New Ultimo Pyrmont Public School

Waste – Construction and Operational Waste Management Plan

Prepared by Foresight Environmental

e. info@foresightenvironmental.com

w. www.foresightenvironmental.com

This report is based on information provided by School Infrastructure NSW c/o DesignInc Sydney Pty Ltd coupled with Foresight Environmental's knowledge of waste generated within the education and commercial sectors. To that extent this report relies on the accuracy of the information provided to the consultant. It has been compiled by Foresight Environmental on behalf of DesignInc Sydney.

This report is not a substitute for legal advice on the relevant environmental related legislation, which applies to businesses, contractors or other bodies. Accordingly, Foresight Environmental will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Foresight Environmental negligence.

Revision No.	Issue date	Author	Reviewed by	Reason/comments
1	14th September 2017	Yvette Pascoe	Scott Ebsary	Draft issue for review
2	6th October 2017	Scott Ebsary		Final issue incorporating DesignInc feedback
3	10th October 2017	Scott Ebsary		Combine construction and operational content
4	11th October 2017	Scott Ebsary		Update staff numbers
5	24th October 2017	Scott Ebsary	Yvette Pascoe	Include ToA comments 19/10/17

Table of Contents

1. Introduction

This waste management plan (WMP) has been prepared by Foresight Environmental on behalf of School Infrastructure NSW (the 'Applicant') as part of the Development Application for the New Ultimo Pyrmont Public School. The site is located on the corner of Wattle & Quarry St, Ultimo.

The proposed development seeks to redesign the existing school to accommodate 800 primary students, 40 out of school hour students, 33 staff and a shell space for a 40 place childcare centre.

The proposed school development includes the following:

- Shared facilities including Classrooms, Communal Hall, Libraries (6 in total), Outdoor Learning Space, Canteen and other specialist learning spaces;
- Administration area for the whole school;
- Shell space for a 40-place child care centre

The purpose of this waste management plan is to outline the systems and practices involved in managing waste and recycling during the construction phase and ongoing operation of the School. The following sections of this waste management plan detail how the development will address the requirements of SEARs no.15.

2. Construction Waste

The following sections of this waste management plan detail how the development addresses the requirements of SEARs no.15 as it pertains specifically to construction waste.

This plan aims to ensure that all wastes generated from construction activities are managed in an effective and environmentally aware manner. Specifically;

- To maximize the reuse and recycling of construction materials
- To reduce the volume of materials going to landfill
- To maximise waste material avoidance and reuse on site
- To ensure that where practicable, an efficient recycling procedure is applied to waste materials
- To ensure efficient storage and collection of waste

The following waste hierarchy will be used as a guiding principle for all construction waste:

Avoid and Reduce

Minimise the production of waste materials in the construction process by

- Assessing and taking into consideration the resultant waste from different design and construction options
- Purchasing materials that will result in less waste, which have minimal packaging, are pre-cut or fabricated.
- Not over ordering products and materials

Reuse

Ensure that where ever possible, materials are reused either on site or offsite

- Identify all waste products that can be reused
- Put systems in place to separate and store reusable items
- Identify the potential applications for reuse both onsite and offsite and facilitate reuse

Recycling

Identify all recyclable waste products to be produced on site

- Provide systems for separating and stockpiling of recyclables
- Provide clear signage to ensure recyclable materials are separated
- Process the material for recycling either onsite or offsite

Note: In some cases it may be more economical to send the unsorted waste to specialised waste contractors who will separate and recycle materials at an offsite location.

Disposal

Waste products which cannot be reused or recycled will be removed and disposed of. The following will need to be considered:

- Ensure the chosen waste disposal contractor complies with OEH requirements
- Implement regular collection of bins

2.1 Construction Waste Estimate

The quantity of waste materials to be generated onsite are estimates based on the information provided to Foresight Environmental and therefore the systems that will be put in place need to incorporate flexibility to allow for variation in the total quantities generated. Active site management during the construction phase will ensure all waste/recyclable materials are disposed of appropriately and that all waste receptacles are of sufficient capacity to manage onsite activities.

Table 1 below details the estimated composition by volume of construction waste to be generated.

Table 1 - Composition of construction waste by volume

Material	M^3
Fill/excavation	1500
Plasterboard	183
Timber	165
Concrete	147
General residual	100
Tiling	83
Paint	73
Metal	65
Carpet	55
Waterproof	21
Total	**2,392**

2.2 Onsite and Offsite Waste Management Systems

Table 2 details the expected waste materials and management systems for the construction phase of the project.

Table 2 – Waste management systems (construction)

Material	Estimated volume (m^2 or m^3 where indicated)	Onsite (re-use or recycle)	Offsite (recycling contractor)	Disposal (contractor and landfill site)
Fill	1,500	Suitable soil to be reused where appropriate for onsite landscaping/fill	All surplus fill will be taken offsite to suitable C&D facility for processing/reuse	
Plasterboard	183		Stockpiled onsite and collected by plasterboard supplier/recycler or taken to appropriate recycling facility	
Timber	165		Separated onsite then returned to supplier for re-use if appropriate or transported timber recycling yard	
Concrete	147		Separated where possible and taken to concrete recycling facility – deposited onsite directly into skips or trucks to be removed from site.	
Residual general waste (incl. fittings, fixtures etc)	100			Collected by contractor and disposed at appropriate landfill

Tiling	83		Stockpiled and collected as required by specialty metal recycling contractor for recycling/resale	
Paint	73L		Clean tins recycled by metal recycler where possible	Residue/wash-off hardened and disposed appropriately
Metal	65		Stockpiled and collected as required by specialty metal recycler or taken to appropriate C&D facility for separation and recycling	
Carpet	55		Stockpiled and collected as required by carpet supplier for recycling contractor	Unsuitable material will be taken to landfill for disposal
Waterproofing	21		Clean tins recycled by metal recycler where possible	Residue/wash-off hardened and disposed appropriately

Note: The quantities of construction and demolition waste materials have been estimated using industry guides for predicting waste quantities[1]. The figures in Table 3 and 4 above are estimates and are used as a guide for designing the waste management systems on site. These figures will be adjusted according to the final building material selection and quantities. The waste management systems will be adjusted as necessary.

It should be noted that there are multiple offsite recycling/disposal facilities available for the appropriate processing of the materials detailed above and the facility choice will depend largely on the waste contractor/supplier engaged.

[1] McGregor Environmental Services (2000) Predicting C&D waste quantities in the Inner Sydney Waste Board Waste Planning Guide for Development Applications-Planning for Less Waste (1998) NSW Waste Boards

2.3 Contracts and Purchasing

Each subcontractor working on the site will be required to adhere to this Waste Management Plan.

The Head Contractor will ensure each subcontractor:

- Takes practical measures to prevent waste being generated from their work
- Implements procedures to ensure waste resulting from their work will be actively managed and where possible recycled, as part of the overall site recycling strategy or separately as appropriate
- Ensures that the right quantities of materials are ordered, minimally packaged and where practical pre fabricated. Any oversupplied materials are returned to the supplier
- Implements source separation of off cuts to facilitate reuse, resale or recycling.

The Site Manager will be responsible for:

- Ensuring there is a secure location for on-site storage of materials to be reused on site, and for separated materials for recycling off site.
- Ensuring all skips/bins/stockpiles are clearly labeled identifying which material is suitable for each receptacle
- Engaging appropriate waste and recycling contractors to remove waste and recycling materials from the site
- Co-coordinating between subcontractors, to maximise on site reuse of materials
- Monitoring of bins on a regular basis by site supervisors to detect any contamination or leakage
- Ensuring the site has clear signs directing staff to the appropriate location for recycling and stockpiling station/s. And that each bin/skip/stockpile is clearly sign posted
- Providing training to all site employees and subcontractors in regards to the WMP as detailed in section 5.3 below.
- Should a subcontractor cause a bin to be significantly contaminated, the Site Manager will be advised by a non-conformance report procedure. The offending subcontractor will then be required to take corrective action, at their own cost. The non-conformance process would be managed by the Head Contractors' Quality Management Systems
- Retaining demolition and construction waste dockets to confirm and verify which facility received the material for recycling or disposal.

2.4 Training and Education

All site employees and sub contractors will be required to attend a site specific induction that will outline the components of the WMP and explain the site specific practicalities of the waste reduction and recycling strategies outlined in the WMP.

All employees are to have a clear understanding of which products are being reused/recycled on site and where they are stockpiled. They are also to be made aware of waste reduction efforts in regards to packaging.

The site manager will post educational signage in relation the recycling activities on site in breakout areas, lunch rooms etc.

3. Operational Spatial Use

Table 3 below details the **waste generating areas** of the operational phase of new development – these areas will form the basis of the waste generation estimates to be incorporated with the whole-of-campus estimate, allowing for projected student numbers (800 primary students) and equivalent full time (EFT) staff numbers (33 staff).

Table 3 – Waste generating areas by location and type

Location	m2	%
Teaching Areas	2458	44%
Common Areas (Cola & Courtyards)	957	17%
Office / Admin/ 6 x Libraries	786	14%
Childcare (indoor and outdoor)	608	11%
Storage Rooms (over whole development)	363	7%
Communal & Community Hall	324	6%
Canteen/Kitchenette	78	1%
TOTAL	5574	100%

4. Waste Generation Estimate

Based on the information provided and benchmark data from similar developments, the primary waste streams expected to be generated in the ongoing operation of the development would be:

- Cardboard/paper recycling
- Comingled recycling
- Food organics recycling
- General waste

Additional smaller waste streams may include toner cartridge recycling, fluoro tube/globe recycling and battery recycling.

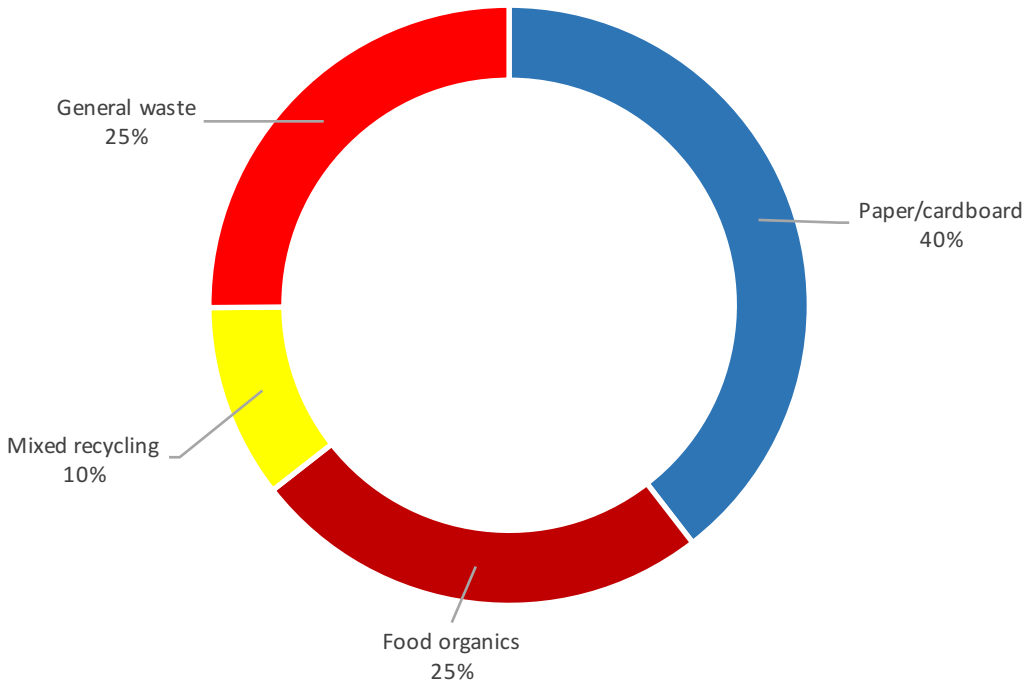
4.1 Estimated Waste Generation

Based on industry averages and historical audit data, it is estimated that the proposed facilities will generate a total of **294 kilograms and 2,173 litres** of waste and recyclables per day. It should be noted that the following waste generation profile is an estimation only, based on average teaching and office use – assuming full use during weekdays with the projected total student number of 800 and staff of 33.

Table 4 – Waste generation estimate

	kg/day	L/day	kg/wk	L/wk
Paper/cardboard	47	859	237	4,295
Food organics	168	541	840	2,706
Comingled recycling	10	227	49	1,135
General waste	69	546	344	2,730
Total	**294**	**2,173**	**1,470**	**10,867**

Chart 1 – Waste profile (volume)



5. Waste Management Systems

5.1 Waste Systems

Table 5 below demonstrates how the current onsite systems provide ample capacity for the estimated waste volumes detailed in Table 4 above.

Table 5 - Recommended equipment and collection frequency

Waste Stream	Bin Type	No. of Bins	Weekly Clearance Frequency	Capacity (weekly)	Estimated volume / week	Footprint per bin (m^2)	Total Footprint (m^2)
Paper/Cardboard Recycling	1100L MGB	2	2	4,400	4,295	1.37	2.7
	240L MGB	4	1	960		0.43	-**
Comingled Recycling	660L MGB	2	2	2,640	1,135	1.05	2.1
General Waste*	1100L MGB	2	3	6,600	5,437	1.37	2.7
TOTAL				14,600	10,867		7.6
Recommended Storage Area (including circulation space)							11m^2

*note: includes organics

**note: these bins will be stored throughout the school for use at the point of generation – they will only be brought to the waste storage/collection area as required for collection. It is unlikely that they will all be located at the collection area at any one time – thus have not been included in the total spatial requirement for the waste storage area.

5.2 Liquid/Hazardous waste

In addition to the above systems, it is recommended that a bunded liquid/hazardous waste storage cabinet be implemented as required in any areas that are likely to generate paints, solvents or liquid chemical wastes i.e. visual arts store rooms and in science prep/chemical store rooms. These wastes should then be collected by a specialist contractor directly for appropriate disposal i.e. Chemsal (see figure 1 below for example of cabinet).

Figure 1 – example of liquid/hazardous waste storage cabinet

5.3 Other waste/recycling

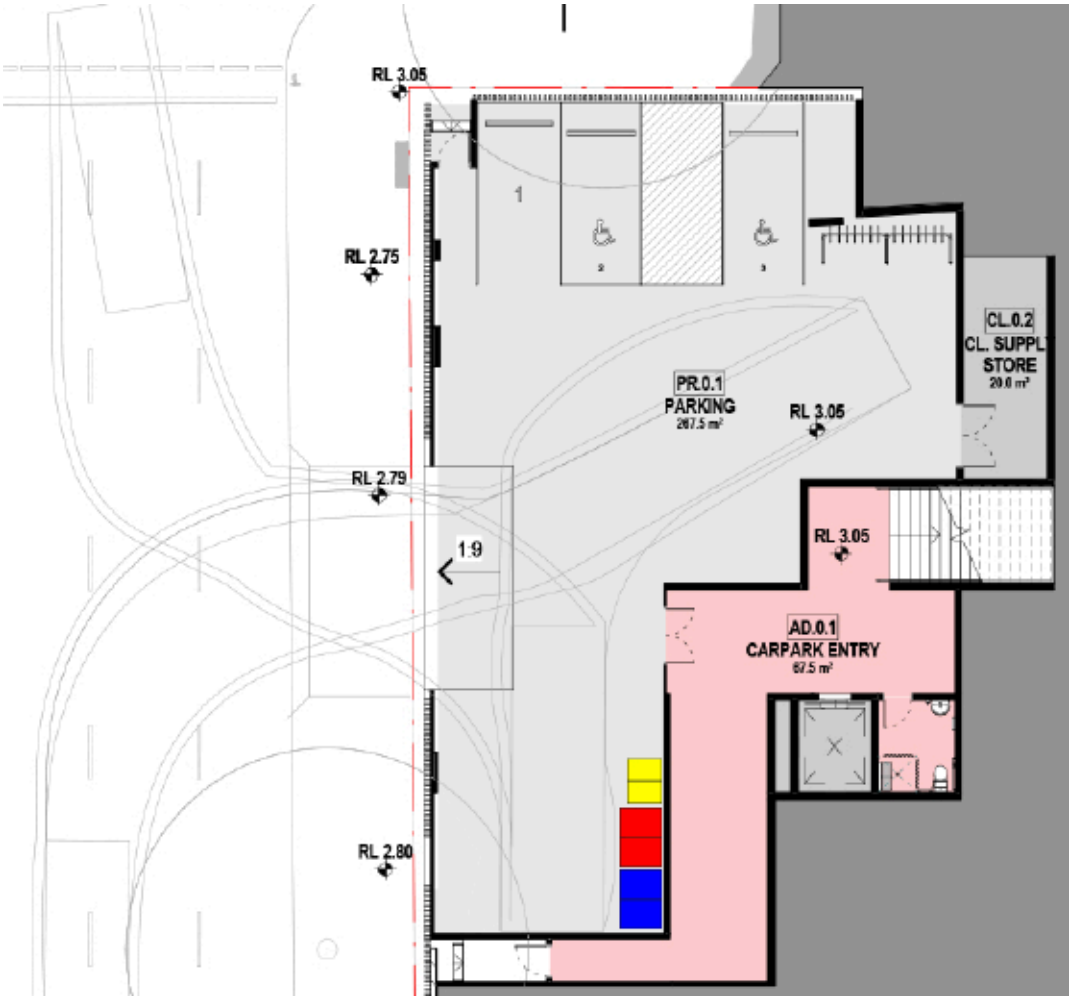
The following waste stream will be collected on call as needed:

- Battery Recycling – Battery recycling boxes will be present where deemed necessary e.g. copy rooms, office/study common areas. These boxes will be collected when full by a dedicated contractor.
- Toner Cartridge Recycling – Used toners will be collected by administration staff and consolidated for collection by specialty cartridge recycler (usually provided by office supplier).

6. Waste and Recycling Storage Area

The current waste storage area is located within the loading area of the lower ground carpark which is accessed from the Wattle Street entry. Figure 2 below shows the waste area location and indicative layout.

Figure 2 – Waste storage area location



6.1 Signage and Colour-coding

All waste and recycling streams should be differentiated with clear signage and colour-coding on all bins and on walls within the waste storage area. Below are examples of appropriate signage incorporating textual information, pictures and colour-coding to communicate the message.

7. Onsite Management Protocols

7.1 Waste systems on each level

Throughout each level are various areas with different functions – including teaching/study areas, office/admin areas, tutorial rooms etc.

Due to the amount of different rooms and areas it would be impractical and unnecessary to offer bins in every single room. Instead, it is recommended that bin hubs be established throughout the floors in hallways and common spaces to service the different areas. This encourages students/staff using the spaces to remove any waste they have and place it in the appropriate bin at the nearest hub – such a practice should promote recycling by giving users the choice of stream to dispose material into, and also reduce the time taken for cleaners to empty the bins. See photograph below for an example of a waste/recycling hub.

Signage will need to be displayed on all bins and ideally on walls above bins advising of acceptance criteria within each system.

Photograph 1 – Best practice bin hub

7.2 Outdoor Areas

Appropriate public place bin hubs should be implemented throughout high traffic outdoor areas i.e. sporting fields, break-out/lunch areas, walkways etc.

The following photographs provide examples of waste and recycling bin hubs. It is important to note that if recycling is implemented in these areas that both general waste and recycling bins must be located next to each other – when these streams are isolated from each other the likelihood of the recycling stream being contaminated by non-recyclables significantly increases.

For ease of use, bin hubs should be large enough to house a 240L MGB for each stream so that maintenance staff can simply remove the full bin and replace it with an empty bin. Full bins can then be transferred to the waste storage/collection area for collection by the waste contractor.

Photographs 2 & 3– Outdoor bin hubs

7.3 Waste Stream Collection Practices

Table 6 outlines the cleaners and campus operational staff collection practices for each waste stream

Table 6 - Onsite waste and recycling collection practices

Waste Stream	Collection Practices
Paper/cardboard recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to waste storage area via the lift core and transferred into the paper/cardboard bins. 2. Where possible, bulky cardboard should be taken directly to the waste storage area or left in a designated area on each level (e.g. store rooms) to be collected by cleaning staff. 3. Cleaners collect flattened cardboard as required and transfer it to the waste storage area where it is deposited into the paper/cardboard recycling 1100L MGBs 4. 240L paper bins located throughout teaching floors transferred to waste storage area when full for collection 5. Bins collected from the waste storage area directly by waste contractor via Wattle St.
Comingled Recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to waste storage area and transferred into the 660L MGBs comingled bins in waste storage area. 2. Bins collected from the waste storage areas directly by waste contractor via Wattle St.
General Waste	1. Cleaners to collect general waste from bin hubs using a trolley and transport the waste to the waste storage area to be transferred into the 1100L general waste bins. 2. Bins collected from the waste storage areas directly by waste contractor via Wattle St.
Liquid/hazardous waste	1. Liquids and hazardous chemical waste to be stored within liquid waste cabinet in arts store-room and science lab store-room areas – these materials should be catalogued and managed by head teacher or designated staff member. 2. Specialist contractor will be engaged as required by head teacher to collect materials directly from storage cabinet
Toner Cartridge Recycling	1. Used toner cartridges will be collected by campus operations and placed into the designated toner cartridge recycling bin located in office areas 2. This will be collected on call by a dedicated contractor (i.e. Planet Ark)
Battery Recycling	1. Batteries will be collected in boxes at collection point decided upon by campus management (ideally office common areas, reception areas) 2. This waste stream will be collected on call.

Figure 3 – example of segregated cleaner trolley to transfer waste from bin hubs to waste storage area

7.4 Waste Stream Acceptance Criteria

Paper/cardboard Recycling:

The paper/cardboard recycling stream offered by the Department of Education (DoE) waste contractor accepts all paper and cardboard materials including newsprint, glossy paper and mixed office paper.

Comingled Recycling:

The comingled recycling stream offered by the DoE waste contractor accepts all recyclable plastic containers, aluminium containers, glass bottles and steel cans.

General Waste:

The general waste stream accepts all other non-recyclable materials including food waste/scraps.

7.5 Waste Collection Vehicle

Waste truck specifications will vary slightly between contractors however as a guide, all streams and bins recommended in this report would be collected by a rear lift waste truck – figure 4 details the indicative dimensions of a typical small MRV rear-lift truck used by most commercial waste contractors.

Figure 4: Small rear-lift commercial waste truck specifications

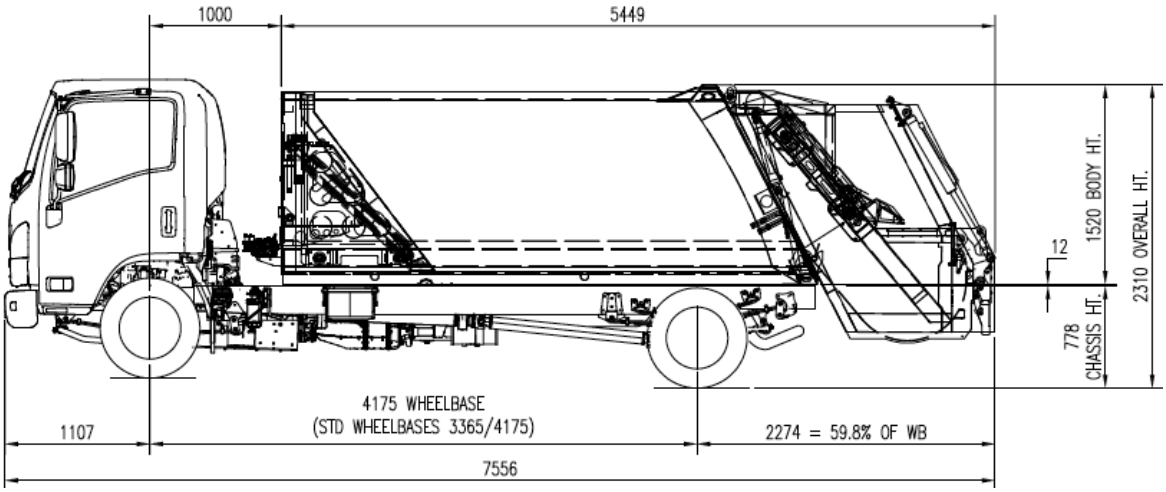
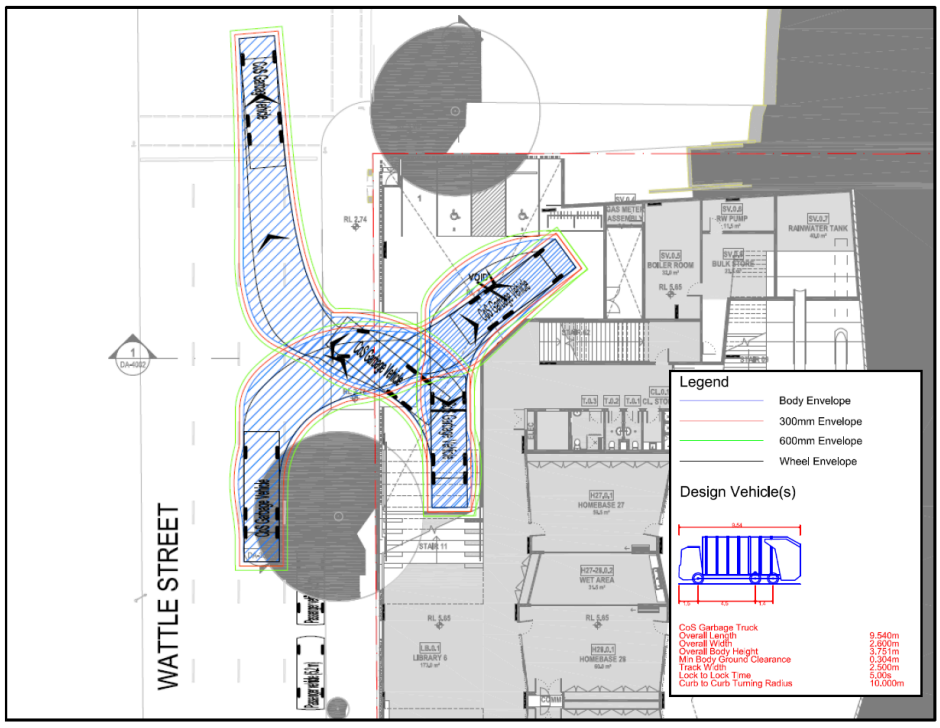


Figure 5 below shows the swept path diagrams that have been produced demonstrating adequate access for a standard City of Sydney 9.5m rear-lift waste truck – this demonstrates access for the largest MRV waste truck that would be used.

Figure 5: Swept path diagram entry/exit for 9.5m rear-lift waste truck



8. Additional Opportunities

8.1 Waste Diversion Opportunities

The following initiatives represent opportunities for Ultimo Pyrmont Public School to explore in an effort to reduce total waste generation. These options are not a requirement however should be considered to move towards best practice waste management.

8.1.1. Organics Recovery/recycling

It should be noted that offering food/organic recycling throughout all areas of the school is not recommended due to the challenges of managing contamination, however options should be investigated for the canteen and within food technology classrooms where there is more control over the type of materials being disposed ensuring that organics bins would remain free of contaminants.

The waste contractor should be consulted to explore the commercial options they offer for dedicated organics recycling. Alternatively, other onsite options should be investigated which would reduce the quantity of waste being taken offsite by waste contractors. An effective solution could incorporate one or all the following:

- Onsite compost bins
- Onsite worm farms

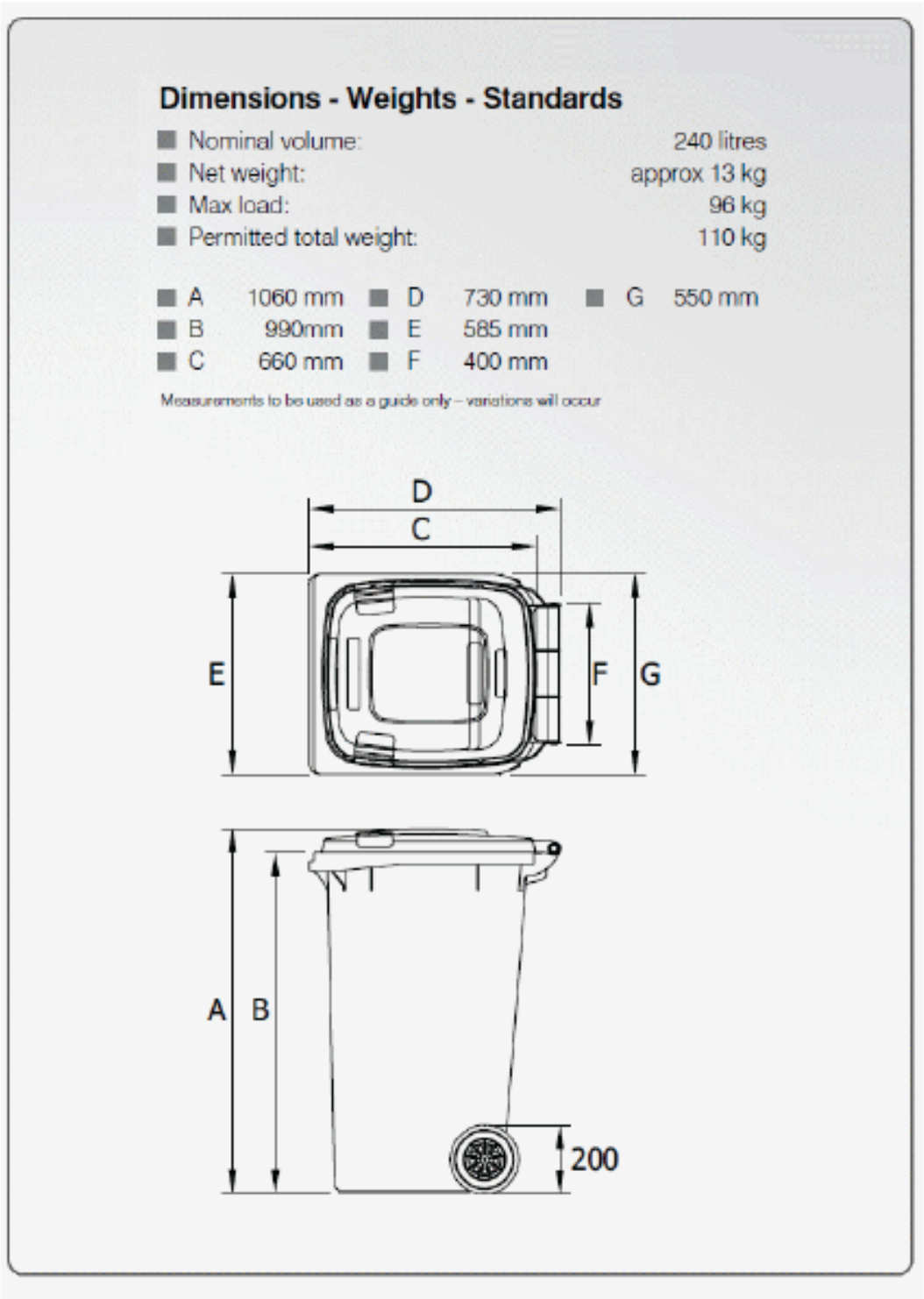
Figure 6 – example of compost set up

Figure 7 – example of basic worm farm

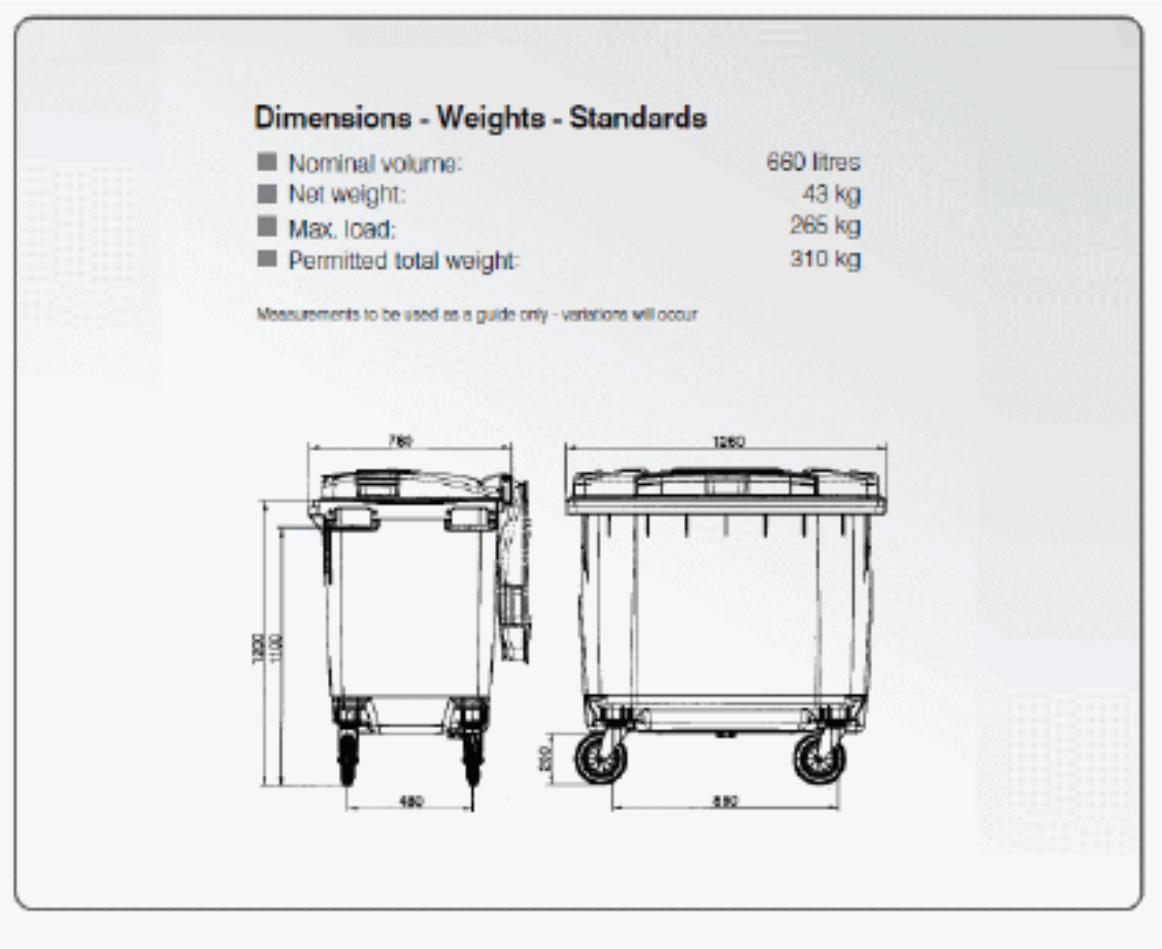
9. Appendix

The following figures provide the approximate dimensions of the proposed bin systems.

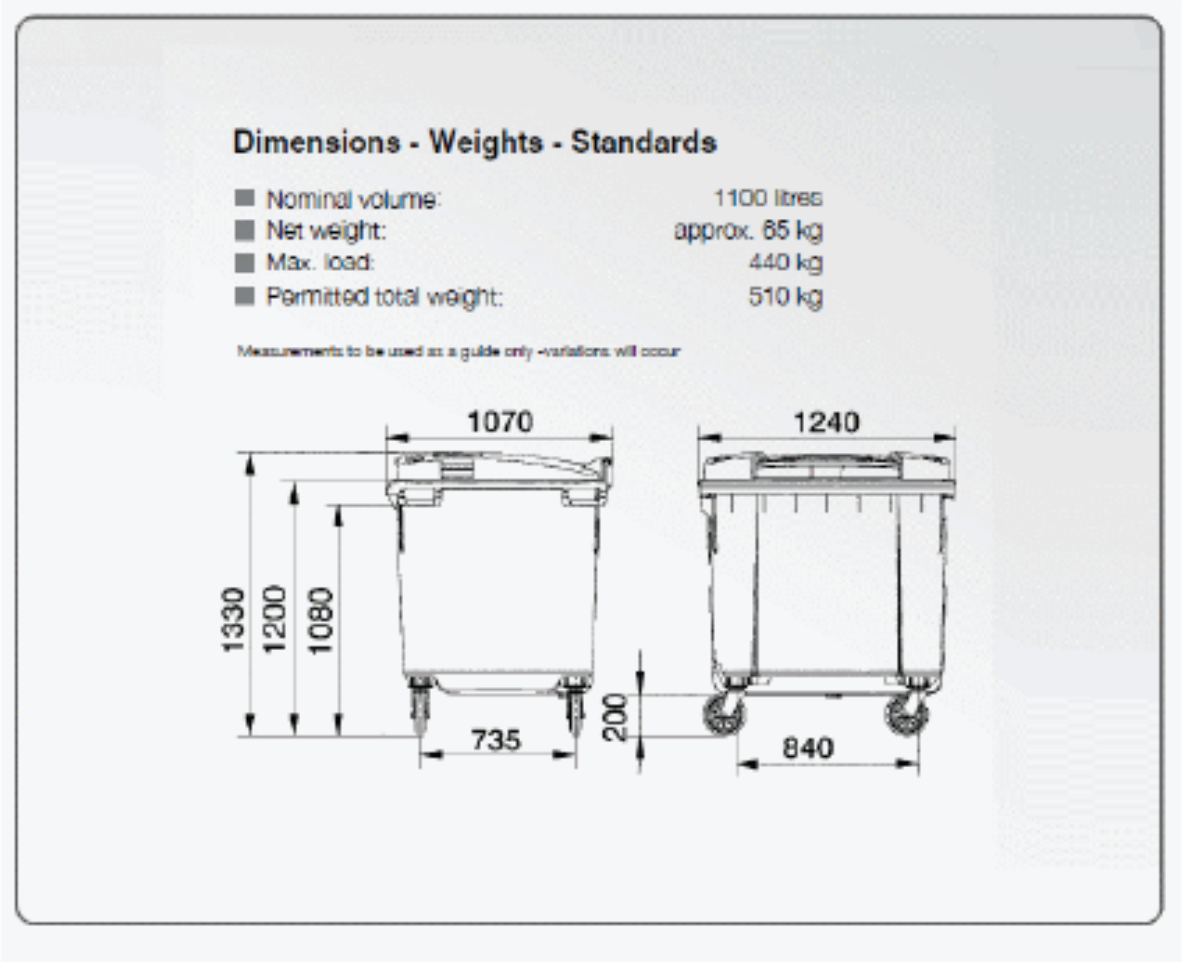
240L MGB



660L MGB


Dimensions - Weights - Standards
Nominal volume: 660 litres
Net weight: 43 kg
Max. load: 265 kg
Permitted total weight: 310 kg
Measurements to be used as a guide only - variations will occur
780
1260
1370
1000
480
320
880

1100L MGB


Dimensions - Weights - Standards
Nominal volume: 1100 litres
Net weight: approx. 65 kg
Max. load: 440 kg
Permitted total weight: 510 kg
Measurements to be used as a guide only -variations will occur
1070
1240
1330
1200
1080
735
200
840