1 Station Lane, Penrith NSW

Residential Development

OPERATIONAL WASTE MANAGEMENT PLAN

2/08/2018
Report No. 18019
Revision B

Client

Station Lane Pty Ltd

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SCOPE

This waste management plan (WMP) only applies to the **operational** phase of the proposed development; therefore the requirements outlined in this WMP must be implemented during the operational phase of the site and may be subject to review upon further expansion for, and/or changes to the development.

The waste management of the **construction** and **demolition** phases of the development are not addressed in this report. It is EFRS's understanding that a construction and demolition WMP will be completed by a separate party appointed by the developer, and submitted separately to this report. Typically, the head contractor of the site will be responsible for removing all construction-related waste offsite in a manner that meets all authority requirements.

REVISION REFERENCE

Revision	Date	Prepared by	Reviewed by	Description
A	26/07/2018	J Elliot	A Armstrong	Draft
B	2/08/2018	J Elliot	A Armstrong	Final

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GLOSSARY OF TERMS

TERM	DESCRIPTION
Baler	A device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by strapping
Chute	A ventilated, vertical pipe passing from floor to floor of a building with openings as required to connect with hoppers and normally terminating at its lower end at the roof of the central waste room(s)
Chute Discharge	The point at which refuse exits from the refuse chute
Chute Discharge Room	A secure, enclosed area or room housing the discharge and associated equipment for the refuse chute
Collection Area/Point	The identified position or area where garbage or recyclables are actually loaded onto the collection vehicle
Compactor	A machine for compressing waste into disposable or reusable containers
Composter	A container/machine used for composting specific food scraps
Crate	A plastic box used for the collection of recyclable materials
Garbage	All domestic waste (Except recyclables and green waste)
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
L	Litre(s)
Liquid Waste	Non-hazardous liquid waste generated by commercial premises that is supposed to be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste)
LRV	Large rigid vehicle described by AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities as heavy rigid vehicle (HRV)
Mobile Garbage Bin(s) (MGB)	A waste container generally constructed of plastic with wheels with a capacity in litres of 120, 240, 360, 660, 1000 or 1100
MRV	Medium rigid vehicle
Putrescible Waste	Component of the waste stream liable to become putrid. Usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.

Recycling	Glass bottles and jars – PET, HDPE and PVC plastics; aluminium aerosol and steel cans; milk and juice cartons; soft drink, milk and shampoo containers; paper, cardboard, junk mail, newspapers and magazines
Refuse	Material generated and discarded from residential and commercial buildings including general waste, recyclables, green waste and bulky items
SRV	Small rigid vehicle as in AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities, generally incorporating a body width of 2.33

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INTRODUCTION

EFRS has been tasked to prepare the following waste management plan for Station Lane Pty Ltd on behalf of Antoine Saouma Architects for the operational management of waste generated by the residential development located at 1 Station Lane, Penrith.

Waste management strategies and auditing are a requirement for new developments to provide support for the building design, and promote strong sustainability outcomes for the building. It is EFRS's belief that a successful waste management strategy contains three key objectives:

i. ***Promote responsible source separation*** to reduce the amount of waste that goes to landfill, by implementing convenient and efficient waste management systems

ii. ***Ensure adequate waste provisions and robust procedures*** that will cater for potential changes during the operational phase of the development

iii. ***Compliance*** with all relevant council codes, policies, and guidelines.

To achieve these objectives, this WMP identifies the different waste streams likely to be generated during the operational phase of the development. Associated information includes: how the waste will be handled and disposed of, details of bin sizes/quantities and waste rooms, descriptions of the proposed waste management equipment used and information on waste collection points and frequencies.

It is essential that this waste management plan is integral to the overall management of the building and clearly communicated to all relevant stakeholders.

DEVELOPMENT SUMMARY

The proposed development falls under the LGA of Penrith City Council, and consists of:

- 1 building
    - 17 residential units in total

All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

PENRITH CITY COUNCIL

The residential garbage and recycling will be guided by the services and acceptance criteria of the Penrith City Council. All waste facilities and equipment are to be designed and constructed to be in compliance with the Penrith Council's *Penrith Development Control Plan 2014, Residential Flat Building Waste Management Guidelines,* Australian Standards and statutory requirements.

COUNCIL OBJECTIVES

- To facilitate sustainable waste management within the City of Penrith in accordance with the principles of Ecologically Sustainable Development;
- To manage waste in accordance with the 'Waste Hierarchy' to:
    - Avoid producing waste in the first place;
    - Minimise the amount of waste produced;
    - Re-use items as many times as possible to minimise waste;
    - Recycle once re-use options have been exhausted; and
    - Dispose of what is left, as a last resort, in a responsible way to appropriate waste disposal facilities;
- To assist in achieving Federal and State Government waste minimisation targets as set out in the *Waste Avoidance and Resource Recovery Act 2001* and *NSW Waste*
- *Avoidance and Resource Recovery Strategy 2007*;
- To minimise the overall environmental impacts of waste by:
    - Encouraging development that facilitates ongoing waste avoidance and complements waste services offered by both Council and/or private contractors;
    - Requiring on-site source separation and other design and siting standards which assist waste collection and management services offered by Council and/or the private sector;
    - Encouraging building designs and construction techniques that minimise waste generation;
    - Maximising opportunities to reuse and recycle building and construction materials as well as other wastes in the ongoing use of a premise; and
    - Reducing the demand for waste disposal.

COUNCIL REQUIREMENTS

Access – Ensure waste systems are easy to use and collection vehicles are able to access buildings to safely remove waste and recycling;

Safety – Ensure safe practises for storage, handling and collection of waste and recycling;

Pollution Prevention – Prevent stormwater pollution that may occur as a result of poor waste storage and management practises;

Noise Minimisation – Provide acoustic insulation to the waste service facilities or residential units adjacent to or above chutes, waste storage facilities, chute discharge, waste compaction equipment and waste collection vehicle access points;

Ecologically Sustainable Development (ESD) – Promote the principles of ESD through resource recovery and recycling leading to a reduction in the consumption of finite natural resources;

Hygiene – Ensure health and amenity for residents, visitors and workers in the Penrith City Council.

STAKEHOLDER ROLES AND RESPONSIBILITIES

The following table demonstrates the primary roles and responsibilities of the respective stakeholders:

Table 1: Stakeholder Roles and Responsibilities

Roles	Responsibilities
Strata/Management	• Ensuring that all waste service providers submit monthly reports on all equipment movements and waste quantities/weights; • Organising internal waste audits/visual assessments on a regular basis; and • Manage any non-compliances/complaints reported through waste audits.
Building Manager/Waste Caretaker	• Ensuring effective signage, communication and education is provided to occupants, tenants and cleaners; • Providing staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities; • Ensuring site safety for residents, children, visitors, staff and contractors; • Abiding by all relevant OH&S legislation, regulations, and guidelines; • Assessing any manual handling risks and prepare a manual handling control plan for waste and bin transfers; • Preventing storm water pollution by taking necessary precautions (securing bin rooms, preventing overfilling of bins) • If a blockage is evident, building management or cleaning staff must immediately take steps to identify the level concerned and clear the blockage • General maintenance and cleaning of chute doors on each level; • Cleaning and transporting of bins as required; • Organising, maintaining and cleaning the general and recycled waste holding area; • Organising both garbage and recycled waste pick-ups as required; • Organising replacement or maintenance requirements for bins; • Organising bulky goods collection when required; and • Investigating and ensuring prompt clean-up of illegally dumped waste materials.
Residents/Tenants	• Dispose of all garbage and recycling in the allocated waste chutes and/or MGBs provided; • Ensure adequate separation of garbage and recycling; and • Compliance with the provisions of Council and the WMP.
Council/Private Waste Contractor	• Provide a reliable and appropriate waste collection service; • Provide feedback to building managers/residents in regards to contamination of recyclables; and • Work with building managers to customise waste systems where possible.
Gardening/Landscaping Contractor	• Removal of all garden organic waste generated during gardening maintenance activities for recycling at an offsite location.
Building Contractors	• Removing all construction related waste offsite in a manner that meets all authority requirements.

EDUCATION

Educational material encouraging correct separation of garbage and recycling items must be provided to each resident by building management to ensure correct use of the waste chute. This should include the correct disposal process for bulky goods (old furniture, large discarded items, etc.), and other appropriate materials (electronic, chemical waste, etc.). It is recommended that information is provided in multiple languages to support correct practises and minimise the possibility of chute blockages as well as contamination in the collective waste bins.

It is also recommended that the owners' corporation website contain information for residents to refer to regarding use of the chute. Information should include:

- Directions on using the chute doors;
- Recycling and garbage descriptions (council provides comprehensive information);
- How to dispose of bulky goods and any other items that are not garbage or recycling;
- Residents' obligations to whs and building management; and
- How to prevent damage or blockages to the chute (example below).

To prevent damage or blockage to rubbish chute DO NOT dispose of any newspapers, umbrellas, bedding, cigarettes, cartons, coat hangers, brooms, mops, large plastic wrappings from furniture, white goods, any sharp objects, hot liquid or ashes, oil, unwrapped vacuum dust, syringes, paint and solvents, car parts, bike parts, chemicals, corrosive and flammable items, soil, timber, bricks or other building materials, furniture, etc. down the chute.

LIMITATIONS

The purpose of this report is to document a Waste Management Plan (WMP) as part of a development application and is supplied by Elephants Foot Recycling Solutions (EFRS) with the following limitations:

- Council are subject to changing waste and recycling policies and requirements at their own discretion. Information in this operational waste management plan is correct as of June 2018.
- The works agreed to in the fee proposal includes a review of the waste management plans and up to three amendments. Any revisions subsequent to the third amendments will be charged at an hourly rate.
- Drawings, estimates and information contained in this waste management plan have been prepared by analysing the information, plans and documents supplied by the client, and third parties including Council and government information. The assumptions based on the information contained in the WMP is outside the control of EFRS;
- The figures presented in the report are an estimate only – the actual amount of waste generated will be dependent on the occupancy rate of the building/s and waste generation intensity as well as the building managements approach to educating residents and tenants regarding waste management operations and responsibilities;
- The building manager will make adjustments as required based on actual waste volumes (if waste is greater than estimated) and increase the number of bins and collections accordingly;
- The report will not be used to determine or forecast operational costs or prepare any feasibility study or to document any safety or operational procedures;
- The report has been prepared with all due care however no assurance or representation is made that the WMP reflects the actual outcome and EFRS will not be liable to you for plans or outcomes that are not suitable for your purpose, whether as a result of incorrect or unsuitable information or otherwise;

- EFRS offer no warranty or representation of accuracy or reliability of the WMP unless specifically stated;
- Any manual handling equipment recommended should be provided at the recommendation of the appropriate equipment provider who will assess the correct equipment for supply;
- Design of waste management chute equipment and systems must be approved by the supplier.

RESIDENTIAL WASTE MANAGEMENT

The Penrith Council's *Residential Flat Building Waste Management Guidelines* has been referenced to calculate the total number of bins required for the residential units. Calculations are based on generic figures; waste generation rates may differ according to the residents' waste management practice.

ESTIMATED WASTE VOLUMES AND PROVISIONS

The following table shows the estimated volume (L) of garbage and recycling generated by the residential component of the development.

Table 2: Calculated Waste Generation – Residential

Building/ Core	# Units	Garbage Generation Rate (L/unit/week)	Generated Garbage (L/week)	Recycling Generation Rate (L/unit/week)	Generated Recycling (L/week)
Core A	17	60	1020	60	1020
TOTAL	**17**		**1020**		**1020**
Collections & Equipment		Garbage Bin Size (L)	1100	Recycling Bin Size (L)	1100
		Garbage Collections per Week	1	Recycling Collections per Week	1
		Total Garbage Bins Required	1	Total Recycling Bins Required	1

**Note: An additional 1100L MGB should be provided for each chute discharge for use during collection periods. Additional 240L MGBs should also be provided to act as service bins for the ground level bin enclosure. These bins are not included in the above figures.*

HOUSEHOLD WASTE

1 garbage chute and 1 recycling chute will be installed with access provided on all residential levels.

Garbage discharges into 1100L MGBs placed on linear tracks and recycling (comingle) into 1100L MGBs. The discharge is located in the waste discharge rooms for the building. Residents on ground level will have access to a bin enclosure containing 1 x 240L garbage bin and 1 x 240L recycling bin due to the chute terminating on ground level.

Full garbage and recycling bins will be transferred to the collection area on ground level to await servicing.

COMMON AREAS

The lobbies, amenities and circulation areas will be supplied with suitably branded waste and recycling bins where considered appropriate. These areas generate minimal waste, however garbage and recycling receptacles should be provided and located in convenient locations.

Washroom facilities should be supplied with collection bins for paper towels (if used). Sanitary bins for female restroom facilities must also be arranged with an appropriate contractor.

SOURCE SEPERATION

Waste avoidance, recovery and reuse of discarded materials and responsible management of hazardous waste are all crucial elements of sustainable development. Effective waste management practices in residential developments significantly improve environmental, social, and economic outcomes on both a local and regional scale, and should be integrated into the waste management processes.

GENERAL WASTE (GARBAGE)

Residents will be supplied with a collection area in each unit to deposit garbage and collect recyclable material suitable for one day's storage. This is typically located generally in the kitchen, under bench or similar alternate area. Residents should wrap or bag their garbage; bagged garbage should not exceed 3kg in weight or 35cm x 35cm x 35cm in dimension.

RECYCLING

Recycling must not be bagged. It is recommended that residents use a crate or dedicated bin for collecting recyclables within the allocated residential space provided to ensure correct separation.

Cardboard furniture boxes or large cardboard containers should not be included in the garbage chute – a cardboard collection bin will be made available to residents to deposit flattened cardboard and will be managed by the waste caretaker. Residents should be advised of the location of these bins by building management.

GREEN WASTE

Green waste is not typically generated from multi-unit dwellings other than from surrounding building landscaped areas and is removed by the designated maintenance contractor. In the event that green waste is produced i.e trimming of indoor or balcony plants then this may be disposed of via coordination with the building caretaker or cleaner. Very small quantities may be disposed of via the general waste stream.

BULKY GOODS

Penrith Council requires that a bulky goods room is provided at the following rate:

Household bulky waste room dimensions = no. of dwellings x 8 m^2 / 52 (weeks)

A room or caged area will be made available for the storage of discarded residential bulky items (e.g. whitegoods, furniture, etc.). This room should be located within close proximity of the garbage and recycling bin collection room and must have a minimum doorway width of 1.5m to allow for easy movement of large waste items in and out of the room.

These areas are crucial to prevent residents from illegally dumping bulky waste on the footpath outside Councils scheduled collection times. Regular illegal dumping can attract other dumped waste, generate litter, detract significantly from the quality and appearance of the development and reduce amenity of the street.

Residents will be required to liaise with building management regarding the transportation and disposal of bulky goods. Ideally, bulky waste should be collected on a regular schedule so that the storage area does not become overfull and so that residents know when to place items in there for collection. Councils may arrange for more frequent collections of bulky waste for MUDs, however collection frequencies vary among different local government areas.

Donations to charitable organisations should be encouraged. Clean, sound furniture and household goods etc. are highly sought after to provide for the disadvantaged. Donations can be arranged with the assistance of the building manager/waste caretaker.

ELECTRONIC WASTE

Electrical waste (e.g. fluorescent tubing, batteries, laptops etc.) can potentially contaminate soil and surrounding water bodies if not disposed correctly. These items must not be placed in standard garbage and recycling bins. Disposal or recycling of electronic waste will be organised with the assistance of the building caretaker. These items must not be placed in garbage or recycling bins due to safety and environmental factors. Residents and/or the building manager may choose to contact Council to find out about new/existing strategies for the disposal/collection of electronic waste.

CHEMICAL WASTE

Chemical wastes (e.g. cleaning chemicals, paints, oils solvents) pose detrimental effects to human health and the environment and should be disposed of to a suitable licensed disposal facility. No liquid wastes or wash down waters should be disposed of via the storm water drainage system. Household Chemical CleanOut events are held at various locations throughout NSW on specified dates throughout the year. Locations and dates are subject to change; hence it is recommended that the building caretaker confirm these details with their local Council.

ORGANIC WASTE AND COMPOSTING

Recycling organic waste, such as food scraps and garden materials, dramatically reduces the quantity of waste being diverted to land fill and thus reduces residents' ecological footprint. Compost material can also be returned to the soil as a rich fertilizer and improve plant growth and the overall health of surrounding vegetation. It is recommended that a space for composting and worm farming is made available for all residents in a communal facility or in small private courtyards (*see APPENDIX D.1*). Composting facilities are to be sited on an unpaved area with soil depth of at least 300mm. Residents may also choose to purchase and install apartment style compost bin where practical and self-manage these systems (*see APPENDIX D.2 and APPENDIX D.3)*.

PUBLIC SPACES

Public spaces are likely to generate minimal waste from the people utilizing these areas. Waste and recycling bins should be place throughout public spaces to minimise the likelihood of littering (see APPENDIX D.4).

Areas allocated to outdoor public space will be managed by Council, unless another type of arrangement has been agreed with by Council. Public waste bins placed in outdoor public areas will be serviced and maintained by Council.

Public areas on commercial developments such as food courts will be managed by building management. Cleaners will circulate throughout the food court while clearing tables and will remove waste as required.

CLOTHING WASTE

Clothing is becoming an increasingly large waste stream for domestic dwellings. Unwanted clothing that is clean and undamaged can be donated to charities. Building management may choose to provide clothing donation bins for residents to donate their unwanted clothing. Building management can directly contact a charity to supply a donation bin or choose to

provide their own nondenominational donation bin. Once a sufficient amount of clothing has been collected, the building management will be responsible for arranging the collection of donated items with the relevant charity.

COLLECTION OF WASTE

RESIDENTIAL

Residential waste and recycling will be collected by Council via a wheel-in, wheel-out arrangement from the ground level waste room. The turning path for a collection vehicle will be proposed when the right of carriageway is confirmed.

INSTALLATION EQUIPMENT AND DESIGN

EQUIPMENT SUMMARY

Table 3: Equipment Summary

Component	Part	Qty	Notes
Chutes	Galvanised Steel / LLDPE Polyethylene Plastic	2	(See APPENDIX C for Typical Chute Section)
Equipment B	Suitable Bin Moving Equipment		Optional (See APPENDIX D for Typical Bin Mover)

WASTE ROOM AREAS

All waste discharge points should be caged off to ensure the safety of any personnel accessing the waste room. Access to waste discharge rooms should be provided to the building manager/waste caretaker **only**. Under no circumstances should access be provided to any residents, or waste collection staff.

Chute discharge requires a minimum of 3000mm distance from floor to ceiling and needs to be free of service pipes and other overhead obstacles within the immediate space around the chute discharge.

The areas allocated for residential waste rooms, commercial/retail bin store, bulky goods and collection areas are detailed in Table 4 below. The areas provided have been assessed by EFRS and deemed suitable for purpose.

Table 4: Waste Room Areas

Level	Waste Room Type	Equipment	Allocated Area (m^2)
G	Waste Room	4 x 1100L MGBs 4 x 240L MGBs	20
G	Bulky Goods Waste Storage Room		7

GARBAGE ROOMS

CONSTRUCTION REQUIREMENTS

The garbage room will be required to contain the following facilities to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- Waste room floor to be sealed with a two pack epoxy;
- Waste room walls and floor surface is flat and even;
- All corners coved and sealed 100mm up, this is to eliminate build-up of dirt;
- For residential: a hot and cold water facility with mixing facility and hose cock must be provided for washing the bins;
- For retail/commercial: a cold water facility with hose cock must be provided for washing the bins;
- Any waste water discharge from bin washing must be drained to sewer in accordance with the relevant water board. (Sydney water);
- Tap height of 1.6m;
- Storm water access preventatives (grate);
- All walls painted with light colour and washable paint;
- Equipment electric outlets to be installed 1700mm above floor levels;
- The room must be mechanically ventilated;
- Light switch installed at height of 1.6m;
- Waste rooms must be well lit (sensor lighting recommended);
- Optional automatic odour and pest control system installed to eliminate all pest types and assist with odour reduction – this process generally takes place at building handover – building management make the decision to install;
- If 660l or 1100l bins are utilised, 2 x 820mm (minimum) door leafs must be used;
- All personnel doors are hinged, lockable and self-closing;
- Waste collection area must hold all bins – bin movements should be with ease of access;
- Conform to the building code of Australia, Australian standards and local laws; and
- Childproofing and public/operator safety shall be assessed and ensured

SIGNAGE

The building manager/caretaker is responsible for waste room signage including safety signage (*see APPENDIX B.2*). Appropriate signage must be prominently displayed on doors, walls and above all bins, clearly stating what type of waste or recyclables is to be placed in the bin underneath.

All chute doors on all residential levels will be labelled with signs directing chute operations and use of chute door.

VENTILATION

Waste and recycling rooms must have their own exhaust ventilation system either;

- Mechanically - exhausting at a rate of 5L/m² floor area, with a minimum rate of 100L/s minimum; or
- Naturally - permanent, unobstructed, and opening direct to the external air, not less than one-twentieth (1/20) of the floor area

Mechanical exhaust systems shall comply with AS1668 and not cause any inconvenience, noise or odour problem.

USEFUL CONTACTS

Elephants Foot Recycling Solutions does not warrant or make representation for goods or services provided by suppliers.

Penrith Council Customer Service
Phone: 02 4732 7777 Email: council@penrithcity.nsw.gov.au

SULO MGB (MGB, Public Place Bins, Tugs and Bin Hitches)
Phone: 1300 364 388

CLOSED LOOP (Organic Dehydrator)
Phone: 02 9339 9801

ELECTRODRIVE (Bin Mover)
Phone: 1800 333 002 Email: sales@electrodrive.com.au

RUD (Public Place Bins, Recycling Bins)
Phone: 07 3712 8000 Email: Info@rud.com.au

CAPITAL CITY WASTE SERVICES (Private Waste Services Provider)
Phone: 02 9359 9999

REMONDIS (Private Waste Services Provider)
Phone: 13 73 73

SITA ENVIRONMENTAL (Private Waste Services Provider)
Phone: 13 13 35

NATIONAL ASSOCIATION OF CHARITABLE RECYCLING ORGANISATIONS INC. (NACRO)
Phone: 03 9429 9884 Email: information@nacro.org.au

PURIFYING SOLUTIONS (Odour Control)
Phone: 1300 636 877 Email: sales@purifyingsolutions.com.au

MOVEXX (Bin Movers)
Phone: 1300 763 444

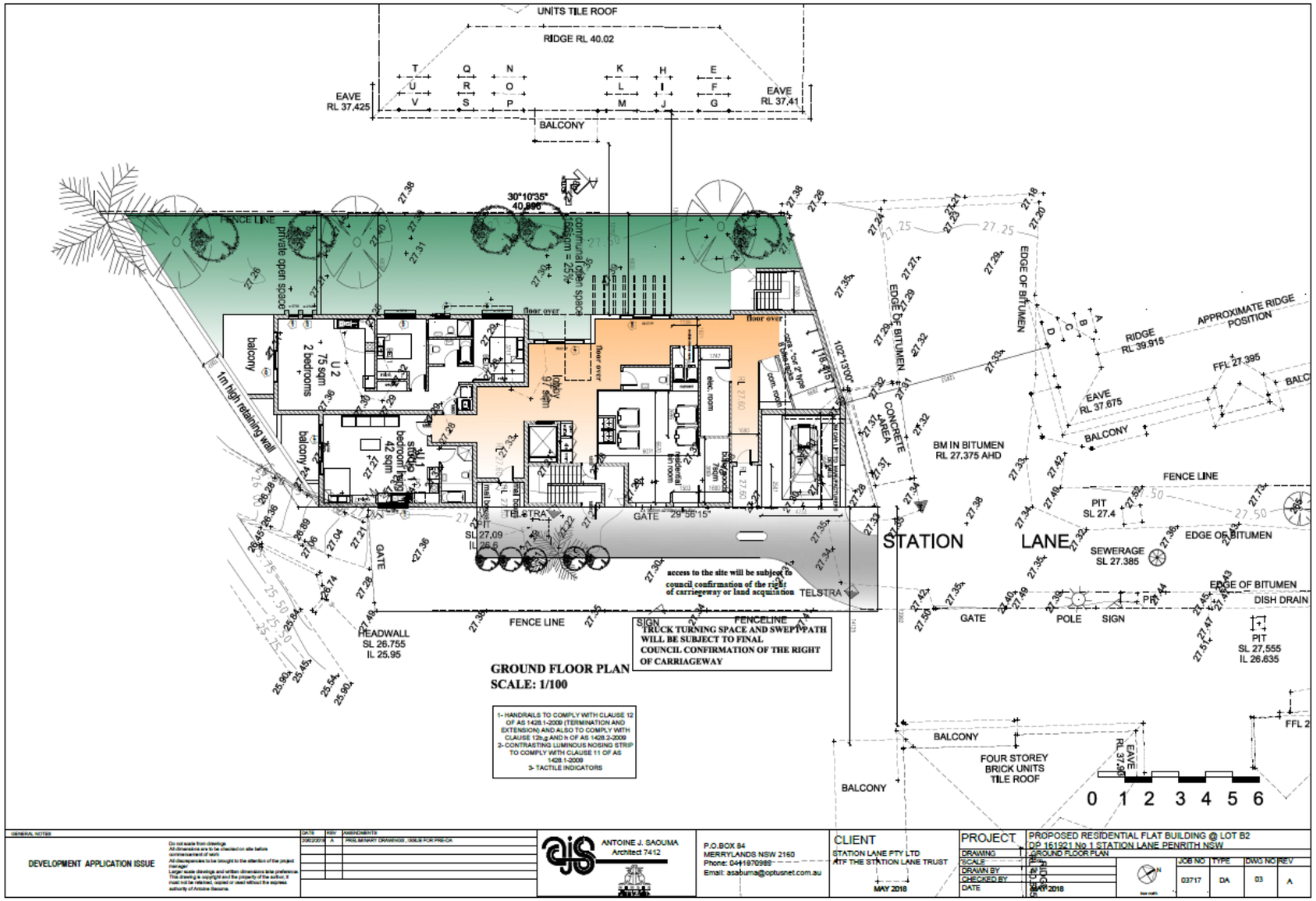
AUSCOL (Recyling Oils & Animal Fats)
Phone: 1800 629 476

Elephants Foot Recycling Solutions (Chutes, Compactors and eDiverter Systems)
44 – 46 Gibson Avenue
Padstow NSW 2211
Free call: 1800 025 073

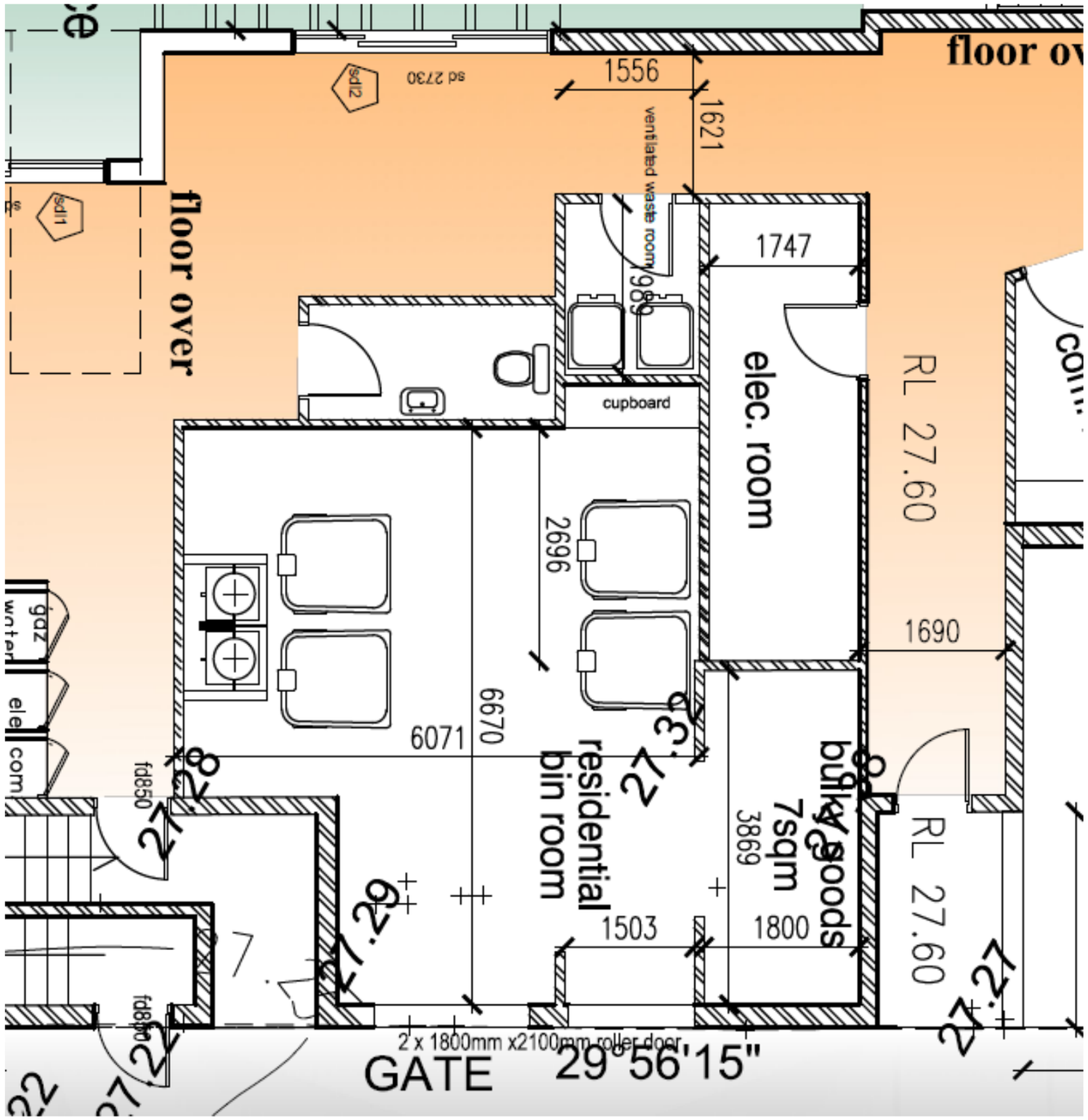
APPENDICES

APPENDIX A ARCHITECTURAL DRAWING EXERPTS

APPENDIX A.1 SITE PLAN



APPENDIX A.2 WASTE ROOM



APPENDIX B PRIMARY WASTE MANAGEMENT PROVISIONS

APPENDIX B.1 PENRITH BIN SPECIFICATIONS

A	Height (mm)	Length (mm)	Width (mm)
240L Bin	1100	740	600
660L Bin	1400	1260	800
1100L Bin	1330	1240	1090

Table 1: Standard Bin Size and Dimensions

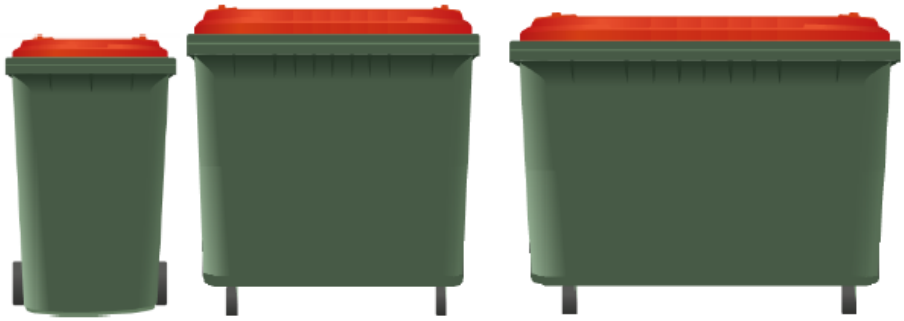


Figure 1: Image of a typical 240L, 660L and 1100L waste collection bins

Source: Penrith's *Residential Flat Building Waste Management Guidelines*

APPENDIX B.2 PENRITH COMPACTION UNITS

Calculations

2.3 WASTE GENERATION RATES IN CUBIC METRES

For developments incorporating compaction unit's cubic meters' calculation is essential to determine the size of the required compaction units. The following table provides cubic metre generations rates for residential flat buildings:

Waste Generation Rates Cubic Liters (m^3)	1100L Bin
Residual	$1.1m^3$
Recycling	$1.1m^3$

Table 3: Waste generation rates in cubic metres

2.4 CALCULATION OF CUBIC METRE WASTE ALLOCATION

To calculate the cubic metre allocation for a RFB consisting of 120 dwellings the following occurs:

Waste Stream	Calculation	Allocation	After Compaction (2:1)
Residual	(120/9) x $1.1m^3$	$15m^3$	$7.5m^3$
Recycling	(120/18) x $1.1m^3$	$8m^3$	$4m^3$

Table 4: Waste generation calculation for RFB's

Note:

- Cubic metre generation rates are based upon collection occurring **once weekly** with all rates rounded up to the next whole number.
- All 'After Compaction' volumes are rounded up to the next whole number (for example $7.1m^3$ will be rounded to $8m^3$).

Source: Penrith's *Residential Flat Building Waste Management Guidelines*

Specifications

7.1.1 Compaction Unit Specifications

The implementation of compaction units within a residential flat building will need to accommodate the following design specifications:

- The compaction units for each waste stream must be large enough to accommodate the developments cubic metre waste allocation (refer to section 2.4)
- The hook lift vehicle proposed to service the compaction units (9.1m, 8.3m or 7.0m) must be capable of servicing the allocated compaction units outlined in sections 7.2, 7.3 & 7.4.
- Unobstructed operational height clearances of 4.5m must be provided free from air conditioner pipes, water and electrical fittings for all compaction units
- All truck movements within the basement must accommodate a 4.5m unobstructed height clearance
- Truck access into the basement must be supported with swept path models showing 1.0m clearances during all on-site manoeuvres

- Reverse manoeuvres will only be considered by Waste Services when reversing occurs into a designated loading bay within the development. The manoeuvres must not result in:
  - Movements against basement traffic
  - Obstruct pedestrian movements
  - Occur at the base of ramps or at blind intersections.
- A minimum 2m separation must be provided between the compaction units to accommodate the bin lifters to accommodate the door cage opening and manoeuvrability when emptying 1,100L bins
  - The separation of compaction units can be reduce to 1m if a rear loading bin lifter is used as shown in sections 7.2.3, 7.3.3 & 7.4.3.

7.1.2 Integrated Auger Compactors

The Integrated Auger Compaction unit will be provided by Councils current contractors. Each development must accommodate one of the following sizes available that include:

- $10m^3$ Integrated Auger Compactor (4.3m long)
- $17m^3$ Integrated Auger Compactor (5.9m long)
- $23m^3$ Integrated Auger Compactor (7.0m long)

The proposed compactor for each development requires a specific vehicle to be accommodated on-site. Vehicle specifications for each Integrated Compaction Unit is outlined in sections 7.2, 7.3 and 7.4.

Figure 11: Integrated Auger Compactor and Bin Lifter

Figure 12: Integrated Auger used to compact objects within the compaction unit

Figure 13: 1100L bin lifter used to empty bin into the Auger Compactor

Source: Penrith's *Residential Flat Building Waste Management Guidelines*

APPENDIX B.3 SIGNAGE FOR WASTE & RECYCLING BINS

WASTE SIGNS

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the Department of Environment and Heritage.

SAFETY SIGNS

The design and use of safety signs for waste rooms and enclosures should comply with AS1319 Safety Signs for Occupational Environment. Safety signs should be used to regulate and control safety behaviour, warn of hazards and provide emergency information, including fire protection information. Below are some examples. Each development will need to decide which signs are relevant for its set of circumstances and service provided.

SOURCE: Department of Environment and Climate Change NSW 2008, Better Practice Guide for Waste Management in Multi-Unit Dwellings

APPENDIX B.4 PENRITH COLLECTION VEHICLE INFORMATION FOR MGBS

NOTE: Small Residential Flat Buildings outlined in section 4.3 do not require on site waste allocation therefore no vehicle specifications have been provided of the 12.5m heavy Rigid Collection Vehicle.

The following dimensions are provided for a standard heavy rigid vehicle as identified in Australian Standard 2890.2:

Vehicle Class:	Heavy Rigid Vehicle Dimensions
Overall Length (m)	10.5
Operational Length (m)	12.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Weight Fully Loaded (tonnes)	22.5
Capacity (m^3)	24
Front Chassis Clearance	13^0
Rear Chassis Clearance	16^0

Table 6: Standard dimensions sourced from AS 2890.2 Parking Facilities: Off-Street Commercial Vehicle Facilities

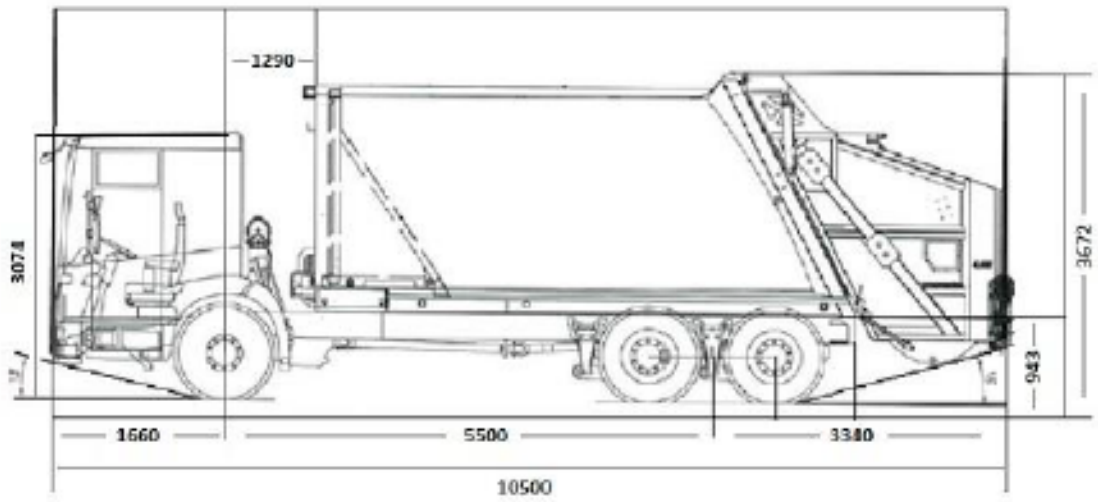


Figure 5: 10.5m Heavy Rigid Waste Collection Vehicle specifications

NOTE: Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

Source: Penrith's *Residential Flat Building Waste Management Guidelines*

APPENDIX B.5 PENRITH COLLECTION VEHICLE INFORMATION FOR COMPACTION UNITS

7.1.6 Hook Lift Vehicle Ground Loading Configuration

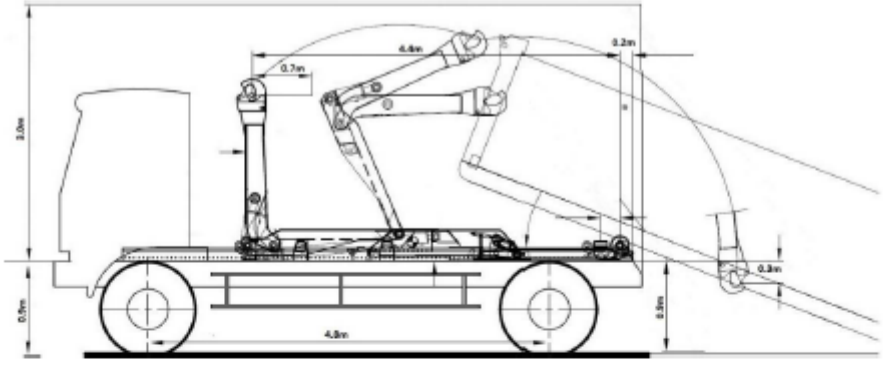


Figure 14: Hook Lift Vehicle ground loading configuration

7.1.7 Hook Lift Vehicle Elevated Loading Configuration

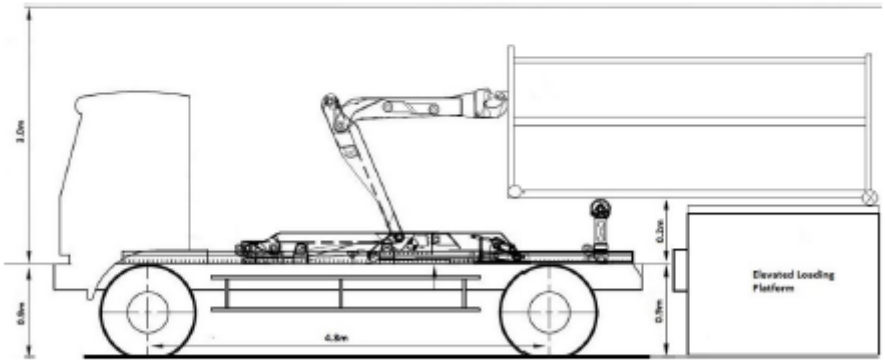


Figure 15: Hook Lift Vehicle ground loading configuration

7m Compaction unit and Hook lift Truck Dimensions

7.2.1 Hook Lift Collection Vehicle Specifications

Vehicle Class:	Heavy Rigid Vehicle Dimensions
Overall Length (m)	7.0
Operational Length- Loaded (m)	8.4
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	21.6
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Weight Fully Loaded (tonnes)	22.5
Front Chassis Clearance	13^0
Rear Chassis Clearance	16^0

Table 7: Standard dimensions sourced from manufacture specifications

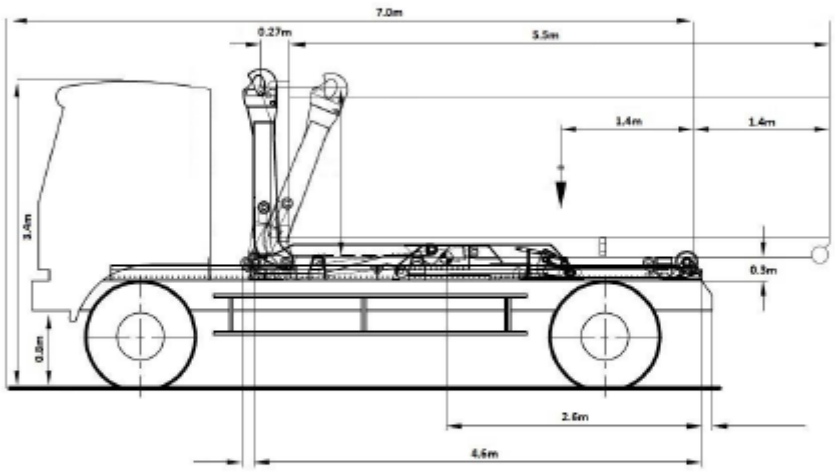


Figure 16: 7m Heavy Rigid Waste Collection Vehicle specifications

NOTE: Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

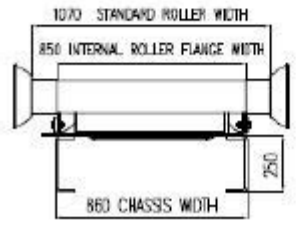


Figure 17: 9.5m Hook Lift Waste Collection Vehicle tray specifications

7.2.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements:	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker - Large enough to start and run 10kw electric motor - Breaker size to be confirmed with breaker supplier

Table 8: Electrical requirements for the operation of integrated auger compactors

7.2.3 Integrated Auger Compactor Schematics (4.3m)

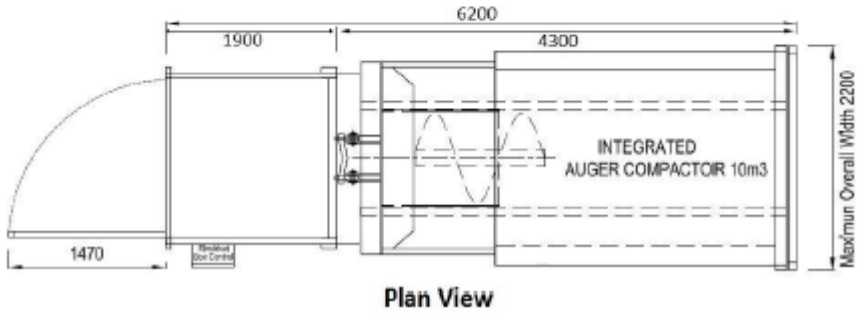


Figure 18: 4.3m Integrated Auger schematic with rear loading bin lifter

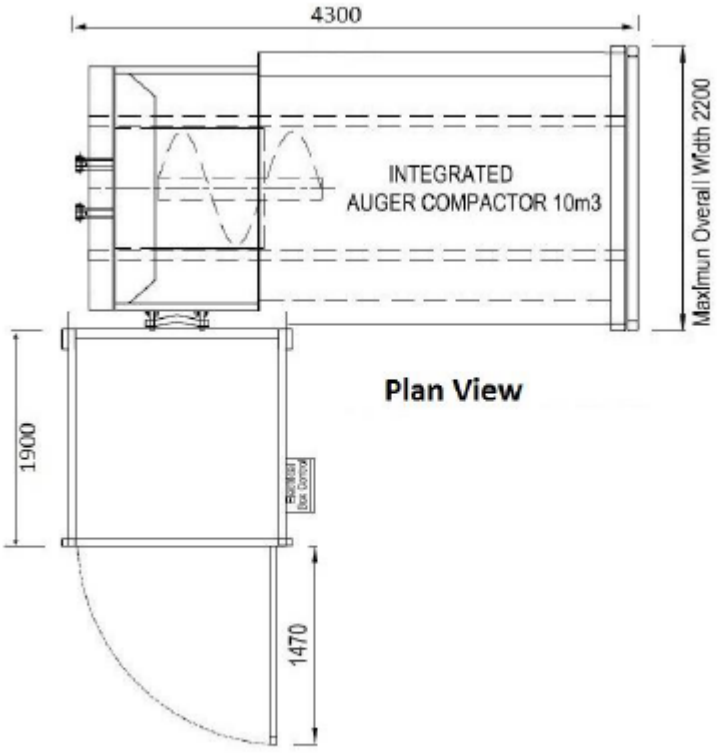


Figure 19: 4.3m Integrated Auger schematic with rear loading bin lifter

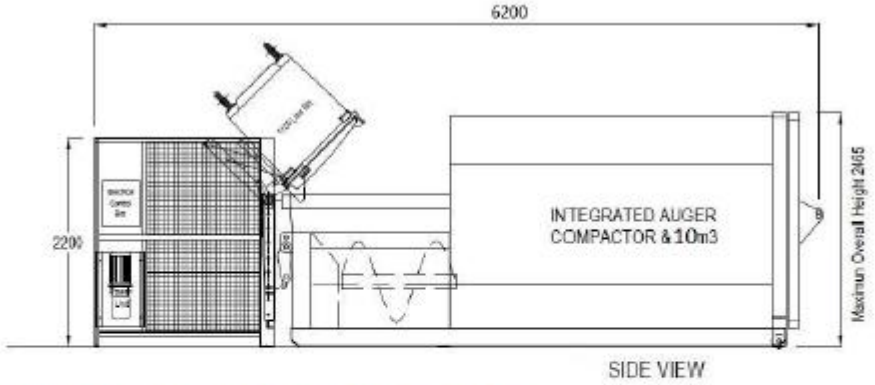


Figure 20: 6.0m Integrated Auger schematic side view

7.2.4 Guide Rail Specifications

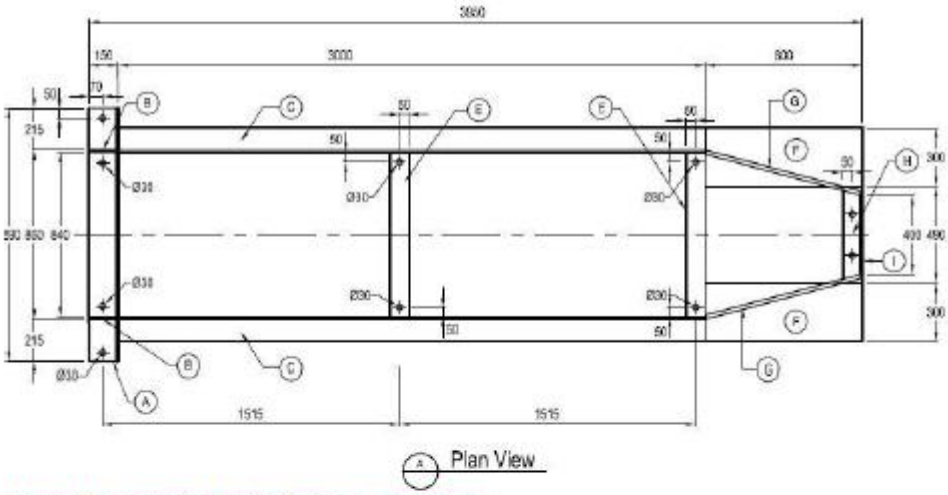


Figure 21: Integrated Auger Guide rails plan view

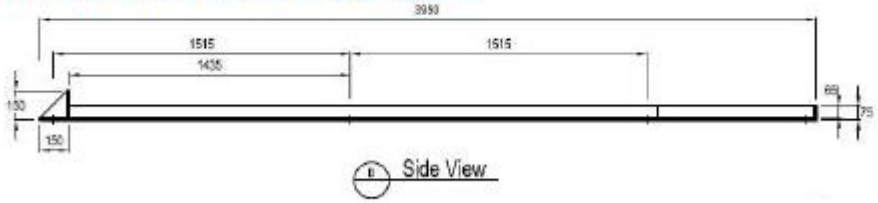


Figure 22: Integrated Auger Guide rails side view

8.3m Compaction unit and Hook lift Truck Dimensions

Vehicle Class:	Heavy Rigid Vehicle Dimensions
Overall Length (m)	8.3
Operational Length- Loaded (m)	9.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	21.6
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Weight Fully Loaded (tonnes)	22.5
Front Chassis Clearance	13^0
Rear Chassis Clearance	16^0

Table 10: Standard dimensions sourced from manufacture specifications

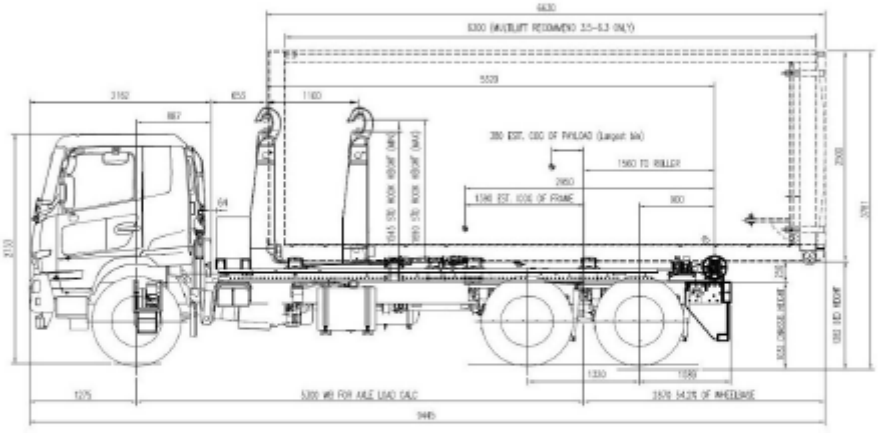


Figure 24: 8.3m Hook Lift Waste Collection Vehicle specifications

NOTE: Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

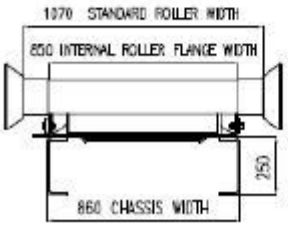


Figure 25: 9.5m Hook Lift Waste Collection Vehicle tray specifications

7.3.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements:	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker - Large enough to start and run 10kw electric motor - Breaker size to be confirmed with breaker supplier

Table 11: Electrical requirements for the operation of integrated auger compactors

7.3.3 Integrated Auger Compactor Schematics (6m)

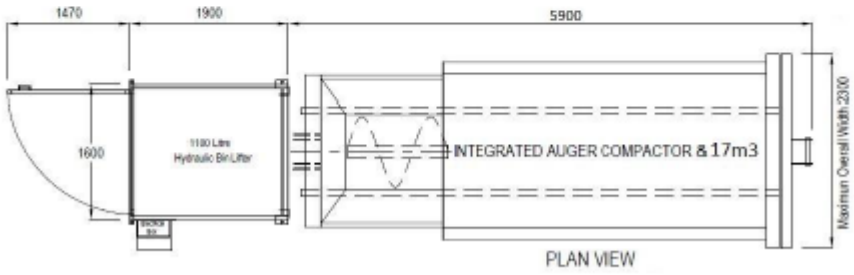


Figure 26: 6.0m Integrated Auger schematic with rear loading bin lifter

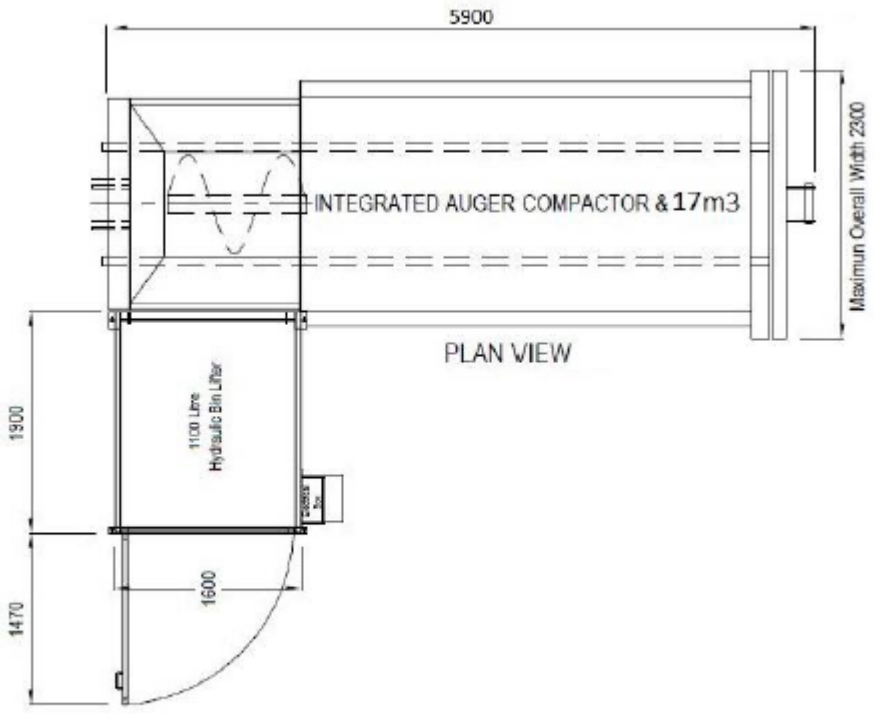


Figure 27: 6.0m Integrated Auger schematic with side loading bin lifter

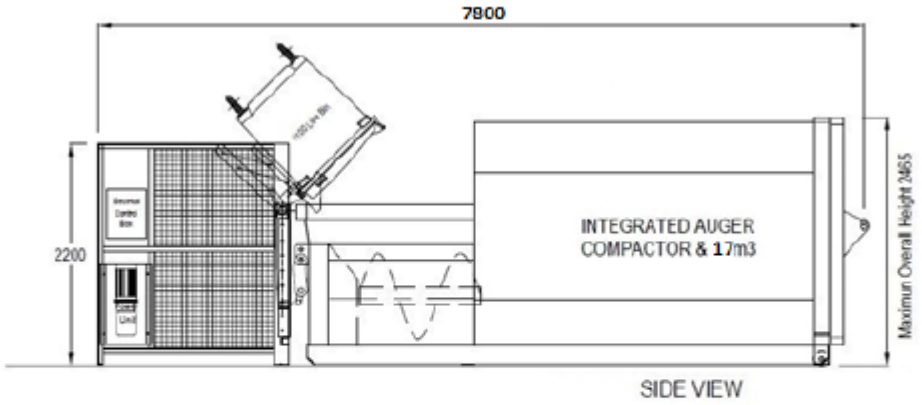


Figure 28: 6.0m Integrated Auger schematic side view

7.3.4 Guide Rail Specifications

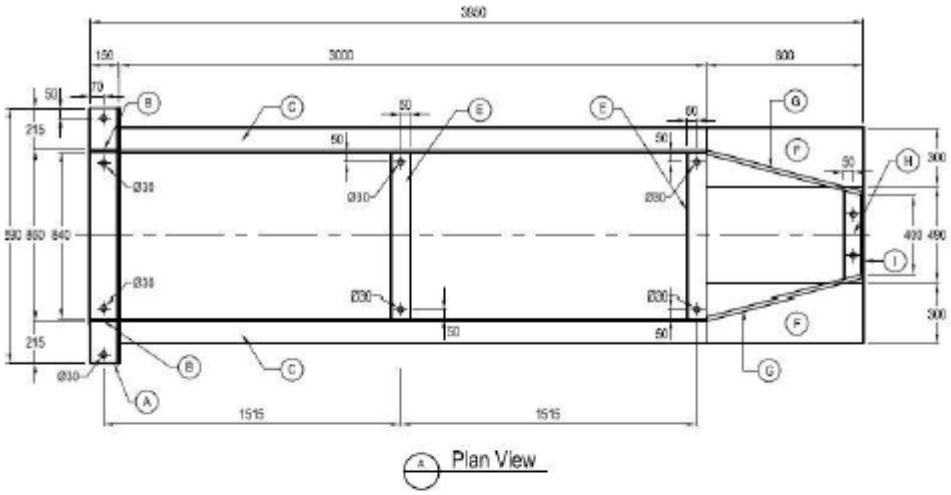


Figure 29: Integrated Auger Guide rails plan view

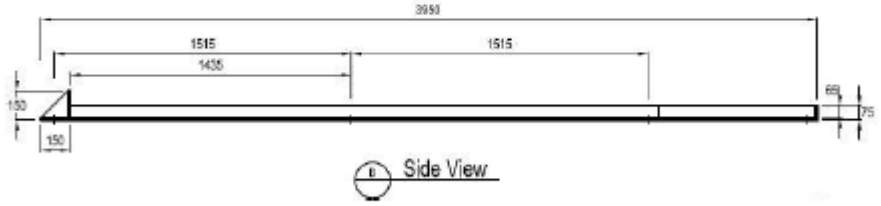


Figure 30: Integrated Auger Guide rails side view

9.1m Compaction unit and Hook lift Truck Dimensions

7.4.1 Hook Lift Collection Vehicle Specifications

Vehicle Class:	Heavy Rigid Vehicle Dimensions
Overall Length (m)	9.1
Operational Length- Loaded (m)	10.2
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Weight Fully Loaded (tonnes)	22.5
Front Chassis Clearance	13^0
Rear Chassis Clearance	16^0

Table 13: Standard dimensions sourced from manufacture specifications

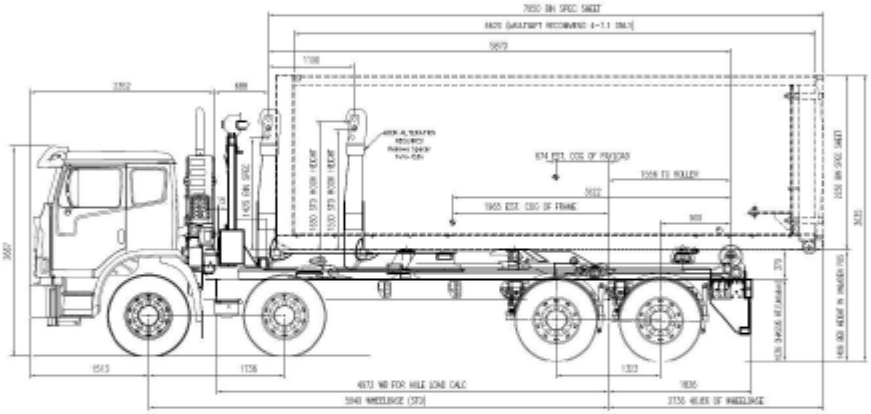


Figure 32: 9.1m Hook Lift Waste Collection Vehicle specifications

NOTE: Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

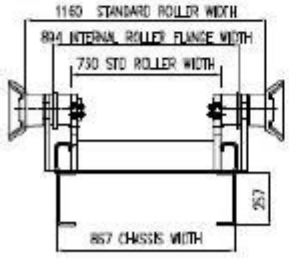


Figure 33: 9.1m Hook Lift Waste Collection Vehicle tray specifications

7.4.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements:	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker - Large enough to start and run 10kw electric motor - Breaker size to be confirmed with breaker supplier

Table 14: Electrical requirements for the operation of integrated auger compactors

7.4.3 Integrated Auger Compactor Schematics (7m)

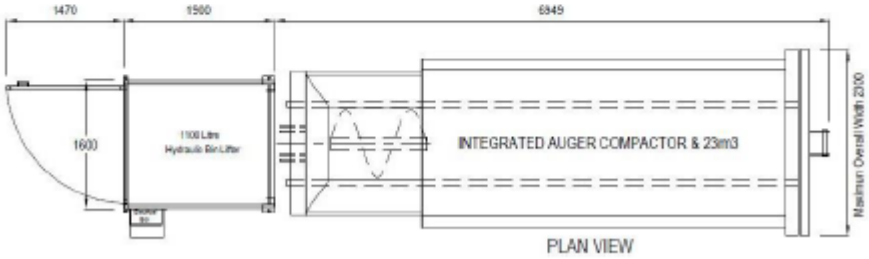


Figure 34: 7.0m Integrated Auger schematic with rear loading bin lifter

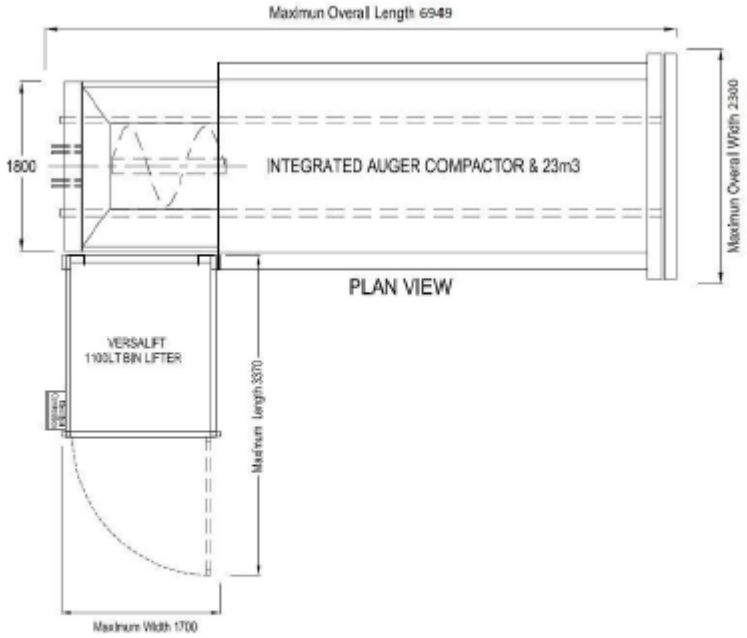


Figure 35: 7.0m Integrated Auger schematic with side loading bin lifter

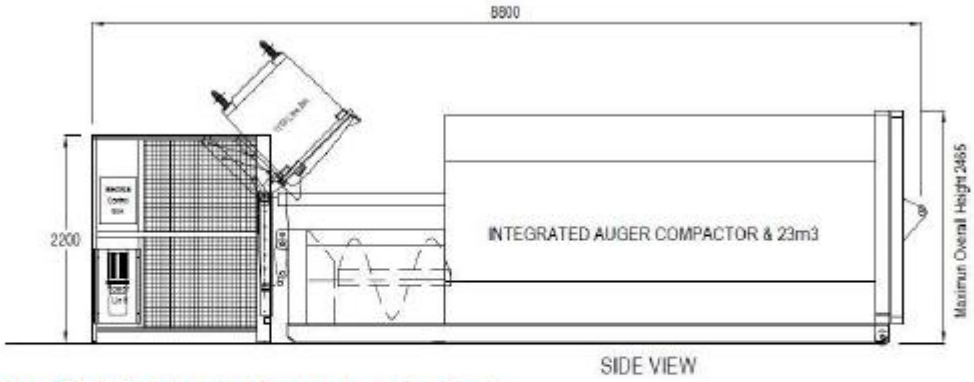


Figure 36: 7.0m Integrated Auger schematic side view

7.4.4 Guide Rail Specifications

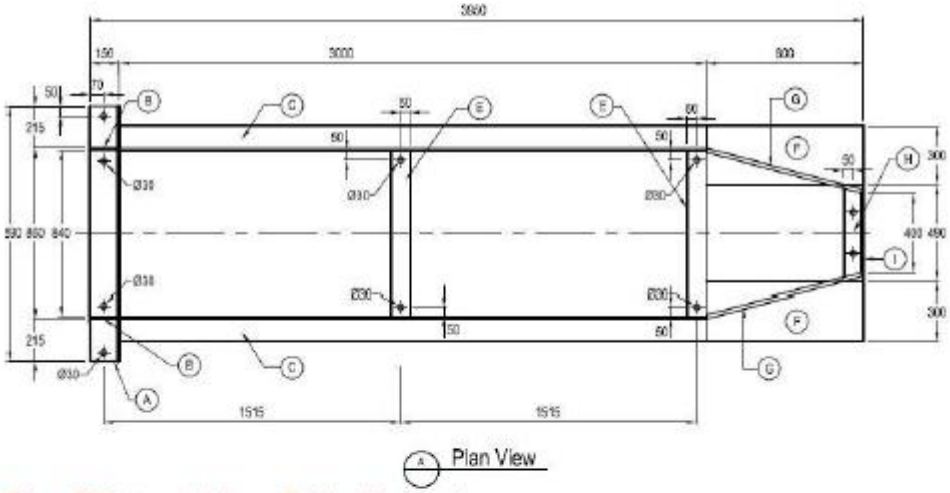


Figure 37: Integrated Auger Guide rails plan view

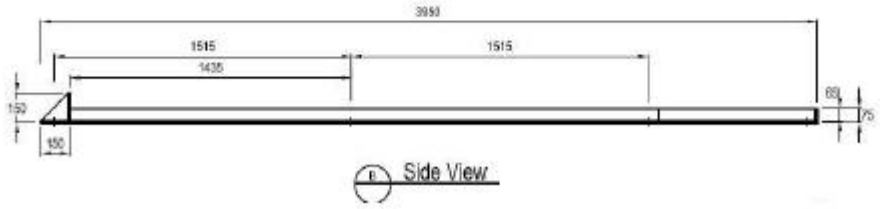
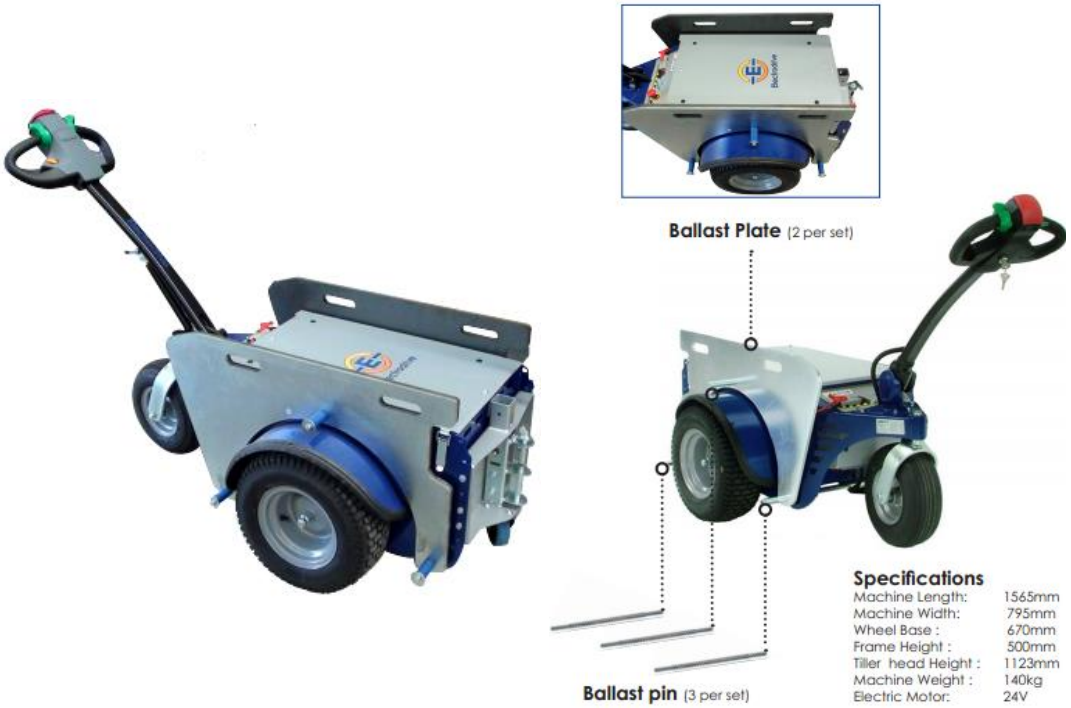


Figure 38: Integrated Auger Guide rails side view

Source: Penrith's *Residential Flat Building Waste Management Guidelines*

APPENDIX B.6 TYPICAL MOTORISED BIN TUG



Typical applications:

- Move trolleys, waste bin trailers and 660/1100L bins up and down a ramp incline.
- Quiet, smooth operation with zero emissions and simple to use, no driver's licence required
- Suitable for:
  - High rise building & apartment basements
  - Large factories & warehouse with sloped ground
  - Caravan parks & other large outdoor areas

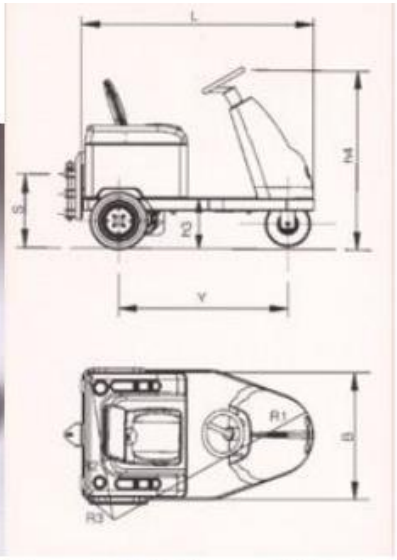
Features:

- 1 tonne tow capacity of inclines up to 8 degrees
- 500kg tow capacity if inclines up to 14 degrees
- CE Compliant
- 4.5 km/h max speed
- 2 x 80amp batteries – includes charger
- Powerful transaxle
- Hitch to suit 660L bins

Safety Features:

- Intuitive paddle lever control
- Stops and repels the unit if activated when reversing.
- Site assessment recommended to assess ramp incline steepness *(See Useful Contacts)*

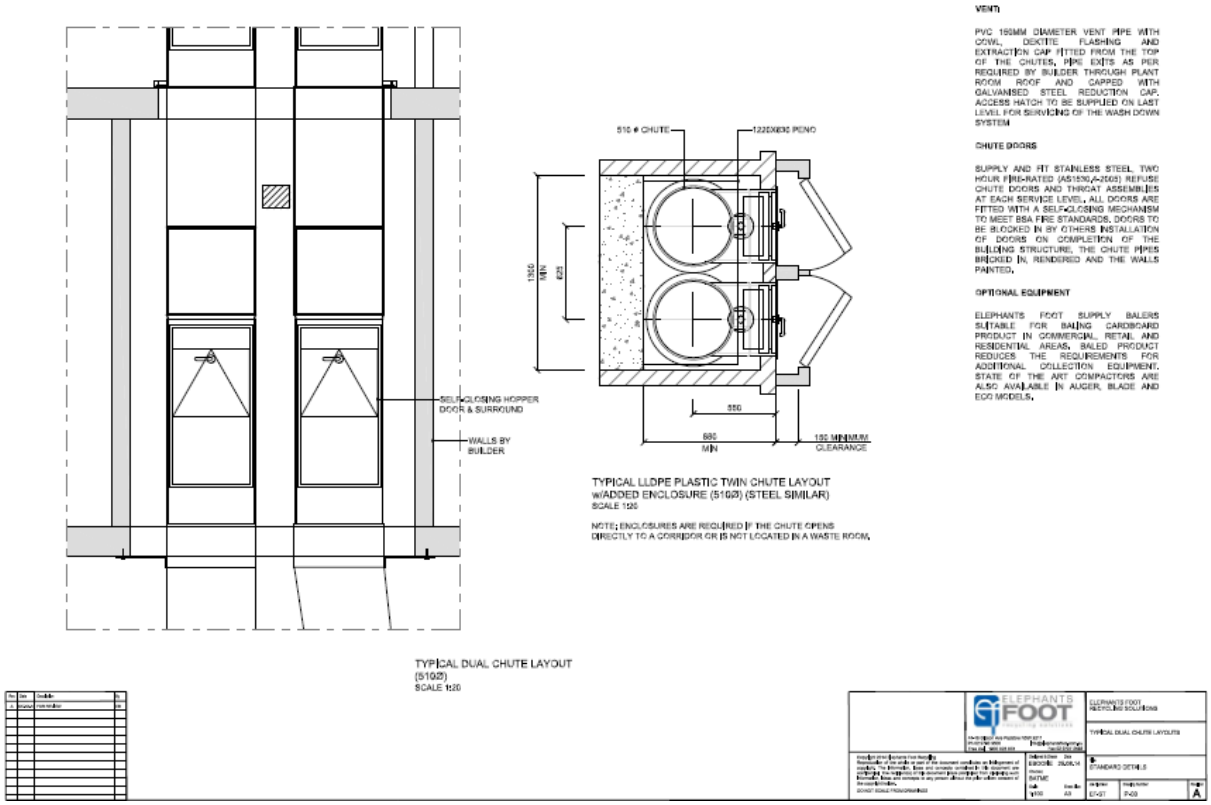
APPENDIX B.7 TYPICAL SEATED BIN MOVER



		UNIT M.	BULL 2	BULL 4
Manufacturer	DEC			
Model	BULL			
Platform loading cap.	Nominal capacity	kg	-----	-----
Pull capacity	Pull nominal capacity	kg	2000	4000
Power type	Electric - endotermic		electric	electric
Controltype	Standing / seated thiller / steer		seated / steer	seated / steer
Tyres	Pn=pneum. Se=superelastic		Pn	Pn
Wheels	N. front/rear - x drive	n.	1/2X	1/2X
Platform dimensions	L x B (lengh x width)	mm	-----	-----
Platform hight	h6 = unload clearence	mm	-----	-----
Overal dimensions	L = lenght B = width h1 = foot leve h3 = Seat height h4 = Steer height	mm mm mm mm mm	1500 900 1820 310 1250	1600 930 1960 340 1330
Turning radius	R1 = front min. external R2 = rear min. external R3 = front min. internal	mm mm mm	1400 1000 400	1500 1000 400
Aisle width	A = 180° turn	mm	2200	2300
Tow hook height	s = center from ground	mm	220-350-490	240-380-520

APPENDIX C INSTALLATION EQUIPMENT AND WASTE ROOM LAYOUTS

APPENDIX C.1 TYPICAL DUAL WASTE CHUTE SPECIFICATIONS



Waste chutes are supplied per the following specifications:

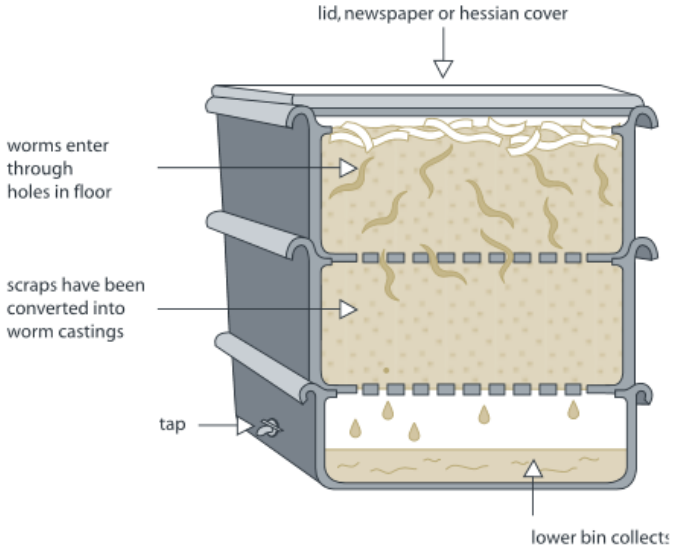
- either 510mm or 610mm (for 20+ levels) galvanised steel or recycled LLDPE polyethylene plastic;
- galvanised steel chute hoppers are wrapped with 50mm poly-wool R1.3 noise insulation foil to assist in noise reduction (or equivalent);
- penetrations on each building level at vertically perpendicular points with minimum penetration dimensions of either 600x600/700x700mm (square) or 650/750mm diameter (round) are required to accommodate the chute installation;
- a wash down system and vent should also be included as part of the chute system;
- council and supplier require that all chutes are installed without offsets to achieve best practise operationally for the building; and
- two hour fire-rated (AS1530.4-2005) stainless steel refuse chute doors at each service level. All doors are to be fitted with a self-closing mechanism to meet BSA fire standards.

NOTE: Chute doors are installed after walls rendered, painted or when required. Information stickers will be placed on each chute door at each residential level.

APPENDIX D SECONDARY WASTE MANAGEMENT PROVISIONS

APPENDIX D.1 TYPICAL WORM FARM SPECIFICATIONS

Worm farms



Space requirements for a typical worm farm for an average household:

Height – 300mm per level

Width – 600mm

Length – 900mm

There are many worm farm arrangements. The above dimensions are indicative only.

SOURCE: Department of Environment and Climate Change NSW 2008, Better Practice Guide for Waste Management in Multi-Unit Dwellings

APPENDIX D.2 TYPICAL APARTMENT STYLE COMPOST BINS

Apartment Style Compost bin – available from hardware stores

Suitable for:

- Vegetables
- Coffee grounds and filters
- Tea and tea bags
- Crushed eggshells (but not eggs)
- Nutshells
- Houseplants
- Leaves
- Cardboard rolls, cereal
- Boxes, brown paper bags
- Clean paper
- Shredded newspaper
- Fireplace ashes
- Wood chips, sawdust,
- Toothpicks, burnt matches
- Cotton and wool rags
- Dryer and vacuum cleaner lint
- Hair and fur
- Hay and straw

APPENDIX D.3 ELECTRIC ORGANIC COMPOST BIN

Product Specifications

Decomposition Method	Fermentation by microorganisms
Decomposition Capacity	2 metric tonnes per year* (4 kg per day*)
Rating	220–240 V 50/60 Hz – 1.1 A
Decomposition Time	24 hrs
Operating Temperature	0C and 40C.**
Deodorisation Method	Nano-Filter system
Maximum Power	210 W
Power Usage	Average 1 kwh per day
Weight	21 kgs
External Dimensions	w 400 mm d 400 mm h 780 mm

* Food Waste Handling Capacity – based on an optimal operating environment.
** Ambient temperature range of area where unit may be installed.

SOURCE: Closed Loop Domestic Composter – See Useful Contacts
http://www.closedloop.com.au/domestic-composter

APPENDIX D.4 TYPICAL PUBLIC PLACE WASTE BINS

** Products and specifications may change according to manufacturer.*

SOURCE: *SULO Environmental Technology*