemicals Act 1985.*

Key NSW regulatory and policy requirements which are of particular relevance to the construction and operational phase of the project are outlined in the following sections.

3.1.1 Protection of the Environment Operations Act 1997

Section 88 of the *Protection of the Environment Operations Act 1997* (PoEO Act) sets a levy on waste disposed to landfill. The levy aims to reduce the amount of waste being disposed and promote resource recovery and varies between different areas of NSW.

The landfill levy significantly increases over time and therefore presents a financial driver for increased waste recovery. In addition to the landfill levy, the PoEO Act sets out strict requirements for the management of all material that will be excavated and removed from the Project construction site (including associated activities such as classification). These requirements include:

- Ensuring waste is classified appropriately and in accordance with relevant guidelines;
- Waste materials are disposed to appropriately licensed landfill facilities; and
- Recoverable and other materials are removed to facilities lawfully able to accept such materials.

3.1.2 Protection of The Environment (Waste) Operations Regulation 2014

The *Protection of the Environment (Waste) Operations Regulation 2014* (the Regulations) set out requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site are not required to be licensed. However, Section 70 of the

Regulations requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

The Regulations exempts certain waste streams from full waste tracking and record keeping requirements as waste tracking is required only for industrial and hazardous waste.

3.1.3 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery (WARR) Act 2001* establishes the waste hierarchy to ensure that resource management options are considered against the following principles:

- **Avoidance** – actions to reduce the amount of waste generated
- **Resource Recovery** – which includes reuse, reprocessing, recycling and energy recovery, consistent with the most efficient use of the recovered resources; and
- **Disposal** – an ‘end-of pipe’ option that must be carefully undertaken to minimise any negative environmental outcomes.

3.1.4 Waste Avoidance and Resource Recovery Strategy 2014-2021

The *NSW Environment Protection Authority Waste Avoidance and Resource Recovery Strategy (WARR Strategy) for 2014-2021* provides the strategic direction for future waste management and resource recovery activities in NSW. It establishes the following targets:

- avoiding and reducing the amount of waste generated per person in NSW,
- increasing recycling rates to 70% for municipal solid waste, 70% for commercial and industrial waste and 80% for construction and demolition waste, and
- increasing waste diverted from landfill to 75%

3.1.5 The NSW Waste Classification Guidelines

The *NSW Waste Classification Guidelines* (Guidelines) provide a procedure for classifying waste to support organisations in appropriately recovering, treating or disposing waste generated. The procedure for classifying waste includes:

- Establishing whether a waste is a ‘special’ waste
- Establishing whether the waste is a liquid waste
- Refer to the POEO 1997 definitions for waste classifications to assess whether the waste type can be pre-classified as waste hazardous, restricted solid, general solid waste (putrescible) or general solid waste (non-putrescible)
- Establishing whether the waste has hazardous characteristics
- Chemical assessment

- If the waste is assessed be general solid waste, further investigations are undertaken to determine if the waste is putrescible or non-putrescible.

3.2 Local Government Requirements

The Project is located within the North Sydney Local Government Area (LGA), governed by NSLEP and NSDCP which provides more detailed provisions to guide development within the North Sydney LGA.

It is noted that while the NSDCP does not apply to SSD projects, the requirements stipulated in the NSDCP have been used as a reference point for designing a best practice waste strategy and system for the Project. This strategy aims to align as close as possible with the NSDCP requirements.

The NSDCP specifically outlines waste management guidelines for any waste or recycling produced during construction and operational works, which the Project should align with.

The aspects of the NSDCP relevant to the waste management strategy of the Project include:

- **Section 19 of the NSDCP:** *Waste Minimisation and Management*. This Section applies to all development applications that involve demolition, construction activities or a change in use, and provides high level objectives and provisions for inclusion in the waste management plan.
- **Section 2 of the NSDCP:** Commercial and Mixed-Use Development. This Section of the DCP aims to ensure that commercial and mixed-use developments are aligned with broader Council objectives. Of particular relevance in **Section 2.5.9**, Garbage Storage.
- **Appendix 3 of the NSDCP:** *The Waste Handling Guidelines for High-Residential and Mixed Residential / Commercial Buildings*. This expands on requirements for waste facilities contained within the main NSDCP to ensure that all new facilities comply with Council's collection service and waste minimisation policy.

From these aspects, a summary of the key relevant requirements which have informed this development of this Strategy for the Project has been summarised below:

For buildings which are served by a passenger lift, waste facilities must:

- provide an internal garbage chute leading to a central garbage storage room that has a waste compaction unit attached. The compaction unit shall be set at a 2:1 ratio
- provide each level of the building with at least one point of access to the chute. The access point shall be located in a signposted room, having a floor area not less than 1.5 metres square, appropriate to hold as a minimum 1 x 240L mobile recycling bin for the collection of paper and containers such as glass/plastic bottles, steel/aluminium cans
- provide a separate bulky waste storage room for household clean-up material

In mixed residential/commercial buildings, waste facilities must:

- ensure the garbage chute for the commercial area of the building is kept separate from the residential garbage chute or vice versa
- provide ventilation, fire control and other services to the garbage chute room in accordance with the Building Code of Australia (BCA)
- provide a commercial garbage storage facility, separate from the residential section of sufficient size to accommodate all waste generated from the commercial section. If a commercial section garbage facility is located within the building that is more than 2 metres from the street alignment, then a temporary holding bay must be provided that is located within 2 metres of the street alignment.

3.3 Green Star – Design & As Built v1.2

The aim of the operational waste credit is to recognise projects that implement waste management plans that facilitate the re-use, upcycling, or conversion of waste into energy, and stewardship of items to reduce the quantity of outgoing waste.

The relevant criteria for credit includes:

- development of an operational waste management plan for the project in accordance with best practice approaches and this is reflected in the building's design
- planning for collection and separation of distinct waste streams, and where facilities meet best practice access requirements for collection by the relevant waste contractor

The aim of the materials criteria is address consumption of resources within the construction sector, and reduce the amount of waste generated, or the recycling of as much of the waste generated as possible.

The relevant criteria for credit includes the use of materials with high levels of recycled content, or the selection of reused products and materials.

3.4 Sydney Metro City and Southwest Sustainability Strategy 2017-24

Sydney Metro has a clear vision for the Sydney Metro City and Southwest project to demonstrate best-practice environmental, social and economic outcomes in delivery and operation. The *Sydney Metro City and Southwest Sustainability Strategy 2017-24* (Sustainability Strategy), documents and outlines performance targets, initiatives and outcomes which will be adopted across key policy areas in the design, construction and operation stages of the metro-related aspects of the Sydney Metro City and Southwest Project. The Sustainability Strategy notes that Sydney Metro will be seeking best-practice sustainable design and governance outcomes for OSD, including achieving site specific responses to achieve Sydney Metro City and Southwest projects sustainability objectives for waste which include:

- minimising waste through the project lifecycle
- reduce materials consumption
- consider embodied impacts in materials selection
- maximise beneficial reuse of spoil

These objectives of the Sustainability Strategy have been considered when preparing this waste strategy.

4.0 Method of Assessment

The waste management assessment presented in this report involved an analysis of the waste characteristics for the concept proposal. The assessment has been completed using the indicative OSD design prepared by Sydney Metro, along with the regulatory requirements outlined in Section 3.0 (i.e. WARR Strategy, NSDCP and the Sydney Metro City and Southwest Sustainability Strategy). This includes consideration of the principles of the NSW EPA waste hierarchy, prioritising waste avoidance where possible, followed by waste stream separation for recycling, as highlighted in 8.



Figure 8: NSW EPA Waste Hierarchy

Specifically, the process for developing these recommendations included:

- estimation of waste types and quantities (where possible)
- description of waste storage requirements, including bin sizes, storage room sizes and other infrastructure
- collection frequencies and specifications of collection vehicles (where possible)
- description of how the waste streams will be managed, from point of generation to collection
- design requirements for waste storage rooms and collection vehicle access.

As noted in Section 2.0, the development assumptions used in this assessment are based on the built area schedule and development mix provided in the concept SSD Application for the indicative OSD design. Details are provided in Appendix B, with a summary provided in Table 2 below.

It is noted that approval is only being sought for the concept proposal and the waste requirements of the future development should be considered further during the detailed design phase once the precise mix of uses is known.

Table 2: Summary of built form Crow's Nest OSD

Site	Use Description	Storeys	Maximum GFA (m ²)
Site A			
North Tower	Residential – approx. 6-7 per storey, 175 in total	26	37,500
South Tower	Residential – approx. 6-7 per storey, 175 in total	26	
Total	350 – approx. 10% studios, 30% 1 bed, 40% 2 bed and 20% 3 bed.	26	
Podium level	Non-residential	1	
Site B	Hotel (250 keys) or commercial use	17	18,300
Site C	Commercial	8	2,700

5.0 Construction Waste Assessment

The purpose of this section is to guide minimisation of the environmental impacts of waste management during the construction of the Project.

In accordance with the NSDCP, a Preliminary WMP for construction has been provided based on the indicative OSD design (Appendix A).

The Preliminary WMP shows the following for the Project:

- type of waste to be generated
- expected volume per week
- proposed on-site storage and treatment facilities
- destination of waste; and
- information about the ongoing management of waste on-site.

The Preliminary WMP aims to meet the legislative waste minimisation requirements and Council objectives. The following section of the report details the broader waste management strategy for the Project and should inform the future design.

5.1.1 Waste Management Objectives

The objectives for the management of waste during the construction works are based on the broader objectives of the *Sydney Metro City and Southwest Sustainability Strategy* and the *Sydney Metro Construction Environmental Management Framework*, which includes:

- minimise waste throughout the project life-cycle
- reduce the demand for waste disposal to landfill during construction
- maximise avoidance and resource recovery of construction waste through minimisation, reuse and recycling
- assist in achieving resource recovery targets in line with the NSW WARR Strategy
- maximise the recycling and reuse of office waste generated during the construction phase.

This WMP adheres to the principles of the waste hierarchy, where avoidance and minimisation of waste are favoured in the first instance wherever possible, followed by reuse and recycling where these avenues exist, followed by energy recovery or otherwise disposal of materials to landfill as a last resort. This approach is in line with overarching Federal and NSW policy and regulatory frameworks.

Maximum waste minimisation occurs when waste is considered at the earliest stages of development. However, this WMP has been developed to provide guidance on best practice

management for all waste generated as part of the construction works, including unanticipated material types or quantities.

The following sections, outline the infrastructure and management practices required to handle waste materials, and identify the destination of these materials, generated as part of the construction works of the Project.

5.1.2 Waste Types and Quantities

The Project construction phase will take place over the station and therefore waste generated from excavation and demolition works are not included within this assessment.

Detailed specifications of materials to be used in the construction are yet to be confirmed. Quantitative estimates of construction materials have not been developed at this stage and therefore waste quantities are unknown.

Table 3 addresses typical construction waste materials and outlines a plan of management. Re-use of materials should be given priority over recycling or disposal wherever feasible.

Table 3: Waste management and resource recovery plan for construction wastes

Material Type	Re-use/Recycling Onsite	Re-use/Recycling Offsite	Disposal
Concrete	Source crushed waste concrete used as clean fill Source crushed and graded concrete to replace aggregate in pavements and other concrete applications	Concrete recycling at local C&D processing facilities. Crushed concrete used in external low-grade roads, pavement sub-bases or as a substitute for virgin crushed rock.	No disposal required.
Bricks	Surplus bricks used whole in pavement design or crushed for walkways or landscaping fill.	Brick recycling at local C&D processing facilities.	No disposal required.
Tiles	Source crushed tiles for paving or landscape decoration	Surplus tiles to be taken back by suppliers Broken tiles to be reconditioned/recycled by manufacturer. Recycling of roof tiles recycling at local C&D processing facilities.	Minimal disposal required.
Timber	Surplus untreated timber ground into mulch for landscaping Treated timber used for new structural work or as formwork, bridging, blocking and propping Source sustainable/ used timber for external timber cladding	Small timber offcuts and untreated timber can be mulched at local recycling facilities. Larger timber off-cuts and excess sent to second-hand supplier Pallets returned for re-use	Minimal disposal required.

Material Type	Re-use/Recycling Onsite	Re-use/Recycling Offsite	Disposal
	Small timber off-cuts to be used in landscaping Wood cutting to occur in centralized locations to maximise reuse and facilitate collection.		
Glass	Source crushed glass for sand substitute in concrete pavements, and other concrete applications	Glass recycling at local recycling facilities.	Minimal disposal required.
Plasterboard	Plasterboard crushed onsite and reused through mixing with soils / soil conditioner in landscaping	Waste plasterboard offcuts used in manufacture of new plasterboard.	Minimal disposal required.
Plastics	Limited opportunities for on-site reuse of offcuts or excess.	Where possible, take-back and recycling of plastics such as PVC pipe, cable conduit and flooring or clean plastic by manufacturer.	Some disposal may occur, particularly for film plastics such as pallet wrap.
Cardboard	Limited opportunities for on-site reuse of offcuts or excess.	Cardboard recycling at local recycling facilities.	No disposal required.
Carpet	Limited opportunities for on-site reuse of offcuts or excess.	Surplus carpet to be taken back by manufacturers for re-use, reconditioning or recycling	Minimal disposal required.
Metals	Limited opportunities for on-site reuse of offcuts or excess, apart from possible decorative elements.	Metals to be sent for recycling into manufacture of new metal products Metal waste can be sent to local recycling facilities.	No disposal required.
Hazardous	n/a	Fuel and oil storage from machinery would be secured and managed responsibly within compound sites during works and removed upon completion of works.	Hazardous items such as gas bottles and oil can be disposed of at local transfer or treatment facilities.
Other		Foam insulation and packaging for new insulation of soft structural foams Light fixtures for cleaning and re-use	Disposal of non-recyclables items at local transfer or disposal facilities. Fuel and oil storage from construction machinery would be secured and managed responsibly within compound sites during works, and removed upon completion of works.

5.1.3 Storage

It is anticipated that where possible, waste will be sorted and stored according to material type in a designated waste storage area on site and materials for reuse, recycling and disposal segregated. The area allocated to material storage should consider slope, drainage, stormwater outlets, dust and impacts on neighbouring properties.

Bulk bins for waste storage must be clearly labelled with signage of the purpose and target contents of each different material stream. Implement measures to prevent damage by the elements, odour and health risks, and windborne litter.

The exact configuration and number of bins would be determined by the materials being generated at the time and it is important to ensure that vehicular access for bulk bin collection and exchange must be adequate and safe.

In addition to the above, the following waste management methods should be adhered to during construction to ensure the highest percentage of construction waste possible is diverted from landfill for reuse or recycling.

- waste management during Project Construction Phase to be centrally administered in order to maintain one consistent system throughout the project
- salvageable materials shall be diverted from landfill wherever feasible
- prior to the removal of any demolition or construction materials from the construction site, recycling coordinators will inspect containers for compliance with WMP requirements
- recycling bins be provided on site for paper and cardboard, metals, glass, plastic and oil, which would then be sent to approved recyclers
- hazardous waste shall be managed by a licensed hazardous waste contractor
- the waste storage area should be appropriately sized to accommodate bins of sufficient volume to contain the quantity of waste generated between collections
- waste management facilities should be suitably enclosed, covered and maintained to prevent potentially contaminated waste/rain water runoff from entering the storm water system
- consideration should be given to the time of day at which containers are collected to minimise the adverse impacts on residential amenity, pedestrian movement and local traffic
- arrangements should be in place regarding the regular maintenance and cleaning of waste management facilities
- the waste storage areas should be appropriately lit to maintain security of contractors and be equipped with fire extinguishing equipment and smoke alarms

- the waste storage areas should be secure
- the waste storage areas should meet all relevant WHS requirements
- ensure that all contractors are aware of the legal requirements for disposing of waste. Ensure that all waste is transported to a place that can lawfully be used as a waste facility
- retain all records demonstrating lawful disposal of waste and keep them readily accessible for inspection by regulatory authorities such as council, EPA, WorkCover NSW and Green Star auditors.

5.1.4 Access

Access to the site for waste collection vehicles would be determined for all construction vehicles. Details on vehicle access to the site are considered within specialist *Transport, Traffic and Parking Assessment Report* and any related noise issues are addressed in the Noise and Vibration Assessment Report which accompanies the concept SSD Application.

In general it is best practice to avoid any requirement for reversing of waste collection vehicles wherever possible and therefore, any bulk bins and waste containers should be positioned in an arrangement that allows for entry, collection and exit in a forward direction.

The positioning, type and size of containers used to hold waste should be compatible with the collection practices of the nominated waste contractor.

5.1.5 Other Waste Management Planning Considerations

When implementing the construction waste management plan, ensure:

- footpaths, public reserves, street gutters etc are not used as places to store demolition waste or materials
- any material moved offsite is transported in accordance with the requirements of the Protection of the Environment Operations Act (1997)
- selection of reputable waste removal contractors who will guarantee that recyclable material will be recycled and will provide any relevant certificates
- waste is only transported to a place that can lawfully be used as a waste facility
- all waste that cannot be re-used or recycled should be disposed of in accordance with the NSW EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (1997)
- generation, storage, treatment and disposal of hazardous waste and special waste (including asbestos) is conducted in accordance with relevant waste legislation

administered by the EPA and relevant Work Health and Safety legislation administered by WorkCover NSW.

5.1.6 Evaluation Plan

The contractor will be encouraged to develop, update and post at the jobsite a graph indicating the progress to date for achieving the project's waste recycling goals.

An audit of records for material generated and removed off site will be required for assessment of Green Star credit. Where only volumetric measurements are possible, standard approved density conversion factors can be applied to calculate relevant weights.

5.1.7 Communications Plan

To ensure that the WMP targets are achieved on-site during construction:

- the main contractor should conduct an on-site pre-construction meeting with subcontractors to reinforce to the subcontractors' key field employees the commitments made with regard to construction waste management goals and requirements and ensure that all crews comply with the WMP
- there should be a nominated WMP site 'champion' to ensure the WMP is adhered to throughout works
- waste prevention and recycling activities should be discussed at the beginning of each subcontractor 'pre-start' or 'toolbox talk' meeting to reinforce plans are on track and to communicate reuse and recycling progress to date
- site induction for each new subcontractor on the site should include a summary of the WMP and tour of the waste and recycling areas
- all recycling skips/containers will be clearly labelled. Containers shall be located in close proximity to the building(s) under construction in which recyclables/ salvageable materials will be placed and lists of acceptable/ unacceptable materials will be posted
- all subcontractors should be informed in writing and on-site of the importance of non-contamination with other materials or general waste
- contractors shall inspect the containers frequently to ensure that no contamination of recycling streams is occurring and precautions shall also be taken to deter any contamination by the public.

6.0 Operational Waste Assessment

This purpose of this section is to outline the waste strategy for the operational phase of the Project. It is noted that a revised WMP would be produced during detailed design stage to assess waste impacts during operation and submitted with the detailed SSD Application.

In accordance with the NSDCP, a Preliminary WMP for operation has been provided based on the indicative OSD design (Appendix B).

The Preliminary WMP shows the following for the Project:

- type of waste to be generated
- expected volume per week
- proposed on-site storage and treatment facilities
- destination of waste
- information about the ongoing management of waste on-site.

The Preliminary WMP aims to meet the legislative waste minimisation requirements and Council objectives. The following section of the report details the broader waste management strategy for the Project and should inform the future design and planning stages of the development. The waste strategy for each Site has been presented in the following format:

- estimates of the waste types and quantities
- estimates of the waste storage space requirements and definition of the strategy to manage the storage and collection of waste
- movement of waste from point of waste generation and storage / aggregation to collection
- details of collection points and requirements.

6.1 Site A (North and South Towers) - Residential

This section outlines the waste strategy for servicing the residential areas of Site A of the Project. The residential areas are part of the North and South towers of the indicative OSD design.

The interactions between the waste storage areas, internal waste movements and waste collection points are shown marked diagrams provided in Appendix D.

6.1.1 Waste Types and Quantities

Sufficient storage is to be provided to manage residual waste and recycling arising from the residential premises within Site A of the Project. Estimations of the key waste streams

generated are provided in Table 4 and the references to infrastructure sizing for developing these assumptions are provided in Appendix B.

Table 4: Key Waste Types and Quantities

Source	Residual Waste (litres)		Recycling (litres)	
	Day	Week	Day	Week
Household waste generated from the 350 apartments (across south and north towers)	4,937	34,560	4,937	34,560
Total	4,937	34,560	4,937	34,560

Other waste streams considered in this development include:

- Bulky waste – furniture items for Council clean-up
- Oversize cardboard

Services for other waste streams such as household chemicals and e-waste would need to be arranged by building management on an occasional or adhoc basis. These waste streams would be managed internally by residents until collection is ordered by building management. Collections could be scheduled such that a space could be temporarily made available for bulky waste storage prior to collection .

6.1.2 Waste Storage

Site A's residential component consists of two buildings, North and South which are located above the common podium which contains non-residential uses (refer to Section 6.2). The indicative OSD design has included space allocation for the residual and recycling chutes along the two buildings. The chutes however are not linearly connected to the chutes that run down through the podium level and join with the Central Waste Storage Rooms located at the street level floor where the waste is collected for removal from site. The angle from the vertical (orange) and the chute connection from waste dropping for the North and the South building residential towers (transfer zone) is 40 degrees and 26 degrees respectively, as shown in 9 below.



Figure 9: Angles between residential and podium chutes for North (left) and South (right) towers

Angled waste chute connections are feasible, however the critical design parameters are typically 45 degrees for residual chutes and 22 degrees for recycling chutes. Therefore, the indicative OSD design for chute design throughout the building will be feasible for the residual chute but may need to be altered for the recycling chutes. Currently the space around the chute is constricted due to heavy demand for space by various Mechanical, Electrical and Power (MEP) infrastructure. Therefore the option of moving the chute to reduce the angle is unlikely unless there is a change to the design. As such, a number of alternative design options have been considered for servicing the recycling from the residential towers, each having a different management and maintenance response. These are detailed below.

Option 1: Ending the recycling chute at the Level 3 car park and using the car lift to move the recycling bulk bins from an allocated space to the Central Storage Waste Room (CSWR).

Potential Conflicts:

- It is estimated that approximately 8 m² of space in each tower is required to store approximately 3 x 1,100 L bulk bins to service the recycling chutes from the residential areas. Preliminary analysis indicates this may result in sacrificing one of the existing car parking space to allow for this space.
- Car lift access will need to be managed, including timing of use. Bins would be required to be moved daily. Recycling bulk bins from the podium levels would need to be transferred manually to the Central Waste Storage Room.
- The car lift will bring the bins to the street level, but will require the bins to be manoeuvred out of the building, and then back into the building.

Option 2: Ending the recycling chute at the podium level, using the podium lift to move the bulk bins to the Central Waste Storage Room.

Potential Conflicts:

- Separate interim recycling storage room space will need to be allocated on the podium level. This is a public access area and inclusion of separate space for this could be unsightly and an inefficient use of podium floor space.
- Existing lift strategy will need to change to allow access to the street level floor for bins to be transported from the podium level to the Central Waste Storage Room or the Waste Collection Point. Currently lift access on this floor is restricted for security and safety purposes, as this is a public entry point. Access could be provided to select staff with key card access and requires consideration from a management perspective.

Option 3: Allocating approximately 4-5 m² of space on each floors Waste Service Room for storage of 3 x 240 L mobile garbage bins which would need to be moved twice weekly manually to the Central Waste Storage Room.

Potential Conflicts:

- Heavy burden on maintenance staff to require manual movement of materials.
- Inefficient system, particularly as chute design will be incorporated for residual removal.

All three options are feasible solutions to servicing the recycling stream from the residential towers. Option 1 is preferred as it will allow utilisation of the existing car lift which has access to the street level with minimal interference to podium space and will only require sacrifice of approximately one car parking spot. An indicative design layout for this space is provided below in 10, with the potential waste transfer from the lift to the Central Waste Storage Room or the Waste Collection Point shown in 11.

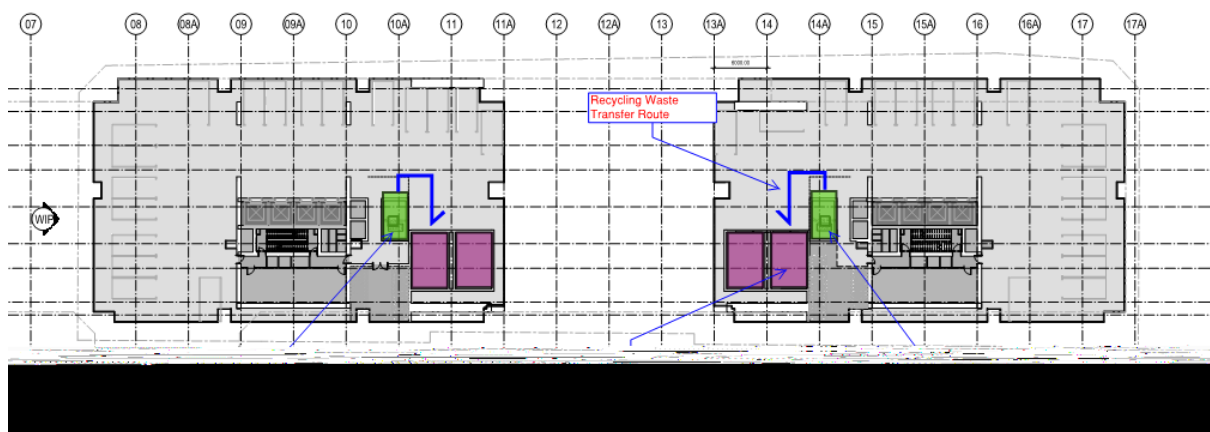


Figure 10: Option 1 Interim Recycling Storage Rooms

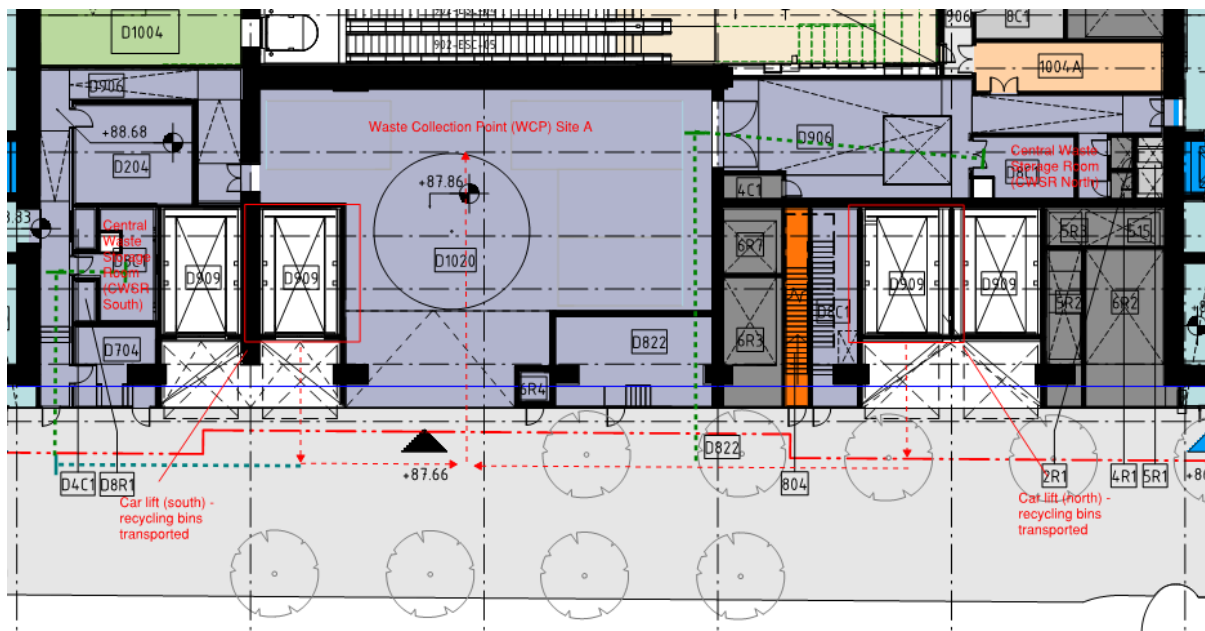


Table 5: Residential Waste Storage

Waste storage area	Infrastructure required	Space required
Individual residences	Bins to be provided by residents	<1 m ²
Waste Storage Room (WSR Site A)	Residual waste chute access Recycling chute access 1x 240L bin for oversize cardboard Optional – separate organics or glass in 240L bins	< 2 m ² per WSR on each level..
Interim Recycling Storage Room (IRSR South and North)	IRSR North 3 x 1,100L recycling bins Recycling chute hopper and linear carousel IRSR South 3 x 1,100L recycling bins Recycling chute hopper and linear carousel	See Appendix D for indicative space provision, approximately 8 m ² has been allocated for IRSR North and South. The chutes from the residential towers directly feed into these rooms. The dimensions of the rooms are adequately sized to fit the recommended 1,100 L bins need to service the residential waste generated. Note a 0.2 m clearance in between bins has been included in this minimum spacing requirement.
Central Waste Storage Rooms (CWSR South and North)	CWSR North 1 x 1,100L residual waste bins (based on residual waste being compacted to approximately one-third of volume) 3 x 1,100L recycling bins (when moved from IRSR North) Hard waste storage space Residual waste chute hopper and linear carousel (with compactor) CWSR South 1 x 1,100L residual waste bins (based on residual waste being compacted to approximately one-third of volume) 3 x 1,100L recycling bins (when moved from IRSR South) 1 x 1,100L for oversize cardboard Residual waste chute hopper (with compactor) <i>Note: A linear carousel is not recommended for CWSR South due to the layout of this room being unable to house a linear system. Manual changing of bins will be required.</i>	See Appendix D for indicative space provision, approximately 15.6 m ² (3.0 m x 5.2 m) has been allocated for CWSR North and 16.6 m ² (5.7 m x 2.9 m) has been allocated for CWSR South (space to accommodate for residual and commercial waste generated from Site A). The chutes from the podium and residential towers directly feed into these rooms. The dimensions of the rooms are adequately sized to fit the recommended 1,100 L bins need to service the residential waste generated, although a linear carousel system is not recommended for CWSR South due to the layout. Overall, a minimum of 10 m ² in CWSR North and 12 m ² in CWSR South is required for residential bin storage. Note a 0.2 m clearance in between bins has been included in this minimum spacing requirement. Total CWSR South and North adequately provide space for Site residential and commercial waste generation

6.1.3 Internal Waste Management

Residential tenants will arrange the disposal of their own waste to the nearest WSR as required. Residual waste and recyclables shall be transferred to the CWSR via a waste chute.

As noted, a linear carousel where bins are automatically moved when full has been recommended to reduce manual handling of the bulk bins in the CWSR for residual waste and in the IRSR for recycling. Recycling bins will need to be transported from the IRSR to the CWSR on a daily basis via the car lift. Access to the car lift and its use should be considered in liaison with the broader operational practises for the site.

Bins will need to be moved from the CWSR by building maintenance staff as needed for servicing by the collection vehicle from the loading bay. An electric bin mover should be used to move the compacted residual bins and the recycling bins to reduce risk of injury from manually lifting the full bins.

Oversized cardboard could be collected at each WSR on each level in smaller mobile residual bins, with space for one oversize cardboard bulk bin allocated in the CWSR. Should it be included, cardboard should be transferred to the central aggregation location (assumed to be CWSR North) for emptying as required, by building management. A small amount of space has been allocated in CWSR North to store hard waste generated by residents.

Cleaning and maintenance of bins located in the WSR on each level of Site A, IRSR North and South, and the CWSR North and South will be the responsibility of building management. A bin wash area will be provided adjacent to the CWSR to enable cleaning of bins. Additionally, building management will be responsible for ensuring that the following management principles are followed:

- standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- adequate signage identifying the CWSR North and South, IRSR North and South and each of the WSR on each level must be prominently displayed
- all waste and recycling receptacles and chutes must be clearly and correctly labelled to identify which materials are to be placed in which bin
- any compactors or mechanical devices for the storage of waste must be child proofed
- equipment must be protected from theft and vandalism.

6.1.4 Waste Collection

Assumed collection frequencies for each residential waste stream are outlined in Table 6.

Table 6: Residential Waste Collection Frequency

Waste stream	Collection
Residual waste	Daily
Recyclables	Daily
Oversize Cardboard	As needed
Bulky Waste	As needed

The Waste Collection Point for Site A (WCP Site A) is internal to the building off the loading dock and located near the CWSR South. Building management will be responsible for moving the bins from the CWSR South and North to WCP Site A. As noted, it is anticipated that an electric bin mover will be required in order to move the bins.

The expected volume of putrescible waste generated in the building necessitates more frequent collection, therefore deviating from the NSDCP. The container necessary for weekly collection would require hook lift truck collection, which is not within the North Sydney collection fleet thus a private collection contractor is likely to be required regardless. Furthermore, the loading dock height and turn table restrictions prevent front lift, or hook lift access, therefore the waste management system is designed for rear lift truck and MRV access.

Collection vehicles required to service each waste stream are outlined in Table 7, with associated dimensions and clearance requirements. Vehicles will be able to enter the building, collect the waste and use the turning circle to exit the building and on to Clarke Lane in a forward direction.

Table 7: Residential Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length ¹ – 8.0 m Overall Width – 2.5 m Height (travel) – 3.4 m Height (operation) – 3.4m Turning circle 25.0m
Recyclables			
Oversize Cardboard			
Bulky Waste	N/A	Dependent upon waste type, may either be a rear lift or an (MRV)	MRV ² Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m

¹ Older rear lift fleet are longer, and would not fit on the turn table. At least two of the major waste collector's user the smaller 8.0 m fleet.

² Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, <http://austroads.com.au/tmp.anchor.net.au/images/stories/ap-g34-13.pdf>)

6.2 Site A – Non-Residential

This section outlines the waste strategy for servicing the non-residential areas of Site A of the Project at the podium level. Based on the non-residential areas in the indicative OSD design, these are assumed to consist of retail (approved in the Station box as part of the CSSI Approval) and community uses (i.e. community centre / day care) development types for the purpose of waste generation assessment, but could change as the project progresses.

The interactions between the waste storage areas, internal waste movements and waste collection points are shown on marked diagrams provided in Appendix D.

6.2.1 Waste Types and Quantities

Sufficient storage is to be provided to manage residual waste and recycling arising from the non-residential spaces within Site A of the Project. Estimations of the key waste streams generated are provided in Table 8 and the references for developing these assumptions are provided in Appendix B.

Table 8: Key Waste Types and Quantities

Source	Residual Waste (Litres)		Recycling (Litres)	
	Day	Week	Day	Week
Retail	335	2,342	335	2,342
Community Centre	59	414	59	414
Child Care	1,155	8,082	1,155	8,082
Total	1,548	10,837	1,548	10,837

Other waste streams considered in this development include:

- Oversize cardboard

6.2.2 Waste Storage

Storage for non-residential waste will be provided within three areas of the Project, being:

- individual premises: space within each premise to store up to one days' worth of residual waste and recyclables
- central Storage Room (CWSR): Two Central Waste Storage Rooms will be provided, one located in the North building (CWSR North) and one located in the South building (CWSR South). Waste from the commercial spaces on the podium should be transported to the bulk bins located in the CWSR.

The NSDCP calls for separate management of residential and commercial waste. It is recommended that management of non-residential waste be controlled to limit the mixing of residential and non-residential wastes in the same bulk bin by allocating specific bins for drop-off of residual and recycling generated from the non-residential spaces.

Note that separate space for interim storage of aggregated residual and recycling at the podium level has not been included. It is assumed bags of waste will be directly transferred as required to the Central Waste Storage Rooms (CWSRs).

Descriptions of the above waste storage areas are outlined in Table 9 and the location and indicative layout of the Central Waste Storage Room is included in Appendix C

Table 9: Non-Residential Waste Storage

Waste storage area	Infrastructure required	Space required
Individual premises	Bins to be provided by tenants and located in open visible space in the community area To be provided by tenants	<1m ²
Central Waste Storage Rooms (CWSR South and North)	<p>CWSR North 2 x 1,100L recycling bins <i>Other infrastructure shared between residential and commercial spaces</i></p> <p>CWSR South 1 x 1,100L residual waste bins (based on residual waste being compacted to approximately one-third of volume) <i>Other infrastructure shared between residential and commercial spaces</i> 1 x 1,100L for oversize cardboard</p>	<p>See Appendix D for indicative space provision, approximately 15.6 m² (3.0 m x 5.2 m) has been allocated for CWSR North and 16.6 m² (5.7 m x 2.9 m) has been allocated for CWSR South (space to accommodate for residual and non-residential waste generated from Site A).</p> <p>Wastes from the non-residential areas are expected to be transported to the CWSR as needed (not through chutes).</p> <p>The dimensions of the rooms are adequately sized to fit the recommended 1,100 L bins need to service the commercial waste generated, although a linear carousel system is not recommended for CWSR South due to the layout.</p> <p>Overall a minimum of 4.8 m² in CWSR North and 2.4 m² in CWSR South is required for commercial bin storage.</p> <p>Note a 0.2 m clearance in between bins has been included in this minimum spacing requirement.</p> <p>Total CWSR South and North provide adequate space for Site residential and commercial waste generation</p>

6.2.3 Internal Waste Management

Non-residential tenants will arrange the disposal of their own waste to the nearest WSR, which as noted may be located on a different level, on a daily basis (or as required). While food waste has not been considered as a separate stream in this assessment, tenants who manage food waste should be removing waste from their premises daily to avoid potential odour or vermin related issues.

The CWSR where waste will be collected will be shared with the residential areas. The same linear carousel where bins are automatically moved when full has been recommended to

reduce manual handling of the bulk bins in the CWSR. Bins will need to be moved by building maintenance as needed to be serviced by the collection vehicle from the loading bay. An electric bin mover should be used to move the compacted residual bins and the recycling bins to reduce risk of injury from manually lifting the full bins.

Space for one oversize cardboard bulk bin has been allocated in the CWSR, to be shared between residential and commercial spaces. Should it be included, cardboard should be transferred from point of generation directly to the bulk bin in the relevant CWSR.

Cleaning and maintenance of bins located in the CWSR will be the responsibility of building management, with details and responsibilities clearly outlined in the relevant contract(s). A bin wash area will be provided adjacent to the CWSR to enable cleaning of bins. Additionally, building management will be responsible for ensuring that the following management principles are followed:

- Standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- Adequate signage identifying the CWSR Site A North and South and the WSR on each level must be prominently displayed
- All waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- Any compactors or mechanical devices for the storage of waste must be child proofed
- Equipment must be protected from theft and vandalism

6.2.4 Waste Collection

Assumed collection frequencies for each non-residential waste stream are outlined in Table 10 below.

Table 10: Non-Residential Waste Collection Frequency

Waste stream	Collection
Residual waste	Every weekday (five times a week)
Recyclables	Every weekday (five times a week)
Oversize Cardboard	As needed

The Waste Collection Point for Site A (WCP Site A) is internal to the building off the loading dock and located near the CWSR South. As with the waste collection strategy outlined for the residential spaces, building management will be responsible for moving the bins from the CWSR South and North to WCP Site A. As noted, it is anticipated that an electric bin mover will be required in order to move the bins.

The scale of the putrescible waste generated necessitates more frequent collection, therefore deviating from the NSDCP. The container necessary for weekly collection would require hook lift truck collection, which is not within the North Sydney collection fleet thus a private collection contractor is likely to be required regardless. Furthermore, the loading dock height and turn table restrictions prevent front lift, or hook lift access, therefore the waste management system is designed for rear lift truck and MRV access.

Collection vehicles required to service each waste stream are outlined in Table 711, with associated dimensions and clearance requirements.

Table 11: Non-Residential Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length ³ – 8.0 m
Recyclables			Overall Width – 2.5 m
Oversize Cardboard			Height (travel) – 3.4 m Height (operation) – 3.4m Turning circle 25.0m

6.3 Site B – Hotel / Commercial Spaces

This section outlines the waste strategy for servicing the hotel / commercial areas of Site B of the Project. The indicative OSD design outlines a hotel use, however it is understood that Site B could also be allocated for commercial use. The upper limiting use for waste generation would be hotel use and therefore waste generation has been estimated based on the indicative OSD design, noting that less space may be required if the space was purely commercial. The development mix and quantities of waste generated should be reviewed once the use is established.

The interactions between the waste storage areas, internal waste movements and waste collection points are shown marked diagrams provided in Appendix D.

6.3.1 Waste Types and Quantities

Sufficient storage is to be provided to manage residual waste and recycling arising from the hotel within Site B of the Project. Estimates of the key waste streams generated are provided in Table 12 and the references for developing these assumptions are provided in Appendix B.

Should the development consist of a commercial use type only, the quantities generated would be less and the waste strategy presented in this assessment should be adequate.

³ Older rear lift fleet are longer, and would not fit on the turn table. At least two of the major waste collectors use the smaller 8.0 m fleet.

Table 12: Key Waste Types and Quantities

Source	Residual Waste (litres)		Recycling (litres)	
	Day	Week	Day	Week
Rooms	1,250	8,750	1,250	8,750
Cafes	348	2,439	232	1,626
Restaurants	4,648	32,539	1,409	9,860
Reception and Office	12	82	12	82
Hotel Business Centre	72	505	72	505
Gym	18	124	18	124
Total	6,349	44,440	2,993	20,948

Other waste streams considered in this development include:

- Grease trap waste and used oil for recovery
- Oversize cardboard

6.3.2 Waste Storage

Storage for commercial / hotel waste will be provided within three areas of the Project, being:

- Individual rooms / premises: space within each hotel room, café, restaurant, office, business centre or gym (or other commercial space) to store up to one days' worth of residual waste and recyclables.
- Individual levels – Waste Storage Rooms (WSR Site B): Space allocated on each hotel or commercial space level for a Waste Storage Room, for interim waste storage and chute access.
- Interim Storage Room (ISR Site B): One Interim Storage Room (ISR Site B) will be provided where waste from the chutes will directly fall into the main bulk bins located in this CWSR Site B.
- Central Storage Area (CWSA Site B): One Central Waste Storage Room (CWSR Site B) will be provided close to the external loading bay. All bulk bins will be stored here and full bins in the ISR Site B will be moved here for servicing. Bins from this area will be moved to the external collection point as needed.

Descriptions of the above waste storage areas are outlined in Table 13 and the location and indicative layout of the CWSR is included in Appendix C.

Table 13: Hotel / Commercial Waste Storage

Waste storage area	Infrastructure required	Space required
Individual premises	Bins of suitable sizes for the different applications – slim bins for under kitchen benches and small bins for under desks, or provision of bins on each level of office/premises if commercial To be provided by tenants	Varies
Waste Storage Rooms (WSR Site B)	Residual waste chute access Recycling chute access 1x 240L bin for oversize cardboard	< 2 m ² per WSR on each level.
Interim Storage Room (ISR Site B)	1 x 1,100 L residual waste bin (based on residual waste being compacted to approximately one-third of volume) 1 x 1,100 L recycling bin Residual waste chute hopper (with compactor) Recycling chute hopper	See Appendix D for indicative space provision, approximately 6.48 m ² in size to be provided This is an interim storage room only where one residual and recycling bin is stored. Overall a minimum of 5 m ² is required for this interim bin storage Note a 0.2 m clearance between bins has been included in this minimum spacing requirement.
Central Waste Storage Room (CWSR Site B)	2 x 1,100L residual waste bins (based on residual waste being compacted to approximately one-third of volume) 3 x 1,100L recycling bins 1 x 1,100L for oversize cardboard	See Appendix D for indicative space provision, approximately 15 m ² in size to be provided to store the bins required to service this site. Note a 0.2 m clearance between bins has been included in this minimum spacing requirement.

6.3.3 Internal Waste Management

Housekeeping or commercial tenants / building maintenance staff will arrange the disposal of waste to the nearest WSR, which as noted may be located on a different level, on a daily basis (or as required).

Waste from the chutes will directly fall into the ISR, which is sized to accommodate a single residual and single recycling bulk bin. Bulk bins from the ISR will need to be moved by building maintenance to the CWSR located adjacent to the ISR in the loading dock area. From here, bins will need to be moved to the external Waste Collection Point (WCP) to be serviced by the collection vehicle from the loading bay. An electric bin mover should be used to move the compacted residual bins and the recycling bins to reduce risk of injury from manually lifting the full bins.

Oversized cardboard could be collected at each WSR on each level in smaller mobile garbage bins, with space for one oversize cardboard bulk bin allocated in the CWSR. Should

it be included, cardboard should be transferred to the central aggregation location for emptying as required, by building management.

Cleaning and maintenance of bins located in the WSR on each level of Site B and the CWSR will be the responsibility of hotel or building management. A bin wash area will be provided adjacent to the CWSR to enable cleaning of bins. Additionally, hotel or building management will be responsible for ensuring that the following management principles are followed:

- standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- adequate signage identifying the CWSR Site B and the WSR on each level must be prominently displayed
- all waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- any compactors or mechanical devices for the storage of waste must be child proofed
- equipment must be protected from theft and vandalism
- a valid and current contract with a licensed collector for waste and recycling collection and disposal / processing must be held on site.

6.3.4 Waste Collection

Assumed collection frequencies for each commercial waste stream are outlined in Table 614.

Table 14: Hotel / Commercial Waste Collection Frequency

Waste stream	Collection
Residual waste	Daily
Recyclables	Daily
Oversize Cardboard	As needed, weekly

The Waste Collection Point for Site B (WCP Site B) is external to the building off Clarke Lane, but within close vicinity of the CWSR Site B. A separate residual waste loading zone (separate to the current lane) will be allocated for vehicles to collect from. Building management will be responsible for moving the bins from the CWSR Site B to the WCP Site B. As noted, it is anticipated that an electric bin mover will be required in order to move the bins.

The traffic implications of this external collection point have been assessed to be minor (more details provided in the specialists *Transport, Traffic and Parking Assessment Report*). It is also noted that limited pedestrian and vehicle traffic is expected on Clarke Lane and that

the lane will mainly service back-of-house businesses. As the collection is external, building management are expected to ensure that bins are transferred to the CWSR Site B internal to the building as soon as they have been collected and emptied from the WCP Site B. As collection is external to the building, it is recommended that off peak servicing times (i.e. early morning) are considered to ensure minimal impact on local traffic, reduce any amenity issues and ensure the bins are contained and securely managed.

Collection services are expected to be provided by a private contractor. Collection vehicles required to service each waste stream are outlined in Table 15.

Table 15: Hotel / Commercial Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length ⁴ – 8.0 m Overall Width – 2.5 m Height (travel) – 3.4 m Height (operation) – 3.4m Turning circle 25.0m
Recyclables			
Oversize Cardboard			
Liquid Waste (Used Oil)	10-20L drums or mobile units	MRV or SRV	MRV ⁵ Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m

6.4 Site C – Commercial

This section outlines the waste strategy for servicing for Site C. Site C of the indicative OSD design comprises commercial use covering approximately 2,700 square meters.

The interactions between the waste storage areas, internal waste movements and waste collection points are shown marked diagrams provided in Appendix D.

6.4.1 Waste Types and Quantities

Sufficient storage is to be provided to manage residual waste and recycling arising from the commercial premises within Site C of the Project. Estimations of the key waste streams generated are provided in Table 16 and the references for developing these assumptions are provided in Appendix B.

⁴ Older rear lift fleet are longer, and would not fit on the turn table. At least two of the major waste collectors use the smaller 8.0 m fleet.

⁵ Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, <http://austroads.com.au/tmp.anchor.net.au/images/stories/ap-g34-13.pdf>)

Table 16: Key Waste Types and Quantities

Source	Residual Waste (Litres)		Recycling (Litres)	
	Day	Week	Day	Week
Commercial Space	270	1,890	270	1,890
Total	270	1,890	270	1,890

Other waste streams considered in this development include:

- Oversize cardboard

6.4.2 Waste Storage

Waste storage for commercial waste generation will be provided within the following areas:

- Individual rooms / premises: spaces allocated on each floor allocated for groups of premises or tenants to store up to one days' worth of residual waste and recyclables.
- Individual levels – Waste Storage Rooms (WSR Site C): Space allocated on each commercial space level for a Waste Storage Room, for interim waste storage.
- Central Storage Room (CWSR Site C): One Central Waste Storage Room (CWSR Site C) in the loading dock where waste is aggregated. Note no compaction of waste has been assumed for Site C.

Descriptions of the above waste storage areas are outlined in Table 17 and the location and indicative layout of the CWSR is included in Appendix C.

Table 17: Hotel Waste Storage

Waste storage area	Infrastructure required	Space required
Individual offices / premises	Bins of suitable sizes for the different applications. To be provided by tenants	Varies
Waste Storage Rooms (WSR – Site C)	2 x 240 L bins for residual 2 x 240 L bins for recycling	Approximately 2 to 4 m ² space on each level – it is anticipated that sufficient space will be allocated on each floor.
Central Waste Storage Room (CWSR – Site C)	1 x 1,100L residual waste bins 1 x 1,100L recycling bins 1 x 1,100L for oversize cardboard 1x bin-lifter for 240L bins	See Appendix C for indicative space provision, approximately 8 m ² in size to be provided. Note a 0.2 m clearance in between bins has been included in this minimum spacing requirement. A linear compact arrangement has been assumed.

6.4.3 Internal Waste Management

Commercial tenants / building maintenance staff will arrange the disposal of waste to the nearest WSR, on a daily basis (or as required).

Oversized cardboard could be collected at each WSR on each level in smaller mobile garbage bins, with space for one oversize cardboard bulk bin allocated in the CWSR. Should it be included, cardboard should be transferred to the central aggregation location for emptying as required, by building management.

Building management will transfer the waste from the WSR to the CWSR Site C on a daily basis, or as required, via the internal lifts. If bins have a high quantities of food waste, daily movement of bins from the WSR is recommended to reduce odour and potential vermin issues.

Cleaning and maintenance of bins located in the WSR on each level of Site C and the CWSR will be the responsibility of building management. A bin wash area will be provided adjacent to the CWSR to enable cleaning of bins. Additionally, building management will be responsible for ensuring that the following management principles are followed:

- standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- adequate signage identifying the CWSR Site C and the WSR on each level must be prominently displayed
- all waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- any compactors or mechanical devices for the storage of waste must be child proofed
- equipment must be protected from theft and vandalism
- a valid and current contract with a licensed collector for waste and recycling collection and disposal / processing must be held on site.

6.4.4 Waste Collection

Assumed collection frequencies for each commercial waste stream are outlined in Table 18.

Table 18: Commercial Waste Collection Frequency

Waste stream	Collection
Residual waste	Twice Weekly
Recyclables	Twice Weekly
Oversize Cardboard	As needed, weekly

As with Site B, the Waste Collection Point for Site C (WCP Site C) is external to the building off Clarke Lane, but within close vicinity of the CWSR Site C. Unlike Site B however, a separate residual waste loading zone, separate to the current lane will not be provided. Movement of bins to Site A's loading dock was considered, however the occupational health and safety risks associated with regularly crossing Clarke Lane with bulk bins was deemed too high and inefficient. Therefore, off kerb collection was considered most suitable for this development.

The traffic implications of this external collection point have been assessed and considered to be acceptable (more details provided in the specialist *Transport, Traffic and Parking Assessment Report*). The main risk of the external collection point is the potential impact on local traffic queuing on Clarke Lane as the collection vehicle would need to stop close to the kerb at the WCP for around 5 to 10 minutes as the bins are lifted and emptied into the vehicle. An analysis was undertaken to ensure that a small vehicle could at least pass a parked collection vehicle and not present any conflict with critical points (driveways etc.), which was confirmed by the preliminary findings.

It is also noted that limited pedestrian and vehicle traffic is expected on Clarke Lane and that the lane will mainly service back-of-house businesses.

As the collection is external, building management are expected to ensure that bins are transferred to the CWSR Site C internal to the building as soon as they have been collected and emptied from the WCP Site C, to reduce any amenity issues and ensure the bins are contained and securely managed. Furthermore, as collection is external to the building, it is recommended that off peak servicing times (i.e. early morning) are considered to ensure minimal impact on local traffic.

Collection services are expected to be provided by a private contractor. Collection vehicles required to service each waste stream are outlined in Table 19.

Table 19: Commercial Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length ⁶ – 8.0 m
Recyclables			Overall Width – 2.5 m
Oversize Cardboard			Height (travel) – 3.4 m Height (operation) – 3.4m Turning circle 25.0m

⁶ Older rear lift fleet are longer, and would not fit on the turn table. At least two of the major waste collectors use the smaller 8.0 m fleet.

6.5 Station waste

All station waste will be collected and managed by Sydney Metro. Station cleaning staff will collect and dispose of waste / recyclables in the back of house station services to be incorporated in the station design. Station waste collection may share the use of loading bays allocated for OSD collection outlined in this Strategy, although collection times and contractors may be different. Station management and OSD building operators will liaise to ensure there are no conflicts in shared use of loading bays.

6.6 Design Specifications

General design principles and specifications for the Waste Storage Rooms (WSR), Central Waste Storage Room (CWSR) and chute system have been provided below.

WSR and CWSR Design

- the WSRs where there is residential access (i.e. Site A North and South tower) should be wheel chair accessible
- the floors must be constructed of concrete at least 75mm thick or other approved material graded and drained to a Sydney Water Corporation approved drainage fitting located in the room
- the floor must be finished to a smooth even surface coved at the intersection with walls and plinths and provided with a ramp to the doorway where necessary
- the walls must be constructed of approved solid impervious material and shall be cement rendered internally to a smooth even surface coved at all intersections
- the ceilings must be finished with a rigid smooth faced non-absorbent material capable of being easily cleaned
- the walls, floors and ceilings must be finished with a light colour
- a close fitting and self-closing door openable from within the room must be fitted
- rooms must be constructed in such a manner as to prevent the entry of vermin
- rooms must be ventilated by either:
 - permanent, unobstructed natural ventilation openings direct to the external air, not less than 5% of the floor area; or
 - a mechanical exhaust ventilation system exhausting at a rate of 5L/s.m² floor area, with a minimum rate of 100L/s minimum
- rooms must be provided with artificial light controlled by switches located both outside and inside the room
- equipment must be protected from theft and vandalism.
- any facet of the waste management system that is visible from outside the building must blend in with the development.

The CWSR Site A where waste will be collected internal should also incorporate the following requirements:

- an industrial-type strength pavement designed for a maximum wheel loading of at least 7 tonnes per axle
- the gradient of the ramp access to basement must not exceed 1:8
- the height to the structural members and ceiling must allow for the largest collection vehicle travel height / operational height
- the provision of space clear of structural members or vehicle parking spaces adequate to allow sufficient clearance for collection vehicles to turn (or provided through a turn table).

Chute Design

Detailed design of the chute should incorporate the following design requirements:

- service openings and charging devices must be constructed of metal or other smooth faced, durable, fire resistant and impervious material of a non-corrosive nature
- must be cylindrical in section and the internal diameter must be adequate
- branches to charging devices must be capable of delivering the waste to the chute without using force
- must terminate in the waste room and discharge the waste directly into a receptacle or waste compactor
- cut-off must be provided at or near the base of the chute to effectively close off the chute whilst the receptacle or compacting device is withdrawn
- charging devices must:
 - be designed to effectively close off the service opening in the chute when the device is opened for loading
 - automatically return to the closed position after use
 - permit free flow of waste into the chute
 - not project into the chute
 - permit easy cleaning of the device and connection between the service opening and the chute
- charging device and service opening must be capable of being easily cleaned
- chutes must be ventilated to ensure that air does not flow from the chute through any service opening.
- it is generally recommended that chutes be vertical without bends or “off-sets” and not be reduced in diameter. It is noted for Site A the two chutes of the North and

South tower are disconnected from the chutes at the podium level leading to the CWSR South and North, due to various design constraints and limitations. Angled waste chute connections are feasible; however the critical design parameters are typically 45 degrees for residual waste chutes and 22 degrees for recycling chutes. For Site A, this means that while the angled residual waste chute is feasible, the recycling chute may not be appropriate, and the chute has ended at the Level 3 car park instead. Other options are presented in this report for consideration during the detailed design phase.

7.0 Mitigation Measures

Management measures to reduce waste through re-use and recycling for construction waste are discussed throughout Section 5.0. Some additional opportunities to avoid waste through design, management and education are provided in this Section.

7.1 Strategies for Waste Reduction in the Construction Phase

7.1.1 Waste Avoidance in Design

Sustainable design has already been thoroughly considered in the preliminary design phase. However, the detailed design phase presents other opportunities to incorporate waste minimisation and resource efficiency into the Project.

Specifications relating to incorporation of used materials or materials with recycled content which contribute to Green Star credit.

7.1.2 Re-use and Recycling in Construction

In keeping with reduce, reuse, recycle hierarchy to waste management, it is recommended that the following measures are taken for the minimisation of construction waste at site:

- minimise site disturbance where possible and limit unnecessary excavation
- if possible, stage the construction so that optimum levels of waste materials can be recycled
- design to consider standard material sizes in order to reduce the generation of off-cuts
- prefabricate structural components where possible
- contractor to reduce potential waste by ordering the correct quantities of materials
- contractor to coordinate and sequence trades people to minimise waste
- contractor arrange for the delivery of materials so that they are delivered 'as needed' to prevent their degradation through weathering and moisture impacts
- contractor to reuse formwork where possible
- contractor to separate off-cuts to facilitate reuse, resale or efficient recycling.

7.2 Strategies for Waste Reduction in the Operational Phase

In keeping with the reduce, reuse, recycle hierarchy to waste management, it is recommended that the following measures are taken to allow tenants, residents and hotel guests to participate in best practice operational waste management:

-
- building Management to work with North Sydney Council or Regional Waste Management Groups in delivery of waste education workshops to increase awareness of waste avoidance activities.
 - literature in Waste Service Rooms about waste avoidance activities (NSW EPA Love Food Hate Waste materials)
 - building management to create opportunity for further source separation – food organics
 - building management may also designate an area within the roof top garden to be used for composting and/or worm-farming.

8.0 Conclusion

This report presents the results of a waste assessment of the OSD above Crows Nest Station (the Project). This report has been prepared to outline the potential impacts from waste generation, storage and collection of the OSD and to specifically respond to the SEARs issued for the concept SSD Application.

The Project concept design has considered relevant planning and regulatory requirements as detailed in Section 3.0 during both construction and operation. This waste strategy forms the framework for the waste management measures for the future detailed design and planning stages of the development.

The area and spaces allocated for waste and recycling storage and collection for Site A, B and C are considered sufficient, based on the expected waste generation from the indicative OSD design.

It is noted that approval is only being sought for the OSD concept proposal and the waste requirements of the proposal should be considered further during the detailed design phase once the precise mix of uses is known. The future detailed design should comply with the minimum waste area requirements proposed in this waste strategy, and a detailed waste strategy should be submitted with the future detailed SSD Application demonstrating how the requirements stipulated in this report have been met in the final building design.

Appendix A

Construction and Operation Preliminary Waste Management Plan

1. Preliminary Details of Waste Management – Construction Phase

Type of waste to be generated	Estimated approximate quantity	Proposed indicative OSD design storage and treatment facilities	Destination
Concrete	Minor / unknown at concept stage	<p>Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination.</p> <p>Onsite reuse options: Source crushed waste concrete used as clean fill</p> <p>Source crushed and graded concrete to replace aggregate in pavements and other concrete applications</p>	<p>If onsite reuse options are not explored then offsite reuse option include; concrete recycling at local C&D processing facilities.</p> <p>Crushed concrete used in external low-grade roads, pavement sub-bases or as a substitute for virgin crushed rock.</p>
Bricks	Minor / unknown at concept stage	<p>Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination.</p> <p>Onsite reuse options: Surplus bricks used whole in pavement design or crushed for walkways or landscaping fill.</p>	<p>If onsite reuse options are not explored, then offsite options include; brick recycling at local C&D processing facilities.</p>
Tiles	Minor / unknown at concept stage	<p>Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination.</p> <p>Onsite reuse options: Source crushed tiles for paving or landscape decoration</p>	<p>If onsite reuse options are not explored, then offsite options include; surplus tiles to be taken back by suppliers, broken tiles to be reconditioned/recycled by manufacturer and recycling of roof tiles recycling at local C&D processing facilities.</p>
Timber	Minor / unknown at concept stage	<p>Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination.</p> <p>Onsite reuse options: Surplus untreated timber ground into mulch for landscaping</p> <p>Treated timber used for new structural work or as formwork, bridging, blocking and propping</p>	<p>If onsite reuse options are not explored, then offsite options include; small timber offcuts and untreated timber can be mulched at local recycling facilities, larger timber off-cuts and excess sent to second-hand supplier, and pallets returned for re-use</p>
Glass	Minor / unknown at concept stage	<p>Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be</p>	<p>If onsite reuse options are not explored, then offsite options include; glass recycling at local</p>

Type of waste to be generated	Estimated approximate quantity	Proposed indicative OSD design storage and treatment facilities	Destination
		enclosed from weather conditions to prevent contamination. Onsite reuse options: Source crushed glass for sand substitute in concrete pavements, and other concrete applications	recycling facilities.
Plasterboard	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination. Onsite reuse options: plasterboard crushed onsite and reused through mixing with soils / soil conditioner in landscaping	If onsite reuse options are not explored, then offsite options include; waste plasterboard offcuts used in manufacture of new plasterboard.
Plastics	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination. Onsite reuse options: Limited opportunities for on-site reuse of offcuts or excess.	Where possible, take-back and recycling of plastics such as PVC pipe, cable conduit and flooring or clean plastic by manufacturer.
Cardboard	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination. Onsite reuse options: Limited opportunities for on-site reuse of offcuts or excess.	Cardboard recycling at local recycling facilities.
Carpet	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination. Onsite reuse options: Limited opportunities for on-	Surplus carpet to be taken back by manufacturers for re-use, reconditioning or recycling



Type of waste to be generated	Estimated approximate quantity	Proposed indicative OSD design storage and treatment facilities	Destination
		site reuse of offcuts or excess.	
Metals	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination. Onsite reuse options: Limited opportunities for on-site reuse of offcuts or excess.	Metals to be sent for recycling into manufacture of new metal products Metal waste can be sent to local recycling facilities
Hazardous	Minor / unknown at concept stage	Should be collected on -site in dedicated skip bins and stored in designated locations. Bins should be enclosed from weather conditions to prevent contamination.	Fuel and oil storage from machinery would be secured and managed responsibly within compound sites during works, and removed upon completion of works.

2. Preliminary Details of Waste Management – Operation Phase

Type of waste to be generated	Estimated volume per week (L)	Proposed indicative OSD design storage and treatment facilities	Destination
Residual Waste	Approx. 94,468 L	<p>Waste aggregated in 1,100 L bins to be serviced by rear lift collection vehicles. Residual waste to be compacted with Site A and B.</p> <p>Chute system used for residential of Site A and all of Site B. Non-residential areas of Site A will require internal transfer of materials to the Central Waste Storage Areas and commercial areas of Site C will require internal transfer of bins to Waste Collection Point.</p> <p>Residential collection from Site A and Site B collections to be daily. Commercial collections from Site A to be daily for five times a week and Site C collection be twice weekly</p> <p>Waste Collection Point located internal to building in Site A loading dock, and external in Site B and C.</p> <p>A waste contractor will need to be engaged to pick up material and take them off-site as required to a licensed off-site waste disposal facility.</p>	To landfill (final destination to be determined)
Recycling	Approx. 70,031 L	<p>Recycling aggregated in 1,100 L bins to be serviced by rear lift collection vehicles.</p> <p>Chute system used for residential of Site A and all of Site B. Commercial areas of Site C to require internal transfer of bins to Waste Collection Point</p> <p>Residential collection from Site A and Site B collections to be daily. Commercial collections from Site A to be daily for five times a week and Site C collection be twice weekly</p> <p>Waste Collection Point located internal to building in Site A loading dock, and external in Site B and C.</p> <p>A waste contractor will need to be engaged to pick up materials and take them off-site as required to a licensed off-site recycling facility..</p>	For recycling (final destination to be determined)

Type of waste to be generated	Estimated volume per week (L)	Proposed indicative OSD design storage and treatment facilities	Destination
Cardboard	Variable not quantified	<p>Separate 1,100 L bins may be provided in all sites if appropriate and collected separately. Adequate space for at least one bin in each Central Waste Storage Room has been provided.</p> <p>Collection frequency to be determined based on need.</p> <p>Waste Collection Point located internal to building in Site A loading dock, and external in Site B and C.</p> <p>A waste contractor will need to be engaged to pick up material and take them off-site as required to a licensed off-site recycling facility.</p>	For recycling (final destination to be determined)

3. Preliminary Details of Waste Management – Operation Phase

Describe how you intend to ensure ongoing management of waste on-site

Information to be provided during detailed design phase.

Appendix B

Assumptions for Calculations

The following is list of areas assumed to be waste generating, and their associated gross floor area. The floor area is the basis for estimating the scale of waste generation.

	Waste Generating Area	Value	Units
Site A	Apartments	350	Units
	Retail (total)	669	m ²
	Community Centre (total)	591	m ²
	Day Care (total)	330	m ²
Site B	Hotel Rooms	250	keys
	Cafes (total)	116	m ²
	Restaurants (total, including preparation areas)	704	m ²
	Reception and Offices (total)	117	m ²
	Hotel Business Centre (total, include the meeting room)	722	m ²
	Gym	178	m ²
Site C	Commercial space (assumed 100% of GFA)	2,700	m ²

Waste Generation Rates

The City of Melbourne waste generation rates are the most recent in the industry, and have been updated with new data, therefore superseding all other Development Control Plans (including North Sydney Development Control Plan).

Waste Generating Area	Residual	Recycling	Units
Retail (non-food)	50	50	L/100m ² floor area/day
Restaurant	660	200	L/100m ² floor area/day
Café	300	200	L/100m ² floor area/day
Office	10	10	L/100m ² floor area/day
Childcare	350	350	L/100m ² floor area/day
Gym	10	10	L/100m ² floor area/day
Hotel	5	5	L/bed/day

Waste Generating Area	Residual	Recycling	Units
3 Bedroom	120	120	L/week
2 Bedroom	100	100	L/week
1 Bedroom/Studio	80	80	L/week

Appendix C

Waste Equipment Specifications

Mobile Garbage Bins (MGB) and bulk bin, overhead compaction device, chute, carousel systems and bin lifter systems.

240 LITRE CONTAINER

Material

■ Polymer components:

- Injection moulded from specially designed HDPE
- Resistant to decay, frost, heat and chemicals
- Special UV-stabilisation provides excellent ageing characteristics

■ Corrosion resistant steel axle

■ Noise reduction:

- Quiet-running solid rubber tyres
- Tight-fitting axle

■ Long service life:

- High quality materials
- Most advanced manufacturing processes
- Withstands exposure to high mechanical stress levels

■ Recycling:

- All container parts are recyclable

Advantages

- Easy to manoeuvre
- Versatile, with a comprehensive accessories range
- Complies with EN840 and AS4123 quality requirements
- Particularly stable due to external position of wheels
- Safe and easy to handle
- Suitable for all DIN lifting equipment
- Double angle rail for greater safety when emptying
- Compatible with identification and weighing systems
- Special ribs prevent containers from becoming jammed when stacked

Imprints and markings

- Manufacturer, year of manufacture, material
- Nominal volume, max permitted total weight
- EN 840 and AS4123 markings
- Individual markings with imprints, hot-foil printing or adhesive labels*
- Customer specific serial numbers if required*

Accessories

- For accessories and special design variations such as lid apertures and locks please refer to the separate accessories sheet for 2-wheeled containers

Quality

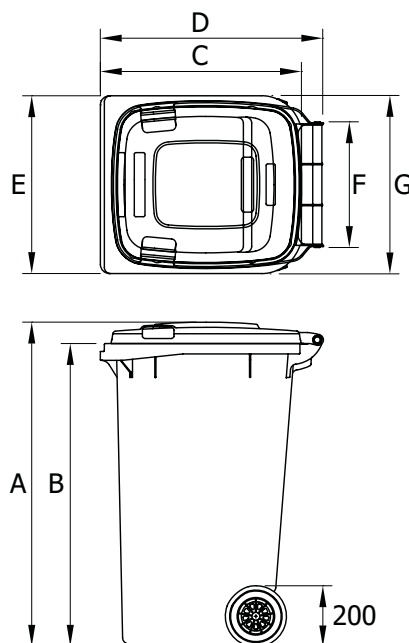
- Certified according to EN840
- Manufactured in accordance with AS4123

Dimensions - Weights - Standards

- Nominal volume: 240 litres
- Net weight: approx 13 kg
- Max load: 96 kg
- Permitted total weight: 110 kg

- | | | | | | |
|-----|---------|-----|--------|-----|--------|
| ■ A | 1060 mm | ■ D | 730 mm | ■ G | 550 mm |
| ■ B | 990 mm | ■ E | 585 mm | | |
| ■ C | 660 mm | ■ F | 400 mm | | |

Measurements to be used as a guide only – variations will occur



Colours

- Standard colours: black, nature green, dark green, grey
- Special colours are available on request* – common colours include blue, yellow, red, brown, orange, purple



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PO Box 58 962
Greenmount, Manukau City 2141

New Zealand

Tel: +64 9 - 968 2180
Fax: +64 9 - 968 2188

1100 Litre Flat Lid Container

Material

- **Polymer components:**
 - Injection moulded from specially designed HDPE
 - Resistant to decay, frost, heat and chemicals
 - Special UV-stabilisers provide excellent ageing characteristics
- **Corrosion resistant steel components**
- **Noise reduction:**
 - Wheel assemblies with solid rubber tyres
- **Long service life:**
 - High quality materials
 - Excellent manufacturing processes
 - Withstands exposure to high mechanical stress levels
- **Recycling:**
 - All container parts are recyclable

Design

- Easy handling through the use of ergonomic handles
- Versatile, with a comprehensive accessories range
- In accordance with the safety requirements of EN-840
- Easy grip handles on all sides
- Safe, easy handling, even with heavy loads
- Various wheel assembly configurations for different applications
- Improved water drainage as a result of rounded lids
- Water drainage plug as standard†
- Compatible with identification and weighing systems
- Reinforced base, front and rear panels for greater stability
- Fitted as standard with chip nest in accordance with RAL GZ 951/1
- Easy to clean due to smooth surfaces and rounded internal corners

Accessories

- For accessories and special design variations such as lid apertures, locks and towing brackets, please refer to the separate accessories sheet for 4-wheeled containers



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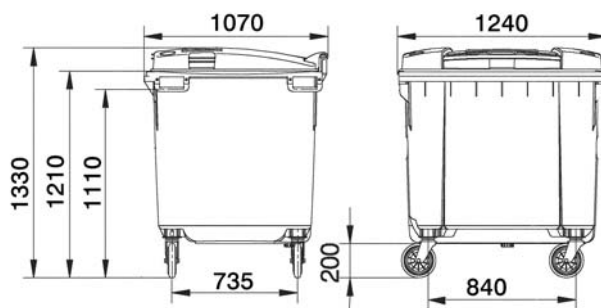
Quality

- Certified according to DIN EN 840 and RAL GZ 951/1
- Constant quality control through manufacturers laboratory as well as independent institutes

Dimensions - Weights - Standards

- Nominal volume: 1100 litres
- Net weight: approx. 65 kg
- Max. load: 440 kg
- Permitted total weight: 510 kg

Measurements to be used as a guide only - variations will occur



Note: Certification and Quality Marks depicted in this brochure are registered to SULO Umwelttechnik GmbH & Co. KG

Colours

- Standard colours: green, blue, yellow
- Special colours are available on request*
- All additives are cadmium free and environmentally friendly



Imprints and markings

- Manufacturer, year of manufacture, material
- Nominal volume, max. permitted total weight
- EN 840, RAL markings
- Individual markings with imprints, hot-foil printing or adhesive labels available on request *

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Design. Develop. Deliver.

Waste Chute Systems

Waste and Recycling Chute and Disposal Systems Product Guide

1800 465 465

www.wastech.com.au

Welcome to your complete guide to Wastech Waste Management Systems and Chutes range.

Company Profile

Waste Management Plan

Smoothtubes™ Plastic Chutes

Smarttubes™ Diverter

Discharge Room Equipment

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Technical Specifications

Smoothtubes™ Plastic Chutes Specifications

Smoothtubes™ Chute Assembly Specifications

Bin Feed System Examples

Diverter Example Room Layouts

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Optional Parts & Accessories

Service & Support

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Company Profile

Over 23 years of experience supplying waste and recycling equipment, both Australia wide and internationally. Wastech consultants have extensive industry knowledge coupled with state of the art equipment that will save you both time and money.

Whether it's general waste, cardboard, plastic, e-waste or polystyrene, Wastech has a solution for your site. From Melbourne to Darwin, Brisbane to Perth, Sydney to Adelaide; our waste management consultants are able to tailor solutions for each unique site to save on costs, while promoting a sustainable future.

Company owned
branches Australia wide.



Design.

Dedicated and experienced design and engineering teams for all Wastech products and equipment.

Develop.

Supporting our engineers, our on-site manufacturing facility furthers our ability to develop tailored solutions quickly, efficiently and cost-effectively.

Deliver.

On-time project delivery backed by a national 24/7 Service & Support network. Offering delivery on a national scale, our Service and Support team operate out of dedicated facilities to maintain a high level of service, Australia wide.



Waste



Recycling



Linen



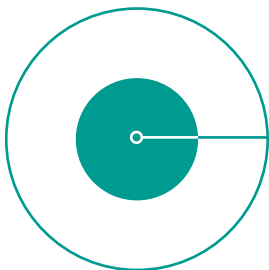
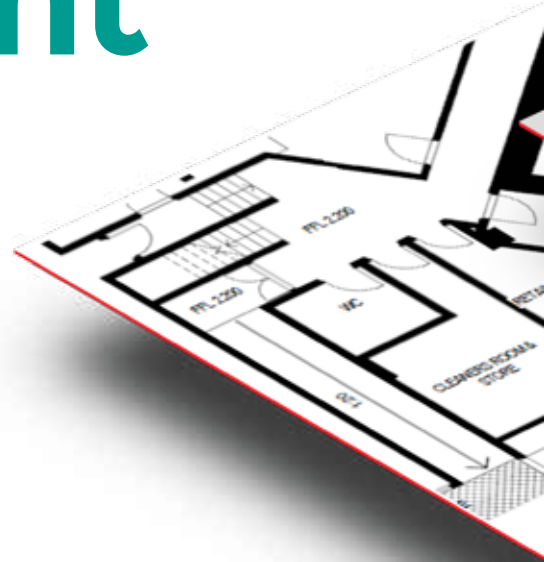
Organics

Waste Management Plan

Preparing a plan to manage the waste and recycling needs of your development is an important part of the application process.

Don't know where to start?

Wastech Waste Management Plans provide a comprehensive report on waste volumes, equipment recommendations, collection methods and operational requirements all in one place!



Upfront capability from inception to council submission.



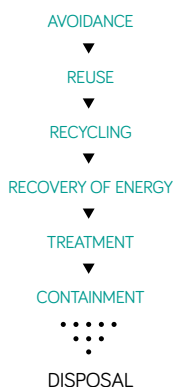
Waste stream and volume assessment.



Equipment recommendations and collection alternatives.



Operational requirements.



From low, medium or high density residential developments, through to large commercial or mixed used developments, Wastech will deliver a waste management plan that works within your projects space and design objectives.

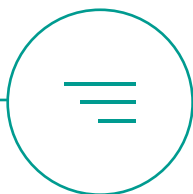
Let our experienced Waste Management consultants work closely with you to deliver a comprehensive report that complies with all council codes, BCA, Australian standards and statutory requirements.

To arrange a detailed discussion, Contact a Wastech Waste Management consultant today on 1800 465 465.



Preliminary Advice

Talk to an experienced waste consultant to consider waste and recycling elements at the design phase.



Priority Service

Fast, efficient and reliable service with complete reports available within ten business days from receiving final plans.



Tailored & Comprehensive Reporting

Working closely with you to cover all specific planning and design requirements.

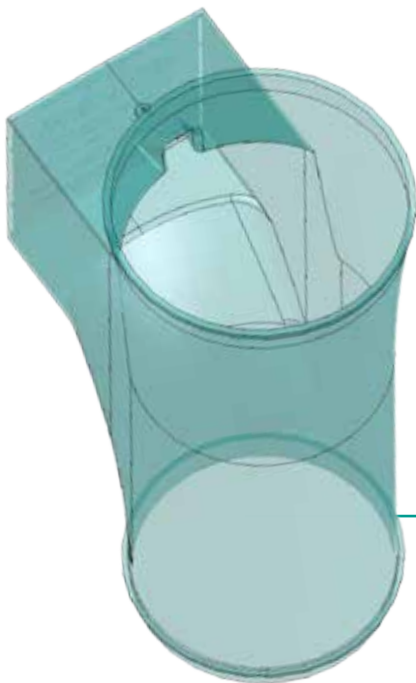


Delivered
in just 10
business days!



SmoothtubesTM Plastic Chutes

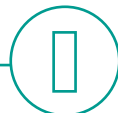
Introducing Wastech's very own super smooth plastic Waste Chute system offering 80% less friction than steel, allowing for quieter and smoother waste disposal, whilst being a more cost effective solution.



Pioneering the design of Australia's first plastic chutes, Wastech's SmoothtubesTM Chutes system offers:

- ✓ Superior industrial grade plastic
- ✓ Superior acoustic properties
- ✓ Low density, flexible material
- ✓ Corrosion proof
- ✓ Australian designed and developed
- ✓ Made from recycled* Polyethylene
- ✓ Offers less restricted continuous flow
- ✓ Self cleaning smooth internal surface

Recommended configuration/installation options are:



Single Chute System



Dual Chute System

For more detailed specifications on Single and Dual chute systems, please refer to page 14.



Innovative Design

The SmoothtubesTM modular design caters for any application without the need to custom build sections. The innovative slip-joint assembly system significantly reduces installation time.

SmoothtubesTM also offer UV and impact resistance while weighing less than 15kg per section.



Builder Friendly

Easy installation by offering:

- In-built block-off panels that seal the chute until installation of doors is complete. This helps to ensure no usage or damage to occur during construction and installation.
- Self supporting modular sections with built in mounts.
- Lightweight for easy handling.



Cleaner & Quieter

SmoothtubesTM are designed to be cleaner whilst eliminating noise by:

- Offering crevice free joins with no sharp angles eliminating collection of any waste particles.
- Closed cell, non-porous material repelling grime, bacteria, odour and liquid.



Fact!

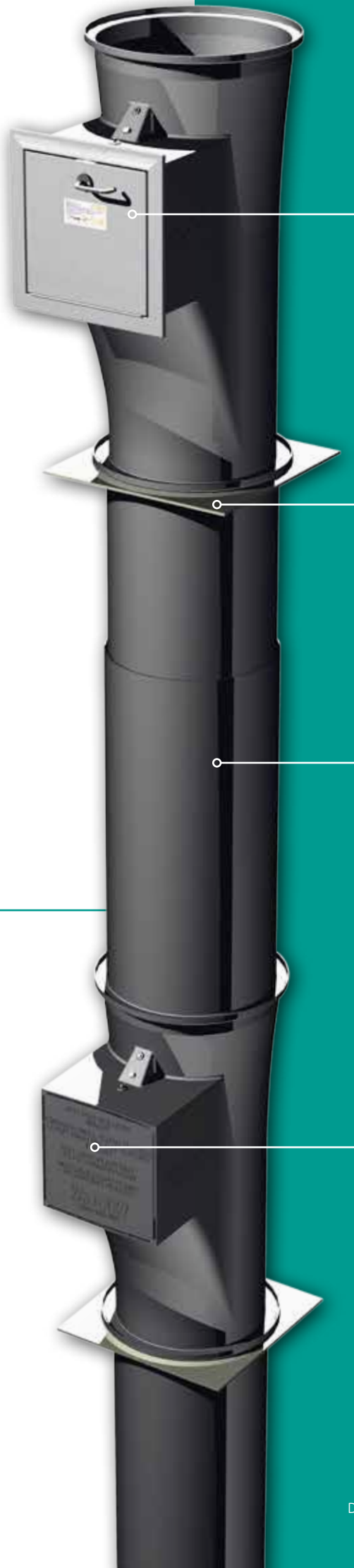
Wastech pioneered the plastic chute system with Smoothtubes™ and have successfully manufactured, delivered and installed over 900 waste chute major commercial projects Australia wide!



Contact Us

A large range of options are available including Steel chutes and custom built solutions.

To arrange a detailed discussion, contact a Waste Management consultant today on 1800 465 465.



Stainless Steel fire rated door. (AS1530)

Flexible floor level penetration section for mounting onto slab.

Lightweight self supporting chute modular section.

In-built installation block off panel.

For detailed specifications, please refer to page 12.



Waste



Recycling



Linen



Organics

Smarttubes™ Diverter

A smart, space saving, single chute diverter system for both waste and recycling.

Designed for use with a single chute waste disposal system, the Smarttubes™ diverter provides a simple and efficient method for disposing of multiple waste streams while saving valuable building space.

Smarttubes™ is an intelligent system that is simple to use for residents and building managers alike. The basic door control panel allows residents to easily select their desired waste stream, while the advanced web-based dial in system allows building managers to control the chute from anywhere within the building through wifi access!



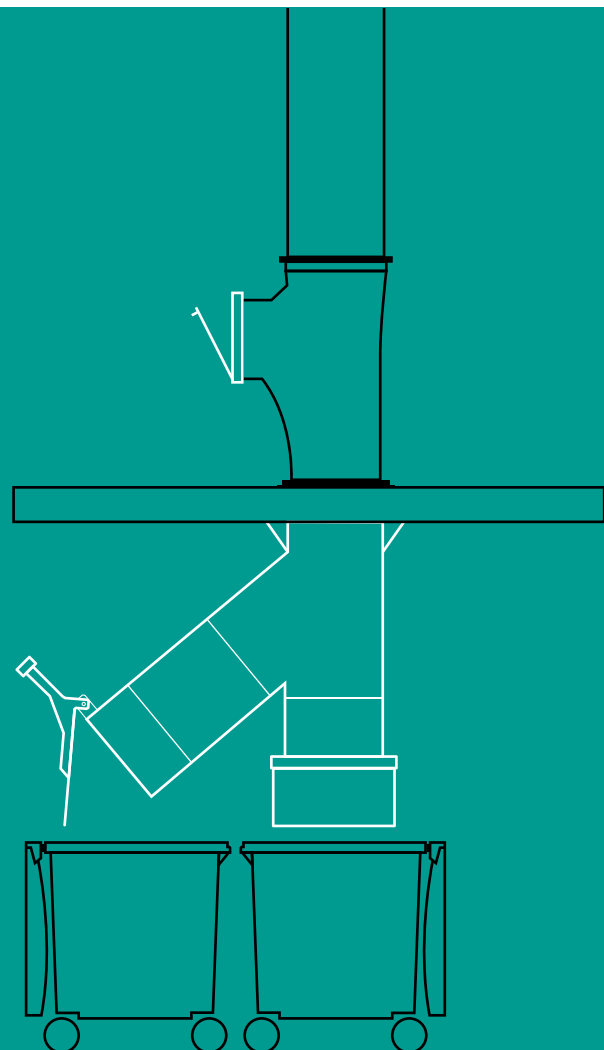
Wifi Dial-In

The Smarttubes™ single chute diverter systems allow for web based, wifi dial-in. This enables the user to lock individual or sets of doors, lock out of all doors for maintenance, or setting of the programmable timer. (i.e. disposal only allowed between 6am and 12am).



Programmable & Remote Lock-Out

The Smarttubes™ system is fully programmable, allowing building managers to lock out specific levels or even the entire system for maintenance. Additionally, the system can be used to enforce a building disposable curfew via a programmable timer.





Easy Installation & Maintenance

The electric actuator of the Smarttubes™ system eliminates the need for expensive hydraulics and results in lower lifetime maintenance costs. The electric motor also allows for lower power requirements, only requiring one standard 240V outlet.



Simplified Operation

- 1. Select** waste stream (waste or recycling).
 - 2. Wait*** - Diverter arm will move to the appropriate position.
 - 3. Open** - Chute door unlocks for disposal.
- To ensure correct disposal, the chute door will only open for one waste stream at any stage of operation.

Smarttubes™ Door Control Panel



*Wait time will vary depending on building height and current/active users.



Waste



Recycling



Linen



Organics

Discharge Room Eq

Introducing Wastech Chute compactors designed for efficient waste disposal for multi-story or multi-level buildings.

Chutepac™ Compactor

Introducing an extremely quiet and fast, hydraulic free, state-of-the-art compactor, designed to handle high volumes of even the most diverse garbage types with ease.

Running costs are minimised, while maintenance and cleaning is kept simple and safe.

- Low power drive motor
- Self cleaning compact drum
- Compact profile
- Large access panels
- Jam sensor switch
- Light weight bin cradles
- Configurable control box mount

Bin feed system compatible

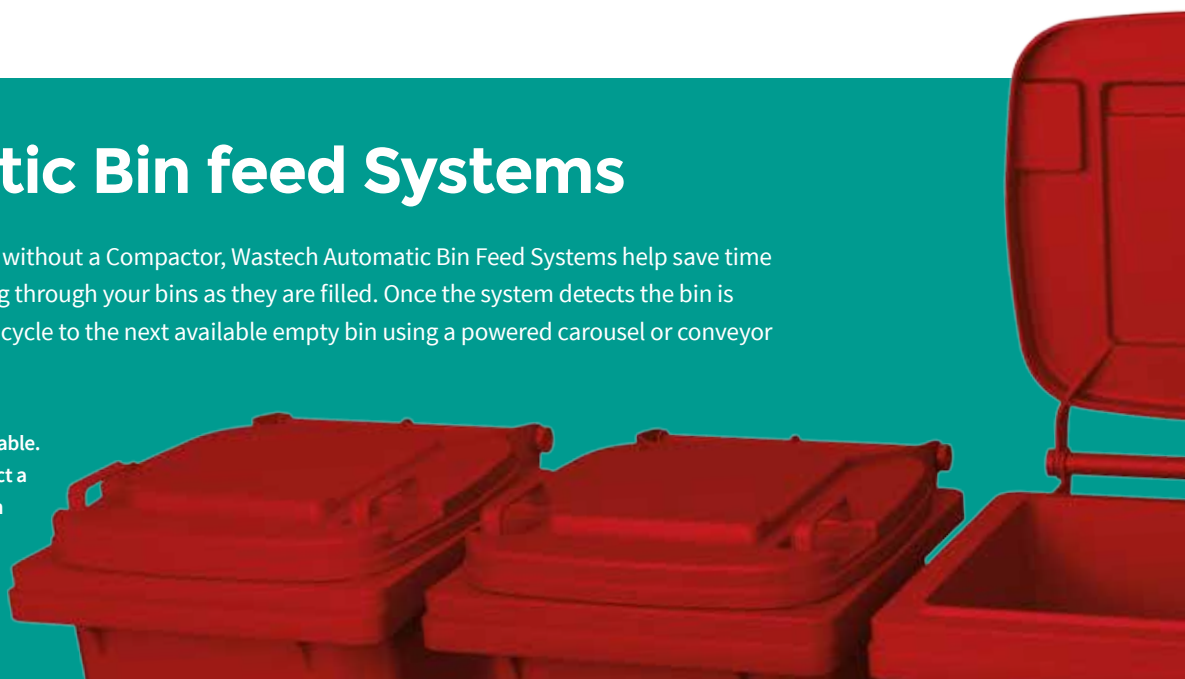


Compaction Ratio	2:1 to 10:1 (dependant on waste types.)
Construction	5mm to 10mm Grade 250 M/Steel
Chamber Dimensions	N/A
Waste Capacity	N/A
Power Requirements	240V / 10A GPO
Hydraulic Specs	N/A
Compaction Force	680kg
Waste Bin Qty	4-8 x 240ltr Bins
Electric Control	PLC Control with Electronic Cycle
Service	Hydraulic Free 24 Hour Service
Warranty	12 months (terms & conditions apply)

Automatic Bin feed Systems

Designed for use with or without a Compactor, Wastech Automatic Bin Feed Systems help save time by automatically rotating through your bins as they are filled. Once the system detects the bin is full, it will automatically cycle to the next available empty bin using a powered carousel or conveyor machine system.

Smart alert options are available.
For more information, contact a
Wastech waste consultant on
1800 465 465.



Equipment

Eco-pack Compactor

Engineered for working installation within tight space restrictions, the economical Eco-pack is a hydraulic based compactor offering high packing force to help eliminate potential OH&S issues and bin damage.



3:1 to 10:1 (dependant on waste types.)

5mm and 20mm Grade 350 High Tensile Steel

560 x 600mm

80 ltr/sec per 15 second cycle = 20m³/hr

415V / 20A / 5 Pin power point

12 Lpm Pump / 5.5kW Motor

62kn or 6.3 tonnes force @ 14Mpa

On Carousel System: Multiple Configurations Available

PLC Control with Electronic Cycle

Comprehensive fixed price service available

12 months (terms & conditions apply)

- High compaction reducing bins required in floor space
- Robust high tensile steel construction
- Quiet and efficient hydraulic system
- Continually sealed door
- Suits all bin sizes
- Suits both carousel or linear bin feed systems
- Waste is compacted inside the compactor unit and not the bin
- No bin damage



Carousel System

Ideal for rooms with tighter space, this system rotates bins in a circular cycle system.



Conveyor System

Ideal for rooms with longer, narrower space, this system rotates bins in a linear cycle system.



Smoothtubes™ Plastic Chutes

Chute Construction

Nominal Internal Diameter: Garbage 530mm
Material LLDPE (linear low density polyethylene). Internal surface is closed cell, ultra smooth finish that resists waste residue build up, odour, blockages, corrosion and liquid. +Fire hazard property tests in accordance with BCA Clause C1.10 and Specification C1. 10 in complying with Australian Standard AS1530 by Warrington Fire Research (Aust) Pty Ltd.

Material Thickness: Chute tubes 5mm nominal.

Mounts: Designed to be flexible and smoke seal at every level.

Noise & Vibration Prevention: Acoustic lagging is not necessary. Refer to #acoustic report. Isolation is provided at every level under the floor mounts. Flexible mount is isolated from concrete using polyurethane sealant that is acoustically rated.

Ventilation: 200mm diameter galvanised steel ventilation fan and discharge cowl assembly. The fan is supplied with 240 volt single phase plug and lead. The cowl assembly comes complete with dektite flashing. The vent is connected to the top of the chute by a flexible duct.

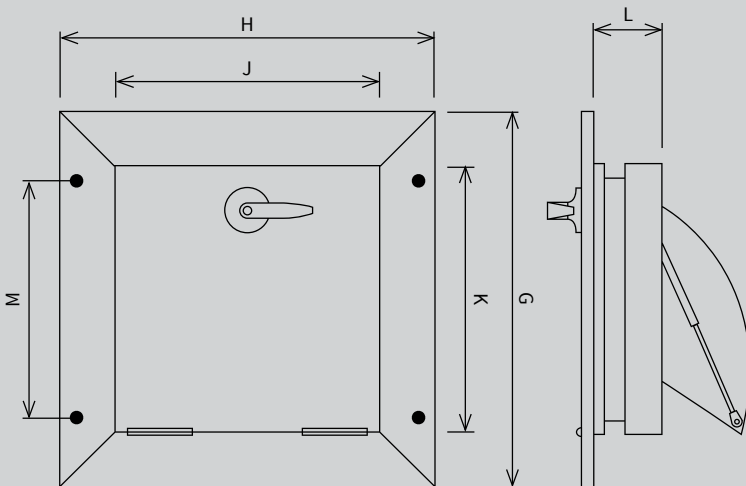
Loading throat door: Smoothtubes™ Loading Throats are molded within the chute tube creating a smooth flowing entry to reduce impact noise and minimise blockages. Loading doors -304 grade Stainless Steel with a fire block core, door frame sealed to wall using fire sealant. Compliance to Australian Standards AS.1530.1 (FRL:-/120/30). Doors are self closing. Key locks are supplied standard for Linen doors, Garbage and recycling doors. Fire sprinklers are installed in every loading throat ready for connection to fire services by others.

Deflector: The discharge of the chute has a 3 or 5mm thick Galvanised Steel deflector, set at 45 degrees (min) for discharge directly into a bin. The deflector is fitted with a fire activated fusible link close-off door which can be manually overridden, to close the chute for bin changes. For garbage discharge into an EcoPack Compactor the fire door is not required as the Compactor isolates the chute at all times.

Installation

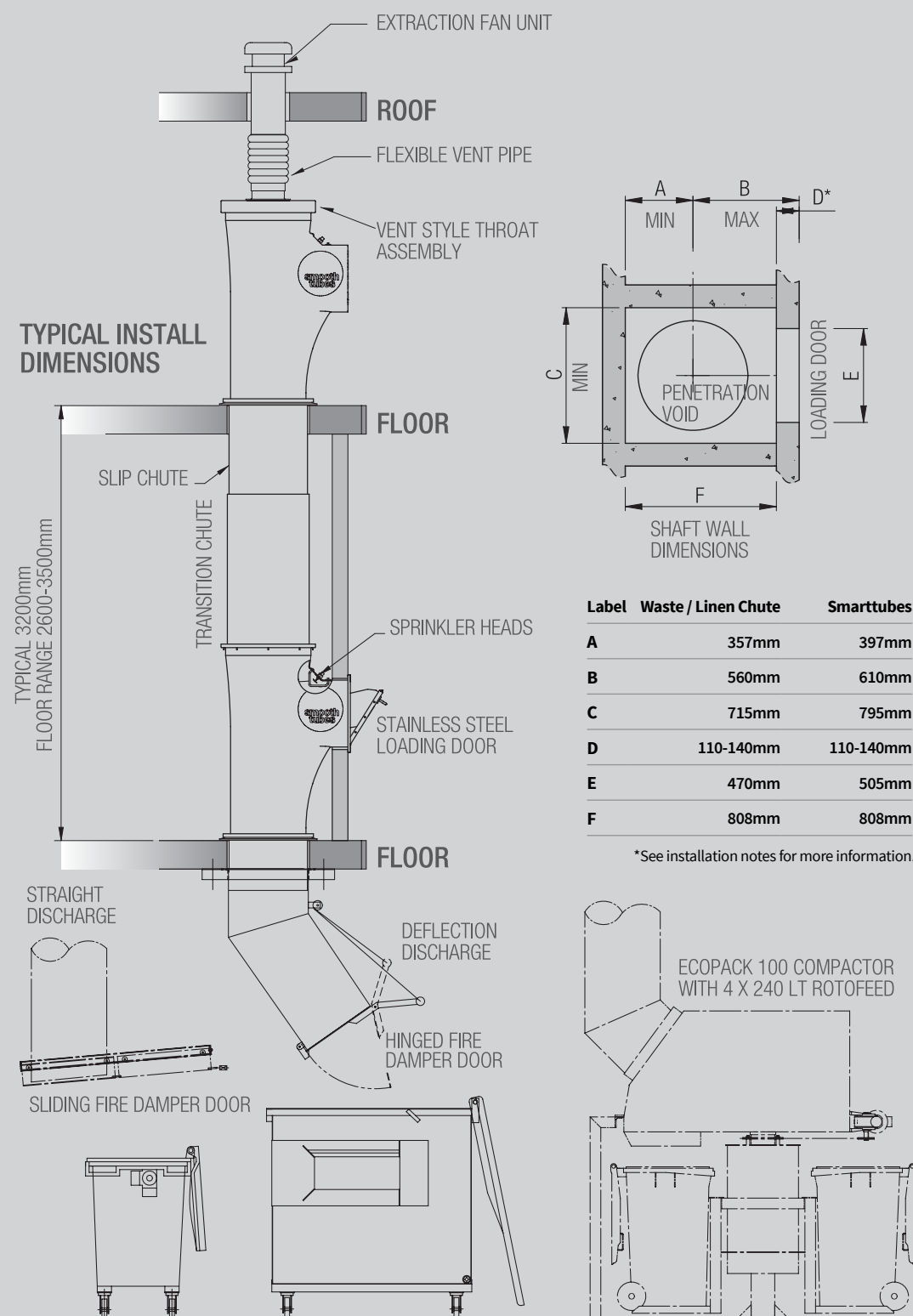
Chute sections weigh no more than 15kg each allowing easy transport and installation by hand without reliance on Tower Cranes. Bricking up instructions are detailed on the front panel of every loading throat, which stays fitted until installation of loading door to prevent unauthorised use and potential damage from building rubble.

Chute Door Dimensions



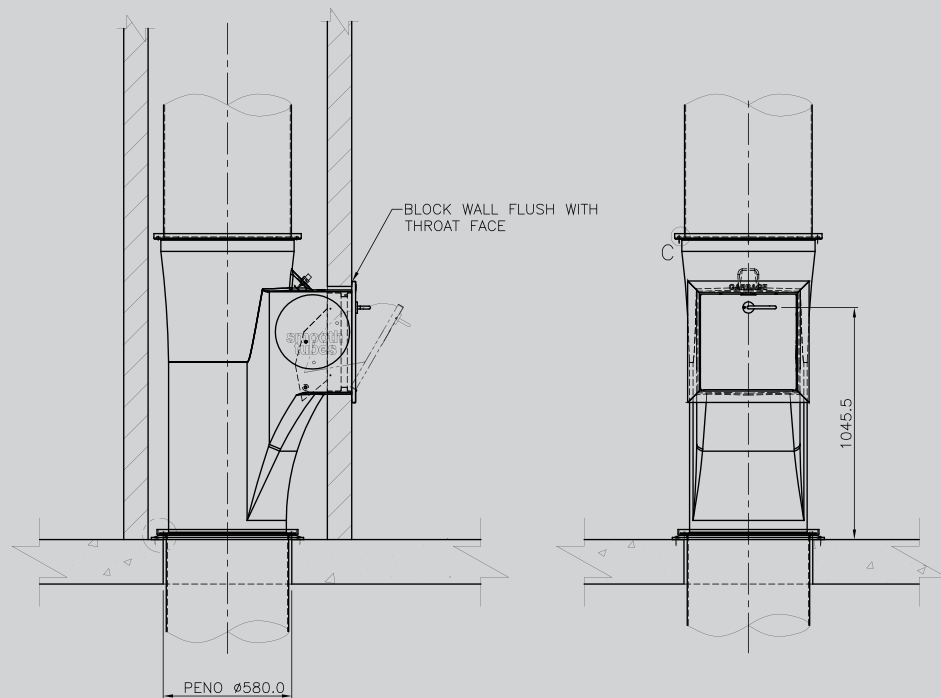
Dimensions

Label	Waste Door	Linen Door	Recycling Door
G	603mm	573mm	603mm
H	603mm	573mm	603mm
J	435mm	432mm	432mm
K	435mm	432mm	432mm
L	110mm	110mm	110mm
M	380mm	380mm	380mm

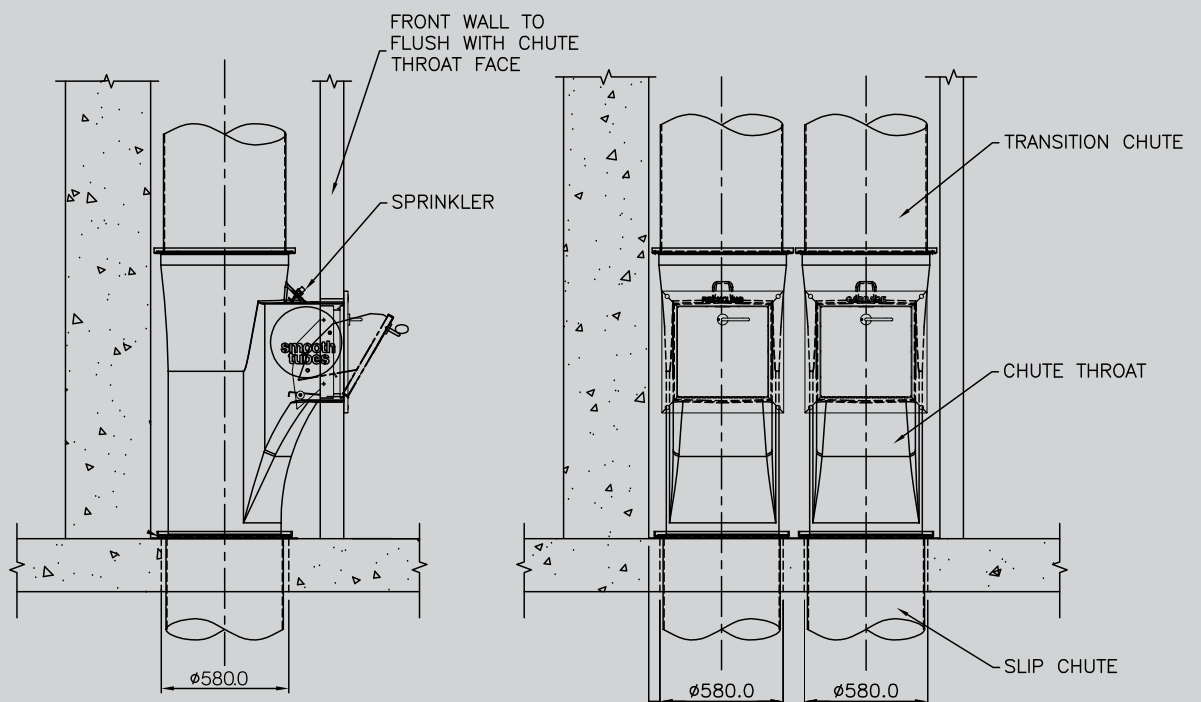


Smoothtubes™ Chute Assembly

Single Chute
Assembly
Example



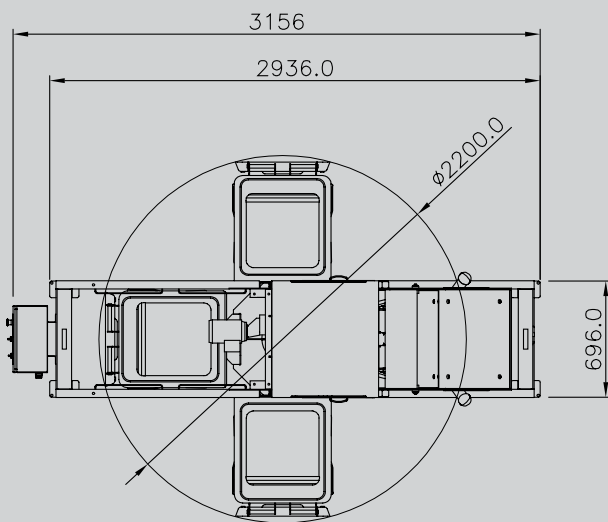
Dual Chute
Assembly
Example



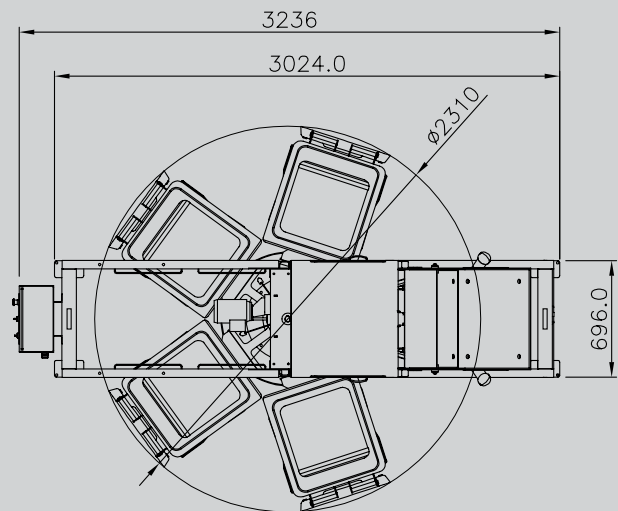
Bin Feed System Examples

Carousel Bin Feed System Examples

4 Bin System

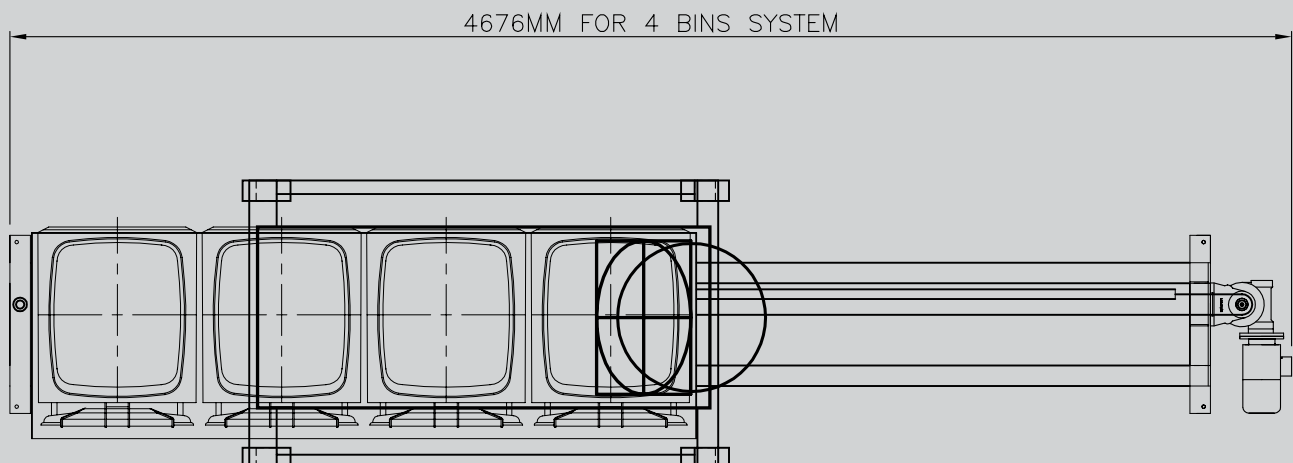


5 Bin System



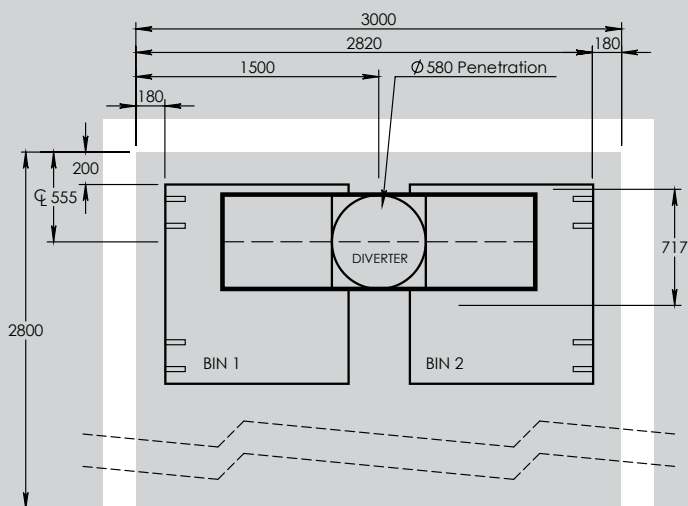
Conveyor Bin Feed System Example

4 Bin System

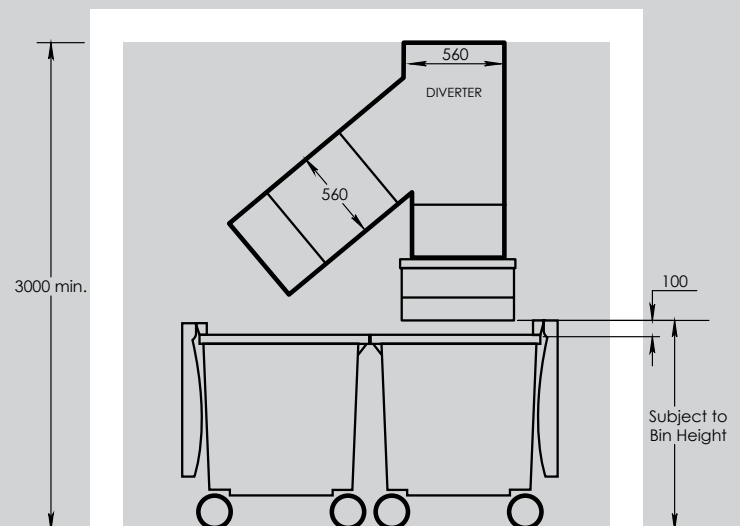
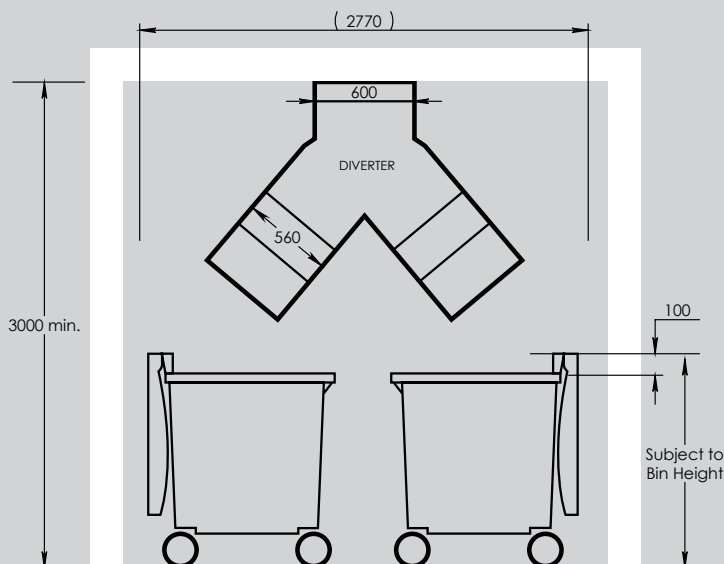
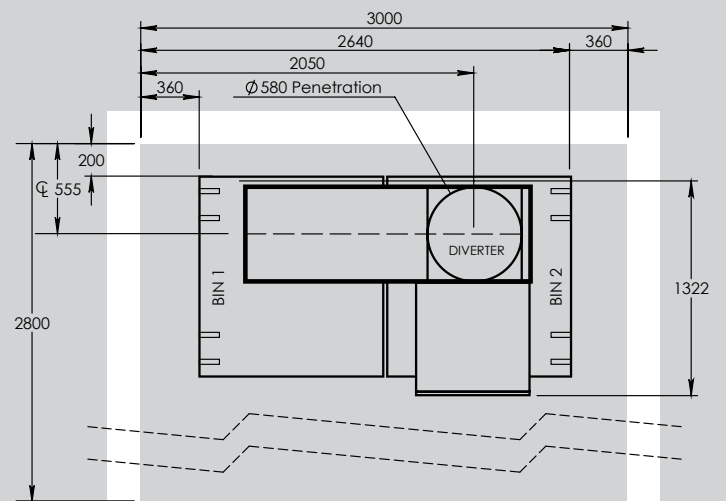


Diverter Example Room Layouts

Standard Configuration 1



Standard Configuration 2

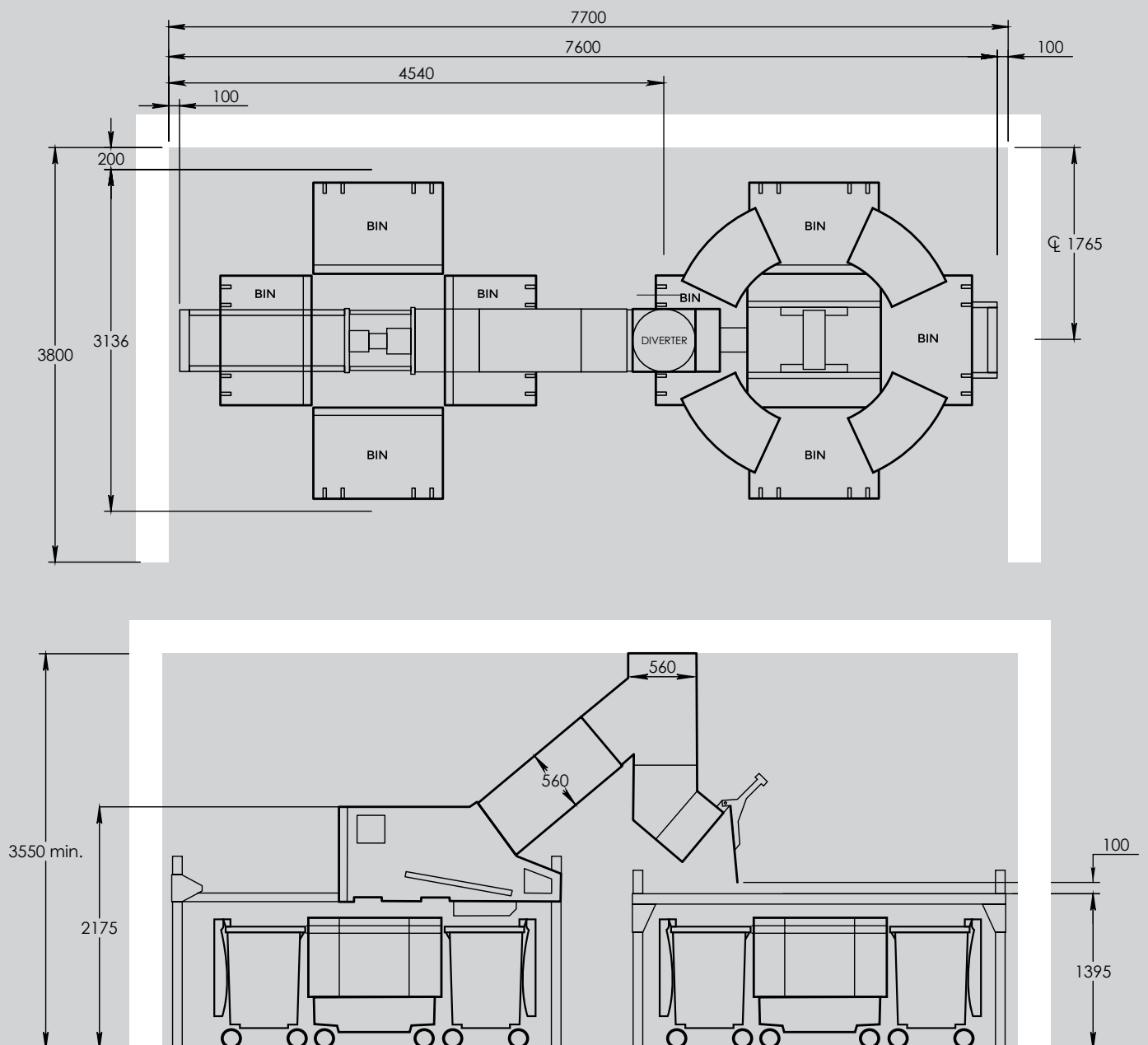


Design Guides

The following are standard installation spacings and requirements solely intended to assist in the design of refuse rooms and chute systems. These are intended as guides only and do not constitute a complete site specific design. Bin arrangements and compacting options vary significantly and are unique to each site.

Please contact Wastech for a formal assessment of your site and for further options.

Carousel Feed System Configuration: Ecopac & Bin Carousel



Optional Parts & Accessories

Wastech offer a large range of additional spare parts and accessories to suit all your needs including:



Penetration Ring

Reusable circular steel mandrel for builder to set out and form floor penetrations.



Flushing Spray

19mm diameter brass flushing spray head fitted to the top of the chute. Supplied complete with fire rate access door for maintenance.



Mounting Brackets

Site-specific brackets to suit oversized penetrations, large building shafts or wall-mounting.



Collector Bins

Plastic or steel collector bins available in all industry sizes.



Automatic Bin Feed Systems

Automatic bin feed systems available in Carousel and Conveyor layouts options.



Odour Control Systems

A range of different products designed to control odour of Waste Chute systems.



Manual Bin Handling Equipment

Wastech offers a range of optional equipment to assist with safe and easy handling of your bins.



Equipment & Bin Monitoring Systems

SMS to mobile phone Bin monitoring systems.

24/7 Service & Support Australia Wide



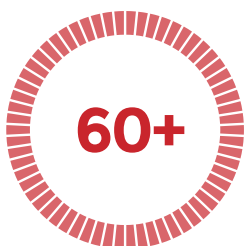
Regardless of your location, with just a simple phone call, a Wastech Service Technician can assist to ensure any Waste Chute System issues are resolved urgently!

With Wastech service centres located Australia wide, we can offer you:

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- Planned service agreements
- Prompt, quality service from trained technicians
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SA

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Regency Park SA 5010
service.sa@wastech.com.au

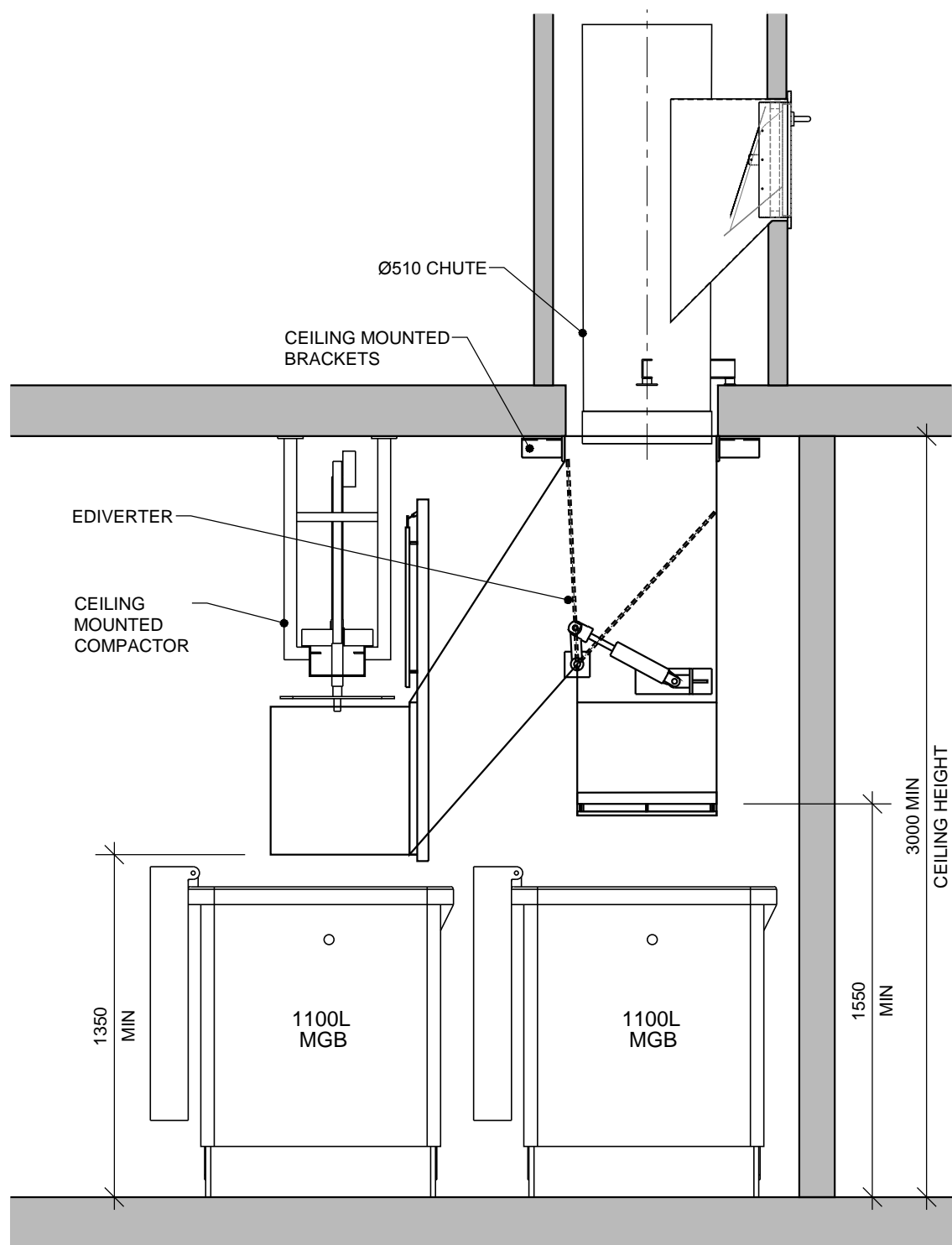
WA

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Kewdale WA 6105
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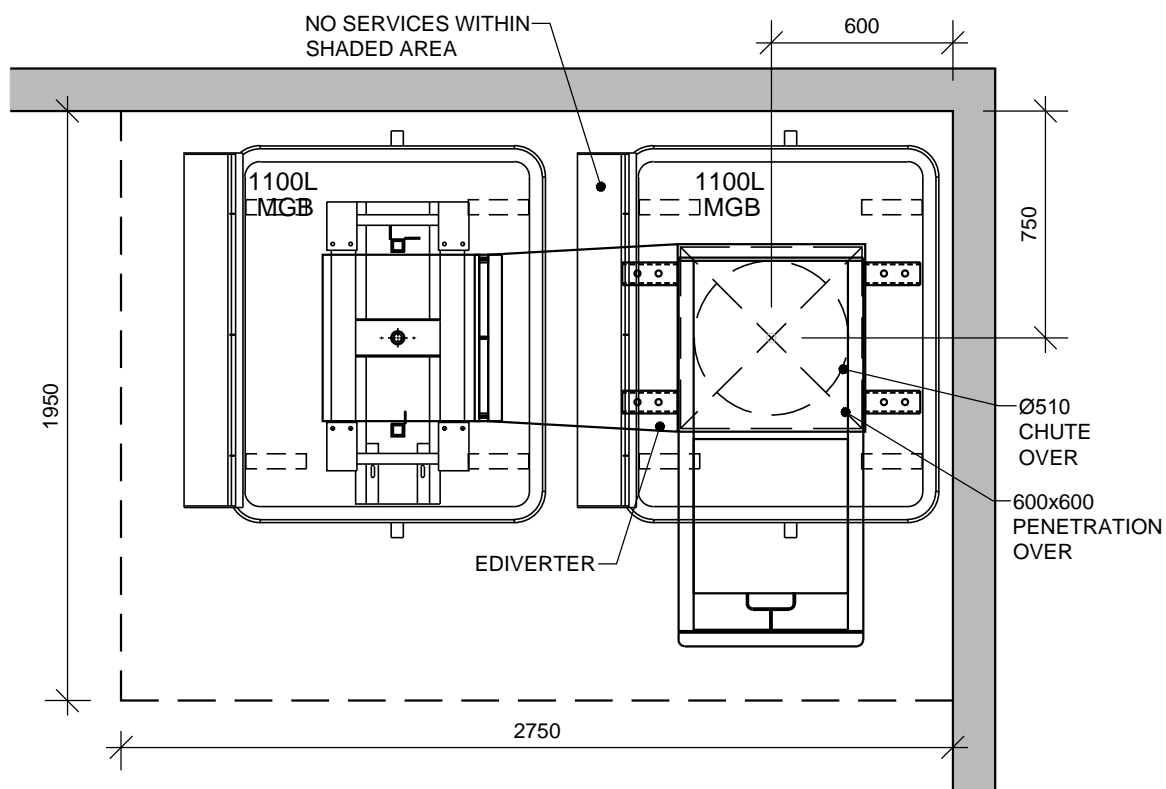


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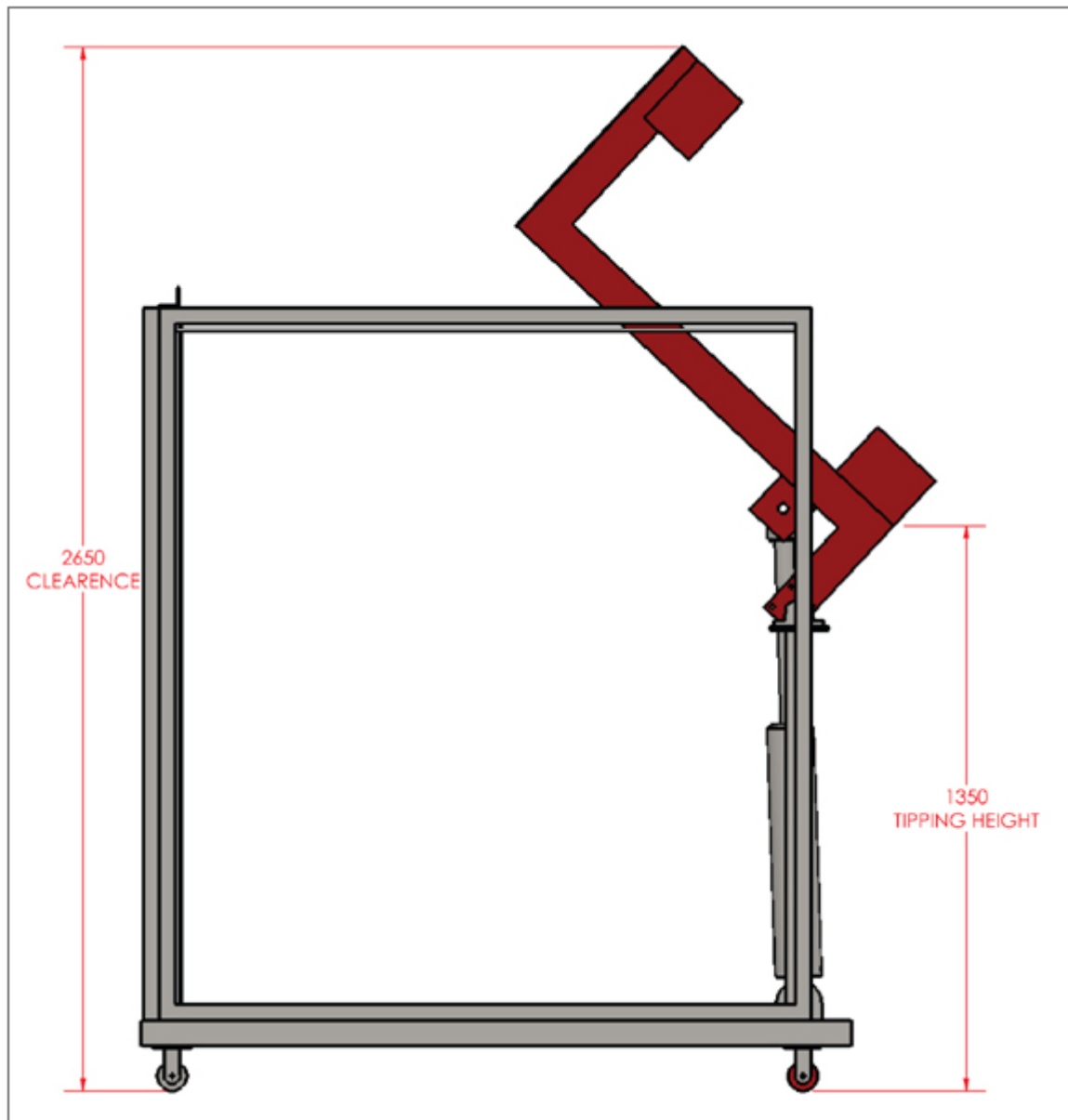
**ELEVATION: EDIVERTER with 1100L MGB
and INTEGRATED WASTE COMPACTOR
(Ø510 CHUTE)**

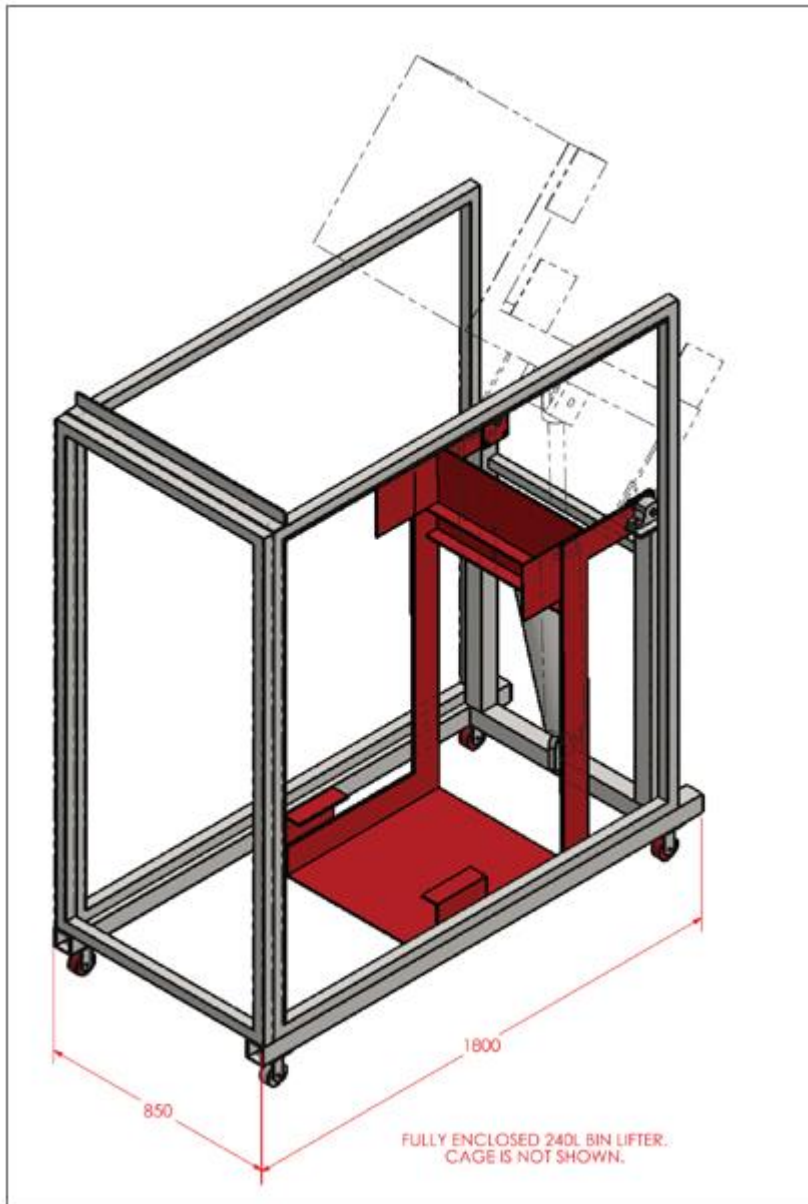


**PLAN: EDIVERTER with 1100L MGB
and INTEGRATED WASTE COMPACTOR
(Ø510 CHUTE)**

 <p>44-46 Gibson Ave Padstow NSW 2211 Ph 02 9780 3500 info@elephantsfoot.com.au Free Call 1800 025 073 Fax 02 9707 2588</p>		Client ELEPHANTS FOOT STANDARDS	
		Project Ø 510 CHUTE & EDIVERTER WITH SINGLE 1100L MGB AND WASTE COMPACTOR	
<p>Copyright 2014 Elephants Foot Recycling Reproduction of the whole or part of the document constitutes an infringement of copyright. The information, ideas and concepts contained in this document are confidential. The recipient(s) of this document is/are prohibited from disclosing such information, ideas and concepts to any person without the prior written consent of the copyright holder. DO NOT SCALE FROM DRAWINGS</p>		Designed & Drawn JW Checked BATME Scale NTS	Date 15.09.17
		Sheet Size A3	Title SAMPLE DESIGN LAYOUT
		Job Number EF's STD	Revision A

Elephants Foot 120-240 Litre Binlifter





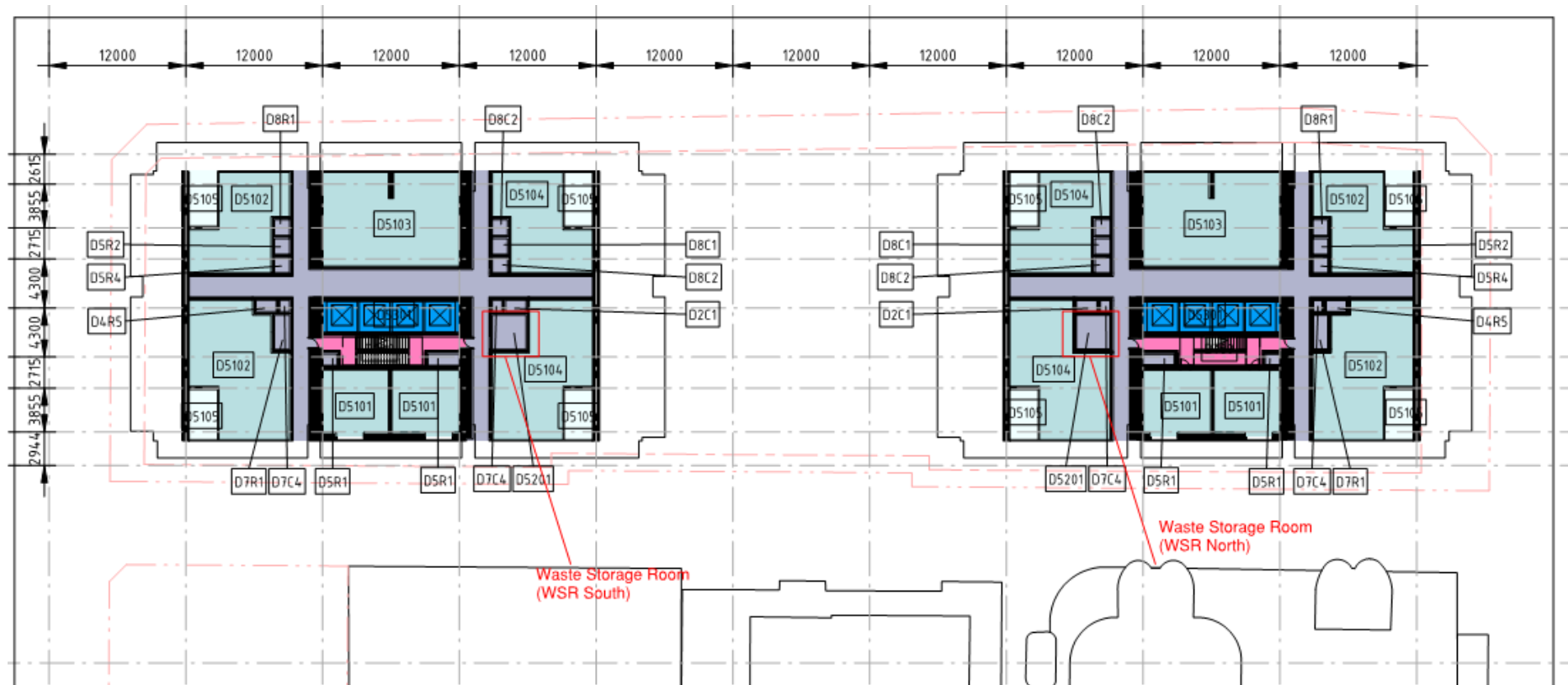
Appendix D

Waste Storage Area Diagrams

Appendix EE

Site A

Waste Storage Rooms (WSR North and South)

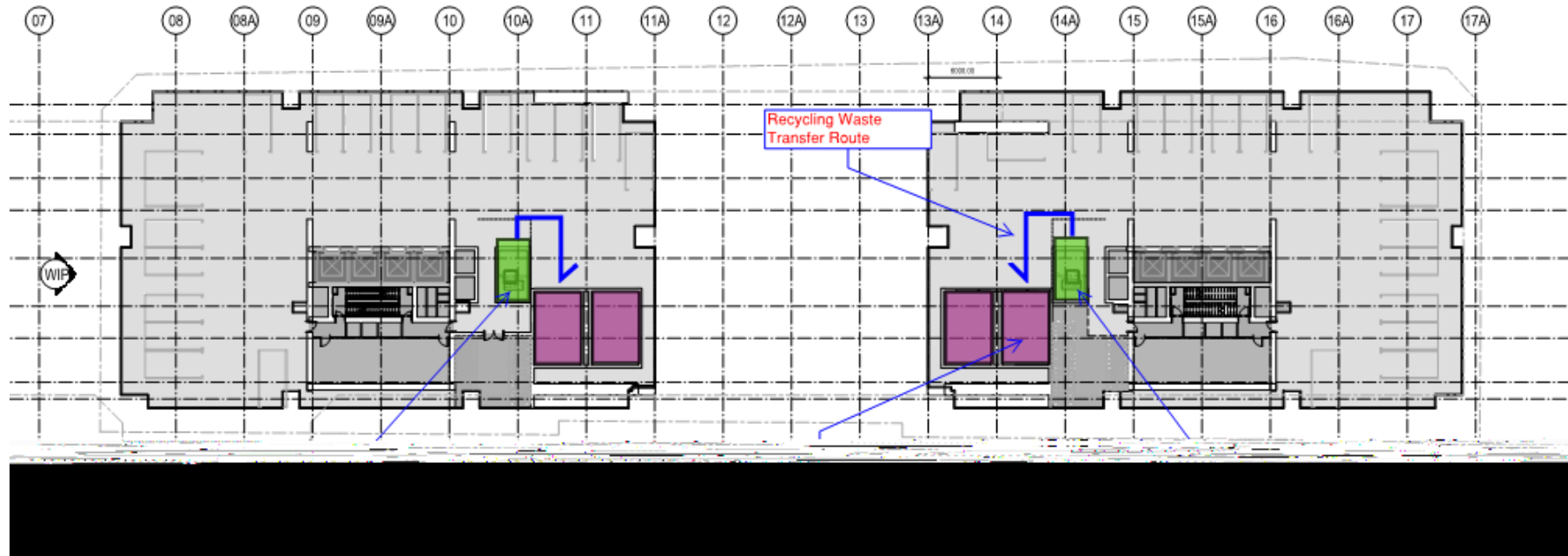


Notes

- Chute access provided for the south and north building at the WSR

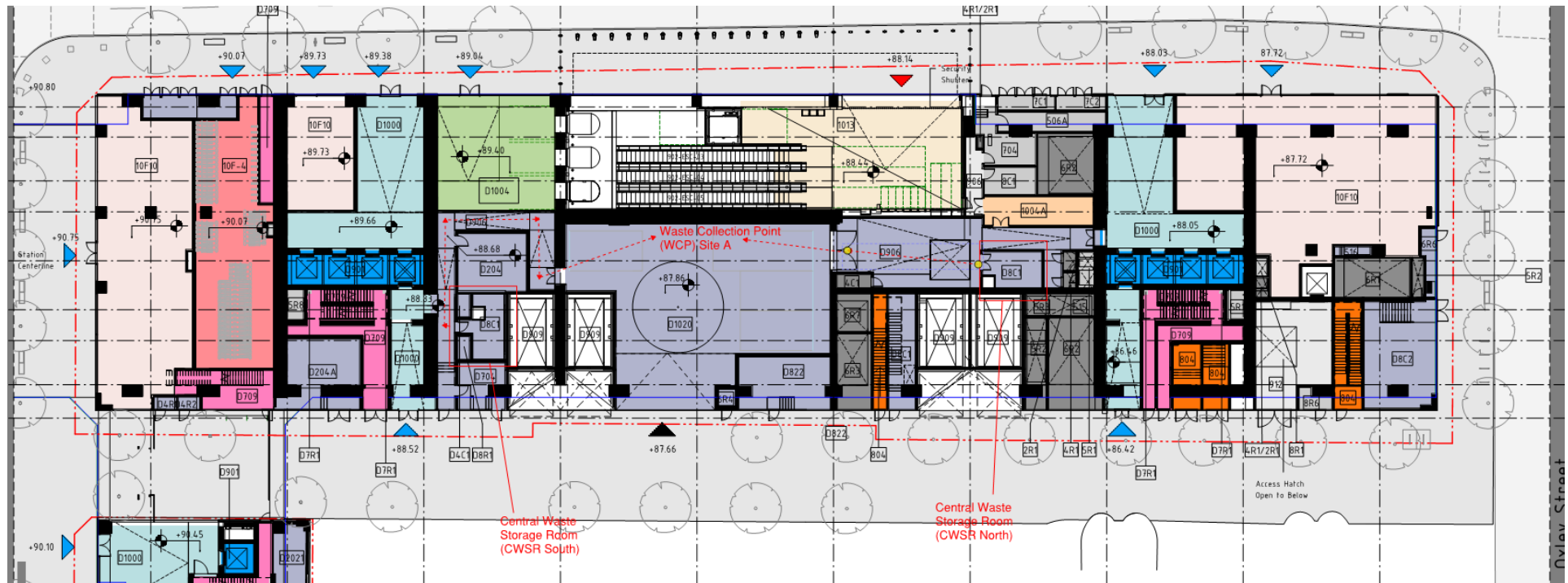
Appendix EE

Interim Recycling Storage Rooms (IRSR South and North) and transportation pathway



Appendix EE

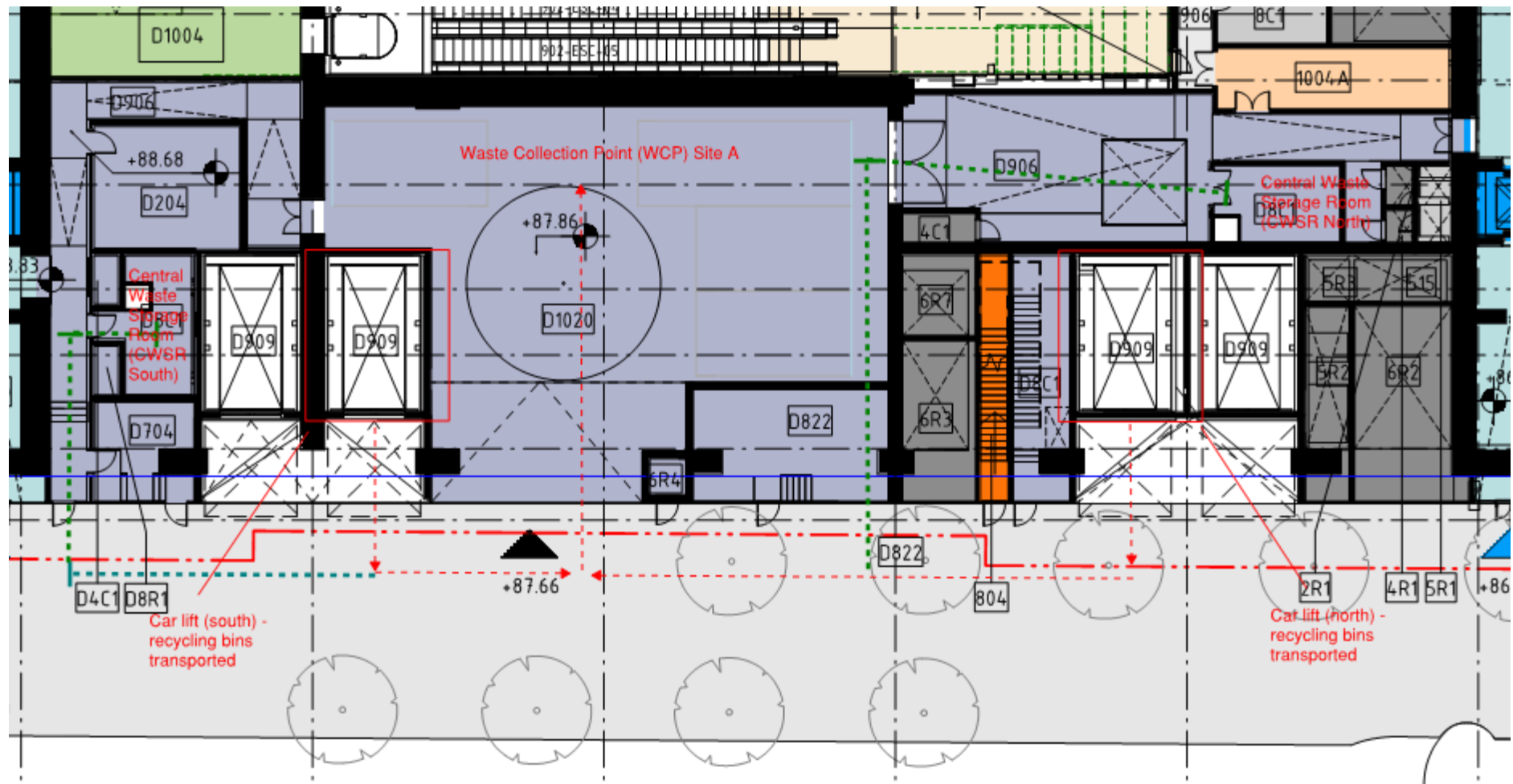
Central Waste Storage Room (CWSR North and South) and Waste Collection Point (WCP)



Notes

- Residual waste from WSR chutes will drop straight to the CWSRs. Recycling waste will be transported from the IRSRs – see image below.
- Ramp access provided to move bins from CWSRs to the WCP.
- Dotted arrow indicates movement of bins to occur using electronic bin mover or manually by staff to be collected daily.

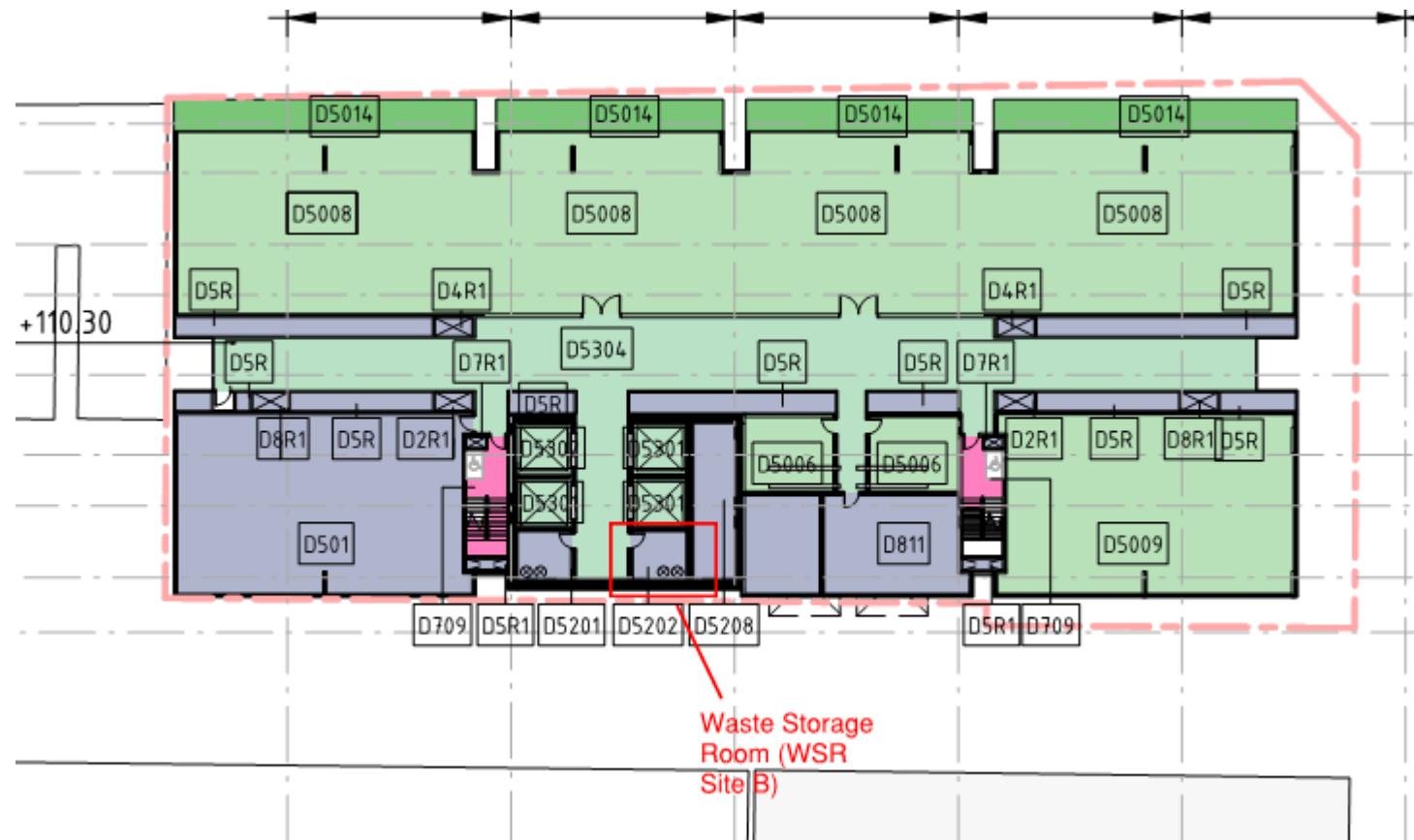
Appendix EE



Appendix EE

Site B

Waste Storage Rooms (WSR Site B)

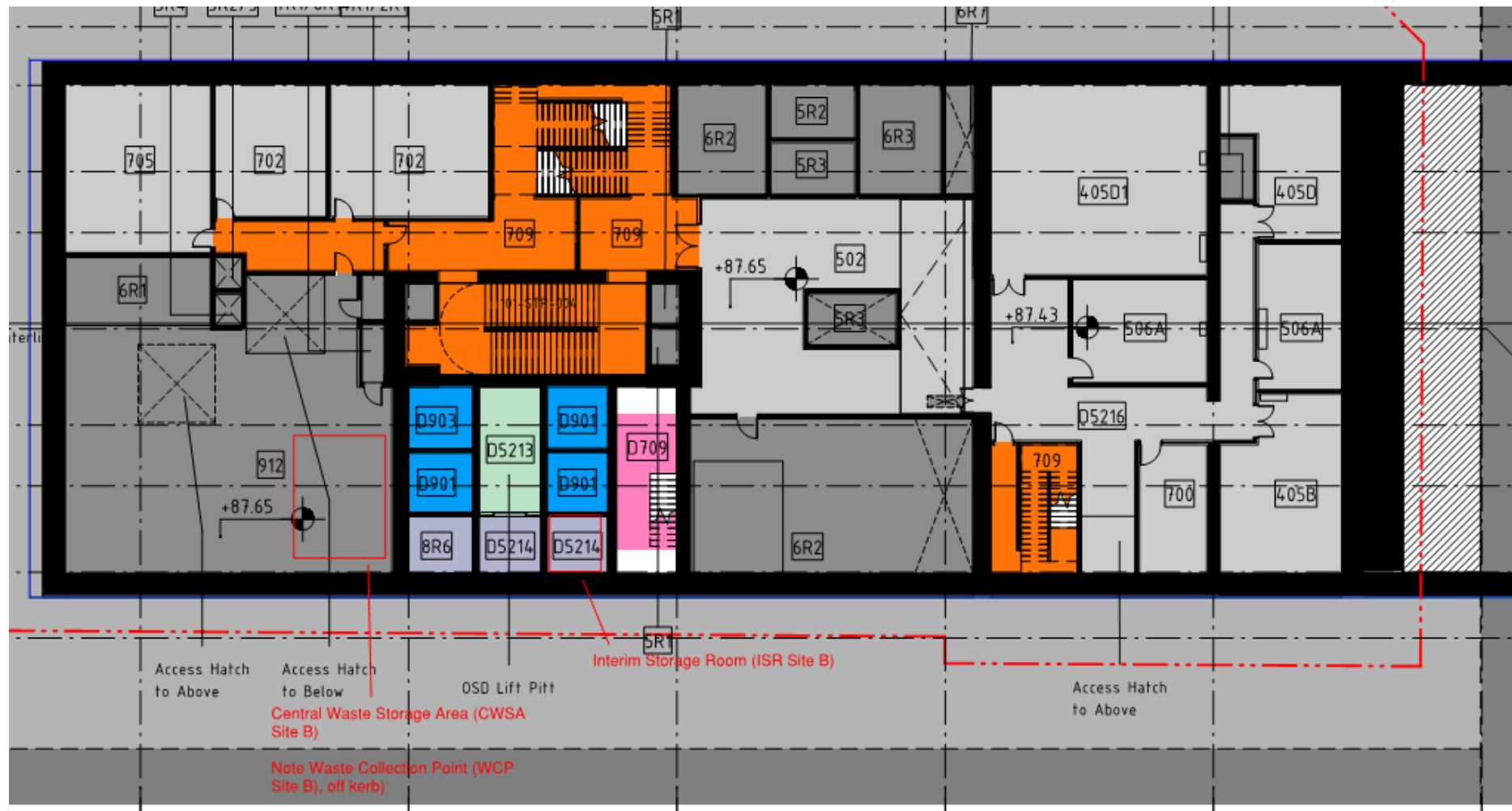


Notes

- Access to the WSR may be provided from BoH (not through corridor) in Stage 2 design

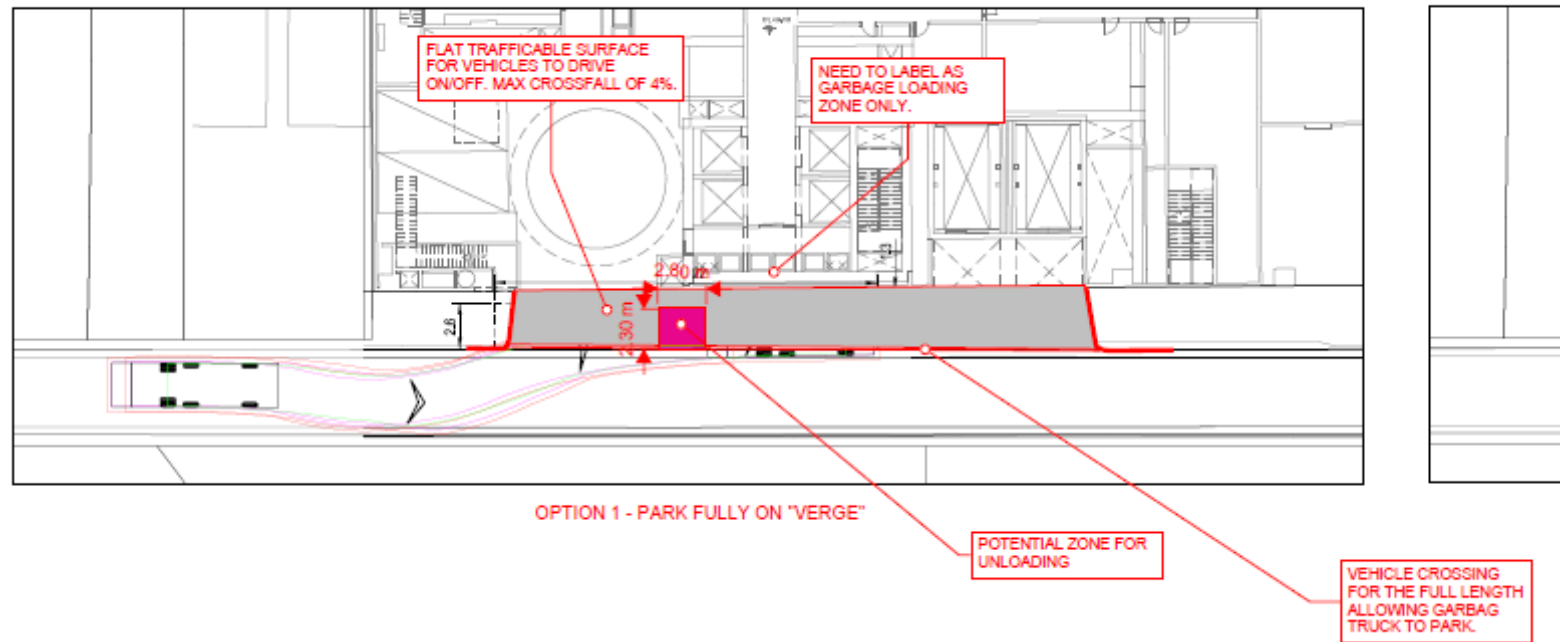
Appendix EE

Interim Storage Room (ISR) and Central Waste Storage Area (CWSA) Site B



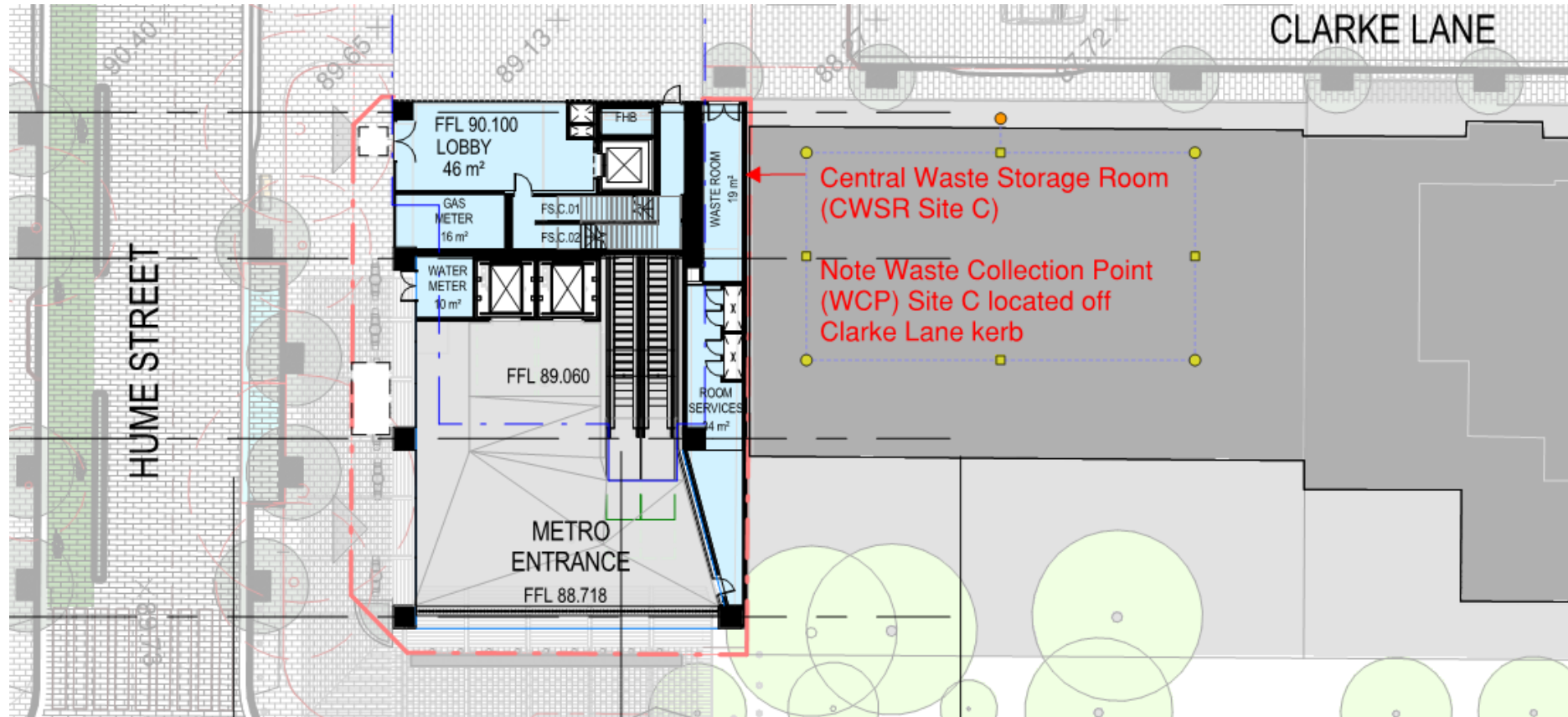
Appendix EE

Waste Collection Point (off Clarke Lane)



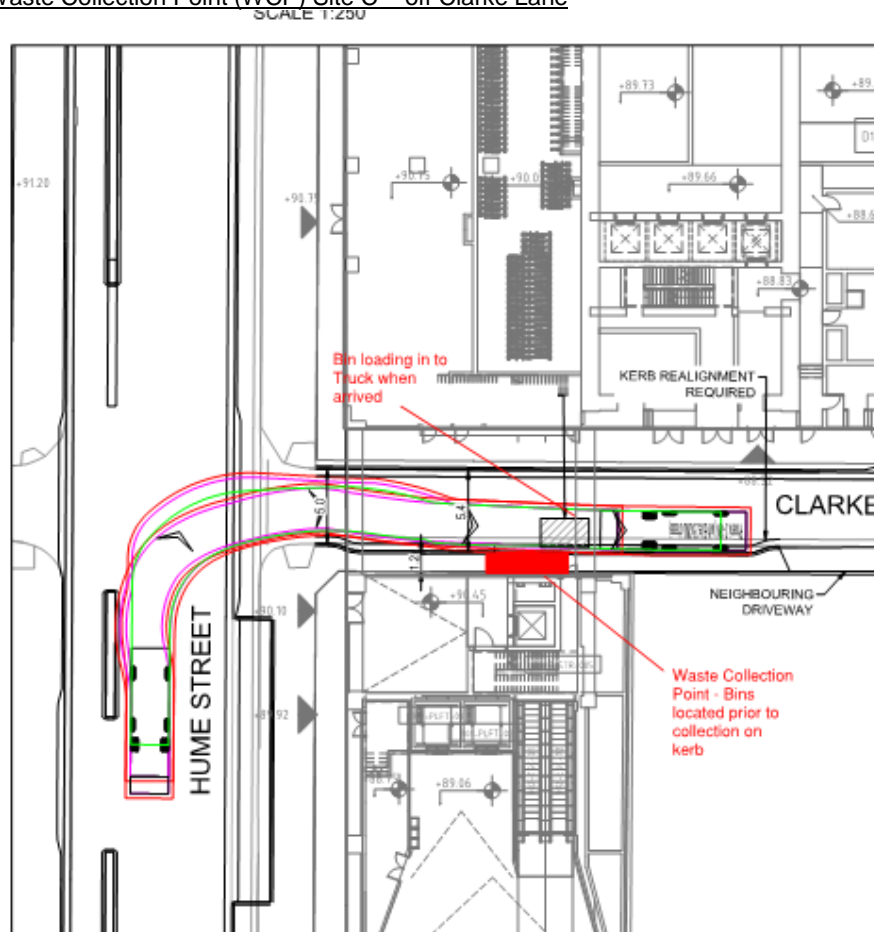
Site C

Central Waste Storage Room (Site C)

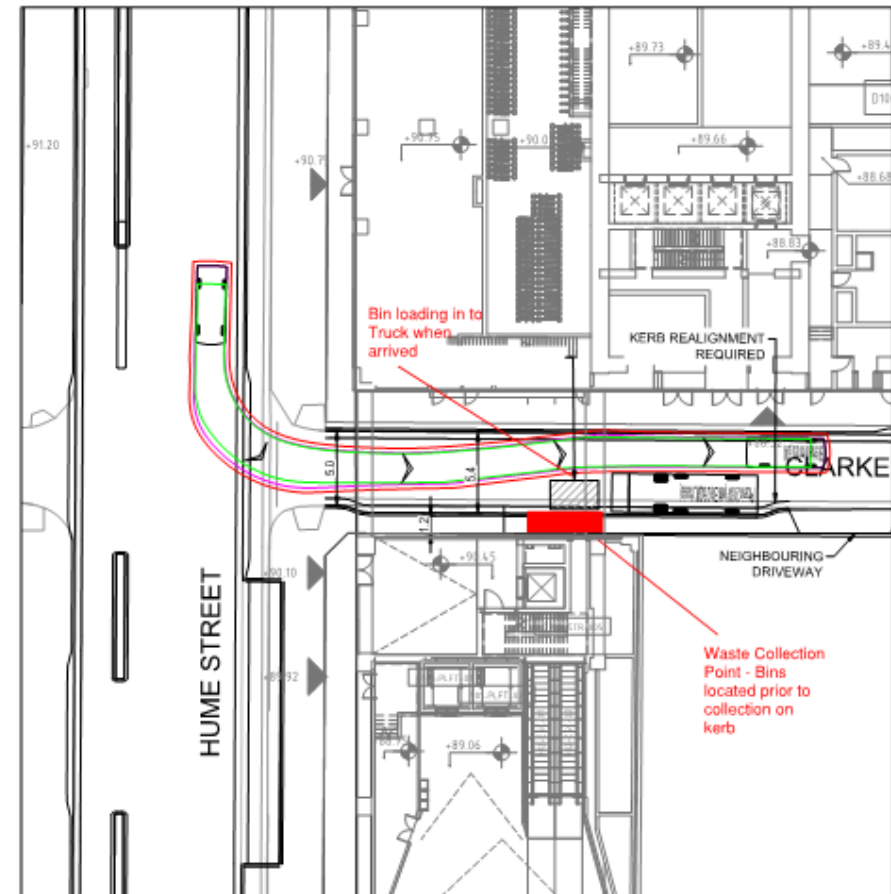


Appendix EE

Waste Collection Point (WCP) Site C – off Clarke Lane



SCALE 1:250



Notes

- Second image demonstrates that a small vehicle will be able to pass a stationary MRV give slight modification to kerb off Site C.