Operational Waste Management Plan

Proposed Mixed-Use Development

At 19-25 Campbell Street, Bowen Hills

On Behalf of New Urban Villages

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Revision Record

No.	Author	Reviewed/Approved	Description	Date
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5.				

Executive Summary

This document is an Operational Waste Management Plan (OWMP) developed for a proposed mixed-use development to be located at 19-25 Campbell Street, Bowen Hills.

The purpose of the OWMP is to provide compliance and design information relating to the handling, storage, and collection of refuse within the proposed development. The content of the OWMP is written with the purpose of providing a guide for the Design, Construction and Operational phases of the development and therefore may be updated to include detailed information as required for each phase.

A summary of the proposed waste management processes and equipment is outlined below:

- Equipment:
  - Residential refuse:
    - 11 x 1100L general waste bins (+ 2 additional bins to remain on equipment during servicing).
    - 24 x 1100L commingled recycling bins (+ 2 additional bins to remain on equipment during servicing).
    - A total of 35 x 1100L bins accessible to the collecting contractor.
    - A dual chute system with hopper doors on residential levels (Levels 3 – 34) for disposal of waste and recycling.
    - A single chute with diverter system with hoppers on podium levels for the disposal of waste and recycling.
    - 2 x bin rotation systems; 1 system for each chute discharge (1 system to have a compactor for the compaction of general waste).
    - A bin tug or alternate bin towing equipment for the transfer of bins from Basement 1 to Ground level.
  - Commercial Refuse:
    - 1 x 1100L general waste bin.
    - 3 x 1100L commingled recycling bins.

- Refuse collection:

All collections will occur on-site within the loading area accessed via Edgar Street.

  - Residential refuse:
    - Designed to be serviceable by Council using rear-loading RCV's.
    - 3 collections per week for both general waste and commingled recycling.
  - Commercial refuse:
    - Collected by private contractors using rear-loading RCV's or other vehicles.
    - 3-4 collections per week or 7 collections per fortnight for each refuse stream.

- Refuse storage:
  - Residential refuse:
    - Waste and recycling chutes will discharge into 1100L bulk bins stored within the refuse room located on Ground floor for refuse generated above Level 3 or Basement 01 for refuse generated on podium levels.
    - All refuse areas are adequately sized to store all appropriate bins.
    - The rotation and compaction equipment is partitioned for safety purposes.
    - Bin washing facilities will be provided within each refuse room.
  - Commercial refuse:
    - Stored within the commercial refuse room in appropriate bins or equipment as detailed above.
    - Bin washing facilities will be provided within the refuse room.

- Refuse transfer:
  - Residential refuse:
    - Full bins on the rotation equipment will be rotated as required. Building management will be responsible for bin rotation / changeover.
    - Prior to Council collection, all full waste or recycling bins will be removed from the rotation equipment and placed in the refuse area outside of the partition to be collected directly from refuse room by the collection contractor.
  - Commercial refuse:
    - Bins will be collected directly from the commercial refuse room by a private contractor and immediately returned once serviced.

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1 Introduction

1.1. Background

TTM Consulting has been engaged by New Urban Villages to prepare an Operational Waste Management Plan (OWMP) to support the proposed mixed-use development located at 19-25 Campbell Street, Bowen Hills.

This OWMP has been amended to incorporate the waste management requirements of the revised design. It is understood that an s99 Change to a Development Approval will be submitted to Economic Development Queensland (EDQ) for application reference DEV2021/1193.

Whilst the application will be submitted to EDQ, it is noted that the site is located within the Brisbane City Council (BCC) local government area. As such, where relevant this development has been assessed against the respective provisions of the Brisbane City Council City Plan 2014 v21.

1.2. Scope

The content of this OWMP is intended to provide information in reverse order to the typical movement of waste streams from disposal to collection. The reverse order provides context for refuse collection, storage and transfer. Information on refuse disposal and collection points is given for each use within the development.

The items covered within the OWMP are described in Table 1.1. The key information for Council approval can be found in Section 2.

Table 1.1: Scope Items

Item	Description
Refuse streams	Identification of refuse streams & anticipated development refuse volumes likely to be produced
Refuse separation	Recommendations for appropriate segregation methods for each refuse stream
Refuse collections	Assessment of refuse collection vehicle (RCV) access and maneuvering
Refuse storage	Detailed analysis of refuse storage facilities and design
Refuse transfer	Assessment of refuse transfer between refuse storage and collections areas
Refuse disposal	Recommendations for refuse disposal within the development
Refuse management equipment	Identification of recommended and optional refuse management systems and equipment
Refuse management operations	Recommendations for operational efficiency and ongoing management, including refuse minimisation, tenant education and safety
Building design	Recommendations for design of refuse management facilities

Detailed information including refuse calculations, site plans and drawings, recommended refuse management equipment and system specifications, common refuse signage as well as a list of terms and abbreviations are provided in the appendices.

The recommendations in this OWMP relate to the operational phase of the development. Additional requirements for refuse management during or after demolition or construction phases are not included and require a dedicated plan.

1.3. Regulatory Considerations

1.3.1. Council's Refuse Planning Scheme

As this development is located within BCC Local Government Area, this plan has been prepared to align with BCC's refuse requirements of SC6.26 Refuse Planning Scheme Policy v21.

As this development is a mixed-use, TTM has referred to BCC requirements as outlined in the Refuse PSP under section 2, 3, 4 and 5 as these sections are related to general requirements for all developments and specific controls for residential and non-residential uses.

Table 1.2 demonstrates the refuse management items addressed to align with BCC's requirements.

Table 1.2: OWMP Compliance Checklist

BCC SC6.26 Refuse Planning Scheme Policy		
Item	Requirement	Compliance / Comment
Section 3 - Access and Manoeuvrability		
(1)	If refuse collection is from an on-site bin storage area for multiple dwellings or from mobile garbage bins located throughout a development, the pavement/carriageway trafficked by the refuse collection vehicle is a minimum 6.5m wide.	6.2m driveway provided, consistent with the manoeuvring areas provided in the approved scheme.
(2)	For detached dwellings on rear lots, pavements/carriageways trafficked by a refuse collection vehicle have a minimum width of 5.5m.	N/A
(3)	The pavement/carriageway has a minimum crossover width of 6.5m and is free from overhanging gardens or trees.	B2 crossover provided, consistent with the approved scheme.
(4)	If the collection point is at the kerbside of the internal private road, it is preferred that mobile garbage bins are placed in front of each dwelling. If there are short dead-end streets off the main internal circulating road, sufficient level areas are to be provided beside the main internal circulating road (near the intersection) for a collection point for the mobile garbage bins required for those dwellings.	N/A
(5)	Turning and manoeuvring facilities for refuse collection vehicles are provided to meet design requirements for the vehicles identified in Table 3.	Complies
(6)	Subdivision layouts are to provide for the safe and efficient operation and manoeuvring of a side loading refuse collection vehicle. Layouts that require a refuse collection vehicle to reverse more than two truck lengths are to be avoided. If a temporary turnaround is provided, an easement in favour of Brisbane City Council for this purpose will be required over any turning area located within private property. The temporary turnaround is to be constructed to a standard that is satisfactory to Council.	N/A
(7)	Adequate lift clearances are provided to overhanging trees and wires in accordance with Table 3.	Complies
(8)	For MGB's, if it is necessary to wheel them to a collection point from a bin storage area: (a) the distance does not exceed 50m; (b) for a retirement facility, the distance does not to exceed 25m; (c) the mobile garbage bin transfer path is free of steps or other obstructions and does not exceed a 1:14 grade.	N/A – 1.1m^3 Bulk bins proposed.
(9)	In instances where the gradient of the on-site manoeuvring area is greater than 5% (1:20), the pad that the collection vehicle will stand on while accessing refuse bins at the collection point, is to have a maximum gradient of 2% (1:50).	Complies

Section 4 - Residential Refuse Collection		
(1)	Residential development is to provide sufficient capacity for 240L of refuse and 240 or 340L of recycling per dwelling, allowing for one collection per week.	Complies – Performance solution of 180L / week for recycling used, as per the approved scheme.
(2)	Residential development is to utilise kerbside collection where the locations for both the bin storage area and kerbside collection point can be appropriately accommodated in accordance with section 4.1.	N/A – Greater than 10 dwellings
(3)	a) On-site collection of bulk bins is provided for development comprising greater than 10 dwellings. b) the development comprises greater than 10 dwellings; or where the road verge is not properly shaped to the standard 1:50 gradient and a minimum of 2.5m wide or where the longitudinal road gradient is greater than 1:10.	Complies
(4)	Refuse and recycling collection for a mixed-use development ensures residential and commercial bins are stored separately with separate access to each.	Complies Separate storage areas are provided.
Section 4.1 - Kerbside Collection (MGB's) – Greater than 10 dwellings, kerbside collection not proposed		
Section 4.2 – On-site Collection (Bulk Bins)		
(1)	In accordance with section 4, development will avoid adverse impacts to residents, pedestrians and roads users by limiting the number of collections required per week while ensuring sufficient refuse and recycling capacity is provided to meet the needs of residents. Table 1 provides details of bulk bin volumes and the number of standard 240L kerbside bins their capacity is equivalent to. These are to be used when identifying the required refuse arrangements.	Unchanged service frequencies from the approved design. 3 Collections per week proposed.
(2)	The type of refuse service that is to be used (domestic or commercial) is identified, including whether the refuse collection vehicle is to be front loading, side loading or rear loading (sufficient height must be available).	Complies Rear loading vehicles are proposed.
(3)	A written design proposal for waste collection is to be provided, giving full details of the proposed system, bin sizes, number of bins, storage and collection areas, frequency of collection and the refuse collection vehicle size. Table 2 provides the dimensions and types of bulk bins.	Complies Details are provided within the OWMP.
(4)	The manoeuvring of the refuse collection vehicle is undertaken in a safe and efficient manner, without detrimental impacts to pedestrian amenity or safety, Council or private infrastructure or the function of the road network.	Complies Further details are provided in Section 2 of this OWMP and within the transport report.
(5)	For multiple dwelling developments fronting a local, neighbourhood, district or suburban road, the refuse collection vehicle may enter the site in a reverse gear in a single movement. An onsite dedicated pedestrian route is provided and is separate from the required vehicle manoeuvring area to ensure pedestrian safety is protected. The pedestrian route is to provide access from the site's frontage to the development and will have a minimum width of 1.2m. The refuse collection vehicle is to leave the site in a forward gear.	Complies Forward-in forward-out manoeuvring provided, as per approved scheme.
(6)	For multiple dwellings developments fronting an arterial road, or where the refuse collection vehicle cannot reverse onto the site in a single movement, the refuse collection vehicle must enter and leave the site in a forward gear.	N/A
(7)	All entry and exit points are of a width and design that allows for sufficient ingress and egress for the refuse collection vehicle including a 6.5m crossover.	B2 crossover provided, consistent with the approved scheme.
(8)	To maximise safety, the distance required for refuse collection vehicles to reverse on-site is minimised. Where on-site turnaround of the refuse vehicle cannot be achieved, the bin storage area and collection point is located within 30m of the street frontage.	Complies Reversing distance is limited to the manoeuvring area, adjacent to the storage and collection points.

Section 4.2 – On-site Collection (Bulk Bins) – Continued		
(9)	Access for a refuse collection vehicle to the collection point is maintained at all times.	Complies RCV access is provided at all times.
(10)	The required vertical and horizontal clearances are provided for the service to operate safely and efficiently. Operational clearance dimensions are shown in Table 3 for various types of collection arrangements.	Complies Operational clearances comply with Table 3 of the Refuse PSP.
(11)	Bulk bins of 1.1m³ or less are positioned so that collection personnel do not have to move them more than 5m. If a gradient is evident, speed bumps are provided to stop bulk bins from rolling away from the collection point.	Servicing and collection points are located adjacent to each other, consistent with the approved scheme.
(12)	Bulk bins of 1.5m³ or more are positioned so that front-lift refuse vehicles can drive directly to the container without relocating the bulk bin. If this cannot be achieved due to physical constraints, then the bulk bins are not moved more than 3m from the storage to the collection point.	N/A
(13)	The storage areas for bulk bins are: (a) contained in an enclosure or room of sufficient size for the bulk bin quantity required; (b) easily accessible for residents and for the required servicing of bins; (c) screened from neighbouring properties for odour, amenity and noise; (d) protected from the environment; (e) provided with natural or temperature-controlled ventilation if in an enclosed room; (f) kept clear of obstructions, such as fixed bay separators, that impede the ability to change from existing bin sizes or which otherwise limit future refuse collection options; (g) kept clear of other amenities such as air-conditioning units, hot water systems or electrical hubs where located in a bin room.	Complies Refer to Sections 2,3 and 4 and Appendix B.
(14)	If a refuse or recycling chute is provided: (a) it is to be constructed to allow refuse to fall into the centre of the bin; (b) it is to have a door / lid to ensure clean changeover of bins; (c) separate chutes and bulk bins are to be used for each waste stream; (d) the room containing the chute and bin or compactor excludes all but authorised personnel.	Complies Refer to Sections 2,4 and Appendix B.
(15)	Environmental best practices may also include the installation of a trapped waste connection to the sewer system and providing a roof canopy over the designated storage area.	Complies
Section 5 – Non-Residential Refuse Collection		
(1)	The requirements for refuse bins or refuse compactors for non-residential development will be assessed case by case, based on the type and amount of waste generated by the development, which is dependent on the operational activities of the development.	Non-residential refuse arrangements consistent with the approved scheme. Details throughout Sections 2,4 and Appendix B.
(2)	Sufficient information is provided to demonstrate that refuse collection can occur in an efficient and safe manner on site without adverse impact on amenity (acoustic, odour or visual impacts) and pedestrian and vehicular traffic.	Complies Refer to information detailed within OWMP.
(3)	This information may include evidence from a refuse collection contractor to demonstrate that collection will occur outside normal service/delivery or business times, where seeking permission to allow a refuse collection vehicle to use service bays or parking spaces on the site for access.	Complies Refuse collection contractors can enter the loading dock at anytime however it is likely that timeslots will be assigned by loading dock or facilities management.

Section 5 – Non-Residential Refuse Collection – Continued		
(4)	If proposing to use clearances less than the minimum vertical clearances in Table 3, a written confirmation from the proposed waste collection contractor giving full details of the proposed system, bin sizes, number of bins, frequency of collection and the refuse collection vehicle size is to be provided.	Complies Operational clearances comply with Table 3 of the Refuse PSP.
(5)	If the gross floor area of a freestanding food and drink outlet, shop or office is less than 200sqm a dedicated service bay is not required for a refuse collection vehicle.	N/A
(6)	Provision is made for on-site refuse collection for Short-term accommodation if an accommodation hotel or motel.	N/A
(7)	Where disposal of industrial or commercial liquid waste by discharge to a road tanker, the road tanker is to be wholly on-site during collection.	Complies – Tanker can access site as per RCV arrangements if required.
(8)	The storage areas for industrial bins are to be either within a building or enclosure.	Complies – Non-residential bins located within room, within a building.

1.3.2. Waste Levy

The Queensland state government has introduced a levy on commercial wastes sent to landfill. It will normally be applied per tonne of waste and will be passed on by waste collection contractors to customers, possibly based on an assumed volume per bin.

The cost of the levy in Metro Level 1 zone for the 2023-2024 financial year is $105 per tonne, and it will increase by $10 per tonne each year thereafter until 2028 where cost will be indexed annually.

This cost will be on top of normal waste collection costs charged by waste collection contractors. Therefore, in order to reduce waste levy costs, waste generators should choose to avoid waste generation through a range of preventative measures, and recycle the waste they do generate as much as possible.

1.4. Site Location

The site is located at 19-25 Campbell Street, Bowen Hills, as shown in Figure 1.1 and Figure 1.2.

The property description is Lot 10 & 12 on RP144655, Lot 41-45 on RP9895, Lot 1 on RP 151932 and Lot 1 on RP144514.

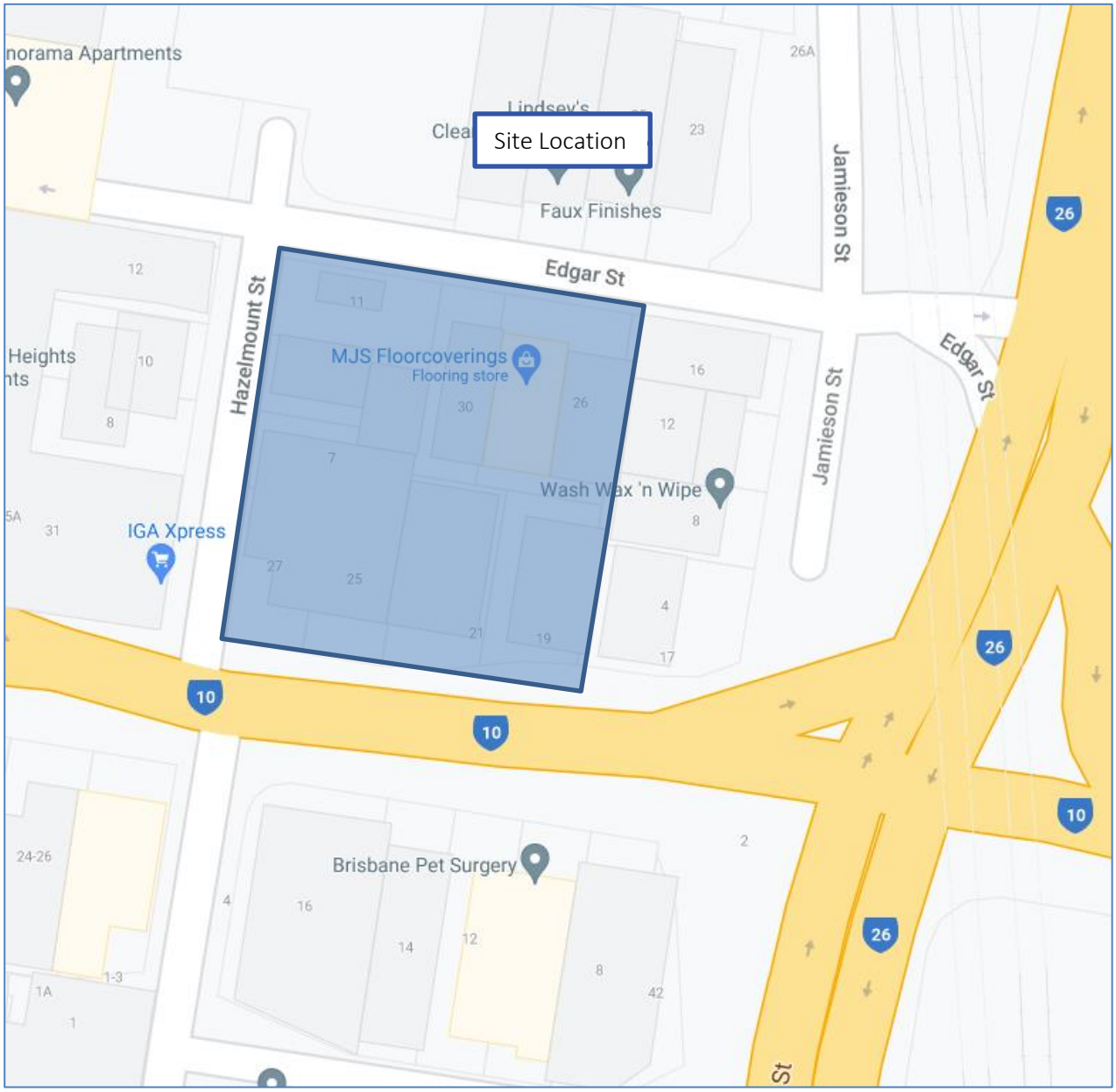


Figure 1.1: Site location
Source: Google Maps

Figure 1.2: Site area
Source: Google Maps

1.5. Development Summary

The mixed-use development is single building consisting of 432 Build-to-Rent residential units with residential amenity and a combined 371m^2 of retail GFA.

Table 1.3 provides a summary of the development, including the refuse infrastructure areas as context for the volume information provided in Section 1.6.

Table 1.3: Development Summary

Level	Description	Measure *
Ground	Retail 1 Retail 2 Retail 3 – Food and Beverage	136m^2 GFA 89m^2 GFA 146m^2 GFA
Level 3 - 33	Residential Apartments	432 Units

* Areas and unit numbers relevant for refuse calculations only; excludes areas such as resident amenity where refuse generation is factored into residential refuse generation rates.

1.6. Development Refuse Profile

Table 1.4 and Table 1.5 demonstrate the anticipated volumes for each of the commonly separated refuse streams. All calculations and equipment requirements are based on the development schedules and common waste generation rates as outlined in the detailed information in *Appendix A*.

Table 1.4: Residential Refuse Summary

Type	Measure	Quantity	General Waste (L / Week)	Commingled Recycling (L / Week)
All Dwellings	Units	432	103,680	77,760

Table 1.5: Commercial Refuse Summary

Description	Measure	Quantity	General Waste (L / Week)	All Recycling (L / Week)
Retail	GFA (m^2)	371	2,517	8,260

Taking in consideration the waste levy as outlined in Section 1.3.2, examples of additional waste costs for this development are outlined in *Appendix A.2*.

The calculation is based on the anticipated commercial refuse volumes as shown in Table 1.5.

2 Refuse Management

This section describes the arrangements for the collection, storage, transfer and disposal of refuse within the development. This includes associated bin quantities, storage capacities, equipment details, collection frequencies and site access details.

2.1. Refuse Collection

2.1.1. Bin Quantities

Table 2.1 below outlines the number of bins per collection. As waste volumes may vary according to the development occupants' attitudes to waste disposal and recycling, bin numbers and sizes may need to be altered to suit the building operation. The table shows the maximum number of bins and equipment expected.

Table 2.1: Bins per Collection

Component	Refuse Stream	Bin / Equipment - Type or Size	Numbers of Bins / Items per Collection
Residential	General Waste	1100L	11 (+2 bin to remain beneath chute discharges)
	Commingled Recycling	1100L	24 (+2 bin to remain beneath chute discharges)
Commercial	General Waste	1100L	1
	Commingled Recycling	1100L	3

2.1.2. Collection Cycle

Table 2.2 and Table 2.3 outline the RCV types and estimated collection frequencies / site entries required to service the site. The type of vehicles allocated, and demand will be subject to final design and potential selection of volume reduction equipment.

The figures and days demonstrated apply as an indicative maximum demand.

Table 2.2: Estimated Residential RCV Demands

Residential Refuse Collections		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Collections per Week
General Waste	Collection Days	✓		✓			✓		3
	Vehicle Type	REL RCV		REL RCV			REL RCV		
Commingled Recycling	Collection Days	✓		✓		✓			3
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Total Collections per Week		**2**	**0**	**2**	**0**	**1**	**1**	**0**	**6**

Commercial Collection cycles are based around a 2-day storage for all waste types. This equates to a collection frequency of 3-4 collections per week or 7 collections per fortnight.

Table 2.3 illustrates the maximum number of collections that could occur on any given week. Alternate weeks will see a maximum number of RCV movements of 6 collections per week. Refuse streams may also be collected on alternating weeks equating to a maximum of 7 collections week.

Table 2.3: Estimated Non-residential RCV Demands

Non-residential Refuse Collections		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Collections per Week
General Waste	Collection Days	✓		✓		✓		✓	4
	Vehicle Type	REL RCV		REL RCV		REL RCV		REL RCV	
Commingled Recycling	Collection Days	✓		✓		✓		✓	4
	Vehicle Type	REL RCV		REL RCV		REL RCV		REL RCV	
Total Collections per Week		2	0	2	0	2	0	2	8

2.1.3. RCV Arrangements

All RCV's will enter the site from Edgar Street and enter the loading bay in a forward gear. Once the service has been completed, RCV's will perform a single reverse manoeuvre to complete a turnaround and exit the site in a forward gear. The vehicle will stand and service the bins on a flat grade.

Residential collections have been designed to be serviceable by BCC's waste contractor and commercial / retail collections will be conducted by private contractors. All bins will be collected directly from the respective refuse area / room and returned once serviced.

Further details on vehicle access, egress and on-site manoeuvring can be found in the transport report with copies of RCV swept paths contained in the Appendices.

2.2. Refuse Storage

Residential refuse will be disposed of into 1100L bulk bins stored within the refuse room located on Ground level or beneath the diverter chute discharge on Basement 1. A total of 4 x 1100L bins will be stored on the automatic rotation equipment for use under the chute systems on Ground level. 2 x 1100L bins will be located beneath the diverter chute discharge. Excess bins will be stored in the room adjoining the chute discharge on Ground level.

Commercial / Retail outlets will have 1100L bulk bins stored for everyday use directly adjoining the residential refuse room and the loading area.

All refuse areas are adequately sized to store all appropriate bins.

A bin wash area will be provided in the refuse rooms and all associate chute discharge / equipment area for residential use will be partitioned for safety purposes. Storage for a bin tug is provided within the diverter chute discharge room on Basement 1.

2.3. Refuse Transfer

Residents will transfer all general waste and recycling to the chutes.

Building Management will be responsible to remove full bins from the rotation equipment when full or at regular intervals to prevent overfilling. Additionally, transfer of bins between Basement 1 and Ground level via the driveway ramps utilising the bin towing equipment provided.

All residential and commercial bins will require a minimal transfer distance from the collection area to the rear of the collection vehicle standing within the servicing area.

2.4. Refuse Disposal

The tables in this section summarise general recommended disposal arrangements for frequently generated and infrequently generated refuse for each use within the development. Sections 2.4.1 and 2.4.2 describe the frequently generated refuse streams that are generated in high volumes for any given period and require significant capacity for storage prior to collections. Section 2.4.3 describes the infrequently generated refuse streams that are generated in relatively low volumes, and where minimal provision for storage can be easily managed by collection frequency.

2.4.1. Frequently Generated Residential Refuse

Table 2.4: Residential Refuse Disposal Details

Refuse Stream	Disposal Details
WASTE	
General Waste	Waste bins should always be lined with bags and the bags tied before removal. Operationally, bins used for the disposal of general waste should be limited to 40L or less and does not exceed the dimensions of the chute hoppers. Waste bins should be accompanied by a commingled recycling bin in order to facilitate separation of general waste and recycling (see below). **Residential Apartments** Residents will have receptacles within their individual units for collection and storage of at least one day of general waste. Bins are typically placed under the kitchen sink. Additional bins can be placed in other areas as required. Once receptacles are full, residents will dispose their waste via dual chute system accessible on each residential level via the hopper doors. The chutes discharge directly into the bulk bins located in the building refuse rooms. **Communal Spaces** General waste from the communal spaces (e.g. recreational deck) may include small quantities of food waste, food packaging, drink bottles etc. General waste bins of an appropriate size to accommodate at least one day of waste should be located within the respective areas. Additional bins may be provided for special events. The single refuse chute with diverter system will be used for the disposal of all refuse generated in communal spaces.
Organic (Food) Waste	While BCC does not currently offer a food organics collection service to multiple unit dwellings, commercial options are available at additional cost. Separating organic or food waste from general waste is recommended to reduce the total amount of general waste produced. Alternatively, apartment style equipment such as an organic household composters or worm farms is available for use where practical and space allows. Composting should be arranged with building management. Refer to *Appendix C.2* and *C.3* for options.

RECYCLING	
Recycling Comingled, including • glass • aluminum • steel cans • tins • paper • small cardboard • semi rigid plastics	Items for recycling must not be bagged and disposed in loose form. Residential Apartments This can be done by decanting the materials from the individual receptacles into the refuse chute access hopper. Residents will have receptacles within their individual units for collection and storage of at least one day of recycling. Recycling bins are typically placed under the kitchen sink next to the general waste bin. Recycling bins will usually be used for all recycling materials (commingled recycling). However, residents are encouraged to make use of the container refund scheme and separate eligible containers from the commingled recycling material (see below). Communal Spaces Recycling from the communal spaces (e.g., residential recreation levels) may consist of recyclable drink containers, food packaging, (clean) paper, cardboard etc. Recycling bins should be located next to waste bins within this area. Extra bins may be provided for special events.
	Container deposit / refund schemes are currently in place in Queensland. Various models exist including bottle return facilities and (automated) reverse vending machines. Occupants should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams and send back to a return points.

2.4.2. Frequently Generated Non-Residential Refuse

Bins will be provided for the tenancy. After each day of operation or as required, refuse will be transferred by staff / cleaners to the refuse room and decanted into the appropriate bulk bins. Further details are provided in Table 2.5.

Table 2.5: Non-residential Refuse Disposal Details

Refuse Stream	Disposal Details
WASTE	
General Waste	Depending on the type of operations of the individual tenancies, different wastes may be produced. Waste bins should always be lined with bags and the bags tied before removal. Waste bins should be accompanied by a recycling bin in order to facilitate separation of general waste and recycling. For general waste from non-food and beverage outlets, bins of at least 60L capacity should be located in staff rooms, back-of-house or pantry areas. Larger bins an also be placed in areas accessible to the public, e.g. near entrance and exit doors. General waste from food and beverage outlets such as restaurants, takeaways, cafés will be captured by bins typically ranging in size from 30L to 80L that will be placed within the kitchen or back-of-house area to meet the design or layout criteria of the café or restaurant operators.
Organic (Food) Waste – Optional (future)	Separating organic or food waste from general waste is recommended to reduce the total amount of general waste produced. 120L bins can be used in retail and food and beverage outlets, commercial offices should consider benchtop style bin, for disposal of food waste if required. The bins are then transferred to the refuse room for collection. Smaller bins of 120L or 60L caddy bins can be used and the content decanted into bins or food processing equipment in the refuse room.
Cooking Oil Waste	Waste oils should be disposed separately from general waste if large quantities are produced (e.g. in food and beverage outlets). All waste liquids / oils (e.g. from commercial kitchens) should be separated and stored in clearly labelled containers. Typically, waste oils are removed during delivery of new oils by the supplying contractor. Portable self-bunded storage tanks may be utilized by individual tenancies and stored within back-of-house areas of relevant tenancies.

Refuse Stream	Disposal Details
RECYCLING	
Commercial Comingled, including: • glass • aluminum • steel cans • tins • paper / Cardboard • small cardboard • semi rigid plastics	Depending on the type of operations of the individual tenancies, different recycling materials may be produced. Items for recycling must not be bagged and disposed in loose form. This can be done by decanting the materials from the individual receptacles into a larger container / bin on a trolley for transport to the refuse room. For commingled recycling material from non-food and beverage outlets, bins of at least 60L capacity should be located in staff rooms, back-of-house or pantry areas. Larger bins an also be placed in areas accessible to the public, e.g. near entrance and exit doors. Commingled recycling from food and beverage outlets such as restaurants, takeaways, cafés will be captured by bins up to 240L that will be placed within the kitchen or back-of-house area to meet the design or layout criteria of the cafe or restaurant operators.

2.4.3. Infrequent Waste

Table 2.6: Disposal of Infrequently Generated Waste

Refuse Stream	Disposal Details
Green Waste	Green waste is not typically produced from this type of development other than from surrounding landscaped areas or potted plants. Green waste is produced on a largely weather dependent basis and will be removed by the designated maintenance contractor. The engaged contractor will be required to send this material to a composting or resource recovery facility rather than to a landfill. Interim storage is not provided.
Hard Waste / Bulky Goods	Residential hard / bulky waste collections will be coordinated in line with council's standard hard waste collections arrangements. Non-residential hard / bulky waste may be stored in a designated general storage room which should be located on the loading dock level. Alternatively, collections can be coordinated, and hard waste / bulky goods moved to the loading dock or a designated area for removal prior to collection. When storing bulky goods in a loading dock, it is recommended that items are placed on a pallet for easy loading via a pallet jack or forklift onto the RCV.
Hazardous Waste (paints, batteries and cartridges) **Electronic Waste**	Where applicable, occupants usually make their own arrangements for the disposal of specialised or hazardous waste and electronic waste such as recycling of toner cartridges and batteries. Please refer to local council and state government websites for disposal options. Batteries must be disposed of separately and never in the general waste or commingled recycling bins. TTM recommend a communal disposal point is provided by site management and located in the main lobby or alternate suitably accessible location. Collection occurs via commercial arrangement on an ad hoc basis when receptacle is full. It is an expectation that the building management assist with disposal of hazardous, electronic or liquid waste and any paint or chemicals as required and requested. Hazardous waste must be handled with due care, separated and securely stored for collection by a specialist waste contractor. Please refer to local council and state government websites for further information.

3 Recommended Operational Requirements

3.1. Operational Equipment Summary

Equipment required or suitable for use as part of the operational phase of the development is outlined in Table 3.1.

Lists of equipment, equipment suppliers and refuse management service providers for use during the operational phase of the development can be found in *Appendix C*.

Table 3.1: Equipment Schedule

Component	Description	Quantity	Notes
Residential Refuse	General Waste Bins (incl. bin under chutes)	13	1100L bins
	Commingled Recycling Bins (incl. bin under chutes)	26	1100L bins
	Dual Chute System	2	For waste and recycling disposal. See *Appendix C.2* and *C.3*.
	Bin Rotation System – 1 with compaction unit for waste	2	See *Appendix C.2*
	Single Chute with Diverter System	1	For waste and recycling disposal.
	Bin Tug or Bin Towing Equipment	1	See *Appendix C.2*
Commercial Refuse	General Waste Bins	1	1100L bins
	Commingled Recycling Bins	3	1100L bins
	Refuse Trolleys	TBD	See *Appendix C.2* and *C.3.*

3.2. On-going Management

The tables below are intended to demonstrate the required tasks during the operational phase of the development and therefore intentionally left blank.

Responsibilities have to be assigned for all on-going refuse management operations. This is generally done by a building manager, staff and / or cleaners. The following lists (Table 3.2 to Table 3.8) are designed to help managing responsibilities and monitor the refuse operations in order to maintain efficient services and a safe environment.

Table 3.2: General Refuse Management Checklist

Objectives	Checked	Remarks
Organise temporary additional bins or collections to cater for additional waste generated during initial resident move in.		
Organising of weekly pick-ups for all refuse streams.		Liaise with private contractors and Council as required.
Managing daily bin transfers between refuse storage / collection areas if required.		
Check bin fill levels and rotate / swap bins as required, e.g. under chutes.		

3.2.1. Safety

Transferring refuse bins and using refuse management equipment are considered hazardous tasks. Therefore, contractors must ensure that a full risk assessment of equipment, surfaces and related gradients is complete. The contractor must provide procedural documentation to appropriate personnel prior to delivery of equipment and occupancy of the development.

Table 3.3: Safety Checklist

Objectives	Checked	Remarks
Abiding by all relevant occupational health and safety legislation, regulations and guidelines to ensure site safety for residents, visitors, staff and contractors.		
Assessment of any manual handling risks and preparation of a manual handling control plan for waste and bin transfers.		
Provision of equipment manuals, training, health and safety procedures, risk assessments and personal protective equipment to staff / contractors in order to control hazards associated with all waste management activities.		

3.2.2. Signage

All receptacles, bins and other refuse management equipment will have adequate signage. Standard signage will be provided in and around waste collection and storage areas and should be colour coded in accordance with AS 4123.7 – 2006 Mobile waste containers (see *Appendix D*).

Table 3.4: Signage Checklist

Objectives	Checked	Remarks
Ensuring compliance of signage with government local council regulations.		Use signage compliant with colours as noted in *AS 4123.7–2006 Mobile waste containers – Part 7: Colours, markings and designation requirements*
Ensuring that labelling on bins, refuse room etc. is appropriate and clear and easy to read and updated if required.		

3.2.3. Cleaning and Maintenance

Regular cleaning and maintenance of all refuse management facilities is important to maintain a safe and hygienic environment for residents, visitors, staff and contractors.

Table 3.5: Cleaning and Maintenance Checklist

Objectives	Checked	Remarks
General cleaning of all refuse holding and transfer areas including • Refuse bins, rooms and storage areas • Refuse transfer areas including lifts and staircases • Refuse chutes and hopper doors • Any other refuse management equipment		Frequency depends on refuse generation and building operation.
Coordination of specialised cleaning contractors as required.		
Maintenance and servicing of refuse management equipment as per schedule.		Frequency based on manufacturer or supplier specification.
Coordination of specialised equipment contractors as required.		

3.2.4. Refuse Minimisation

Refuse minimisation is an important part of any site operation, it is strongly recommended that building management are actively involved in encouraging and assisting residents to follow the refuse hierarchy. At a minimum, the following should be implemented. Additional refuse minimisation options can be found in *Appendix C*.

Refuse minimisation requires regular reviewing to ensure operational sustainability of refuse volumes, equipment and economic feasibility. It is recommended that refuse weights and movements are noted and reviewed. An external review is usually conducted 12 to 18 months after the implementation of the plan.

Table 3.6: Refuse Minimisation Checklist

Objectives	Checked	Remarks
Regular review of material quantities to avoid over-ordering.		
Encourage residents to regularly review grocery quantities to avoid over-ordering and food waste.		
Consideration of secondary and recycled materials where possible.		
Encouraging refuse minimisation through education and signage (see below).		
Reduce refuse through continuous monitoring and review (see below).		

3.2.5. Education and Communication

On-going education is important to ensure people continue to use the facilities as originally intended. Building management should be involved in education of residents and encouraging participation in recycling activities. All body corporate and leasing contracts should contain clauses pertaining to waste management arrangements and use of any associated equipment.

Table 3.7: Education and Communication Checklist

Objectives	Checked	Remarks
Communication of refuse management arrangements to residents, staff and contractors as required.		
Consideration of promotional opportunities for any successes e.g. awards programs.		

3.2.6. Monitoring and Review

Regular monitoring and inspections of waste and related equipment and facilities from the development should be conducted by building management or designated staff for maintenance and sustainability.

Table 3.8: Monitoring and Review Checklist

Objectives	Checked	Remarks
Continual monitoring of equipment uses and scheduling to ensure best operational outcomes.		
Regular review of refuse management equipment and facilities such as bin volumes, refuse storage capacities and stormwater management arrangements.		
Review refuse collection frequency on a 6 monthly basis with collection contractor.		
Update and amend OWMP based on review outcomes.		

4 Recommended Design Requirements

This section lists general recommended design requirements for the building and refuse management facilities. They should be considered for optimal refuse management within the development, and to comply with relevant regulations and Council requirements. Further details can be found in BCC's Refuse PSP.

4.1. Bin Servicing Point

The RCV's will park in the loading bay area as detailed in Section 2.1.3 for refuse collections. The bin service point will have the following features:

- Has sufficient access and clearance for the waste and recycling collection vehicles to service the bins, including no overhead obstructions.
- Allows bins to be serviced safely while minimising the impediment to vehicle movements during servicing.
- Is clearly separated from car parking bays, footpaths and pedestrian access.
- Is of sufficient size to accommodate the bins.
- Is devoid of stairs, lips or ramps and allows bins to be manoeuvred easily.
- Does not block the entry and exit to the property.
- Is not adjacent to a kitchen or eating area for public use.
- Is over 5m from any door, window or fresh air intake within the development or any adjoining site.
- Is screened sufficiently to minimise the view of bins from neighbouring properties or passing vehicles and pedestrian traffic external to the site.
- Is positioned away from entrances to shops or residential premises.

4.2. Refuse Chutes

The requirements for a waste removal system incorporating waste chutes are as follows:

- Adequate strength for its purpose, including additional reinforcing where necessary at joints, bends and hopper intersections.
- Insect and vermin proof.
- Constructed and installed to prevent the following during use and operation of the system:
  - Transmission of vibration to the structure of the premises.
  - Excessive odour and noise to the occupants of the building.
- Installed in a fire rated duct and ventilated in compliance with building requirements of the Building Code of Australia.
- Comply with the waste chute manufacturer's technical specifications and / or operational limitations, including installation design features and ancillary equipment required to prevent blockages and noise disturbances.
- Fitted with a shutter at the base of the chute for closing off the chute manually during bin exchange and automatically in the case of fire.
- Discharge centrally above the waste containers in the chute discharge rooms.
- Chute hoppers to be:
  - Provided on each residential floor and be located in a mechanically or naturally ventilated position.
  - Be easily accessed by the occupants of each unit.
  - Be separate from any habitable room or place used in connection with food preparation or living areas.
  - Be designed and installed to:
    - Close off the service opening in the chute when the device is open for loading.
    - Be between 1.0m and 1.5m above floor level.
    - Automatically return to the closed position after use.
    - Permit free flow into the chute with hoppers that do not project into the chute.
    - Allow easy cleaning of chute discharge equipment and the chute.
  - Have the largest dimension of the service opening (the diagonal of a rectangular opening) not exceeding 0.75m diameter of the chute with which the hopper is connected.
  - Have a surround on the wall around the hopper that is at least 300mm wide and made of glazed tiling or other impervious material that can easily be cleaned.
  - Have a floor treatment adjacent to the hopper that is constructed of hard impervious materials with a smooth finished surface.
  - Be ventilated and finished with an impervious material covered at all angles, if located within a waste disposal room.

4.3. Refuse Rooms

The refuse rooms will have the following features in order to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- Be insect and vermin proof.
- Fire rated and ventilated in accordance with the National Construction Code – Building Code of Australia.
- Doors must be wide enough to allow for the easy removal of the largest container to be stored.
- The walls, ceilings, floors and equipment are to be designed and constructed of impervious material with a smooth finish to allow for easy cleaning.
- The floors to be graded to fall to a drainage point.
- Drainage points connected to sewer in accordance with trade waste requirements.
- A hose cock must be provided inside the room for cleaning bins and the rooms.
- Adequate artificial lighting.
- Not located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage).
- Permit unobstructed access for removal of the containers to the service point and for positioning the containers correctly in relation to the chutes.
- Will be attractively designed to minimise their visual impact on the surrounding areas.
- Does not have any steps or lips.
- Is enclosed on all sides except for the gated entrance to ensure bins are not visible from a public place, neighbouring properties, passing vehicles or pedestrian traffic external to the site.
- Is of sufficient size to accommodate the bins with sufficient clearance around the combined bin area.
- Is positioned away from entrances to shops or residential premises.
- The height of the bin storage area allows for waste bins to be opened and closed.

4.4. Bin Carting

The bin carting route will the following features:

- Is via hard stand pathways.
- Allows bins to be easily manoeuvred.
- Does not impede traffic flow.
- Does not extend through any habitable parts of a building or food premises.
- Does not have any lips, stairs or steps for bins to be manoeuvred easily.

4.5. Bin Wash

A bin wash-down facility will be provided in each refuse room. It will have the following features:

- Constructed hardstand with a solid concrete base.
- Roofed and designed to prevent entry to rainwater.
- Graded to fall to a drainage point that is connected to sewer in accordance with trade waste requirements.
- Provided with a hose cock for cleaning.
- Is in a well-ventilated portion of the basement and not within 10m of an opening to a food premises or food handling area.

4.6. Storm Water Prevention and Litter Reduction

Designated staff / cleaners are responsible for on-site storm water pollution and litter reduction. To limit the impact on the environment and site, the following measures should be taken into account:

- Providing adequate signage to promote litter control.
- Providing sufficient refuse bins in appropriate areas.
- Preventing unauthorised entry to waste areas.
- Monitoring waste and prevent waste overflow.
- Promoting best practices for waste minimisation.
- Installing litter traps in car parks for any unwanted discharge.

4.7. Ventilation

Natural or mechanical ventilation must be provided to waste storage areas unless refrigerated below 5˚C. Natural ventilation means unobstructed, permanent openings direct to external air no less than one-twentieth (1/20) of floor area. Mechanical ventilation requires a minimum rate of 100L/s and 5L/m^2 exhaust rate.

Appendix A Detailed Refuse Calculations

A.1 Refuse Calculations

The residential generation rates used for the calculation of refuse produced has been applied using the BCC (WaRRS) generation rates applicable at the time of the original DA.

The retail/commercial generation rates used for the calculation of refuse produced has been generally applied from the City of Sydney's 'Guidelines for Waste Management in New Developments' as utilised at the time of the original DA.

These generation rats are based on data from the Commercial Waste Data Review commissioned by the City of Sydney, document dated 22 February 2017. General waste (uncompacted putrescible) and co-mingled recycling waste density factors are applied according to Western Australia Waste Authority figures. All applied generation rates are indicated in Table A.1.

Table A.1: Generation Rates

Type	Measure	General Waste	Commingled Recycling	Source
Residential				
Residential Units	L / Unit / Week	240	180	BCC – WaRRS (DA Accepted Rates)
Commercial				
Food and Beverage	L / 100m² / Day	200*	500	City of Sydney – Food and Beverage
Retail	L / 100m² / Day	30	200	City of Sydney - Retail

*Food waste service is not initially being considered; therefore, food waste generation volumes have been added to general waste for the purpose of calculations.

Table A.2: Residential Building 1 Refuse Calculations

Description	Quantity	Measure	General Waste (L/Week)	Commingled Recycling (L/Week)
Residential dwellings	Units	432	103,680	77,760
Compacted Volumes (L / Week)			**34,560⁺**	**N/A**
Volumes per Collection (L / Collection)			**14,811⁺**	**33,326**
Collection and Equipment Details	Collections Per Week		3	3
	Storage Capacity		3 Days	3 Days
	Equipment Size		1100L	1100L
	Equipment Quantity Required		10.47	23.56
	Equipment Quantity Provided **		13 Bins	26 Bins

* 1 spare bin to be provided for each chute discharge while all full bins are presented for collection.

⁺ 3:1 compaction ratio applied to general waste calculations

All commercial volumes are calculated based on a seven-day operation.

Table A.3: Non-residential Refuse Calculations

Description	Quantity	Measure	General Waste (L/Week)	Commingled Recycling (L/Week)
Retail 1	GFA m^2	136	286	1,904
Retail 2	GFA m^2	89	187	1,246
Retail 3 – Food and Beverage	GFA m^2	146	2,044	5,110
Total Volume per Week (L / Week)			**2,517**	**8,260**
Volumes per Collection (L / Collection)			**719**	**2,360**
Collection and Equipment Details	Collections Per Week		3.5 or (7 per fortnight)	3.5 or (7 per fortnight)
	Storage Capacity		2 Days	2 Days
	Equipment Size		1100L	1100L
	Equipment Quantity Required (min)		1 Bin	3 Bins

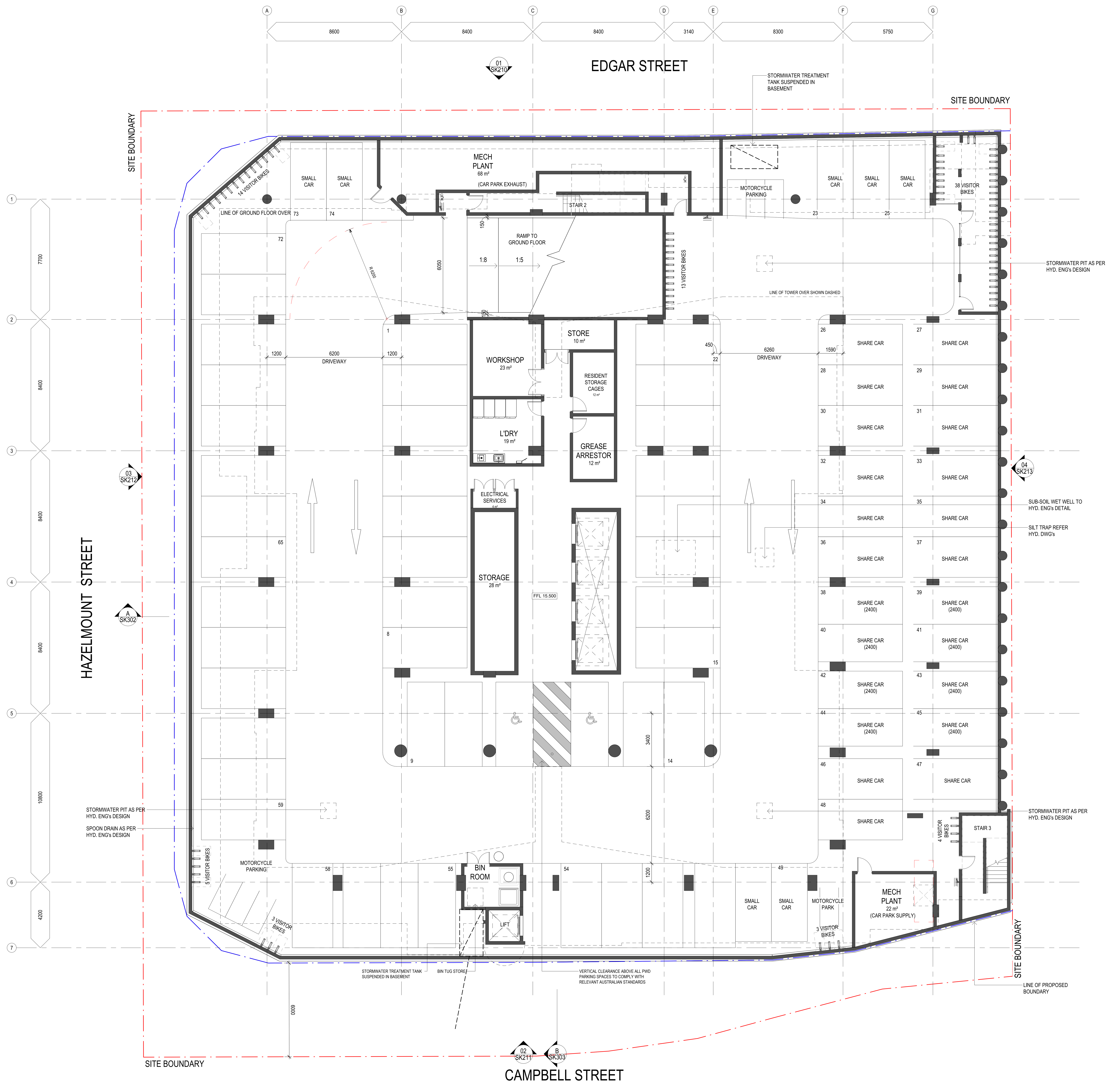
A.2 Non-residential Refuse Volume to Weight Conversion

Table A.4: Commercial Refuse Waste Levy Calculations

Description	Measure	General Waste	Commingled Recycling
Total Volumes	L / Week	2,517	8,260
	m^3 / Week	2.5	8.3
Conversion Factor *	kg / m^3	150	63
Tonnes	T / Week	0.38	0.52
Tonnes per Year	T / Year	19.8	27.2
Diversion Potential	-	46%	54%
Waste Levy **	**$ / Year**	$2,079	$1,313.76

* Applies to uncompacted volumes.
** If 100% of food waste will be diverted from general waste, the waste levy can be significantly reduced.

Appendix B Site Plans and RCV Swept Path Analysis



BASEMENT BICYCLE PARKS	
Level	Count
BASEMENT 1	78

B1 PARKING SCHEDULE		
Carpark Type	Level	Count
Parking Space		
Parking Space	BASEMENT 1	42
PWD		
Parking Space	BASEMENT 1	2
SHARE CAR		
Parking Space	BASEMENT 1	23
SMALL CAR		
Parking Space	BASEMENT 1	7
TOTAL CARPARKS: 74		

B1 MOTORCYCLE PARKING SCHEDULE		
Carpark Type	Level	Count
Parking Space MOTORCYCLE		
Parking Space	BASEMENT 1	7

Key Plan

0 2000 5000

Issue	Description	Date
6	DA ISSUE	16.08.2024
5	ISSUE FOR PRICING	31.01.2022
4	ISSUE FOR INFORMATION	26.11.2021
3	FOR INFORMATION	18.11.2021
2	Preliminary Issue	13.10.2021
1	Preliminary issue for information	08.09.2021

Client

dowse projects
NEW URBAN VILLAGES

Builder

Project Name
BOWEN HILLS RESIDENTIAL

Project Address
19- 25 Campbell Street, Bowen Hills

Drawing Title
B01 GA PLAN

Author:	Checker:	Sheet Size:	Scale:
JF	MH	B1	1:100

Drawing Number:	Issue:
11703_DD1102	6

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Key Plan

0 2000 5000

Issue	Description	Date
6	DA ISSUE	16.08.2024
5	ISSUE FOR PRICING	31.01.2022
4	ISSUE FOR INFORMATION	26.11.2021
3	FOR INFORMATION	18.11.2021
2	Preliminary Issue	13.10.2021
1	Preliminary issue for information	08.09.2021

GROUND BICYCLE PARKS	
Level	Count
GROUND	174

Client

dowse projects NEW URBAN VILLAGES

Builder

Project Name
BOWEN HILLS RESIDENTIAL

Project Address
19- 25 Campbell Street, Bowen Hills

Drawing Title
L00 GA PLAN

Author:	Checker:	Sheet Size:	Scale:
JF	MH	B1	1:100

Drawing Number: **11703_DD1103** Issue: **6**

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Key Plan

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Client

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Builder

Project Name
BOWEN HILLS RESIDENTIAL

Project Address
19- 25 Campbell Street, Bowen Hills

Drawing Title
TYPICAL (EVEN) LEVEL 4 - 33 GA PLAN

Author:	Checker:	Sheet Size:	Scale:
JF	MH	B1	1:100

Drawing Number: **11703_DD1107**

Issue: **6**

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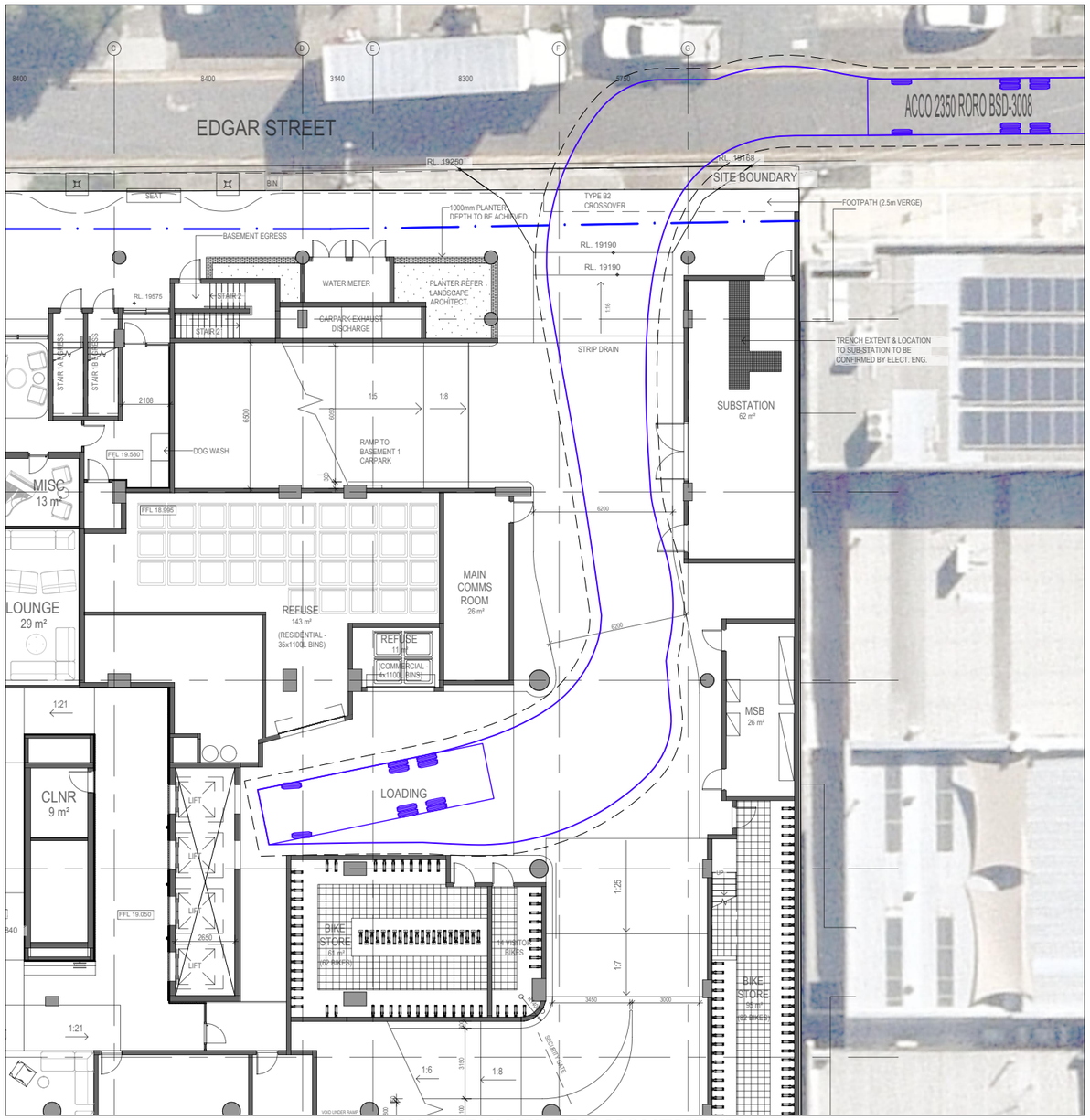
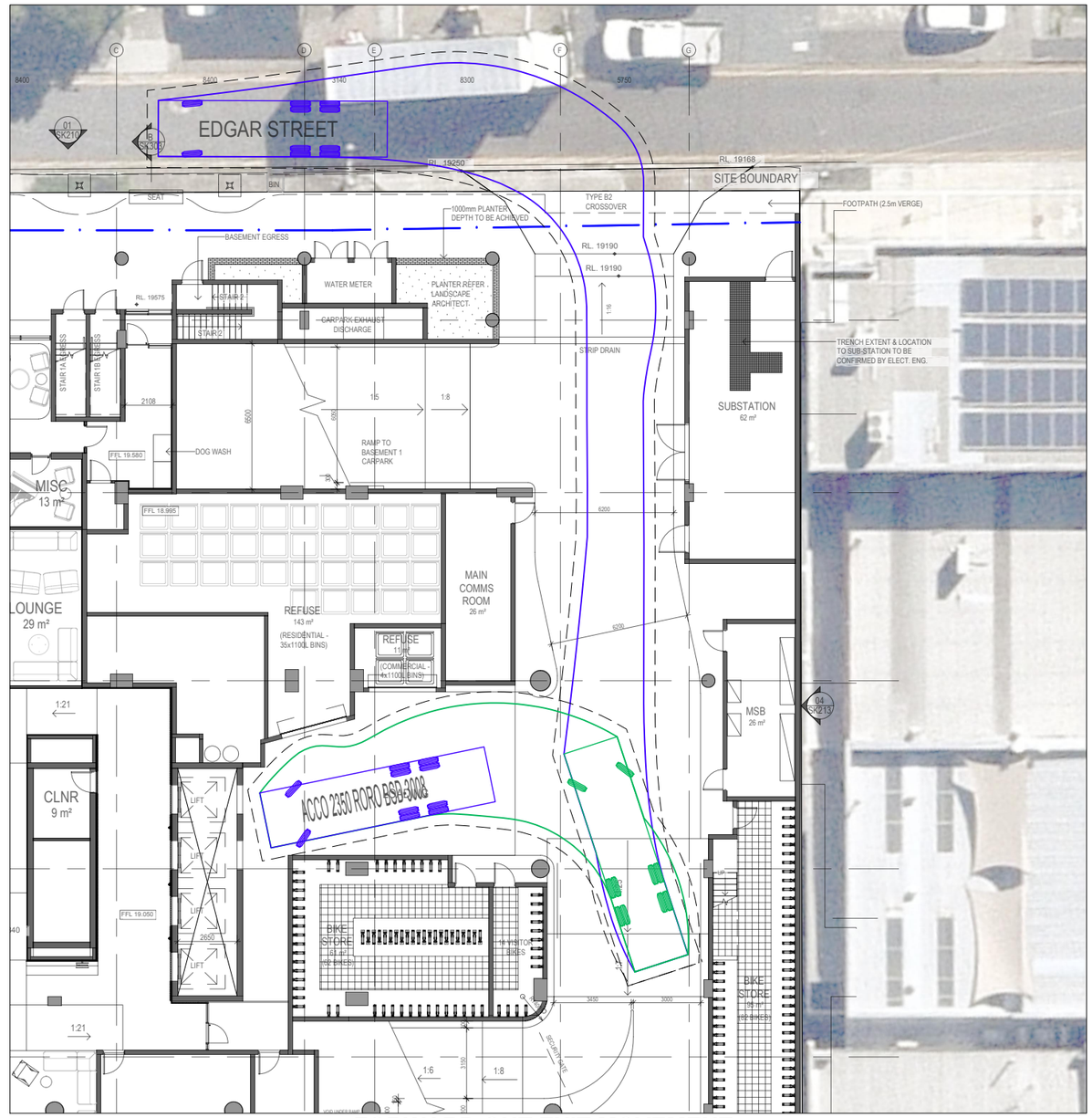
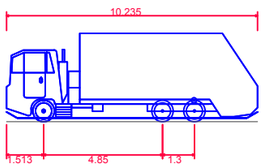


FORWARD IN ENTRY MOVEMENT

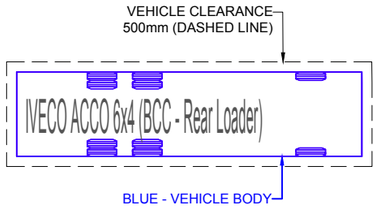


FORWARD OUT EXIT MOVEMENT



BCC Fleet 2020 (Rear Loader)

Overall Length	10.235m
Overall Width	2.500m
Overall Body Height	3.600m
Min Body Ground Clearance	0.150m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.757m
Design Speed Forward	5.0km/h
Clearance Envelope	0.500m



DIRECTOR

SIMON CRANK RPEQ 18360

APPROVED 19 Aug 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
C	19.08.24	1 IN 25 RAMP TRANSITION ADDED	DSF	RBe	SC
B	08.08.24	1 IN 25 RAMP TRANSITION ADDED	DSF	RBe	SC
A	06.08.24	ORIGINAL ISSUE	BV	RBe	SC

SCALE 0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: City Developments Limited

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT: **19 Campbell Street, Bowen Hills**

DRAWING TITLE: **SWEPT PATH ANALYSIS**
10.235m Rear-loader RCV - DESIGN VEHICLE

PROJECT NUMBER	23BRT0683
ORIGINAL SIZE	A3
DRAWING NUMBER	23BRT0683-01
REVISION	C
DATE	19 Aug 2024
SHEET	1 OF 1

Appendix C Systems and Specifications

C.1 Typical Refuse Bins

Bin Types	Waste Streams	Examples	Information
Residential unit bins	General waste and recycling		Various options and sizes. Built and standalone bin available. Examples: https://www.bunnings.com.au
Back-of-house bins	General waste, recycling, food waste, paper / cardboard		Various options and sizes available. Tenant to supply depending on preference and space available. Example: 60L metro bins Dimensions approx. 559 x 279 x 635mm (L x W x H) Examples: https://www.spacepac.com.au
240L bins	General waste, paper, recycling, green waste		Dimensions approx. 740 x 580 x 1080mm (L x W x H) (dimensions may depend on contractor) Examples: http://www.justwheeliebins.com.au, http://wheeliebinsonline.com.au
1100L bins	General waste, recycling, paper / cardboard		Dimensions approx. 1070 x 1240 x 1330mm (L x W x H) (dimensions depend on contractor) Examples: http://www.justwheeliebins.com.au, https://www.australianwaste management.com.au

C.2 Typical Refuse Management Equipment

Systems	Waste Streams	Examples	Information
Organics Household Composting, Worm Farm, Digesters	Food waste / organics		Organics / food waste separation, composting and digesting; household-type and commercial grade equipment available Examples Urban Composter https://www.urbancomposter.com.au Closed Loop https://closedloop.com.au/upcycling-products ORCA https://www.feedtheorca.com
Food Waste Processing, Storage and Disposal	Food waste / organics		Volume reduction and organics / food waste recycling through food waste separation and macerating Examples: Pulpmaster Food Processing and Storage https://pulpmaster.com.au Under-sink food waste macerators and disposers https://www.insinkerator.com.au (household type macerators) https://insinkerator.emerson.com (commercial-grade macerators)
Cooking oil storage and recycling	Used cooking oil		Cooking oil recycling Example: https://www.cookers.com.au Cooking oil delivery, used oil collection and provision of required equipment

Systems	Waste Streams	Examples	Information
Bunded pallets	Liquid Waste		Spill containment, e.g. for waste cooking oil containers Example: https://www.tradeenviro.com.au/bunded-pallets https://www.materialshandling.com.au/products/bunded-pallet
Trolleys	General waste, recycling, food waste, paper / cardboard		Assisted manual transfer of refuse Examples: https://rubbermaidcommercial.com.au/products/waste-management/mega-brute https://www.materialshandling.com.au/products/deluxe-compact-cleaning-carts
Chute systems	General waste, recycling, food waste		Refuse disposal in multi-storey buildings through refuse chutes: single chute for waste only, or single chute with diverter system or dual chute for disposal of waste and recycling Examples: https://www.wastech.com.au/products/chutes https://www.elephantsfoot.com.au/products/chutes
Bin tugs	-		Dimensions: 650mm L x 609mm W Assisted transfer of refuse Examples: http://ev.spacepac.com.au/categories/tugger, https://www.spacepac.com.au/product/wheelie-bin-aluminum-steel-trailers
Bin Trailers	-		Dimensions: 2100mm L x 600mm W

C.3 Refuse Transfer and Disposal Methods

Method	Examples	Description
Manual transfer / disposal	   	**Manual transfer** is simply the process of physically carrying waste bags, food waste receptacles or recycling boxes and crates without assistance. From a safety perspective, this is acceptable for small quantities and initial disposal into refuse chutes, refuse compartments or, in the case of ground level activities, directly into the refuse storage room. • **Waste** material should be bagged prior to any transfer from apartments, suites, offices, back-of-house areas etc. to waste storage compartments or rooms. • **Food waste** should be placed in receptacles such as a caddy style bin or bucket which will not allow leakage during transfer. • **Recycling** material should be placed in boxes or crates prior to transfer. • **Cardboard and paper** items can be placed within another cardboard box for transfer. Examples: https://www.alamy.com
Assisted manual transfer		**Assisted manual transfer** includes the use of any wheeled container, wheelie bin or trolley with a capacity to carry refuse items with a combined weight of 20kg and above. The equipment bares the weight of the material, but it still requires physical force and or balance to move the bin or trolley. From a safety perspective, this type of equipment should be a minimum requirement for transfer of material greater than 20kg and when transferring between individual levels to the refuse storage room or loading areas. Use of enclosed or caged equipment will also eliminate 'litter or leakage trails' which can occur when using open or unsealed equipment. Examples: http://www.justwheeliebins.com.au, https://rubbermaidcommercial.com.au, https://www.materialshandling.com.au
Gravity transfer / disposal	 	**Gravity transfer** describes the use of refuse chutes. This typically includes access at all floors and discharging in bulk bins in ground floor or basement refuse rooms. Examples: https://www.elephantsfoot.com.au/products/chutes, https://www.wastech.com.au/products/chutes
Assisted transfer	 	**Assisted transfer** includes the use of any container with capacity to carry 20kg or more, pushed or towed by mechanical or electrical self-propelling equipment.

C.4 Refuse Minimisation Options

Refuse Minimisation Options – Waste

Systems	Description
Food rescue	OzHarvest and Second Bite are food rescue organisations working throughout Australia. The organisation collects surplus foods from businesses (including Woolworths, Coles, Goodman Fielder and other smaller companies) and redistributes the foods to welfare agencies. They provide regular scheduled collections or ad-hoc / on call collections, and they have refrigerated vehicles. Other accepted items include fresh fruit and vegetables, tinned goods, cold meats and deli items, and readymade meals (which will only be accepted frozen). Where food rescue organisations are available, consideration may be given to suitable space for the temporary storage of food stuffs, including dry storage and the placement of a small fridge if cold room space is not available. There is no associated collections cost. Hence, it can be considered a zero-cost option for disposal of what would otherwise be food waste, and it supports the community at the same time.   Sources: www.ozharvest.org, www.secondbite.org
Composting	Food waste composing is an option of reducing the amount of general waste going to landfill where organic waste can create methane gas due to anaerobic digestion, which contributes to global warming. Systems of different scales exist from small benchtop composters for individual households or apartments to commercial size systems. Examples are shown below. The process usually involves breaking down organic food scraps through natural processes. This includes systems such as worm farms or composters where microbes break down the food waste, with or without the aid of compost additives. The composted products are rich in nutrients and good bacteria, and they can be added to flower bed or gardens. Most food wastes and other organic (garden) material can be composted including meat, fish, vegetables, fruit, dairy, coffee or wilted flowers. However, large bones, excessive liquids such as cooking oil or seafood shells should not be placed in the composers.  Sources: https://www.urbancomposter.com.au, https://closedloop.com.au/upcycling-products, https://www.feedtheorca.com

Food waste separation and collection	When considering separation of organic food waste, the handling and potential for volume reduction should also be considered. As an example, the **Pulpmaster** system can be used to reduce the stored volume of food waste produced, and to prepare the material for re-use. Typically, the system is placed in proximity to sink areas in the kitchen, particularly where food preparation waste or plate scrapings can be easily disposed. This provides a fully sealed transfer system for storage and collection. Pulping systems can also be placed back-of-house spaces for restaurants and cafes or placed within a refuse room for centralisation to multiple users. Pulped food waste is pumped into holding tanks for storage and collection via a 50mm pipe and collected by a liquid vacuum tanker. The images below provide visual context of the connection from pulping machine to storage tank and the option for decanting 120L bins into the machine via a bin lifter and auger feed. The tank may be up to 20m away from the pulping machine. The distance is increased when including vertical drops from upper levels of the building. The storage tank may be up to 30m from a loading area, with the only requirement being a service pipe with camlock end connection placed within proximity of the loading area. Collections are completed by a vacuum tanker which may range in size depending on the size of the storage tanks and the distance of the tank from the loading area.      Source: http://pulpmaster.com.au
Waste Conversion	Converting waste by reducing its volume and weight means less material to be disposed of, which results in fewer refuse collection vehicle kilometres. This allows cost savings in logistics and has a positive environmental effect due to less fuel used per amount of waste to be disposed. As an example, OMPECO provide a solution for converting general and medical waste into a sterilised, dehydrated ground material as shown below. The process involves loading the sterilisation chamber with waste material and crushing / shredding of the material by rotors to produce a fine ground. During the process, the material is heated by friction to 100˚C which causes the moisture in the waste material to evaporate. After evaporation, the material is heated further to sterilisation or pasteurisation. The ground material is then cooled down to be unloaded from the converter. The final product has excellent long-term handling and storage properties, the it has up to 80% less volume and 50% less weight than the original waste material. It can be used in waste to energy systems as it is comparatively dry with a high calorific value.    Source: http://www.ompeco.com/italian/language/en/home-2/#

Waste compaction	Various compaction equipment exists for reducing the volume of (general) waste. As a result, less bins and / or fewer bin collections and service vehicle trips are required, which helps to reduce costs and environmental impact. Examples of typical waste compaction equipment include the following: • Under chute compactors can be installed in developments with waste chutes. This allows to compact waste material before it is discharged from the chute into the waste bins. • Bin presses can be used to annually compress waste material in bins of different sizes. • For public spaces, litter bins are available with a built-in compaction mechanism that reduces the volume of waste material in the bins. An innovative example is the solar compactor shown below. Energy produced by a solar panel on top of the bin is used to operate a fill level sensor and automated internal compaction mechanism, allowing up to eight times more waste to be stored in the bin before collection is required. In addition, notification about the fill level of the bins can be sent out in order to monitor bins and manage collection frequencies.  Sources: https://www.wastech.com.au/products/compactors, https://www.wastech.com.au/products/chutes/ecopac-compactor, https://wasteinitiatives.com.au/products/waste-compactors, https://www.solarbins.com.au/features/big-belly-solar-bin
Charity donations	A good way of minimising waste is to reuse items that are still good to use. Several charity organisations exist that accept items such clothing, shoes, bedding, books, toys, furniture, kitchenware and other household items. The donated items must not be torn, damaged or broken. Electrical appliances such as white goods are usually not accepted. Common organisations operating in Australia include Saint Vincent de Paul Society (Vinnies) and Lifeline (see images below). Items can be placed into the organisations' charity / donation bins located in various public spaces such as near community or shopping areas. Alternatively, they can be dropped off at the organisations' shops during opening hours. Refer to https://www.lifeline.org.au or https://www.vinnies.org.au for further information. For larger developments and precincts where large amounts of donation items can be expected, the placement of charity bins within the development should be taken into consideration.   Sources: https://www.vinnies.org.au, https://lifelinesouthcoast.org.au

Refuse Minimisation Options – Recycling

Systems	Description
Container deposit schemes	Container deposit / refund schemes are currently in place in several states in Australia. Various models exist including bottle return facilities and (automated) reverse vending machines. Residents, tenants, staff and cleaners should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams, and return them to one of the return points. Storage space or dedicated bins within tenancies, apartments or communal areas should be provided. For larger developments or precincts where large amounts of empty containers are expected, consideration may be given to an on-site return point. The return points should be located near recycling bins so that cardboard boxes or plastic bags that have been used to transfer the empty containers to the return point can be disposed appropriately. This can prevent cluttering of the area around the return point. The images below show a typical return point and containers that commonly qualify for a deposit refund.    Sources: https://returnandearn.org.au, https://envirobank.com.au/bottle-and-can-recycling-queensland, https://www.containersforchange.com.au/how-it-works

C.5 Refuse Management Service Providers

Specialist Waste Services	Food Waste	Waste Cooking Oil	Hazardous Waste	Liquid Waste	Electronic Waste	Industrial Waste	Construction & Demolition Waste	Waste Water	Secure Document Destruction
Cleanaway * https://www.cleanaway.com.au		✓	✓				✓	✓	
JJ Richards * https://www.jjrichards.com.au		✓	✓	✓		✓	✓	✓	
Veolia * https://www.veolia.com/anz			✓	✓	✓		✓	✓	✓
SecondBite https://www.secondbite.org	✓								
OZ Harvest https://www.ozharvest.org	✓								
Cookers https://www.cookers.com.au		✓							
ToxFree https://www.toxfree.com.au			✓		✓	✓			
AceWaste https://www.acewaste.com.au			✓			✓			

Appendix D Refuse Signage

D.1 Refuse Signage

Waste signage guideline are provided by the Queensland government: https://www.qld.gov.au/environment/pollution/management/waste/recovery/recycling/signage.

General Refuse Signage

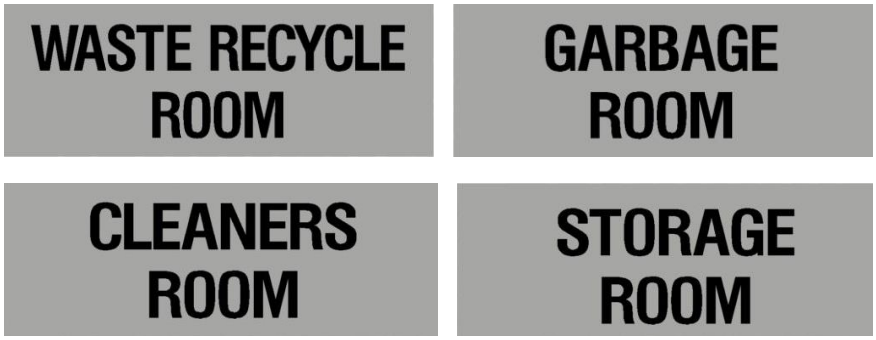
Other Refuse Signage

D.2 Chute Signage

D.3 Other Refuse, Facility and Safety Signage

Various signage including refuse area, safety and facility signage should be arranged through certified signage providers. Example signs can be found at http://www.signblitz.com.au, https://www.wayout.com.au or https://www.smartsign.com.

Example Refuse Room Signage



Example Facility Signage

Example Safety Signage

Appendix E Terms and Abbreviations

In this OWMP, a term or abbreviation has the following meaning unless indicated otherwise:

TERM	ABBREVIATION	DEFINITION
Equipment		
Bin (Refuse Bin)		A plastic or steel container for disposal and temporary storage of waste or recycling items. Various types and sizes exist for different items and purposes. Examples include residential unit bins, bulk bins, MGB, steely bins and specialised for medical waste or cigarette butts.
Bin Storage Area		An enclosed area designated for storing on-site refuse bins or a refuse compactor within the property.
Bulk Bin		A galvanized or steel bin receptacle that is greater than 360L in capacity generally ranging from 1.00m³ to 4.50m³ used for the storage of refuse that is used for on-site refuse collection.
Bulk Mobile Garbage Bin	Bulk MGB	A plastic (polypropylene) receptacle that is greater than 360L in capacity generally ranging from 660L to 1100L used for the storage of refuse.
Chute Discharge		The point at which refuse exits from the refuse chute.
Chute Discharge Room		An enclosed area / room housing the discharge and associated equipment for the refuse chute.
Collection Point		An identified position where refuse bins are stored for collection and emptying. The collection point can also be the bin storage area.
Compactor		A receptacle that provides for the mechanical compaction and temporary storage of refuse. It allows to reduce bin numbers and collection frequency.
Composter		A container or machine used for composting specific food scraps and/or organic materials.
Food Waste Recycling System		Defined as a vacuum or pump-based system for shredding, macerating or pulping of food waste. The food waste is transferred through pressure (service) pipes to sealed liquid storage tanks.
Green Waste		All vegetated organic material such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers.
Hopper		A fitting into which waste is placed and from which it passes into a chute or directly into a waste container. It consists of a fixed frame and hood unit (the frame) and a hinged or pivoted combined door and receiving unit, and it is typically mounted on a wall.
Liquid Waste		Non-hazardous liquid waste generated by commercial premises should be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste).
Mobile Garbage Bin	MGB	A plastic (polypropylene) bin or bins used for the temporary storage of refuse that is up to 360L in capacity and may be used in kerbside refuse collection or on-site collection.
Putrescible Waste		Putrescible waste is the component of the waste stream liable to become putrid and usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.
Recycling		Recycling contains all material suitable for re-manufacture or re-use, e.g. glass bottles and jars; plastics such as PET, HDPE and PVC; aluminium aerosol and steel cans and lids; milk and juice cartons; soft drink, milk and shampoo containers; paper, cardboard, junk mail, newspapers and magazines.
Refuse		Refuse is material generated and discarded from residential and commercial buildings including general waste, recyclables, green waste and bulky items.

TERM	ABBREVIATION	DEFINITION
Refuse Chute		A ventilated, essentially vertical pipe passing from floor to floor of a building for the purpose of refuse disposal, with openings as required to connect with hoppers and normally terminating at its lower end at the roof of a central refuse room.
Refuse Collection Vehicle	RCV	A vehicle specifically designed for collecting and emptying refuse bins and refuse compactors.
Refuse Storage Room		An area identified for storing on-site MGBs or Bulk Bins within the property.
Refuse Tolley		A cart on wheels that can be used to collect smaller quantities of refuse from different areas or rooms of a building or site, and wheel the collected refuse to a (bulk) bin storage area where it is disposed. Refuse trolleys are commonly used in hotels or offices.
Regulated Waste		Regulated waste is waste prescribed under legislation as regulated waste.
Transfer (Manual Transfer)		Manual transfer means physical transfer of refuse material and associated bulk bins or trolleys without assistance.
Waste		Waste is referred to as refuse material with the exclusion of recycling, green waste, hazardous waste, special waste, liquid waste and restricted solid waste.
Waste (General Waste)		General waste is generally referred to as material free of any actual or apparent contamination such as pathological / infectious, radioactive materials and / or hazardous chemical. Reporting use is for material considered to be free of food waste.
Wheelie Bin		A MGB of up to 360L, usually with 2 wheels for easy transfer. A common type is a 240L wheelie bin used for kerbside collection in many residential areas.
Measures		
Cubic Metre	m^3	Volume in cubic metre(s) related to refuse management equipment.
Ground Floor Area	GFA	The GFA of all storeys of a building is measured from the outside of the external walls or the centre of a common wall. It is commonly measured in square metres.
Kilogram	kg	Kilogram(s) related to refuse weight.
Litre	L	Litre(s) related to refuse volumes.
Square Metre	m^2	Square metre(s) related to refuse areas.
Ton	T	Ton(s) related to refuse weight.
Collection Vehicles		
Body Truck		A conventional heavy vehicle with a covered loading area. It is generally not specifically designed for emptying the content of bins into the truck during refuse collections, but can be used to carry entire (full) bins for servicing by bin swap-over.
Rear-End-Loading Refuse Collection Vehicle	REL RCV	A truck specially designed to collect municipal solid waste and recycling, typically 240L wheelie bins to 1100L bulk bins, from rear loading mechanism and haul the collected waste to a solid waste treatment facility.
Tank Truck		An RCV that is specifically designed to collect liquid wastes such as waste cooking oil and food waste pulp. The waste is typically pumped from a waste storage tank into the truck via a hose. Liquid waste management equipment is often provided by the contractor who collects the waste and operates the truck.