



1-7 Anderson Ave and 12 Alamein Ave, Liverpool NSW
Residential Development

CONSTRUCTION WASTE MANAGEMENT PLAN

18/05/2020
Revision B

Client

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SCOPE

A Waste Management Plan (WMP) is to be submitted with all development applications for new and change-of-use developments that will generate construction, demolition and operational waste.

This WMP applies only to the **construction** phases of the proposed development. The requirements outlined in this WMP must be implemented on site during construction and may be subject to review upon any change to the design. Construction waste management requirements will also be subject to review as part of the Construction Management Plan.

The waste management for the **operational** phase of the development is not addressed in this report. An operational WMP will need to be provided separately. Elephants Foot Recycling Solutions (EFRS) can supply this if necessary.

REVISION REFERENCE

Revision	Date	Prepared by	Reviewed by	Description
A	7/05/2020	H Wilkes	A Armstrong	Draft
B	18/05/2020	H Wilkes	A Armstrong	Final

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1 INTRODUCTION

1.1 Background

EFRS has been tasked to prepare the following waste management plan for BCL2 Limited for the management of construction waste generated by the residential development located at 1-9 Anderson Ave and 12 Alamein Ave Liverpool.

Waste management strategies and auditing are a requirement on construction sites to promote strong sustainability outcomes. 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. **Comply*** with all relevant Australian Standards, council codes, policies, and guidelines.

1.2 Site Summary

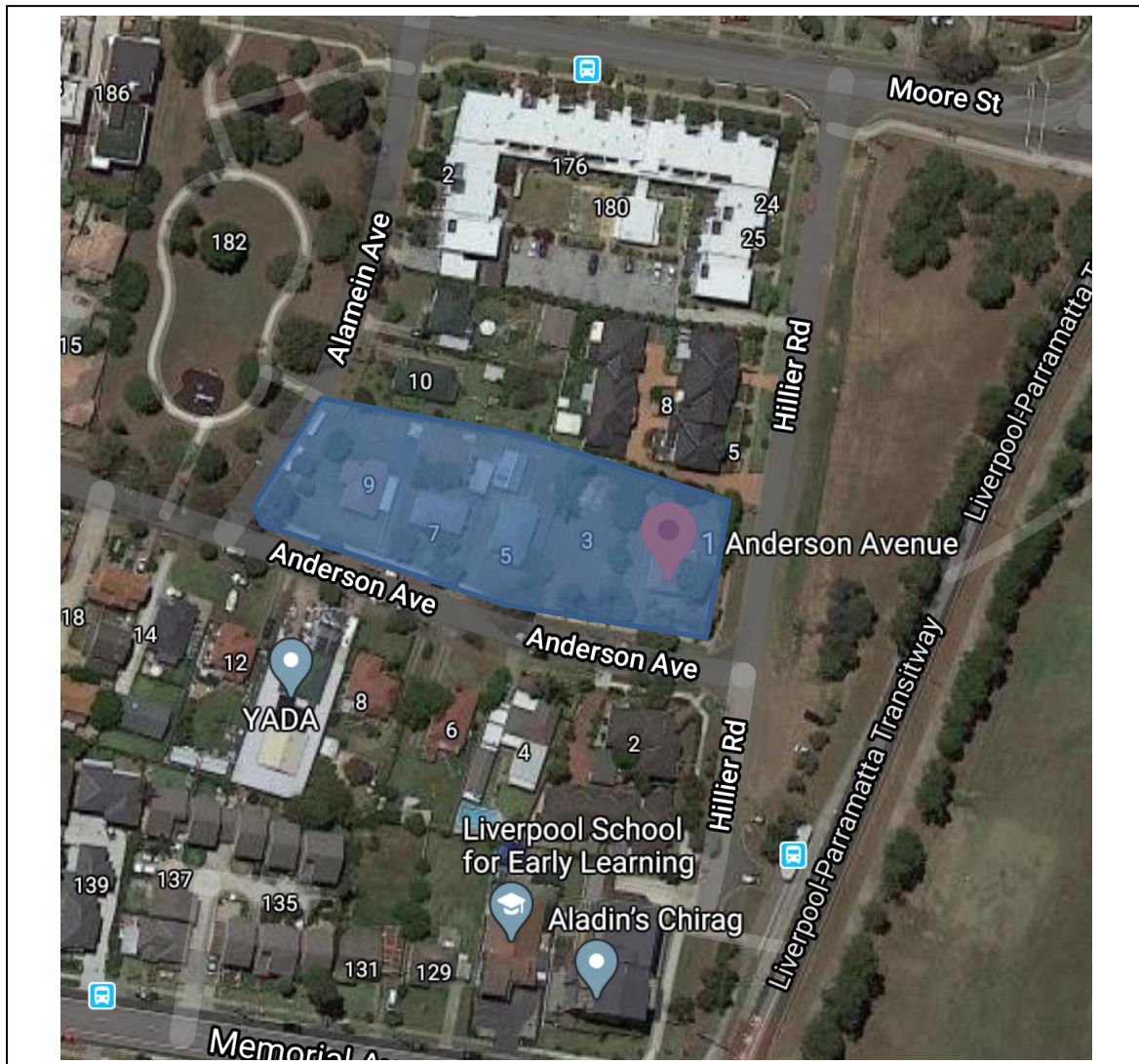
The proposed development falls under the LGA of Liverpool Council. The proposal consists of:

- One building with 5 levels and 2 basement levels with 63 residential units in total separated into 3 building cores

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

1.3 Site Location

The site is located at 1-9 Anderson Ave Liverpool, as shown below. The site has frontages to Alamein Ave, Anderson Ave and Hillier Rd, with vehicle access via Hillier Rd.



Source: Google Maps 2020

1.4 Legislation and Guidance

Information provided in this WMP comes from a wide range of construction and demolition waste management guidance at the local, state, and federal levels. The primary sources of guidance include:

- *Liverpool Development Control Plan 2008*
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities. *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain*. (2014, November).
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021
- NSW Waste Classification Guidelines 2014
- Australia's National Waste Policy 2018

1.5 Waste Diversion Targets

To quantify and measure this sustainable approach to waste management, the NSW WARR Strategy 2014-2021 outlines specific targets in order to clarify the state's long-term goals and priorities. These targets were supported by industry, community, state, and local governments during the Strategy's consultation phase, and include:

- Increasing construction and demolition recycling rates to 80%
- Increasing waste diverted from landfill to 75%
- Reducing litter by 40%

Reduce illegal dumping incidents by 30%

1.6 Report Objectives

Throughout this report, EFRS aims to encourage the following waste management practices for the duration of the construction stages of the development:

- Re-use of excavated material on-site and disposal of any excess to an approved site;
- Green waste mulched and re-used on-site as appropriate, or recycled off-site;
- Bricks, tiles and concrete re-used on-site as appropriate, or recycled off-site;
- Plasterboard waste returned to supplier for recycling;
- Framing timber re-used on site or recycled off-site;
- Windows, doors and joinery recycled off-site;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Plumbing, fittings and metal elements recycled off site;
- Ordering accurate quantities of materials and prefabrication of materials where possible;
- Re-use of formwork;
- Careful source separation of off-cuts to facilitate re-use, resale or recycling.

1.7 Limitations

This report has been prepared by EFRS for the sole purpose of providing a Construction Waste Management Plan (CWMP) to support a development application. The report is provided with the following limitations:

- This report is for the sole use of BCL2 Limited (including their officers, employees and advisers) and should not be used or relied upon by any other party without prior written consent from EFRS;
- Drawings, estimates and information contained in this report have been prepared by analysing information, plans and documents supplied by the client, or nominated third parties. Any assumptions based on the information contained in the report are outside the control of EFRS;
- The calculations presented in the report are estimates only. The amount of waste generated will be dependent on the approach taken by site management, including the levels of training and education offered to site staff and the actions and attitudes of staff themselves.
- The site manager will make adjustments as required based on actual waste volumes (e.g. if waste volumes are greater than estimated, then waste storage capacity and collection frequencies will increase accordingly) and increase the amount of waste storage and collection frequency accordingly;
- The report has been prepared with all due care and attention; however, no assurance or representation is made that the WMP reflects the actual outcome. EFRS will not be liable to for any plans or outcomes that are not suitable for 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;
- Examples of equipment provided in this report should be reviewed by the appropriate equipment supplier who will assess the correct equipment for supply. Reference to any other business or product besides EFRS and EFRS equipment is for information purposes only, and is not officially endorsed or recommended by EFRS.

1.8 Liverpool Council

The garbage and recycling will be guided by the services and acceptance criteria of the Liverpool Council. All construction activities are to be conducted in compliance with the Liverpool Council's *Liverpool Development Control Plan 2008*, Australian Standards and statutory requirements.

The information provided in this report will be assessed against the following Liverpool Council objectives regarding the management of waste from construction activities:

- Manage construction sites so that there is no unreasonable impact on the surrounding amenity, pedestrian or road safety, or the natural environment.
- Promote improved project management by minimising construction waste and encouraging source separation, reuse and recycling of materials.
- Assist industry, commercial operators and site managers in planning their necessary waste management procedures through the preparation and lodgement of a Waste Management Plan
- Discourage illegal dumping.

2 GENERAL WASTE MANAGEMENT PROVISIONS

2.1 Stakeholder Roles and Responsibilities

All stakeholders have a responsibility for their own environmental performance and compliance with all legislation.

The Construction Contractor will be responsible for implementing this WMP, although site staff have a responsibility to ensure their own compliance at all times. Where possible, an Environmental Management Representative (EMR) should also be appointed for the project to help ensure compliance. The following table demonstrates the primary roles and responsibilities of the respective stakeholders:

Table 1: Stakeholder Roles and Responsibilities

Roles	Responsibilities
Construction Site Management	<ul style="list-style-type: none"> • Organising waste collections as required; • Organising replacement or maintenance requirements for bins; • Investigating and ensuring prompt clean-up of illegally dumped waste materials; • Notify the Principal Certifying Authority (Council) of the appointment of waste removal, transport or disposal contractors for waste tracking purposes; • Ensuring waste related equipment is well maintained; • Accurate calculations ensuring only the required amount of materials are ordered; • Ensuring segregation of materials to maximise reuse and recycling; • Routine checking of waste sorting and storage areas for cleanliness, hygiene, contamination and OH&S issues; • Ensuring that all monitoring and audit results are well documented and carried out as specified in the WMP; • Ensuring effective signage, communication and education is provided to site staff/contractors; • Providing staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities; • Assessing any manual handling risks and prepare a manual handling control plan for waste and bin transfers;
Site Staff/Contractors	<ul style="list-style-type: none"> • Ensuring adequate separation and disposal of waste streams in compliance with the WMP; • Abiding by all relevant OH&S legislation, regulations, and guidelines; • Attending training and inductions as required; • Cleaning and transporting of bins as required; • Daily visual inspections of waste storage areas; • <u>Organising, maintaining and cleaning the waste storage areas;</u>
Environmental Management Representative (EMR)	<ul style="list-style-type: none"> • Approaching and establishing the local commercial reuse of materials where reuse on-site is not practical; • Establishing separate skips and recycling bins for effective waste segregation and recycling purposes; • Ensuring staff and contractors are aware of site requirements; • Provision of training of the requirements of the WMP and specific waste management strategies adopted for the development; • Contaminated waste management and approval of off-site waste transport, disposal locations and checking licensing requirements; • Arranging assessment of suspicious potentially contaminated materials, hazardous materials and liquid waste; • Monitoring, inspection and reporting requirements.
Waste Collection Contractors	<ul style="list-style-type: none"> • Provide a reliable and appropriate waste collection service; • Provide feedback to construction site management regarding contamination of waste streams; • Work with construction site management to customise waste systems where possible.

2.2 Monitoring and Reporting

It is recommended that the following measures be taken to improve construction waste management in future and to provide more reliable waste generation figures:

- Compare projected waste quantities with actual waste quantities produced.
- Conduct waste audits of current projects (where feasible).
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained. Additionally, dockets/receipts verifying recycling/disposal in accordance with the WMP must be kept and presented to Council or the EPA if and when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists/logs recorded for reporting to the Site Manager on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the Building Contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling/reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training should be undertaken and signage re-examined.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and should include the contact details of the 24-hour EPA Pollution line. Likely incidents to occur during the construction stage of the development may involve fuel or chemical spills, seepage or mishandling of hazardous waste, or unlicensed discharge of pollutants to environment.

2.3 Opportunities for Reuse and Recycling

There are many opportunities to reduce the volume of waste generated during construction. Adaptive reuse of building materials should be encouraged, with significant consideration given to methods of reusing or recycling materials onsite as well as sourcing used or recycled materials from elsewhere to be used on site.

The site should facilitate reuse and recycling by 'deconstruction', whereby various materials are carefully dismantled and sorted. Any unwanted reusable materials can be taken to a second-hand building centre, reducing waste disposal costs.

Materials that are individually wrapped should also be avoided where possible, with preference given for materials that can be delivered in returnable packaging such as timber pallets.

The table below gives examples of potential reuse and recycling options for the materials likely to be used/generated in construction at this development:

Table 2: Potential Reuse/Recycling Options for Construction Materials

Material	Reuse/Recycling Potential
Asphalt	Hot in-place recycling or reprocessed into Reclaimed Asphalt Pavement (RAP).
Bricks	Cleaned and/or rendered for reuse, crushed for fill, sold or provided to a recycled materials yard
Cardboard Packaging	Recycled at a paper/cardboard recycling facility
Carpet	Cleaned and reused for the same purpose, reused in landscaping or garages/sheds, recycled at an appropriate processing facility
Concrete, Masonry, Spoil	Reused on-site as fill, levelling or crushed for road base
Doors, Windows, Fittings	Reused in new or existing buildings or sent to second-hand supplier
Glass	Recycled at a glass recycling facility, aggregate for concrete production, crushed for termite barrier, reused as glazing
Green Waste (Organics)	Mulched, composted for reuse, trees chipped for use in landscaping or removed carefully and reused onsite or sold
Hardwood Beams	Reused as floorboards, fencing, furniture or sent to second-hand timber supplier
Insulation Material	Reprocessed to remove impurities and reused for the same purpose or as off-cuts, compressed for ceiling tile manufacture
Metal, Steel/Copper Pipe	Recycled at a metal recycling facility, melted into secondary materials for structural steel, roofing, piping etc. copper sold for re-use
Other Timber	Reused in formwork, ground into mulch for garden or sent to second-hand timber supplier
Plasterboard	Crushed for reuse in manufacture of new plasterboard, returned to supplier or used in landscaping
Plastics	Reused as secondary materials for playgrounds, park benches etc.
Roof Tiles	Cleaned and reused, crushed for reuse for landscaping and driveways or sold or provided to a recycled materials yard
Soil	Stockpiled onsite for reuse as fill
Synthetic & Recycled Rubber	Reused for the same purpose or reprocessed for use in manufacture/construction of safety barriers, speed humps
Topsoil	Stockpiled onsite for reuse in landscaped areas

2.4 Management of Hazardous Waste Materials

For the purpose of this report, hazardous waste materials include any waste that poses a hazard or potential harm to human health or the environment, particularly asbestos waste and asbestos containing material (ACM).

During the construction phase of the development, there must be a commitment to engage qualified and certified contractors to remove all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility, where applicable.

In the event that any contaminated or hazardous materials are unexpectedly uncovered during excavation works, the Site Manager is to stop work immediately and contact the relevant hazardous waste contractor prior to further works being undertaken in the area.

The following general mitigation measures will apply:

- Contaminated material stockpiled on site will be minimised as far as possible and should be stored on HDPE liner, in a bunded location which is protected from inclement weather;
- Sediment fences should be installed around the base of stockpiles and the stockpiles should be covered. Where excavated material requires validations, samples should be taken for NATA laboratory testing as per the requirements of the contamination assessment prior to restoration works, backfilling exercises and disposal;
- Any trucks carrying contaminated materials should be securely and completely covered immediately after loading the materials (to prevent windblown emissions and spillage) and must be licensed by the NSW Environmental Protection Authority (EPA);
- Decontamination of all equipment prior to demobilisation from the site is important so that contaminated materials are not spread off-site.

2.5 Management of Excavation Waste

For the purpose of this report, excavation waste consists of any unwanted material generated from excavation activities such as a reduced level dig, site preparation and levelling and the excavation of foundations, basements, tunnels and service trenches. This will typically consist of soil and rock.

All excavated material generated on this site may be re-used in the landscaping or used on other sites as fill material, provided no contamination is present. If sandstone is found to be present, this may be sold or incorporated into the building design.

The following measures and safeguards will apply to the development for excavated material:

- Wherever practical, excavation material will be reused as part of the development;
- Excavation material that is not natural (virgin) material will be transported to an approved landfill site or off-site recycling depot;
- A waste classification assessment of the fill material should be undertaken prior to it being acceptable for waste disposal purposes;
- Transportation routes for excavation material removed from site will be identified and used.

3 SITE SPECIFIC WASTE MANAGEMENT PROVISIONS

3.1 Construction Waste Volumes and Management

Waste generated during the construction stage of the development will be managed by the principal contractor and sub-contractors, with materials being reused and recycled wherever possible. Where neither reuse nor recycling are possible, waste will be disposed of as general waste at a licensed landfill site.

Recyclable material generated during construction will largely consist of off-cuts and discarded bricks, timber, steel, concrete, tiles, plasterboard, and piping, as well as packaging materials.

It is important to note that source separation of waste on-site may offer cost savings when compared to the disposal of mixed waste at landfill sites.

The table below illustrates the anticipated volumes of materials generated at this development during the construction stage. Volumes have been advised by our client.

Table 3: Construction Waste Conversion

Material	Volume (m3)	*Tonnes (t)	** Approx. Percentage Recovered
Excavation Material	27300	27300	99.8%
Green waste	87	13.05	80%
Bricks	20.7	24.84	100%
Tiles	2.05	2.05	100%
Concrete	125.2	187.8	100%
Timber	12.46	2.37	33%
Plasterboard	56	11.2	50%
Metals	5	2.5	100%
Asbestos	0	0	0%
Other waste	0	0	0%
Totals	27608.41	27543.8	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation <<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 4: Construction Waste Management

Type of Material	Less than 10m ³	Estimated Tonnage	How Waste will be Managed			Estimated Tonnage of Material Diverted from Landfill
			Reuse On-Site	Recycle	Landfill	
Excavation Material	<input type="checkbox"/>	27300	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	27231.75
Green Waste	<input type="checkbox"/>	13.05	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10.44
Bricks	<input type="checkbox"/>	24.84	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24.84
Tiles	<input checked="" type="checkbox"/>	2.05	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.05
Concrete	<input type="checkbox"/>	187.8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	187.8
Timber	<input type="checkbox"/>	2.3674	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.781242
Plasterboard	<input type="checkbox"/>	11.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.6
Metals	<input checked="" type="checkbox"/>	2.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.5
Asbestos	<input type="checkbox"/>	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Other Waste	<input type="checkbox"/>	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Total		<u>27543.8</u>	Total			<u>27465.8</u>
Total Diversion of Waste from Landfill (Minimum 80%)						99.7%

3.2 Recycling Directory

Construction materials removed from site will need to be managed in accordance with the provisions of current legislation and may include segregation by material type classification in accordance with NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* and disposal at facilities appropriately licensed to receive the particular materials.

Please find the below recommendations for recycling drop off locations for all materials likely to be generated at this development. Only the nearest locations are provided. See www.businessrecycling.com.au for additional locations:

Excavation Material

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3

Bricks

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3
Enviro Recycling	Revesby	NSW	2212	7.6

Tiles

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3
Enviro Recycling	Revesby	NSW	2212	7.6

Concrete

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3
Enviro Recycling	Revesby	NSW	2212	7.6

Timber

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3

Plasterboard

Business Name	Suburb	State	Postcode	Distance (Km)
Benedict Recycling	Chipping Norton	NSW	2170	4.3
Benedict Recycling	Belrose	NSW	2085	4.3

Metals

Business Name	Suburb	State	Postcode	Distance (Km)
MRI e-cycle solutions (Aust) Pty Ltd	Warwick Farm	NSW	2170	1.7
Barca Metals	Chipping Norton	NSW	2170	3.6

Asbestos

Business Name	Suburb	State	Postcode	Distance (Km)
AKA Civil	Rosehill	NSW	2124	8.9
Veolia Environmental Services	Horsley Park	NSW	2164	11.3

3.3 Site-Specific Operational Measures

Training/Site Inductions

All staff employed during the construction stages of the development must undertake site-specific induction training regarding the procedures for waste management. Employees of the head contractor will undertake a specific induction outlining their duties and how they are to enforce the waste management procedures.

Induction training will include the following at a minimum:

- Legal obligations;
- Emergency response procedures on site;
- Waste storage locations and separation of waste;
- Litter management in transit and on site;
- The implications of poor waste management practices;
- Correct use of general-purpose spill kits;
- Responsibility and reporting (including identification of personnel responsible for waste management and individual responsibilities).

Materials Selection and Ordering

- Selection of all materials will be undertaken by architectural designers;
- Prefabrication of materials off-site where possible;
- Materials requirements are to be accurately calculated to minimise waste from over-ordering;
- Materials ordering process is to aim at minimisation of materials packaging;
- Material Safety Data Sheets (MSDS) are to accompany all materials delivered to site, where required, to ensure that safe handling and storage procedures are implemented.

Waste Avoidance Opportunities

- Limiting unnecessary excavation;
- Selection of construction materials taking into consideration to their long lifespan and potential for reuse;
- Ordering materials to size and ordering pre-cut and prefabricated materials;
- Reuse of formwork;
- Planned work staging;
- Use of naturally ventilating buildings to reduce ductwork;
- Reducing packaging waste on-site by returning packaging to suppliers where possible, purchasing in bulk and requesting cardboard or metal drums rather than plastics;
- Requesting metal straps rather than shrink wrap and using returnable packaging such as pallets and reels;
- Reduction of PVC use;
- Use of low VOC (volatile organic compounds) paints, floor coverings and adhesives;
- Use of fittings and furnishings that have been recycled or incorporate recycled materials;
- the use of building materials, fittings and furnishings with consideration to their longevity, adaptation, disassembly, reuse and recycling potential.

Site Procedures

- Excavated materials will be used onsite where possible;
- Green waste will be mulched and reused in landscaping either onsite or offsite;
- Concrete, tiles and bricks will be reused or recycled offsite;
- Steel will be recycled offsite; all other metals will be recycled where economically viable;
- Framing timber will be reused on-site or recycled off-site;
- Windows, doors and joinery will be recycled off-site where possible;
- Plumbing, fittings and joinery will be recycled off-site where possible;
- Plasterboard will be re-used in landscaping on-site or returned to the supplier for recycling where possible;
- All used crates will be stored for reuse unless damaged;
- All glass that can be economically recycling will be;
- All solid waste timber, brick, concrete, rock, plasterboard and other materials that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Provision for the collection of batteries, fluorescent tubes, smoke detectors and other recyclable resources will be provided on site;
- Beverage container recycling will be provided on-site for employee use;
- All waste and recycling will be disposed of via council approved systems.

3.4 Location and Design of Waste Management Facilities

General Requirements

All waste management facilities onsite should:

- Be conveniently located to enable easy access for on-site movement and collection;
- Be incorporated with other loading/unloading facilities;
- Have sufficient space for the quantity of waste generated and careful source separation of recyclable materials;
- Have sufficient space to contain any on-site treatment facilities, such as compaction equipment;
- Have adequate weather protection and, where required, be enclosed or undercover;
- Be secure and lockable;
- Be well-ventilated and drained to the sewer;
- Be clearly sign-marked to ensure appropriate use.

Waste and Recycling Receptacles

A sufficient quantity of skip bins should be provided for the separate storage of each type of C&D material generated on site. This will assist in maximising source separation and resource recovery, while reducing the costs and quantity of materials disposed of at landfill.

The size of the receptacles should be appropriate to the nature of waste generated and the available storage area. In general, the following options would be acceptable:

Bin Size	Access	Dimensions
2.5m	Top loading	
3m	Drop door walk-in	
4m	Drop door walk-in	
5m	Drop door walk-in	
6m	Double doors walk-in	

Source: Aussie Bins

If the developer chooses to adopt a traditional waste management strategy, whereby waste is deposited into commingled skip bins to be sorted offsite, a single skip bin would be considered sufficient for purpose. However, if the site is to pursue source separation, dedicated skips for the following materials are recommended:

- Timber;
- Plasterboard;
- Concrete;
- Bricks;
- Scrap metal;
- General waste.

Separate receptacles for the safe disposal of hazardous waste types (i.e. light bulbs, batteries, etc) will also be provided where applicable. Where possible, additional bins will be provided in common areas for the collection of commingled recyclables such as beverage containers (glass, plastic, aluminium), paper products, recyclables food containers, etc. Specialised bins for cigarette butts should also be provided.

Safety and Signage

The following safety measures should be considered for the waste storage area:

- Location should not interfere with sight lines of drivers entering or leaving the site;
- Skip bins should be clearly visible and located in well-lit areas;
- Safe paths of travel should be designated using reflective tape, barriers and cones;
- Skip bins must be secured and must not be over-filled to reduce risk of injury through bins moving and falling objects.

Standard signage will be installed in all waste areas, with all skip bins colour coded and labelled appropriately on all sides to allow clear identification of the type of waste to be deposited into each bin.

Refer to the EPA's website for standard construction waste and recycling signs:

www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

Space and Siting Requirements

The waste storage area will be located adjacent to the entrance to the site to enable access and allow sufficient space for the required skip bins and servicing requirements. The storage area will also be flexible in order to cater for change of use throughout construction works.

Where space is restricted, dedicated stockpile areas will be allocated onsite, with regular transfers to the dedicated skip bins for sorting and collections.

The position of the designated waste holding area onsite may change according to building works and the progression of the development. Access, visual amenity and WHS will always be integral to the selection of waste storage area locations. Any stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

Servicing and Transport

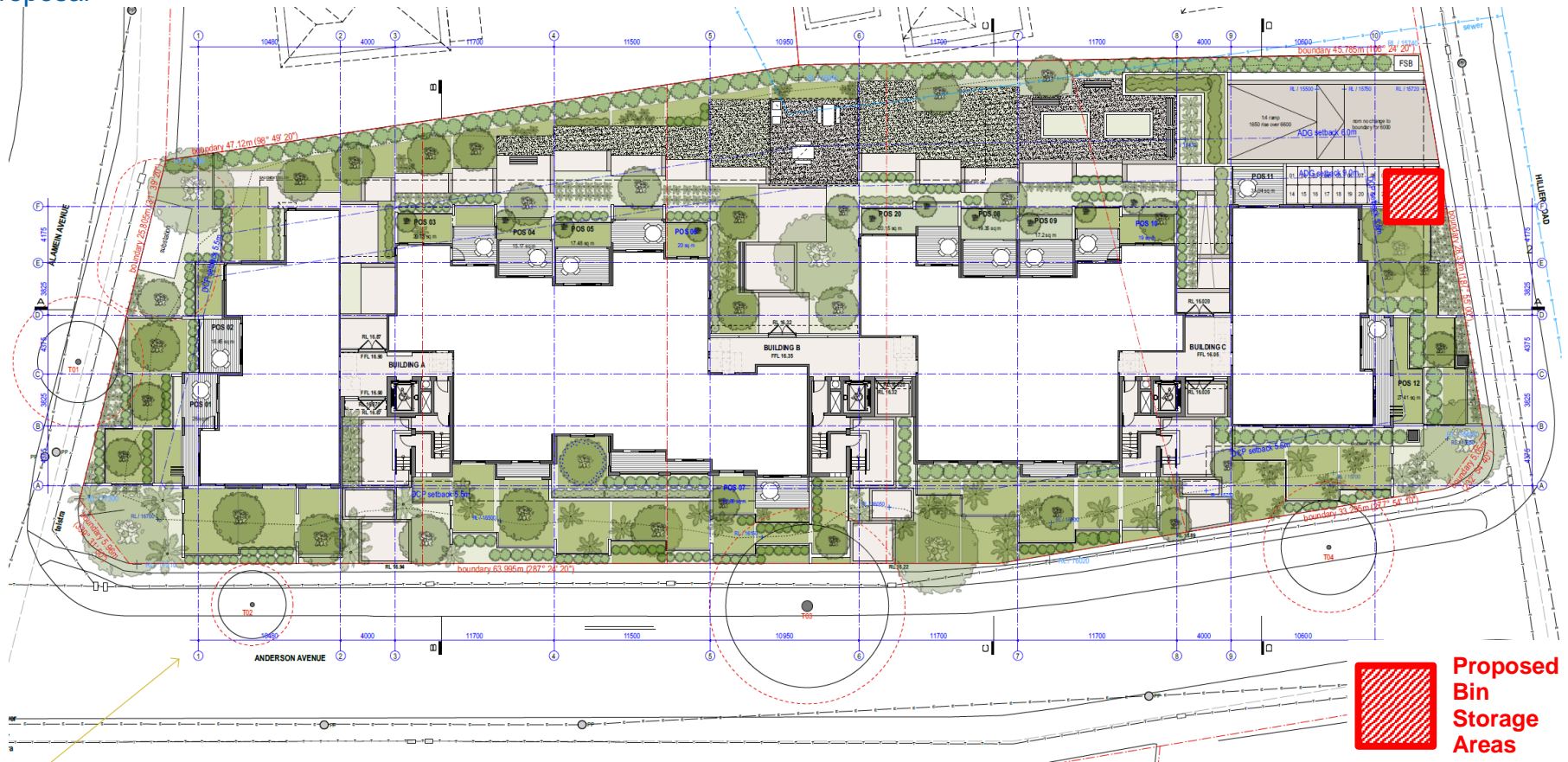
The frequency of waste removal from site will be determined by the volume of materials deposited into the dedicated skip bins. Skip bins will be monitored on a daily basis by the Construction Site Manager to ensure they do not overflow. If skip bins are reaching capacity, removal and replacement should be organised for within 24 hours.

All skip bins leaving the site will be covered with a suitable tarpaulin to reduce spillage of waste while in transit.

All waste collection for construction works will be conducted between approved hours as per Council requirements (typically between 7am and 7pm Monday to Friday, and between 7am and 1pm on Saturdays). All waste generated on site will be transported to an approved and appropriately licensed resource recovery facility and/or landfill site.

3.5 Architectural Plans

Proposal



Source: Kennedy Associates Architects, 1-7 Anderson Ave and 12 El Alamein Ave Liverpool, Site Plan Drawing No DA06 Rev A



1-7 Anderson Ave and 12 Alamein Ave, Liverpool NSW
Residential Development

OPERATIONAL WASTE MANAGEMENT PLAN

18/05/2020
Report No. SO291
Revision F

Client

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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	Signed
A	1/10/2019	H Wilkes	A Armstrong	Draft	
B	15/10/2019	H Wilkes	A Armstrong	Amendment	
C	8/11/2019	H Wilkes	A Armstrong	Final	
D	5/12/2019	H Wilkes	A Armstrong	Amendment	
E	6/05/2020	H Wilkes	A Armstrong	Amendment Draft	
F	18/05/2020	H Wilkes	A Armstrong	Amendment Final	

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GLOSSARY OF TERMS

TERM	DESCRIPTION
<i>Baler</i>	A device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by strapping
<i>Chute</i>	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)
<i>Chute Discharge</i>	The point at which refuse exits from the refuse chute
<i>Chute Discharge Room</i>	A secure, enclosed area or room housing the discharge and associated equipment for the refuse chute
<i>Collection Area/Point</i>	The identified position or area where garbage or recyclables are actually loaded onto the collection vehicle
<i>Compactor</i>	A machine for compressing waste into disposable or reusable containers
<i>Composter</i>	A container/machine used for composting specific food scraps
<i>Crate</i>	A plastic box used for the collection of recyclable materials
<i>Garbage</i>	All domestic waste (Except recyclables and green waste)
<i>Green Waste</i>	All vegetated organic material such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers
<i>Hopper</i>	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
<i>L</i>	Litre(s)
<i>Liquid Waste</i>	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)
<i>LRV</i>	Large rigid vehicle described by AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities as heavy rigid vehicle (HRV)
<i>Mobile Garbage Bin(s) (MGB)</i>	A waste container generally constructed of plastic with wheels with a capacity in litres of 120, 240, 360, 660, 1000 or 1100
<i>MRV</i>	Medium rigid vehicle
<i>Putrescible Waste</i>	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.
<i>Recycling</i>	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
<i>SRV</i>	Small rigid vehicle as in AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities, generally incorporating a body width of 2.33

INTRODUCTION

Elephants Foot Recycling Solutions (EFRS) has been engaged to prepare the following waste management plan for the operational management of waste generated by the residential development located at 1-7 Anderson Avenue and 12 El Alamain Avenue, Liverpool NSW.

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 integrated into the overall management of the building and clearly communicated to all relevant stakeholders.

REPORT CONDITIONS

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

- 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.
- EFRS cannot be held accountable for late changes to the design after the WMP has been submitted to Council.
- EFRS will provide specifications and recommendations on bin access and travel paths within the WMP, however it is the architect's responsibility to ensure the architectural drawings meet these provisions.
- EFRS are not required to provide information on collection vehicle head heights, internal manoeuvring and loading requirements. These variables are considered to be within the applicable Traffic Consultants domain.
- Council are subject to changing waste and recycling policies and requirements at their own discretion.

This WMP has only been finalised once the Draft Watermark has been removed. If the Draft Watermark is present, the information in the WMP is not confirmed.

DEVELOPMENT SUMMARY

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

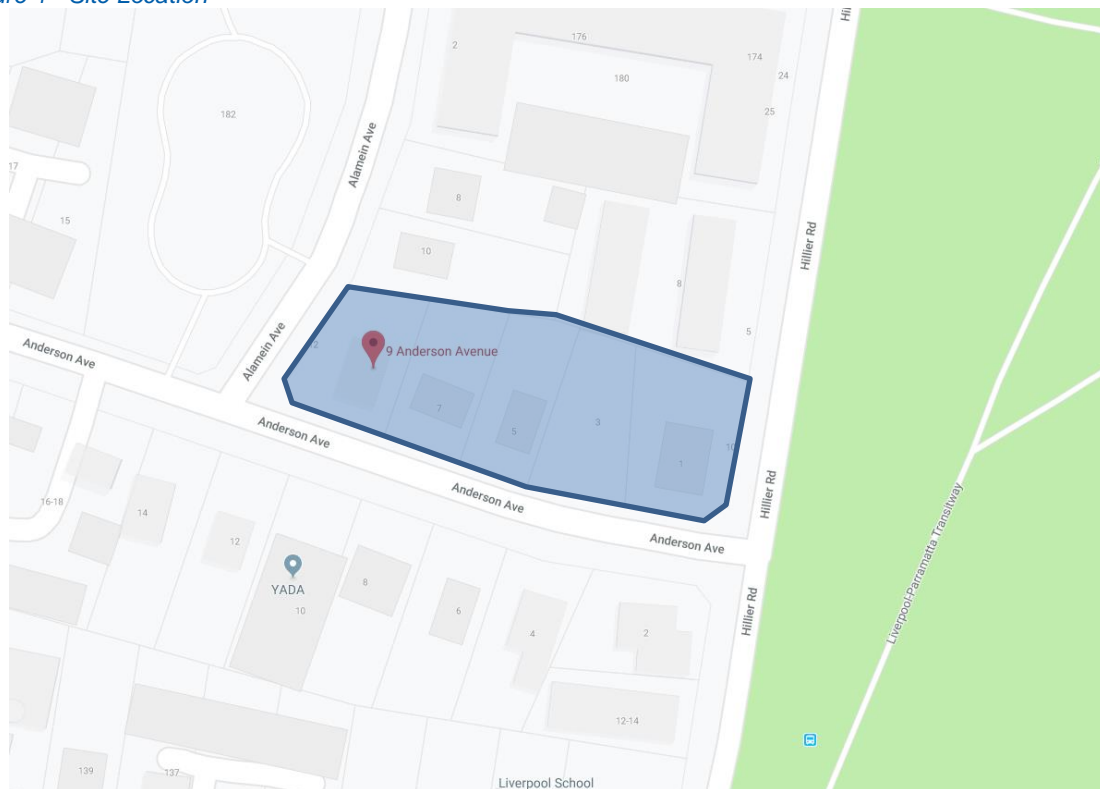
- One building with 5 levels and 2 basement levels
 - 63 residential units in total separated into 3 building cores:
 - Building A has 20 units
 - Building B has 23 units
 - Building C has 20 units

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

SITE LOCATION

The site is located at 1-7 Anderson Avenue and 12 Alamein Avenue, Liverpool as shown in Figure.1. The site has frontages to Anderson Ave, Alamein Ave and Hillier Rd, with vehicle access via Hillier Rd.

Figure 1 - Site Location



LIVERPOOL CITY COUNCIL

The garbage and recycling will be guided by the services and acceptance criteria of the Liverpool City Council. All waste facilities and equipment are to be designed and constructed to be in compliance with the Liverpool City Council's *Liverpool Development Control Plan 2008*, Liverpool Council's *Waste Management services for Residential Flat Buildings and Multi Dwelling Houses – Fact Sheet*, Australian Standards and statutory requirements.

COUNCIL OBJECTIVES

- To minimise waste generation and disposal to landfill with careful source separation, reuse and recycling.
- To avoid the generation of waste through design, material selection and building practices.
- To plan for the types, amount and disposal of waste to be generated during demolition, excavation and construction of the development.
- To ensure efficient storage and collection of waste and quality design of facilities

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 Liverpool 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	<ul style="list-style-type: none"> 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 or Waste Caretaker	<ul style="list-style-type: none"> 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) 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 and Tenants	<ul style="list-style-type: none"> 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.
Waste Contractor	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Removal of all garden organic waste generated during gardening maintenance activities for recycling at an offsite location.
Building Contractors	<ul style="list-style-type: none"> Removing all construction related waste offsite in a manner that meets all authority requirements.

EDUCATION

Building management is responsible for creating and managing the waste management education process.

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

Training videos are available to assist in educating residents to use the eDiverter chute doors correctly and the can be found in the links as follows:

eDIVERTER VIDEOS

<https://vimeo.com/98294003>
<http://youtu.be/kGBGXOe6P0I>

TENANT VIDEO

<https://vimeo.com/98294002>
<http://youtu.be/kGBGXOe6P0I>

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 health and safety as well as 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.

SIGNAGE

The building manager is responsible for all waste management signage throughout the building including safety signage (see *APPENDIX B.1*). Appropriate signage must be prominently displayed on doors, walls and above all bins, clearly stating where waste and recycling will be placed.

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

RESIDENTIAL WASTE MANAGEMENT

The *Liverpool Development Control Plan 2008* and Liverpool Council's *Waste Management services for Residential Flat Buildings and Multi Dwelling Houses – Fact Sheet* 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 development in operation. Please note, total of bins provided for the building is based on the bin quantities provided by the waste officer at Liverpool Council.

Table 2: Calculated Waste and Recycling Generation – Residential

Building	# Units	Garbage Generation Rate (L/unit/week)	Generated Garbage (L/week)	Recycling Generation Rate (L/unit/week)	Generated Recycling (L/week)	
<i>Building A</i>	20	120	2400	120	2400	
<i>Building B</i>	23	120	2760	120	2760	
<i>Building C</i>	20	120	2400	120	2400	
TOTAL	63		7560		7560	
Collections	Garbage Bin Size (L)		660	Recycling Bin Size (L)		660
	Garbage Bins per Week		11.45	Recycling Bins per Week		11.45
	Garbage Collections per Week		1	Recycling Collections per Week		1
	Total Garbage Bins Required		11	Total Recycling Bins Required		11
Equipment	Number of Waste Bins Per Day	Core A	0.52	Number of Recycling Bins Per Day	Core A	0.52
		Core B	0.60		Core B	0.60
		Core C	0.52		Core C	0.52
	Chute Discharge Equipment		eDiverter System			

**Note: An additional 660L MGB should be provided for each chute discharge for use during collection periods. These bins are not included in the above figures.*

During operation, it is the responsibility of the building manager to monitor the number of bins required. Waste and recycling volumes may change according to residents' attitudes to waste disposal and recycling, building occupancy levels or development's management. Any requirements for adjusting the capacity of the waste facilities can be achieved by changing the number of bins, the bin sizes or collection frequencies. Building management will be required to negotiate any changes to bins or collections with the collection service provider.

HOUSEHOLD WASTE MANAGEMENT PROCEDURES

Each building will be supplied with an eDiverter system which comprises of a single waste chute fitted with a recycling diversion.

Three chutes will be installed with access provided on all residential levels of each building. The residents will be responsible for walking the waste and recycling to the disposal point on their level.

The chute discharges into 660L MGBs for waste and 660L MGBs for recycling located in the waste discharge rooms for each building. The building manager is responsible for monitoring the fullness of the bins under the chute and rotating with empty bins as required.

OPERATIONAL WASTE MANAGEMENT PLAN

Full and spare garbage bins will be kept in the bin holding room on basement level 1.

EDIVERTER FUNCTION

Each residential level will be supplied with a chute outlet behind an air lock door that provides the opportunity to dispose of garbage and recyclable items.

Once putrescible and recyclable waste streams are separated, the resident will carry these to the chute door and deposit bagged waste and loose recyclables using the buttons on the chute door.

Residents will select a recycling or waste function button located on each chute door. Direction on using the diversion system will be prominently displayed on each chute door.

The selection button moves a mechanism that guides either the waste or recycling into the correct collection bin, located in the waste room below. If residents on other levels select the same disposal function, they are able to deposit the same waste at the same time (i.e. waste system – all doors will open).

If commingled recycling is chosen during a waste disposal operation, the resident will be required to wait for the diverter to move from the waste bin to the recycling bin function. A wait time of three to ten seconds is the maximum time delay. The chute door will open but will not close until the diverter has returned to accept the correct waste stream.

NOTE: The operation will default to garbage in the case of a power outage.

COMMON AREAS

Any common areas such as 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.

SOURCE SEPARATION

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 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 – cardboard can be placed in the recycling bin located on each residential level of each core.

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

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.

E-WASTE

E-waste (electronic waste) refers to any equipment containing printed circuit boards. E-Waste must not be placed in standard garbage or recycling, E-Waste can potentially contaminate soil and surrounding water bodies if not disposed of correctly. The best disposal method for e-waste is recycling through a E-waste service or council.

Disposal or recycling of electronic waste will be organised with the assistance of the building caretaker. Residents and/or the building manager may choose to contact Council to find out about new or existing strategies for the disposal and collection of electronic waste.

CHEMICAL WASTE

Chemical wastes (e.g. cleaning chemicals, paints, oils solvents) pose detrimental effects to human health and the environment if not disposed of correctly. Chemical wastes should be disposed of at a suitable licensed disposal facility. No liquid wastes or wash down waters should be disposed of via the storm water drainage system.

Residents will need to liaise with the building manager when disposing of their chemical wastes. The building manager will be responsible for arranging the correct disposal of chemical waste. Household Chemical CleanOut events are held at various locations throughout NSW on specified dates throughout the year. Locations and dates are subject to change. It is recommended that the building caretaker confirm these details with their local Council.

ORGANIC WASTE AND COMPOSTING

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*).

MOVEMENT AND TRANSPORTATION OF BINS

The building manager is responsible for the transportation of bins from their designated operational locations to their respective collection area prior to scheduled collection times and returning them once emptied to resume operational use.

Transfer of waste and all bin movements should minimise manual handling. The building management must assess manual handling risks and provide any relevant documentation to relevant stakeholders. If required the developer should contact a bin-tug, trailer or tractor consultant to provide equipment recommendations. Examples of motorised bin moving equipment can be found in 0 and APPENDIX B.5.

COLLECTION OF WASTE

Council will be engaged to collect the residential waste and recycling in accordance with Council's collection schedule. This report assumes waste and recycling will be collected once weekly. It is also understood that Council collects waste and recycling on alternate days, therefore a maximum of 11x 660L MGBs would be serviced at any one collection.

On the night before collections, the building manager will be responsible for transporting the 11x 660L MGBs of either waste or recycling to the kerbside of Hiller Rd and ensuring that the bins are presented appropriately on the kerbside, as per the following:

- Bins are to be presented a minimum of 300mm apart.
- Bins should be presented a distance from trees, telegraph poles, parked cars or other obstacles.
- Bin lids should open facing the road.
- Bin lids should be kept closed while situated on the kerb.
- Bins should not be overfilled or overflowing.

After servicing has been completed, as soon as possible the building manager will return the empty bins to their operational locations.

COLLECTION AREA

It is Elephant Foot's understanding that the collection areas have been reviewed by a traffic consultant to confirm the swept paths, load requirements and clearances for waste collections. It must be ensured that that the collection vehicle can conduct the collections from the proposed location.

EQUIPMENT SUMMARY

Table 3: Equipment Summary

Component	Part	Qty	Notes
Chutes	Please refer to supplier's information	3	(See APPENDIX C for Typical Chute Section)
Equipment A	eDiverter Discharge Systems	3	(See APPENDIX C.1 for a Typical EDiverter system)
Equipment B	Suitable Bin Moving Equipment	Recommended	(See APPENDIX B.4 for Typical Bin Mover)

WASTE ROOM AREAS

In the chute discharge rooms, 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. 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.

The areas allocated for waste storage and collection areas are detailed in Table 4 below. The areas provided are estimates only. Final areas will depend upon room and bin layouts.

Table 4: Waste Room Areas

Level	Waste Room Type	Equipment	Estimated Area (m ²)
B1	Chute Discharge Room – Building A	2x 660L MGBs (recycling) 2x 660L MGBs (waste) 2x 660L MGB (service bin)	>12
B1	Chute Discharge Room – Building B	2x 660L MGBs (recycling) 2x 660L MGBs (waste) 2x 660L MGB (service bin)	>12
B1	Chute Discharge Room – Building C	2x 660L MGBs (recycling) 2x 660L MGBs (waste) 2x 660L MGB (service bin)	>12
B1	Bin Holding Room	7x 660L MGBs (waste) 7x 660L MGBs (recycling)	>28
B1	Bulky Goods Waste Storage Room		Minimum 20

WASTE ROOMS - CONSTRUCTION REQUIREMENTS

The waste 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

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.

LIVERPOOL CITY COUNCIL CUSTOMER SERVICE

Phone: 1300 36 21 70

Email: lcc@liverpool.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 9399 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 (Recycling Oils & Animal Fats)

Phone: 1800 629 476

ELEPHANTS FOOT RECYCLING SOLUTIONS (Chutes, Compactors and eDiverter Systems)

44 – 46 Gibson Avenue

Padstow NSW 2211

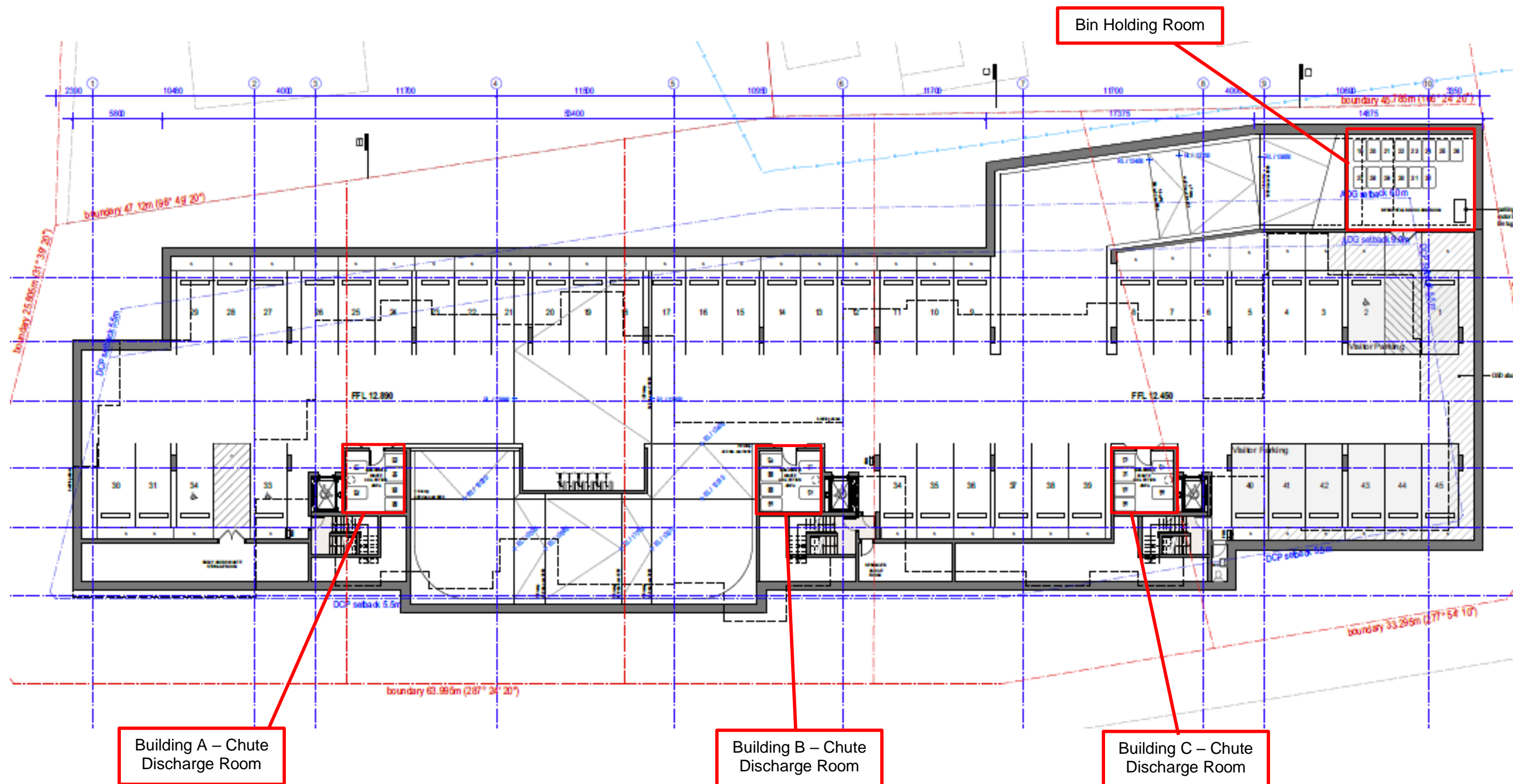
Free call: 1800 025 073

Email: info@elephantsfoot.com.au

APPENDICES

APPENDIX A ARCHITECTURAL DRAWING EXCERPTS

APPENDIX A.1 BASEMENT LEVEL 1 – WASTE FACILITIES

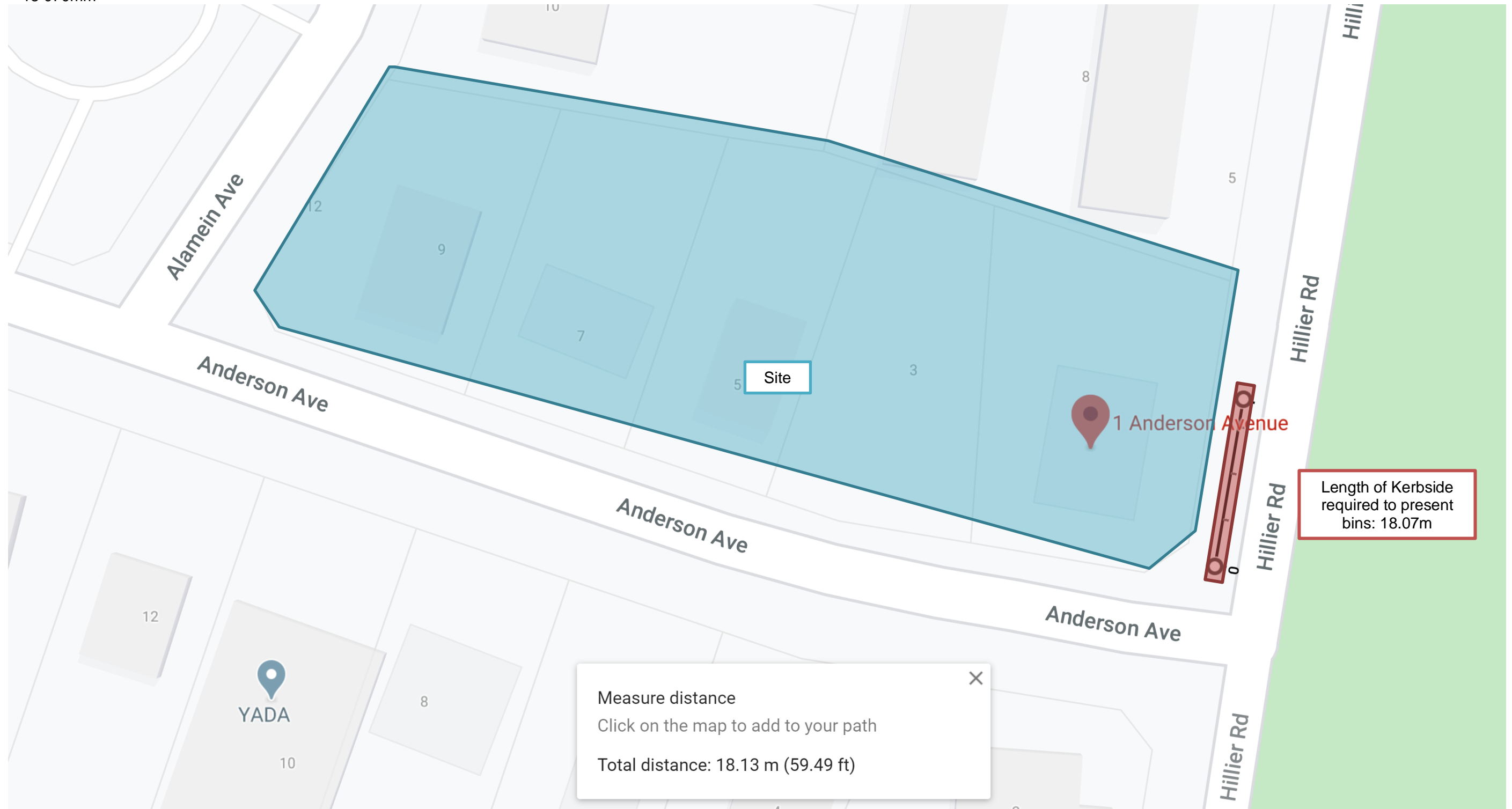


Source: Kennedy Associates Architect, 1-7 Anderson Avenue and 12 Alamein Avenue, Liverpool NSW, Drawing No 08 Rev A Dec2019 – Proposed Level -01

APPENDIX A.2 GROUND LEVEL – KERBSIDE COLLECTION

Estimation for size of kerbside required to present bins

Kerbside required = number of bins x (width of bins + 300mm distance between bins) - 300mm
= 11 (1370 + 300) - 300
= 18 070mm




OPERATIONAL WASTE MANAGEMENT PLAN

APPENDIX B PRIMARY WASTE MANAGEMENT PROVISIONS

APPENDIX B.1 TYPICAL BIN SPECIFICATIONS

The most common bin sizes are provided below, although not all sizes are shown. These dimensions are a guide only and differ slightly between manufacturers.

Average dimension ranges for two-wheel mobile bins




Bin capacity	80L	120L	140L	240L	360L
Height (mm)	870	940	1065	1080	1100
Depth (mm)	530	530	540	735	820
Width (mm)	450	485	500	580	600
Approximate footprint (m ²)	0.24	0.26–0.33	0.27–0.33	0.41–0.43	0.49
Approximate weight (kg)	8.5	9.5	10.4	15.5	23
Approximate maximum load (kg)	32	48	56	96	Not known

Wheelie bin

Sources include Sulo, Single Waste, Cleanaway, SUEZ, just wheelie bins and Perth Waste for two-wheel mobile bins

Average dimension ranges for four-wheel bulk bins




Bin capacity	660L	770L	1100L	1300L	1700L
Height (mm)	1250	1425	1470	1480	1470
Depth (mm)	850	1100	1245	1250	1250
Width (mm)	1370	1370	1370	1770	1770
Approx footprint (m ²)	0.86–1.16	1.51	1.33–1.74	2.21	2.21
Approx weight (kg)	45	Not known	65	Not known	Not known
Approx maximum load (kg)	310	Not known	440	Not known	Not known

Dome or flat lid container

Sources include Sulo, Signal Waste, Cleanaway, SUEZ, Just Wheelie Bins and Perth Waste

Average dimension ranges for bulk bins over 1700L in capacity



Bin capacity	1m ³	1.5m ³	2m ³	3m ³	4.5m ³	6m ³
Height (mm)	1000	910–1250	865–1000	1020–1580	1440–2014	1650
Depth (mm)	1000	905–1000	1300–1400	1470–1700	1605–1900	1900
Width (mm)	1400	1805–2010	1830–2000	1400–2010	1800–2010	2000
Approximate footprint (m ²)	1.4	1.63–2.01	2.4–2.8	2.1–3.4	2.9–3.8	3.8

Bulk bins greater than 1700L

Sources include TORO Waste Equipment, SUEZ, Signal Waste, Perth Waste and ACT Industrial

Source: New South Wales Environmental Protection Authority Better Practice Guide for Resource Recovery (2019)

APPENDIX B.2 SIGNAGE FOR WASTE & RECYCLING BINS

Waste Signs

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the EPA (Environmental Protection Authority).

Examples of waste wall posters (EPA supplied)



Examples of bin lid stickers (EPA supplied)



Problem Waste Signs

The EPA has also produced a range of images and signs that can be used for problem wastes, such as fluoro globes and tubes, household and car batteries, e-waste and smoke detectors. To access these resources, contact the NSW EPA. Some examples are shown below.



Safety Signs

The use of safety signs for waste resource recovery rooms must comply with *AS1319 Safety signs for occupational environments*. Safety signs must be used to regulate and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Suitable signs should be decided for each development as required.

Example safety signs



Source: New South Wales Environmental Protection Authority *Better Practice Guide for Resource Recovery* (2019)

APPENDIX B.3 TYPICAL COLLECTION VEHICLE INFORMATION

Australian Standards for turning circles for medium and heavy rigid class vehicles

Vehicle class	Overall length (m)	Design width (m)	Design turning radius (m)	Swept circle (m)	Clearance (travel) height (m)
Medium rigid vehicle	8.80	2.5	10.0	21.6	4.5
Heavy rigid vehicle	12.5	2.5	12.5	27.8	4.5

Large collection vehicles

Waste collection vehicles may be side-loading, rear-loading, front-lift-loading, hook or crane lift trucks. Vehicle dimensions vary by collection service, manufacturer, make and model. It is not possible to provide definitive dimensions, so architects and developers should consult with the local council and/or contractors.

The following characteristics represent typical collection vehicles and are provided for guidance only. Reference to *AS2890.2 Parking facilities: off-street commercial vehicle facilities* for detailed requirements, including vehicle dimensions, is recommended.

Table B2.1: Collection vehicle dimensions

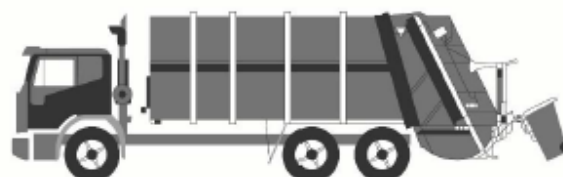
Vehicle type	Rear-loading	Side-loading*	Front-lift-loading	Hook truck	Crane truck
Length overall (m)	10.5	9.6	11.8	10.0	10.0
Width overall (m)	2.5	2.5	2.5	3.0	2.5
Travel height (m)	3.9	3.6	4.8	4.7	3.8
Operational height for loading (m)	3.9	4.2	6.5	3.0	8.75
Vehicle tare weight (t)	13.1	11.8	16.7	13.0	13.0
Maximum payload (t)	10.0	10.8	11.0	14.5	9.5
Turning circle (m)	25.0	21.4	25.0	25.0	18

* The maximum reach of a side arm is 3 m.

Sources: JJ Richards, SUEZ, MacDonald Johnson, Cleanaway, Garwood, Ros Roca, Bingo and Edbro. Figures shown represent the maximum dimensions for each vehicle type.

Rear-loading collection vehicles

These vehicles are commonly used for domestic waste collections from MUDs and RFBs and sometimes for recycling. They can be used to collect waste stored in mobile bins or bulk bins, particularly where bins are not presented at the kerbside. They are also used for collecting bulky waste.



Rear-loading waste collection vehicle

Side-loading collection vehicles

This is the most commonly used vehicle for domestic waste, recycling and organics collections. It is only suitable for collecting mobile bins up to 360L in capacity.



Side-loading waste collection vehicle

Front-lift-loading collection vehicles

These vehicles are commonly used for collecting commercial and industrial waste. They can only collect specially designed front-lift bulk bins and not mobile bins.



Front-lift-loading waste collection vehicle

Source: New South Wales Environmental Protection Authority *Better Practice Guide for Resource Recovery* (2019)

APPENDIX B.4 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:

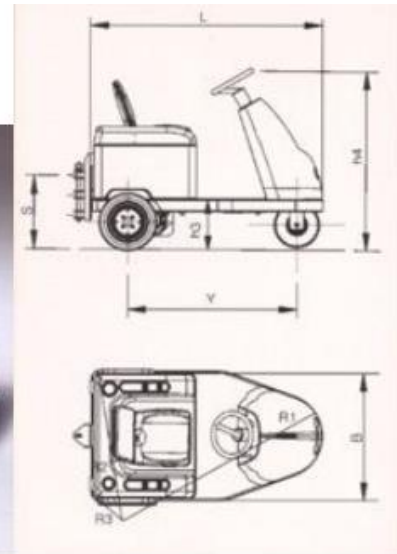
- 1 tonne tow capacity of inclines up to 8 degrees
- 500kg tow capacity if inclines up to 14 degrees
- CE Compliant
- 4.5 km/h max speed
- 2 x 80amp batteries – includes charger
- Powerful transaxle
- Hitch to suit 660L bins

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*)

OPERATIONAL WASTE MANAGEMENT PLAN

APPENDIX B.5 TYPICAL SEATED BIN MOVER

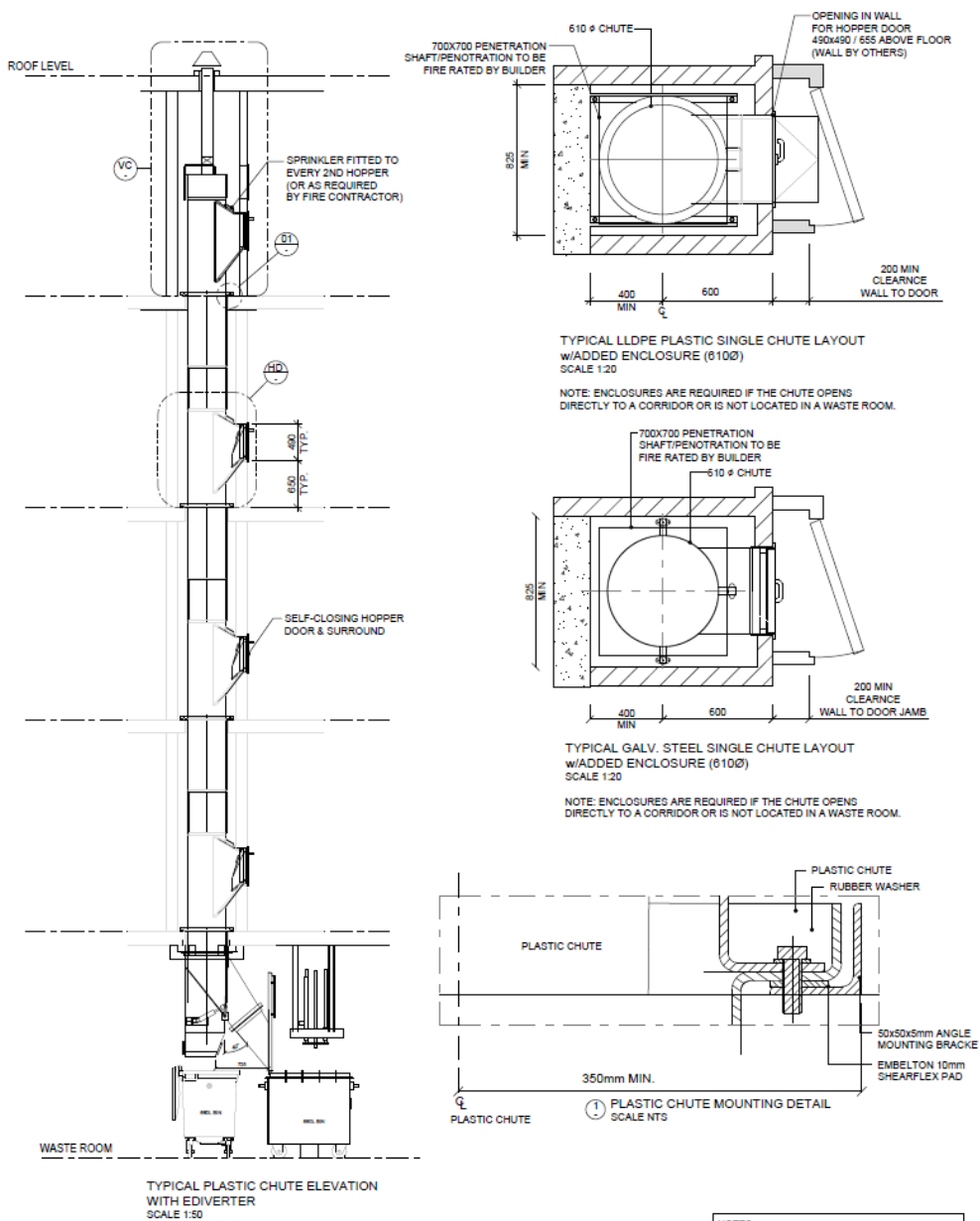


		UNIT M.	BULL 2	BULL 4
Manufacturer	DEC			
Model	BULL			
Platform loading cap.	Nominal capacity	kg	-----	-----
Pull capacity	Pull nominal capacity	kg	2000	4000
Power type	Electric - endothermic		electric	electric
Control type	Standing / seated thiller / steer		seated / steer	seated / steer
Tyres	Pn=pneum.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

OPERATIONAL WASTE MANAGEMENT PLAN

APPENDIX C INSTALLATION EQUIPMENT

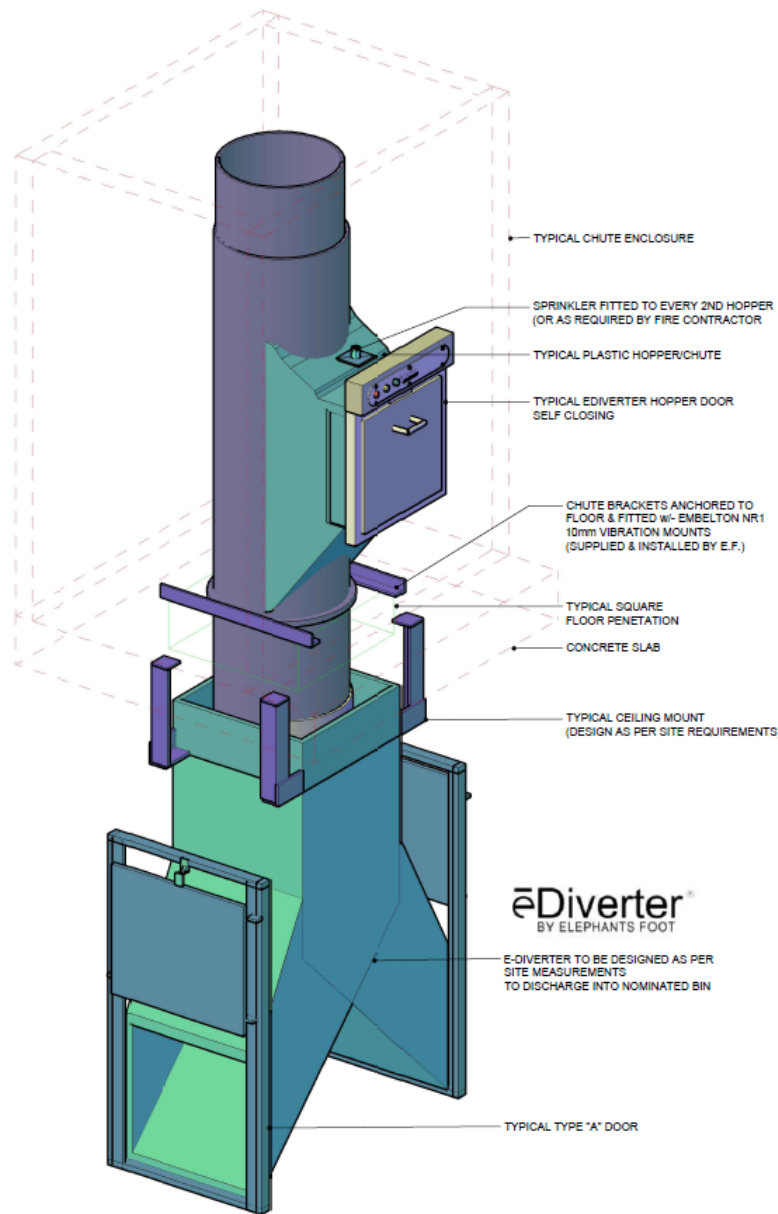
APPENDIX C.1 TYPICAL EDIVERTER WASTE CHUTE



NOTES:
NO SERVICES ARE TO BE INSTALLED WITHIN A MINIMUM OF 200mm OFFSET AROUND ANY ELEPHANTS' FOOT'S CEILING MOUNTED EQUIPMENT AND PENETRATIONS.

Please note: this is an example only – please refer to supplier's information and specification.

OPERATIONAL WASTE MANAGEMENT PLAN



TYPICAL EDIVERTER - PLASTIC CHUTE
scale NTS

EDIVERTER

THE WASTE ROOM WILL BE SUPPLIED WITH AN ELEPHANTS FOOT eDIVERTER WASTE AND RECYCLING DIVERSION SYSTEM. BOTTOM CHUTES WILL DIRECT PRODUCT INTO NOMINATED GARBAGE/RECYCLING SYSTEMS.

eDIVERTER SPECIFICATIONS:

- SPLIT SYSTEM BODY 5mm PLATE WITH TWO BOTTOM OUTLETS
- SHUT OUT DOOR WITH MANUAL OVER RIDE TO CLOSE OFF CHUTE FITTED WITH FUSIBLE LINK
- INTERNAL DIVERTER PLATE 5mm ACTIVATED BY A HYDRAULIC CYLINDER
- HYDRAULICS POWER PACK WITH SINGLE PHASE 0.55kw MOTOR AND ALL ASSOCIATED CONNECTIONS
- PLC CONTROL BOX IN GARBAGE ROOM, PROGRAMMED TO OPERATE DIVERTER AND LOCK OUT DOORS
- 12 CORE 24 VOLT CABLES MOUNTED TO THE EXTERNAL OF CHUTE PIPES
- DOORS FITTING WITH ELECTRONIC LOCK OUT NORMALLY CLOSED SOLENOID
- AT EACH LEVEL ABOVE EVERY CHUTE FOUR BOTTOM OPERATING SWITCH BOARD
- ELECTRIC CONNECTIONS AT EACH STATION
- SYSTEM CONNECTIONS AND OPERATION FROM EVERY LEVEL - TEST AND COMMISSION

FIRE

FIRE SYSTEM CONTRACTOR TO:

- SUPPLY FIRE SPRINKLERS AND CONNECTION FOR SPRINKLER SYSTEM
- SPRINKLERS FITTED ON EVERY 2ND LEVEL (OR AS PER FIRE CONTRACTOR INSTRUCTION)

ELECTRICAL

YOUR ELECTRICIAN TO PROVIDE:

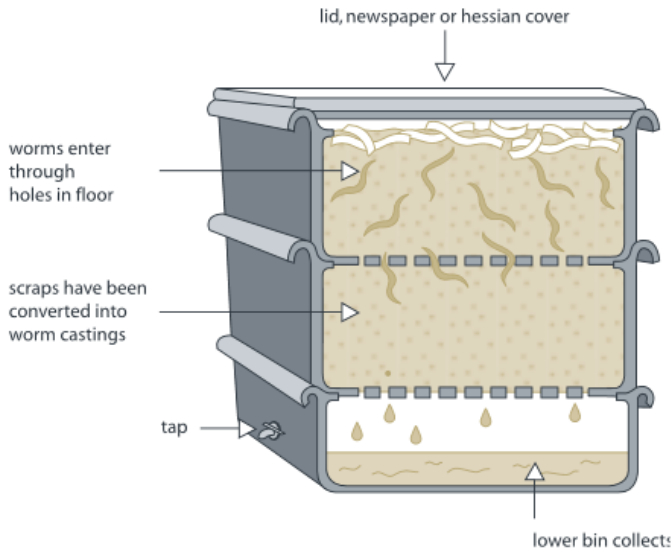
- ONE (1) STANDARD 240V GPO IN MAIN GARBAGE ROOM
- ONE (1) 415VOLTS, 5 PINS, 25AMPS FOR EACH REQUIRED COMPACTOR, CAROUSEL OR LINEAR
- COORDINATE WITH ELECTRICAL SUBCONTRACTOR
- OUTLETS TO BE WATER PROOF AND TO BE WATER PROOF ADD TO ME LOCATED 1700mm OFF THE GROUND OFF THE GROUND.

Please note: this is an example only – please refer to supplier’s information and specification.

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>