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Waste Management Plan

S3 & S4 Younghusband Woolstore
Redevelopment

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Document verification

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1. Introduction

The Younghusband redevelopment is committed to the goals of One Planet Living and moving towards zero waste to landfill. This waste management plan (WMP) provides design advice for S3 and S4 to help meet these objectives and manage the estimated solid waste and recycling volumes. We have developed this WMP in consultation with Impact Investment Group, HGW Projects, Woods Bagot and other project teams. This design aims to maximise the performance of the waste management system while balancing site-specific constraints.

Rawtec has also prepared a Waste Strategy and Implementation Plan for the Younghusband redevelopment. These documents outline strategies and actions for waste avoidance and reduction.

2. Waste and recycling services

Better practice waste and recycling management maximises source separation and recycling of discarded resources. We recommend the following services be provided to achieve this goal:

- organics recycling
- comingled recycling
- cardboard recycling (for food and beverage/retail areas)
- paper recycling (for office areas)
- general waste.

Recycling services for less frequent materials should be provided as part of better practice systems. This includes collection and recycling of E-waste, batteries, used lighting and hard waste.

The design must comply with all relevant aspects of the Building Code of Australia. In addition, Appendix 3 provides a list of relevant Australian Standards for waste management.



3. Roles and responsibilities

This WMP addresses the physical design aspects of the waste system. The success of the plan's implementation also depends on the correct use of systems by tenants, cleaners, building management and private waste contractors. Each group has roles and responsibilities and potential mechanisms to ensure they are implemented (Table 1). These elements are further described in the Waste Strategy and Implementation Plan; however, some elements are provided here to highlight their importance in supporting successful implementation of this WMP design.

Table 1 Roles and responsibilities to support implementation of WMP design

Who	Roles and responsibilities	Mechanisms
Tenants	<ul style="list-style-type: none"> Correctly sort waste and recyclables into the bins provided 	<ul style="list-style-type: none"> Roles and responsibilities and KPIs built into tenancy agreements Induction and training provided to tenants Feedback on performance
Cleaners/building management contractor	<ul style="list-style-type: none"> Transfer sorted recyclables from tenancies to central waste aggregation room. This includes ensuring sorted streams are not mixed (for example by using a multi-sort cleaners' trolley) Record and report information about incorrect use of bins by tenancies as identified when emptying/moving the bins Place in-tenant bins back in their designated locations after emptying Supply and use the correct liners for bins (E.g. compostable bin liners for organics) Circulate bins as required throughout the development Use compactors, balers and other equipment to manage waste 	<ul style="list-style-type: none"> Roles and responsibilities and KPIs built into contracts for cleaning and building management Contract management
Private waste contractor	<ul style="list-style-type: none"> Collect waste and recyclables from development using the designated loading zone and presentation area, and within the agreed collection time Transfer waste and recyclables to suitable depots/facilities (e.g. organics to a licensed commercial composting facility) Provide regular reporting on waste volumes collected by stream and by tenant (where possible), overall diversion performance, etc. 	<ul style="list-style-type: none"> Roles and responsibilities and KPIs built into contracts for waste and recycling Contract management

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4. Estimated waste volumes and types

We estimate about 32,000 litres of waste and recyclables will be generated from S3 & S4 per week (Table 2). These estimates do not include smaller/less frequent waste volumes such as E-waste.

Table 2 Estimated waste volumes produced per week for Building S1 and S2¹

Estimated volume of waste and recyclables per week (litres)						
Building	Organics (food)	Comingled recycling	Cardboard	Paper	General waste	Total
S3	1,800	1,200	1,700	800	2,900	8,400
S4	3,400	3,900	3,700	3,300	9,400	23,700
Litres per week	5,200	5,100	5,400	4,100	12,300	32,100

The volumes are based on land uses in the architectural plans. These estimates are based the Waste and Resource Generation Rates (WRGRs) for general waste and comingled recycling published by Sustainability Victoria. We have refined these estimates to identify likely volumes of recyclables (organics, cardboard and paper) that can be source separated and diverted from landfill via better practice recycling systems.²

We expect that actual volumes for this development may be lower from these design estimates since they are based on average values. Given the development's commitment to working towards zero waste it is anticipated that:

- these volumes can be reduced further through engaging with tenants and developing requirements specifically for waste avoidance and reduction
- volumes of general waste can be further reduced by diverting resources to recycling streams.

¹ Estimates are based on the proposed land use data provided by the client and architect, City of Melbourne waste generation rates and Sustainability Victoria better practice guide for waste management and recycling in multi-unit developments.

² We have estimated the proportion of the general waste that is suitable for organics recycling (using South Australian WRGRs) and the proportion of comingled recyclables that may be suitable for cardboard and paper recycling (using Rawtec industry estimates).



5. In-tenancy systems for recyclables and waste

Tenancies will have different systems to dispose of waste and recyclables and source separate recyclables (Table 3). Across all systems it is important that:

- they are conveniently located for users
- signage for bins is highly visible and displayed above and on bins. If bins are stored in drawers (i.e. in kitchens) signage needs to be displayed in front of drawers
- compostable liners are used in organics bins. This may also include kitchen caddies on kitchen benches to collect food scraps
- transparent liners are used for general waste to identify instances of incorrect sorting of waste
- comingled recyclables are collected loose.

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Table 3 In-tenancy disposal systems

Tenancy /areas	In-tenancy disposal system for waste and recyclables
Office kitchens	Office kitchens equipped with bin stations for recycling of organics (this could be a benchtop kitchen caddy), comingled recyclables and general waste.
Offices	<p>No under desk bins to be provided.</p> <p>Bin stations set up at convenient locations across office areas for recycling of organics, comingled recyclables, paper/cardboard and general waste using 60-80 litre bins.</p> <p>A recycling area provided within printing/utility rooms for recycling of paper (240 litre bin), battery recycling tube, a box for used printer cartridges and a small cage for E-waste.</p>
Retail	<p>Retail areas will collect waste and recycling in bins/containers (60 - 100 litre) located within their tenancy. This includes bins for source separation of organics (food, serviettes, etc), comingled recyclables and general waste.</p> <p>Cardboard and large volumes of recyclable glass should be collected separately.</p>
Public areas	Bin stations set up across public areas for recycling of organics, comingled recyclables, paper/cardboard and general waste.



Photo: Example office bin station setup



Photo: Example public bin station setup³

³ Photo source: Ecoversity, The University of Adelaide.

6. Waste transfer pathways

Cleaners will collect waste and recycling from the bin stations on each floor of the offices and transfer them via a lift to the waste aggregation room in the basement one level of S4. Methods for moving waste from the tenancies to these locations are described in Table 4 below.

Retail tenancies will aggregate their waste and recycling in their back of house (BOH) bins during the day. These bins will then be transferred to the waste room in the S4 basement by staff or cleaners and material placed in the bulk bins.

Maps outlining the transfer pathways of waste and recycling are included in Appendix 2. This includes transfer pathways for tenant waste and for the collection of the bins. These pathways must be:

- clear of steps and obstructions
- minimum width of corridors and doorways of 1.25m (provide 1.5m in pathways where 1100 litre bins need to be transferred)
- sloped no more than 1:10.

To reduce amenity impacts of moving waste and recycling, it should:

- be moved using pathways that avoid public and high pedestrian traffic areas
- be moved during times of low patronage (e.g. late in the evening).

Table 4 Methods and pathways for moving waste from tenancies to waste aggregation rooms

Item	Description
<p>Moving recyclables and waste from smaller bins</p>	<p>Cleaners empty smaller bins (60-80 litre) from offices/tenancies and move them to the waste room using suitable trolleys and/or equipment via corridors. Waste and recycling will then be placed into the relevant bins.</p> <p>Retail tenants or cleaners and move waste and recycling to the waste room using suitable trolleys and/or equipment via corridors. Waste and recycling would then be placed into the relevant bins.</p>
<p>Moving paper recycling bins</p>	<p>Paper recycling bins from printer room can be collected from in-tenancy locations via a pull in/out service or presented in the S4 waste room</p>



Example cleaners' trolley for moving separate waste and recycling stream (source: Rubbermaid)



Photo: 240 litre recycling bin

7. Waste aggregation rooms

Waste and recycling will be collected in the waste aggregation room in basement one of S4. This will be managed by cleaners/building management so it remains functional and safe.

Table 5 provides the estimated number of bins required in the waste aggregation room to manage the estimated waste and recycling volumes across S3 and S4. These figures are based on:

- the building being managed under a single collection contract via a commercial contractor
- using rear-lift services for general waste, commingled recyclables, organics and paper recycling
- cardboard collected from S3 and S4 (into 1100 litre bins) being transferred to the baler in S2.

Table 5 Estimated bin requirements and collections per week for S3 and S4

Estimated bin requirements for S3 and S4					
	General waste	Comingled recycling	Organics (food)	Paper	Cardboard
Bin size	1100	1100	660	240	
Collections per week	3	3	3	1	Taken to S2
Number of bins	4	2	3	17	via 1100 bin and baled
Total bin capacity per week	13,200	6,600	5,940	4,080	

Layout of the waste aggregation rooms

S4 will have a waste aggregation room that also serves S3. The design of the waste storage area should:

- be vented and reduce odour and noise
- consider and preserve visual amenity for tenants, neighbours and the public
- prevent waste spreading beyond the room
- have washable surfaces
- be fitted with fire sprinklers and rated to fire safety according to the Building Code of Australia
- be well lit to allow use after dark
- be designed to comply with the Building Code of Australia

If a forced ventilation or air-conditioning system is used (for enclosed storage areas), it should meet ventilation requirements of the Building Code of Australia and AS 1668.2. The use of ventilation and air-conditioning in buildings should not be connected to the same ventilation system supplying air to the units.

We recommend facilities for bin washing are provided. A bin washing station must:

- slope to a drain leading to the sewer
- have a tap and a hose with mains supply
- be at least 2m x 2m
- be slip resistant.

Line marking and bunding is not required and bins can be stored on top of the bin wash area. It may also be possible for the private waste contractor to be contracted to provide this service (either on-site or off-site).



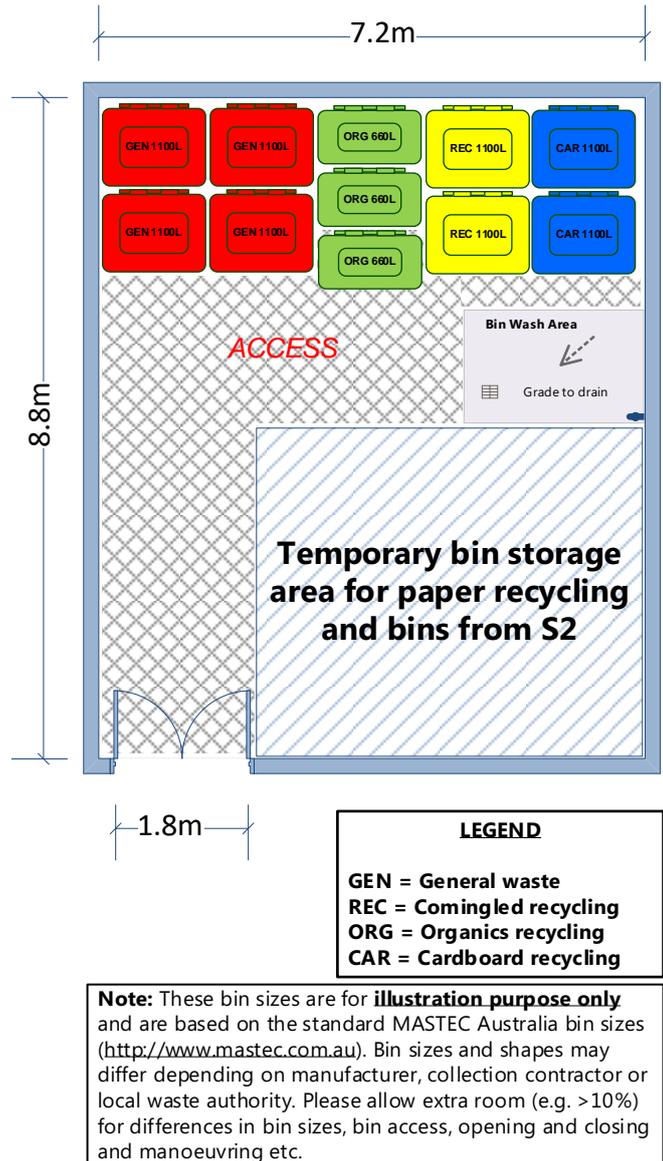
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Figure 1 shows the layout of the waste aggregation rooms. Based on the service requirements for the development outlined above, the room allows the management of waste and recycling. If collection frequencies are reduced (Table 5) then additional space may be needed to store materials between collections.

Paper bins are not displayed on the drawings as they will be stored within the office tenancies. These can be collected from the tenancies via a pull in/out service or transferred to the bin room by the building manager/cleaner for collection and returned to the office tenancies.

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Figure 1 Layout of the waste aggregation room for S4 on the lower ground level



8. Ancillary services

Additional services are required to ensure best practice can be achieved onsite. E-waste is banned from landfill, used lighting is hazardous and both contain valuable resources that can be recovered.

Table 6: Ancillary recycling services

Waste type	On-site management	Collection/ Drop off
E-waste recycling (e.g. computers and IT equipment, batteries, printer cartridges)	<p>Temporarily store E-waste within the tenancies at mini recycling stations within the printing rooms, including:</p> <ul style="list-style-type: none"> a tube for used batteries a box for used printer cartridges a small cage for used e-waste <p>These containers would be emptied by cleaners and/or building management as needed and taken to the central waste aggregation room in S4. Storage areas for E-waste should be developed in accordance with Australian Standard AS/NZS 5377:2013.</p>	Building management to arrange for E-waste to be delivered to an appropriate receipt facility (e.g. recycling depot or participating retailer) or collected by a certified private collection contractor.
Used lighting recycling	Require electricians to take any used lighting offsite for recycling. Temporarily store any remaining lighting in the waste aggregation room.	Building management to arrange for collection of used lighting by a certified private collection contractor as needed.
Hard waste (e.g. used furniture)	Store hard waste within the tenancies.	Hard waste to be collected via a pull-in/pull-out collection service during retrofitting or maintenance activities. This must be arranged by the tenants and building management so collection happens at an appropriate time.
Soft plastics	OPTIONAL: Collect soft plastics within tenancies and transfer to the waste aggregation room in S2. Aggregate into a bale frame and bale to reduce the volume.	Baled soft plastics collected by a suitable private contractor via a flatbed truck (potentially while baled cardboard is collected)

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9. Waste and recycling collections

Collections will take place from the S4 loading area. The private waste contractor will park their vehicle in the loading bay and collect bins from the waste aggregation room in S4. Once emptied, the private contractor will return the bins to the waste aggregation rooms. The pathways should:

- be clear of steps and obstructions
- have a slope of no more than 1:10.
- have corridors and doorways no less than 1.5m wide (to allow transfer 1100 litre bins around corners).

Approximate truck dimensions are provided to help the traffic consultant's analysis (Table 7). Please note:

- Collection vehicle dimensions and operating requirements vary between private waste collection contractors.
- Rawtec does not guarantee the loading area in S4 has space for waste collection vehicles. This must be independently confirmed by the Traffic Consultant.
- The client must ensure the private waste collection contractor can service the development before collection can begin.

Table 7: Approximate waste collection vehicle dimensions

Collection vehicle dimensions ⁴		
Vehicle type	Rear Lift	Pan-tech/Flat Bed
Collection type	Collection of bins up to 1100 L	At call waste streams and baled resources
Dimensions	Minimum 3.5m ⁵ (h) x 2.5m (w) x minimum 8.8m ⁶ (l)	Minimum 3.5m ⁷ (h) x 2.5m (w) x 8.8m (l)
Rear loading space required behind vehicle	2m	-
Operational vehicle height	Minimum 3.5 m	Up to 4.5m
Vehicle turning circle	18-25m	10m

Collection of waste from Stage 1 (S1 and S2)

The loading dock may be used to collect waste and recycling from the S2 building waste room. Bins will be transferred via the lift to the loading dock, emptied and then returned to the central waste aggregation room in S1. There may also be some space in the S4 waste room where bins can be stored temporarily prior to collection.

⁴ Vehicle width and length dimensions are based on Australian MRV standard specifications - AS 2890.2-2002. Vehicle heights are based on common collection vehicles; however, it should be noted that waste and recycling collection vehicles are custom designed and may differ from these specifications.

⁵ Minimum clearance of 3.5 m allows for multiple rear lift trucks in the market. Some trucks may have a higher clearance.

⁶ Minimum length of 8.8m allows for multiple rear lift trucks in the market. Trucks can be 10-12m depending on the contractor.

⁷ Minimum clearance of 3.5 m allows for multiple Pantech trucks in the market, but there may be some trucks with higher clearance.

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10. Appendix 1: Assumed land uses

Table 8 below provides an overview of the land uses and estimated size of each tenancy in S3 and S4. We have allocated waste resource generation rate (WRGR) classifications to each land use to estimate expected waste and recycling volumes.

Table 8 Development land use and occupancy overview

Level	Land use name	Waste resource generation rate classification	NLA (m ²)
S3 Building			
Lower ground	Retail	Shops (non-food)	96
Lower ground	Offices	Offices	367
Ground	Office	Offices	889
Level 1	Office	Offices	898
Level 2	Office	Offices	512
Level 3	Office	Offices	512
Level 4	Kiosk	Cafe	185
Total			3,459 m²
S4 Building			
Lower ground	Retail	Shops (non-food)	353
Lower ground	Office	Offices	599
Lower ground	Manufacturing sales	Shops (non-food)	284
Ground	Food and beverage	Cafe	208
Ground	Manufacturing sales	Shops (non-food)	229
Level 1	Office	Offices	1,556
Level 2	Office	Offices	1,552
Level 3	Office	Offices	1,558
Level 4	Office	Offices	1,552
Level 5	Office	Offices	1,541
Level 6	Office	Offices	1,562
Level 7	Office	Offices	1,562
Total			12,556 m²

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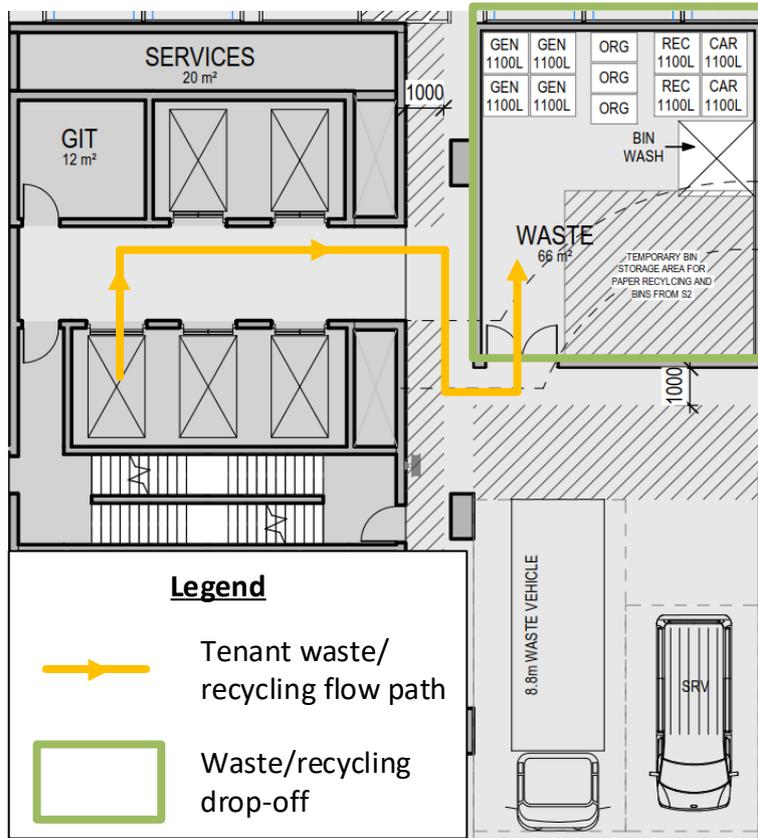
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11. Appendix 2: Waste and recycling transfer pathways

Tenancy waste and recycling flow paths

BASEMENT 01

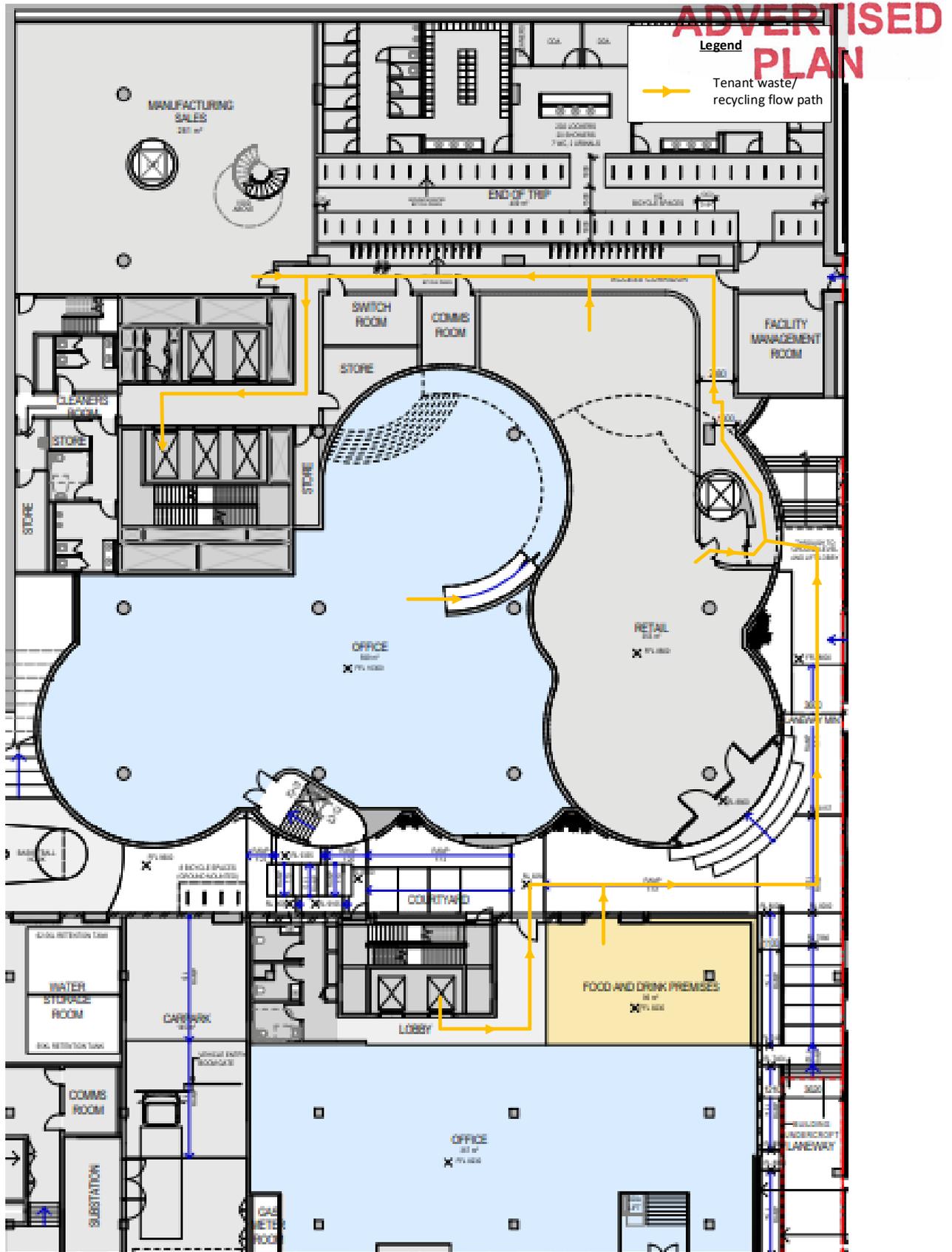
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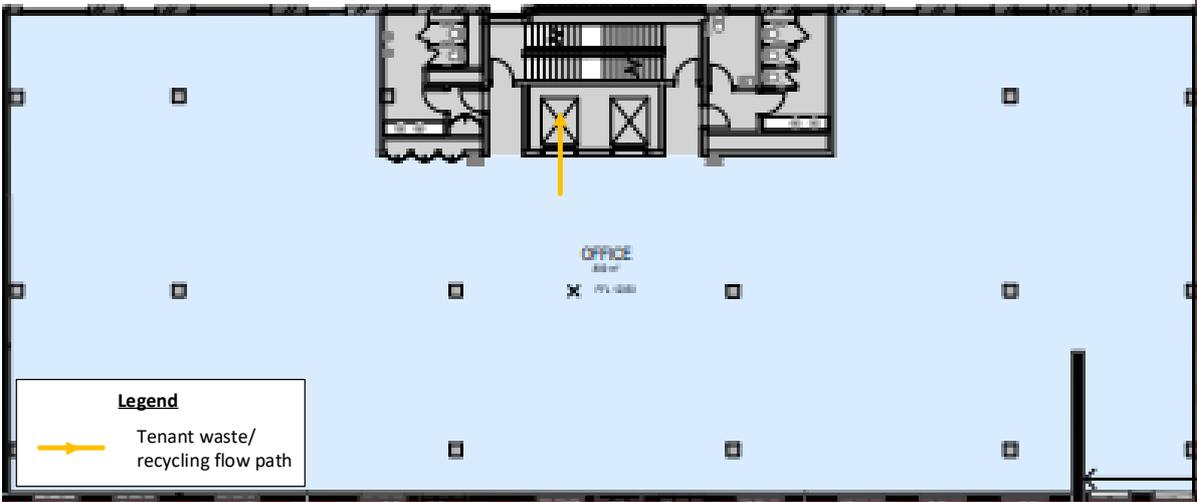
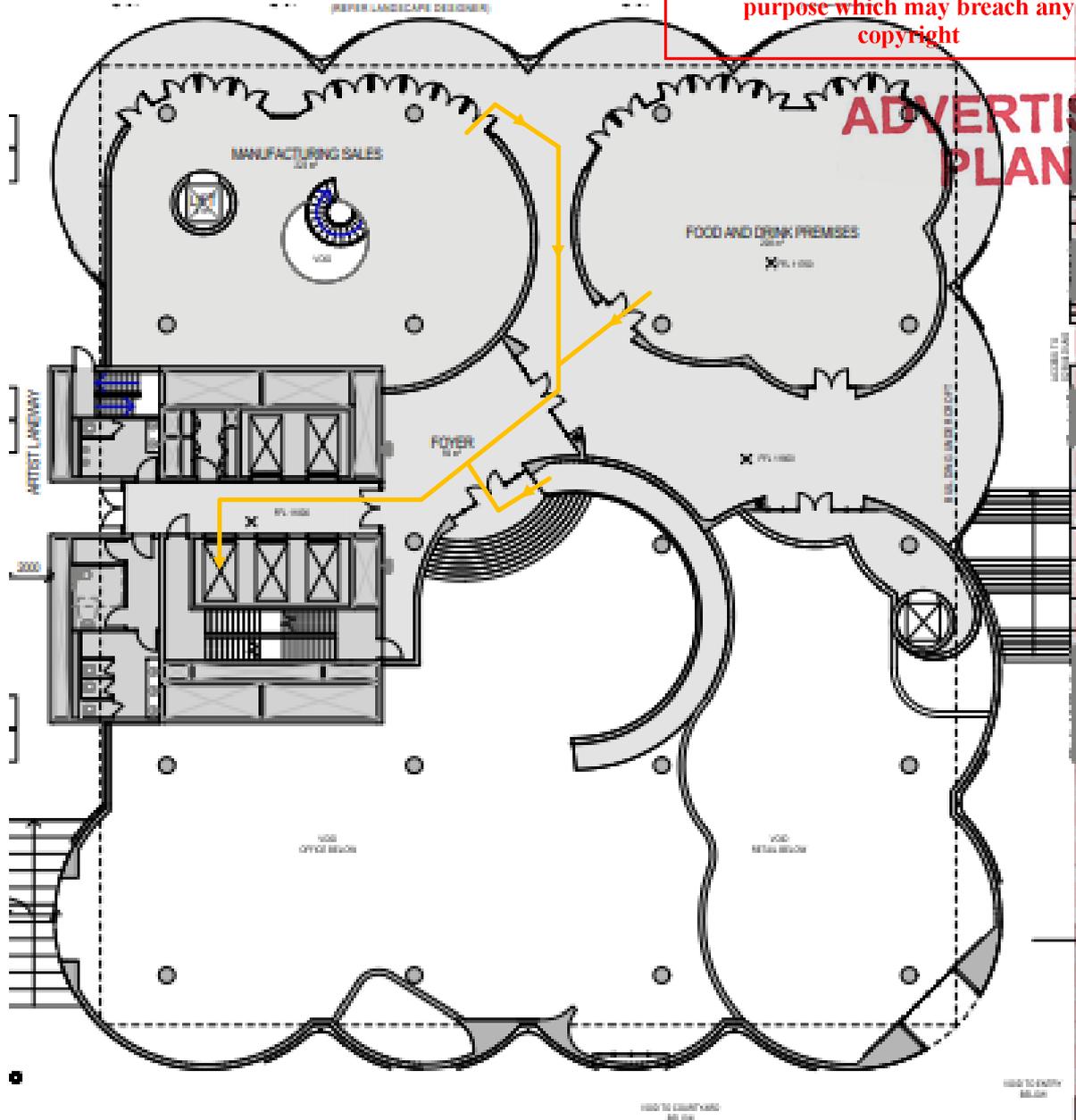
LOWER GROUND

S3 waste and recycling may also be transferred via the lifts directly to the basement waste room if safe, instead going through S4.



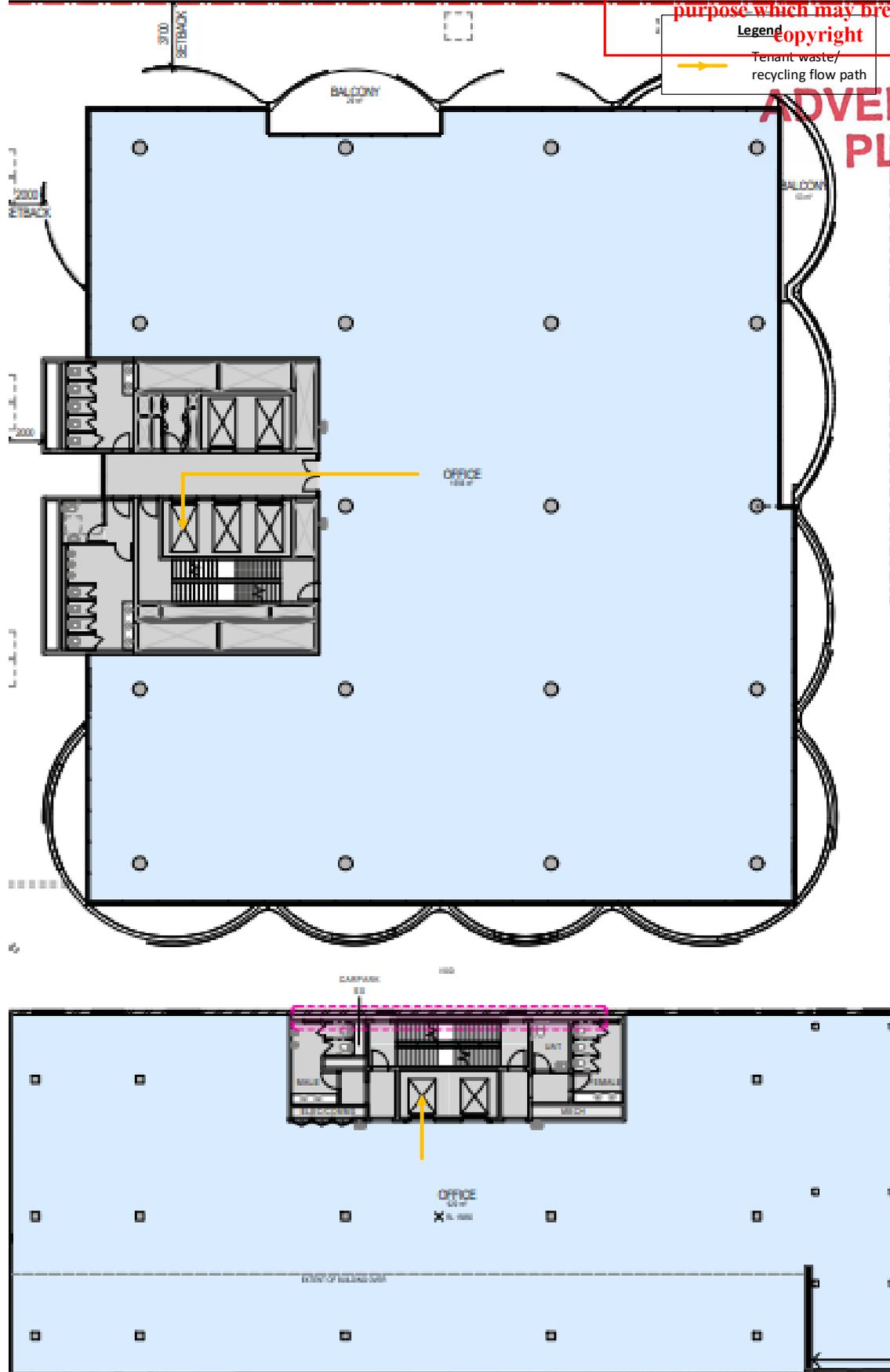
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GROUND



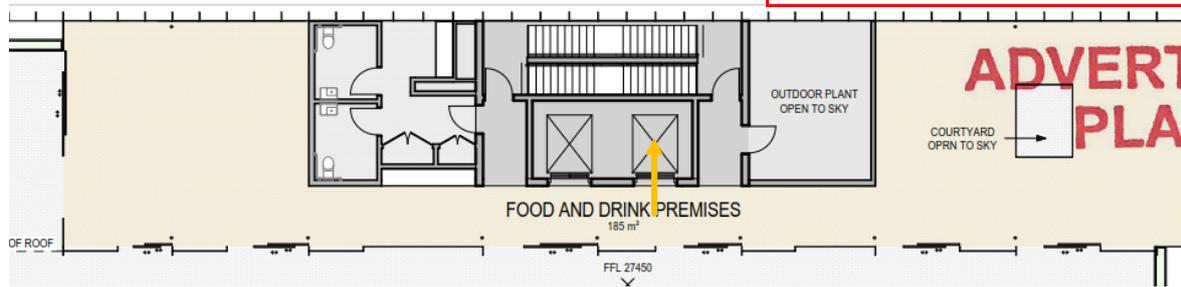
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S3 LEVEL 1-3 AND S4 LEVEL 1-7



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S3 LEVEL 4



Legend

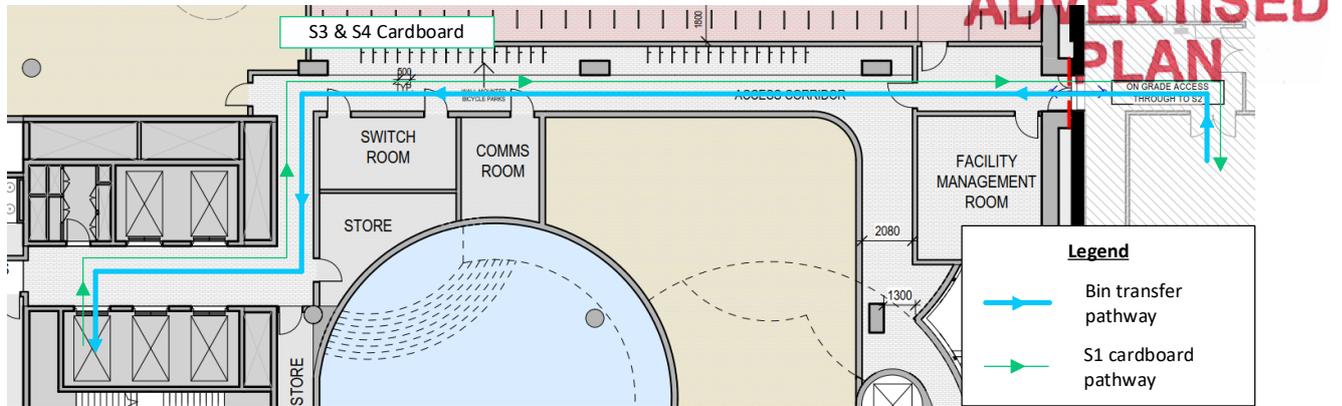
→ Tenant waste/
recycling flow path



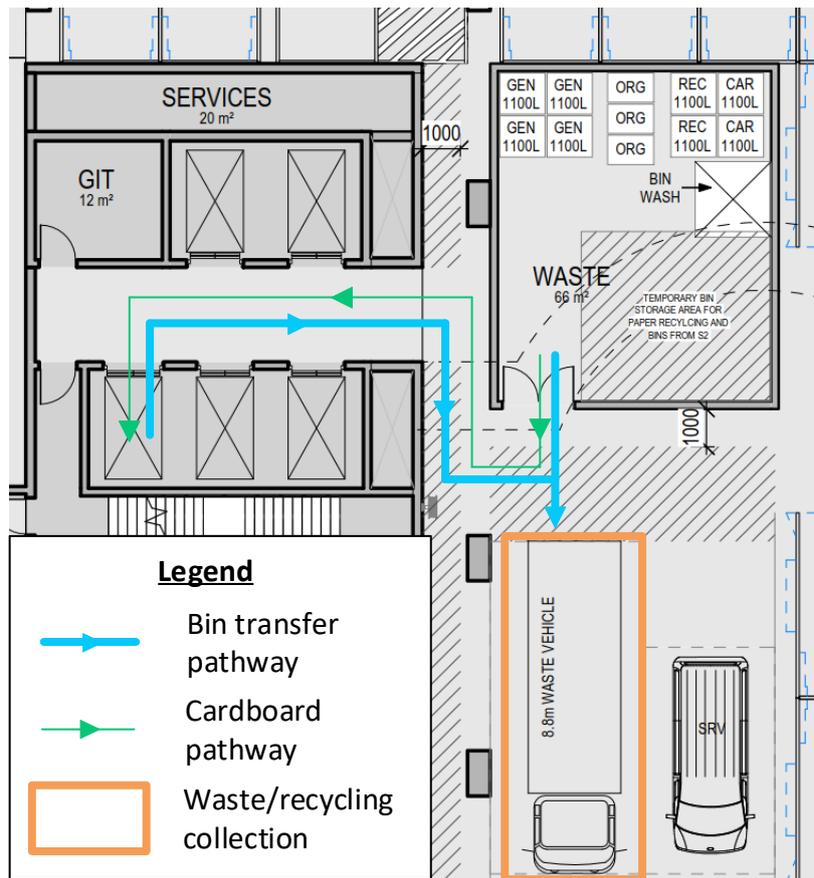
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Waste and recycling collection flow paths

LOWER GROUND



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12. Appendix 3: Relevant Australian Standards

The table below provides a list of relevant Australian Standards associated with waste management.

Table A3: Relevant Australian standards. Table extracted from *Waste Management and Recycling in Multi-unit Developments Better Practice Guide, Sustainability Victoria 2018.*

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Australian Standard	Area of Management
AS 4123.1	Mobile Waste Containers Part 1: Containers with two wheels and a capacity up to 400L for lifting devices – dimensions and design
AS 4123.2	Mobile Waste Containers Part 2: Containers with four wheels with a capacity from 500L to 1200L with flat lid(s), for trunnion and/or lifting devices – dimensions and design
AS 4123.3	Mobile Waste Containers Part 3: Containers with four wheels with a capacity from 770L to 1300L with dome lid(s), for trunnion and/or lifting devices – dimensions and design
AS 4123.4	Mobile Waste Containers Part 4: Containers with four wheels with a capacity from 750L to 1700L with flat lid(s), for wide trunnion or BG and/or wide comb lifting devices – dimensions and design
AS 4123.5	Mobile Waste Containers Part 5: Performance requirement and test methods
AS 4123.6	Mobile Waste Containers Part 6: Health, safety and environment
AS 4123.7	Mobile Waste Containers Part 7: Colours, markings, and designation requirements
AS 1668.2	Odour The use of ventilation and air conditioning in buildings Part 2: Mechanical ventilation in buildings
AS 2890.2	Parking facilities Part 2: Off-Street Commercial Vehicle Facilities
AS/NZS 5377:2013	E-waste Principles and minimum requirements that aim to minimise the risk of harm to human health and the environment. Collection, storage, transport and treatment of end-of-life electrical and electronic equipment.
AS 4736-2006 AS 5810-2010	Biodegradable plastics Biodegradable/compostable plastics suitable for composting





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