



**Co-Op Live**  
**Operational Waste Management Strategy**

20/12/2023

Revision V1.2

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# Glossary

| Term  | Definition                                         |
|-------|----------------------------------------------------|
| AD    | Anaerobic Digestion                                |
| CFG   | City Football Group                                |
| C&I   | Commercial and Industrial                          |
| Defra | Department for Environment, Food and Rural Affairs |
| DMR   | Dry Mixed Recyclables                              |
| FM    | Facilities Management                              |
| GA    | General Admission                                  |
| IVC   | In-Vessel Composting                               |
| MBT   | Mechanical Biological Treatment                    |
| MCC   | Manchester City Council                            |
| MRF   | Materials Recovery Facility                        |
| MSW   | Municipal Solid Waste                              |
| NPPF  | National Planning Policy Framework                 |
| NPPG  | National Planning Practice Guidance                |
| OWMS  | Operational Waste Management Strategy              |
| RDF   | Refuse-Derived Fuel                                |
| WEEE  | Waste Electrical and Electronic Equipment          |

# 1 Introduction

## 1.1 Preamble

Co-op Live is located within the administrative area of Manchester City Council (MCC).

The site sits to the north side of the Etihad Stadium and within the eastern edge of the Etihad Campus Masterplan boundary, as is shown in blue in Figure 1.1.

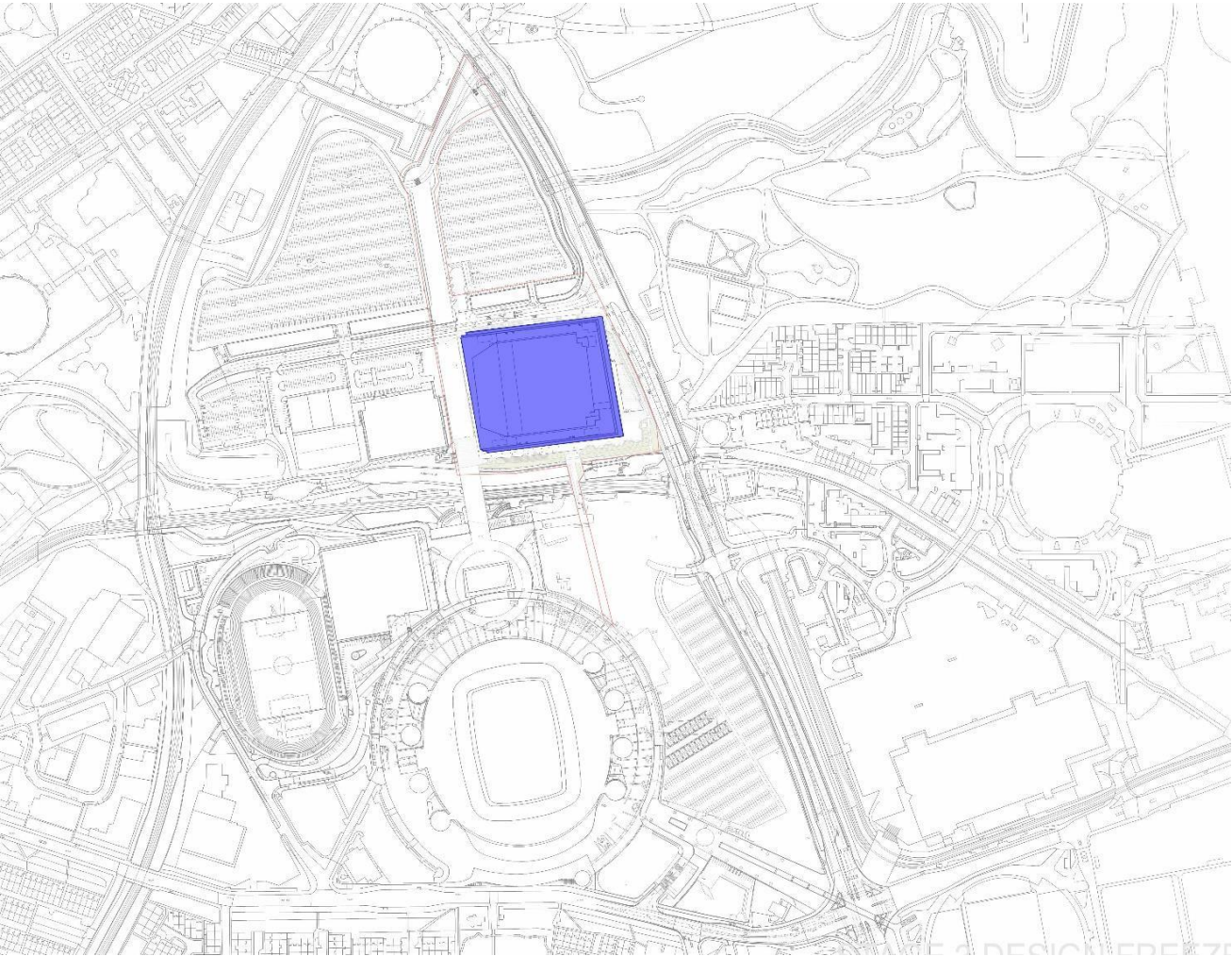


Figure 1.1 Site location

The red line boundary for the site is shown in Figure 1.2.

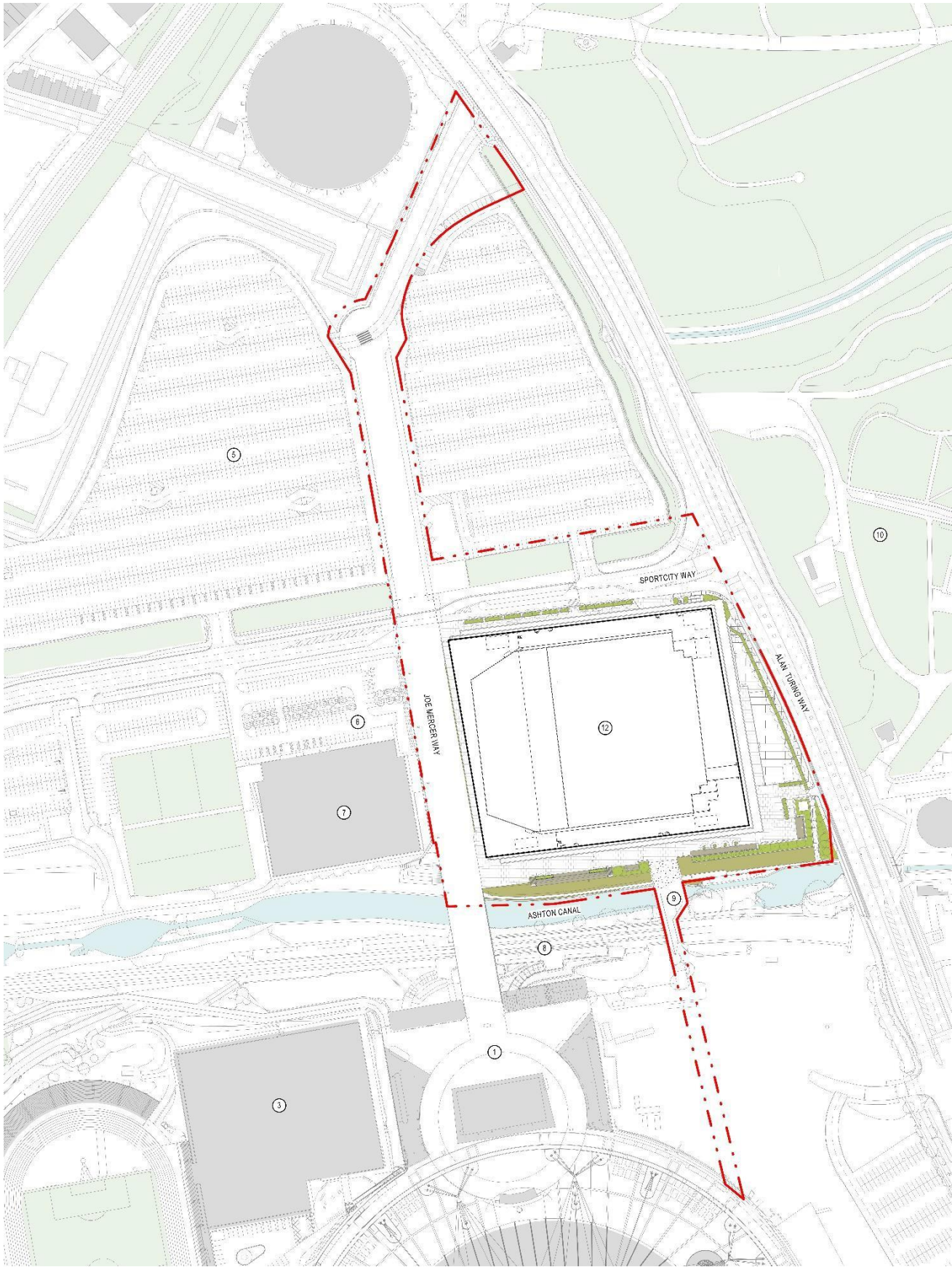


Figure 1.2 Site red line boundary

This Operational Waste Management Strategy (OWMS) has been prepared to accompany a full planning application for the proposed development.

The applicant and the design team have been fully involved in the process of developing this OWMS and acknowledge that the future management of solid waste is an important element to consider when buildings are designed. Planning for future operational waste management will help the venue to operate efficiently, sustainably and safely, all while minimising impacts on building performance, the users of the site and the application site environment.

In line with this, the key objectives of this document are as follows:

- To provide a suite of measures for integrating the principles of the waste hierarchy and circular economy into the proposed development's design and operations;
- To provide an estimate of the anticipated waste generation for the proposed development during operation;
- To provide guidance on the future management of waste to ensure that adequate spatial provision is made in the design for the clean and efficient storage and collection of waste;
- To allow waste and recycling to be easily collected, stored and managed by the Facilities Management (FM) team in a sustainable, efficient and discreet manner; and
- To ensure that national and local policies, as well as all of the applicant's waste management aims and aspirations, are met.

It should be emphasised that developing the waste strategy is an iterative process. In line with this, there is a clear commitment to keep the OWMS under review to ensure that new methods, attitudes and models in waste management are considered and implemented once the venue is operational.

## 2 The Waste Hierarchy and Circular Economy

### 2.1 Introduction

Co-op Live aspires for the proposed development to set a new typology in sustainable venue operation, with a focus on achieving the climate change commitments set out in the Manchester Zero Carbon Framework 2020-

In line with this aspiration, the applicant will promote the principles of the waste hierarchy (see Figure 2.1) and a circular economy across all aspects of its operations. The waste management strategy will first look to prevent and reduce waste generation, before re-using, recycling or recovering value from discarded material. Only after these options have been deemed unfeasible should the safe treatment and final disposal of waste be considered.



Figure 2.1 The waste hierarchy

The development's waste management strategy will facilitate staff and guests in making sustainable choices and will look to move beyond the traditional linear approach of 'make, use, dispose'. Instead, a circular economy model will be promoted, with the aim of keeping resources in use for as long as possible, so that the maximum value possible can be extracted from them. In line with this ambition, attention will be paid to all stages of product packaging design and use, with the necessary provision made in the design and strategy to enable the effective segregation and recycling of materials.

The key principles of a circular economy model are illustrated schematically in Figure 2.2.

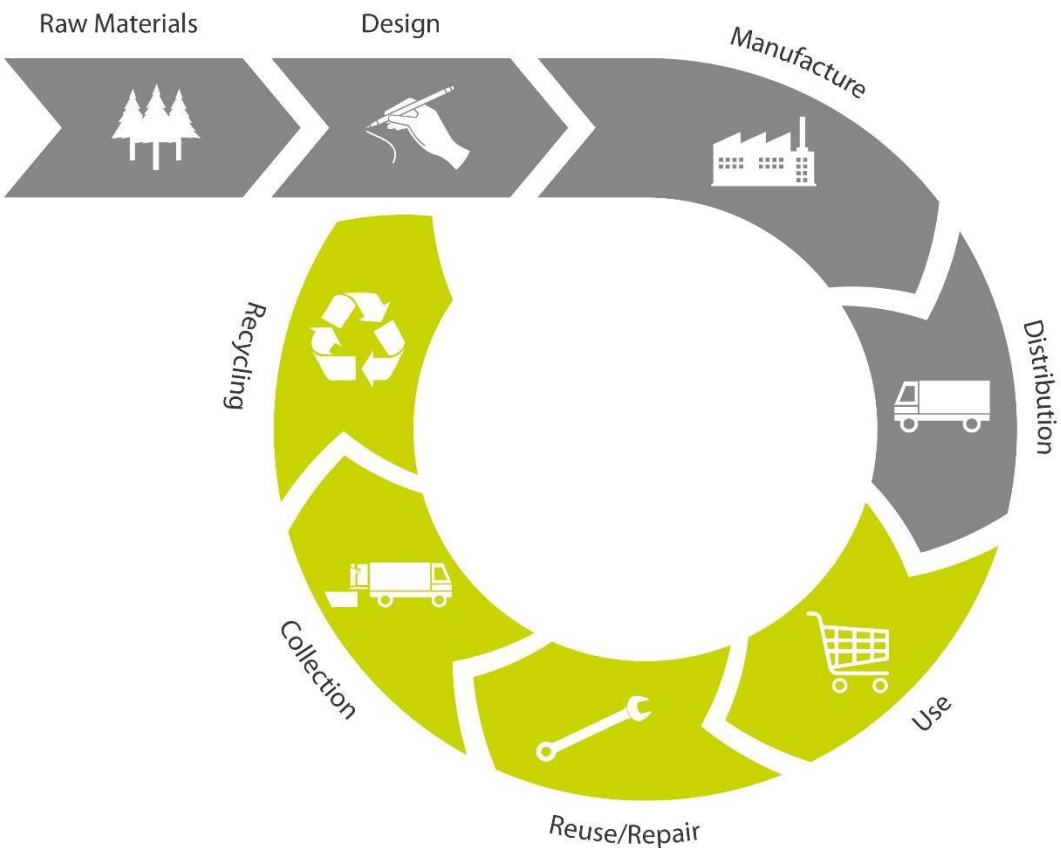


Figure 2.2 Principles of a circular economy

### 2.2 Reduce

The preferred waste management approach is to, first and foremost, minimise the amount of waste produced and to avoid producing waste to begin with. It is recommended that the following initiatives are implemented during the development's operational phase to help achieve this ambition:

- Educating staff and guests on how they can reduce, reuse and recycle effectively, as well as regular monitoring of waste management performance;
- Incorporating drinking water fountains across the venue in suitable locations as a means of reducing waste from plastic bottles;
- Dispensing condiments from bulk containers instead of single-serve packets can reduce plastic waste generation, as can advising staff to only provide utensils, straws and lids when asked. If any utensils are used, these should preferably be biodegradable or compostable, individually dispensed and unwrapped;
- Using a stock inventory system to monitor and provide control over the use of supplies, helping the applicant to avoid over-ordering and producing unnecessary waste. This should be complemented by a supply chain audit to identify opportunities for removing waste at source, streamlining materials and removing avoidable single-use plastics;
- Procuring products from suppliers that allow for the backhauling of packaging waste or the re-use of packaging crates;

- Reducing food waste through tracking food sales/consumption to avoid over-ordering. It is recommended that, where possible, surplus food is recovered and donated to local charities;
- Reviewing and developing supplier guidance on how goods are packaged (e.g. using no packaging, edible materials, less packaging or packaging that is made up of a proportion of recycled materials). The applicant will aim to source 100% of any single-use packaging products it procures from recyclable or compostable materials or from credible certifications; and
- There is potential to develop a campus-wide product procurement strategy. Sharing suppliers and delivering in bulk will help to minimise packaging waste.

### **2.3 Re-use**

Where preventing waste generation is not possible, efforts should then be made to re-use items as many times as possible. One potential initiative is to sell reusable cups to guests, with a discounted drink incentive used to encourage lower waste generation.

### **2.4 Recycle**

Where possible, waste that can no longer be re-used or that is no longer needed should be recycled. The applicant should focus efforts on improving the quality of recyclate, committing contractors to monitoring and inspecting the final destination of sorted material to ensure that it is segregated and then recycled. The following measures should be implemented to help improve the quality of recyclate:

- Training staff to ensure that those working at the venue are fully aware of how the waste management and disposal system works;
- Engaging and educating guests to encourage proper disposal of waste and to reduce the potential for contamination;
- Providing clear signage with recycling and disposal guidance;
- Using colour-coded packaging and bags to make it easier to distinguish which bin should be used to dispose of particular items. This will be defined at later stages, once there is a clearer definition on the type of materials likely to be produced on-site; and
- Ensuring that packaging materials of any procured goods are 'streamlined' to reduce the contamination of recycling streams.

In summary, the applicant should ensure that their product procurement strategy puts an emphasis on sourcing materials that can be recirculated back into the value chain. Products that generate unnecessary waste should be avoided, along with materials where a reusable, recyclable or compostable alternative could have been used instead.

### **2.5 Duty of Care**

In line with the Environmental Protection (Duty of Care) Regulations 1990, the applicant has a duty of care to ensure that their waste is managed properly. All waste materials will therefore be stored safely and securely and, when collected, will be taken by a registered waste carrier to an appropriate permitted facility, with all relevant documentation completed.

### 3 Waste Movement and Collection

#### 3.1 Introduction

The following section describes the proposed strategy to segregate, store, move and collect all waste generated within the venue.

#### 3.2 Integration with Etihad Campus Masterplan

The applicant is keen to explore opportunities to integrate with the rest of the Etihad Campus and, where possible, to make use of existing infrastructure in order to maximise operational efficiencies. In addition, while the applicant is open to having waste compactors collected from the ground floor service yard, they are reluctant for bins to be collected from this area, as the yard will also be used for artist drop-off.

A portion of the venue’s waste will therefore be moved to the existing Etihad Campus waste compound for collection, via a designated bin compound on the L01 podium. The location of the Etihad Campus waste compound is shown in red in Figure 3.1.



Figure 3.1 Location of existing Etihad Campus waste compound

To ensure that the waste management strategy offers sufficient resilience, provision has been made for a portion of the venue’s waste to be compacted on-site and collected from the ground floor service yard. Based on benchmarking work done on existing music-focused arenas, it is anticipated that residual waste will make up the majority of the venue’s waste. At this stage, it is therefore proposed that this waste stream is compacted on-site. Meanwhile, high quality dry mixed recyclables (DMR) (primarily consisting of plastic bottles/cups, cardboard packaging and paper), organics and glass will be moved to the Etihad Campus waste compound for collection, via the bin compound on the L01 podium. Further details on the collection strategy are outlined in Section 3.4.

While the proposal at this stage is for residual waste to be compacted on-site, it should be noted that there is flexibility to adapt the strategy, if required. For example, if DMR were to comprise a higher proportion of the venue’s waste than initially expected, then there is potential to use one or both of the compactors in the ground floor service yard for this stream, rather than residual waste.

#### 3.3 Waste Segregation and Movement

Waste generated within the venue will be segregated at source into a number of streams. This section outlines the segregation and movement strategy for the following areas:

- Public realm areas;
- Secure ticket check;
- General admission areas;
- Hospitality areas;
- The arena bowl; and
- Other areas.

As a minimum, each area will segregate residual waste and DMR, although glass and organic waste will also be segregated in some areas.

##### Public Realm Areas

Litter bins will be provided throughout the public realm podium areas, with residual waste and DMR segregated. The exact specification of litter bins will be confirmed at later stages. To help reduce the risk of littering and improve recycling capture rates, it is recommended that messages on bins are simplified, for example, through using images of recyclable and non-recyclable items. Litter bins should also be easily visible and be placed at frequent intervals to avoid excessive walking distances.

The site FM team will regularly service the litter bins and undertake litter picks to ensure that waste does not become an environmental or visual nuisance. When the bins are nearly full, they will use mobile waste containers to transfer DMR bags to the L01 bin compound and residual bags to the ground floor compactors, as is illustrated in Figure 3.2.

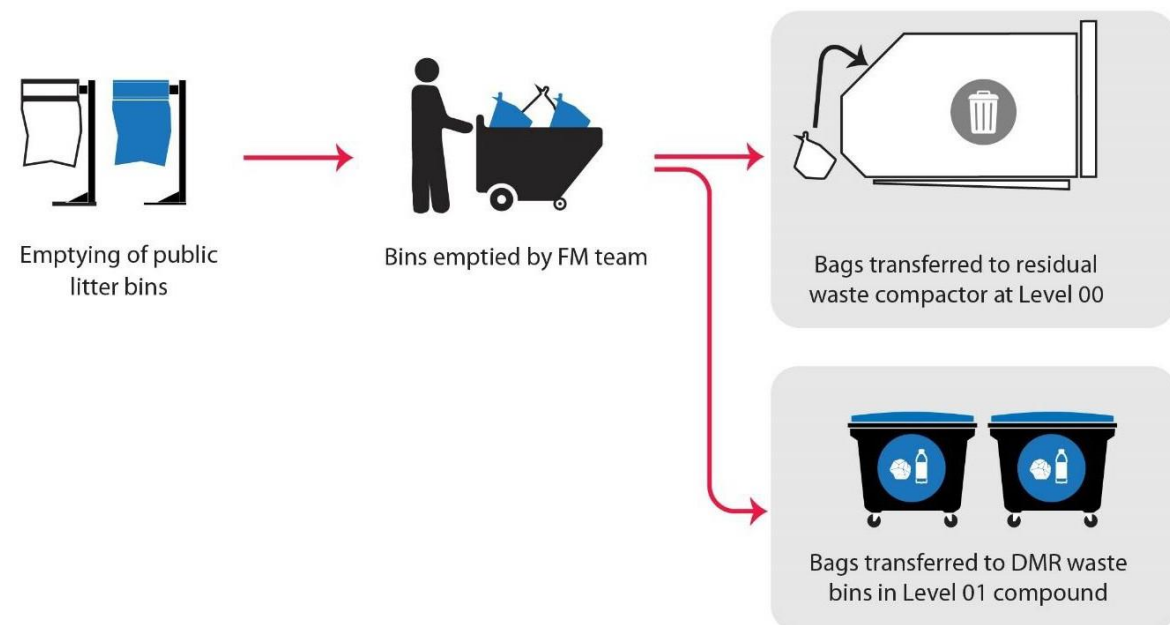


**Figure 3.2 Illustration of waste strategy in public realm areas**

#### Secure Ticket Check

Guests are also likely to dispose of waste when entering the venue. A two-stream system of litter bins will therefore be provided at the secure ticket check, with residual waste and DMR segregated.

Bins at the secure ticket check will be emptied and removed during quieter periods, when the majority of guests are in the arena bowl. The FM team will collect bagged waste from the bins and then use mobile waste containers to move waste manually to the compactors at ground floor (residual waste) or the bin compound at L01 (DMR).

#### General Admission Areas

General admission (GA) concourses give access to the arena bowl and also provide facilities for guests, including toilets, food concessions, bars and merchandising outlets.

Most food preparation on-site will take place in the main commissary kitchen at ground floor level. As such, it is expected that the quantities of organic waste generated in the GA concourses will be minimal. A separate organic waste collection is therefore not deemed necessary in these areas. Instead, two streams will be segregated: residual waste and DMR.

Two-stream litter bins will be provided throughout the concourses. When these areas are less congested, the venue's FM team will empty the litter bins and transfer bagged waste using mobile waste containers to 660 litre bins in intermediate waste stores, as is shown in Figure 3.3. The intermediate stores provide a space for temporary waste storage during an event and will help to reduce the risk of litter bins overflowing.

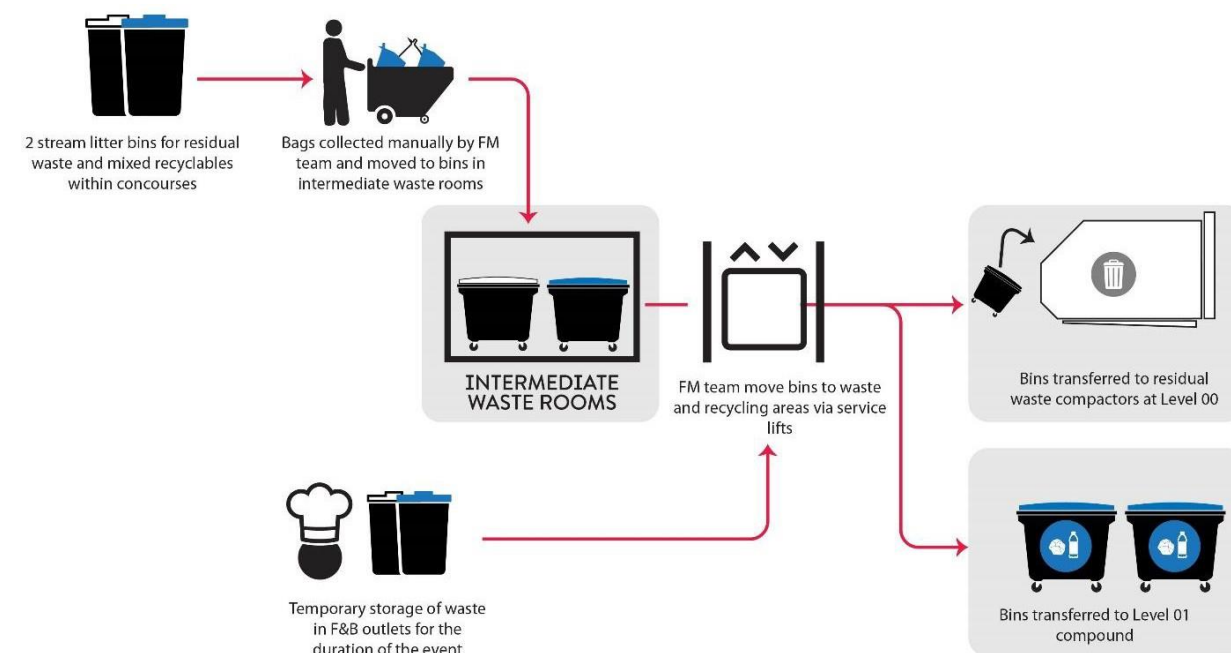


**Figure 3.3 Illustration of waste strategy for GA concourses**

Waste generated within the GA bars and concession units themselves will be stored within these units for the duration of an event, with residual waste and DMR segregated at source.

The FM team will move the 660 litre bins from the intermediate stores and bagged waste from the bar and concession units to the ground floor compactors (residual waste) or to the L01 bin compound (DMR). Bins will mainly be transferred to ground floor or L01 using the service lift in the north-east corner, although the service lift in the south-east corner can also be used if needed. Figure 3.4 shows the location of these lifts and illustrates the main routes that will be used for waste movement at ground floor level and on L01. Each service lift is capable of holding five 660 litre bins and a member of staff. It should also be noted that the northern service lift is located in close proximity to the ground floor compactor area and L01 bin compound which will help to reduce staff travel distances and minimise the time required for venue clean-down.



Figure 3.4 Illustration of main waste movement routes (ground floor and L01)

The movement of bins from the intermediate stores to ground floor and L01 will be staggered so as to avoid bottlenecks in these areas. In addition, the compactors in the ground floor service yard will each be fitted with a bin hoist to improve the efficiency of waste management operations. Once bins have been emptied/collected, the FM team will return them to the appropriate intermediate waste room.

### Hospitality Areas

It is anticipated that a plated (washable) premium service will be offered in the venue's hospitality areas. The use of reusable cutlery, crockery and glasses is an effective means of preventing and reducing waste generation. While this is the case, it is still expected that some wastes will be generated in these areas, namely glass from bottled beverages, organics (from plate waste) and some DMR (as it is likely that plastic glasses will be offered for use in hospitality areas that are open to the bowl).

These areas will be kept clean by hospitality staff, with waste 'backhauled' to the kitchens/bars on each level, where residual waste, DMR, organics and glass will be segregated. Hospitality staff will be provided with adequate training to ensure that they are aware of the procedure for separating waste streams. It is also recommended that a food waste tracking system is used in the kitchens to monitor the main sources of organic waste and to use this data as the basis for effective waste reduction interventions.

Waste from these areas will be moved at the end of an event once all guests have left the venue, with residual waste transferred to the ground floor compactors, while DMR, organics and glass are transferred to the L01 bin compound. The waste segregation and movement strategy for the hospitality areas is illustrated schematically in Figure 3.5.

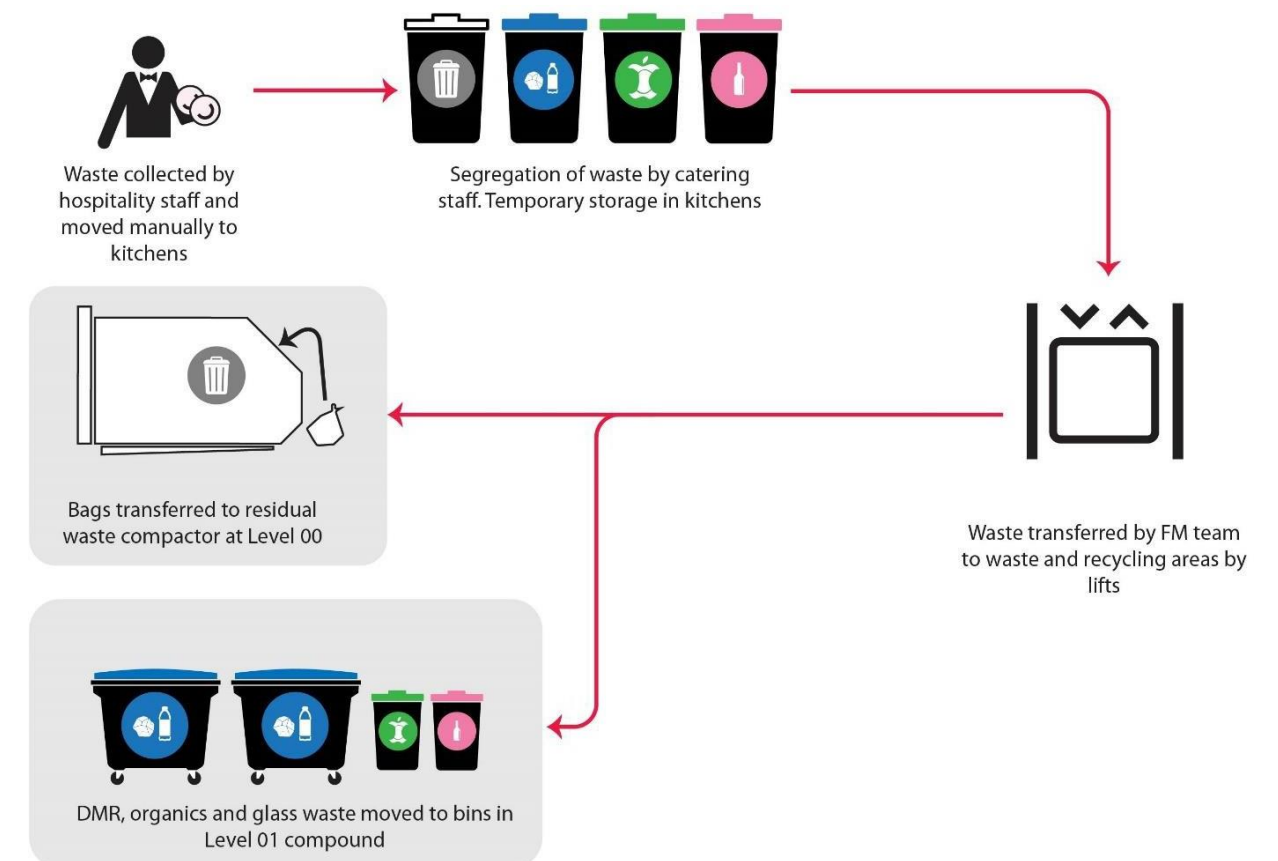


Figure 3.5 Illustration of waste strategy for hospitality areas

**Arena Bowl**

Any waste left in the arena bowl will be moved directly to the compactors at ground floor (residual) and the L01 bin compound (DMR) once guests have left the venue. It is recommended that the FM team carry out a positive pick in order to collect mixed recyclables. While collecting waste by hand is labour-intensive, it is one of the most effective methods for recovering recyclable materials. The residual waste that remains will be bagged and moved manually to the compactors in the ground floor service yard, as illustrated in Figure 3.6.

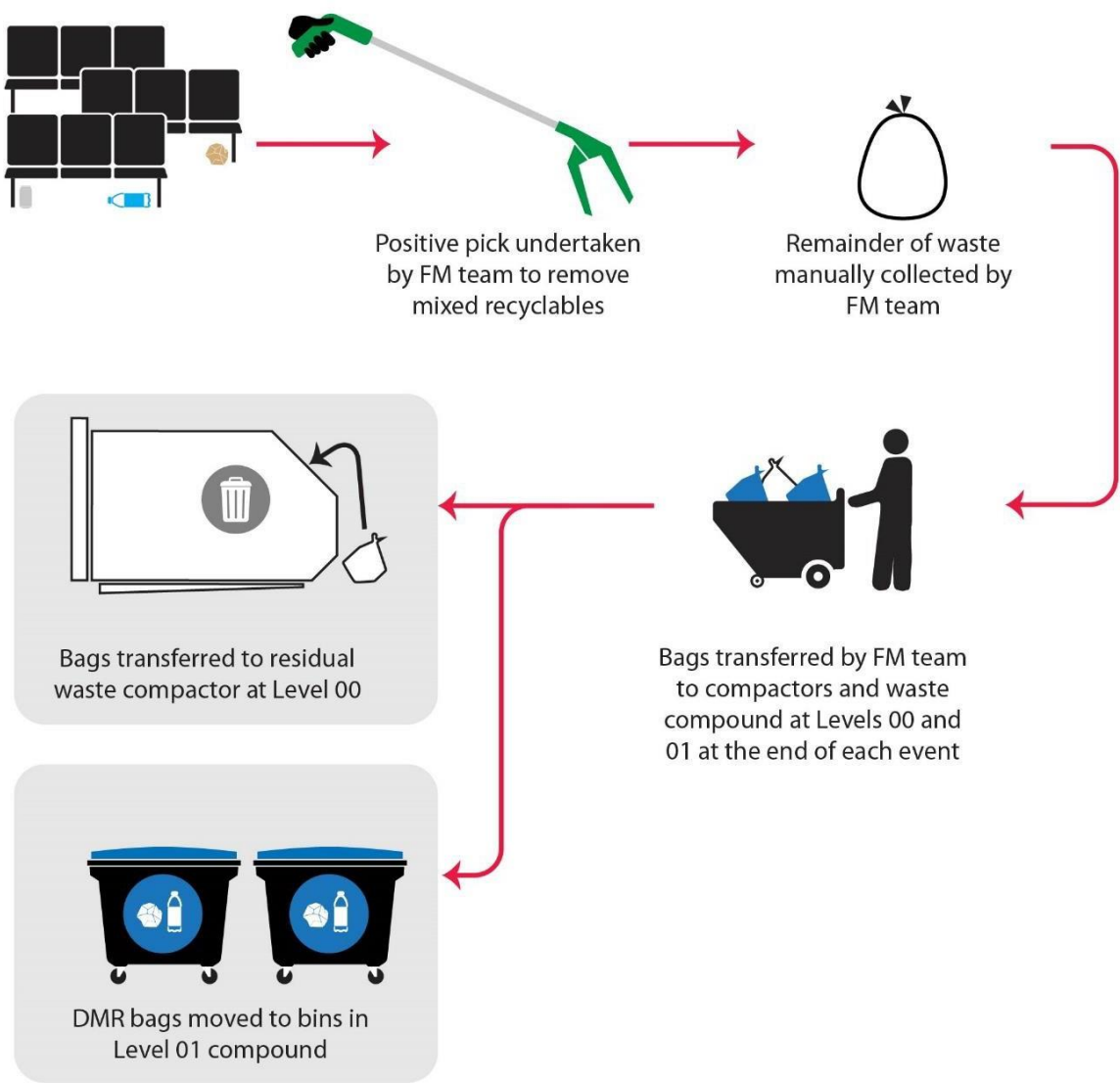


**Figure 3.6 Illustration of waste strategy for the arena bowl**

**Other Areas**

The ground floor commissary kitchen will be the main area in which food preparation is undertaken. It is therefore proposed that organic waste is segregated in this area, in addition to residual waste and DMR. When full, residual bins will be emptied into the compactors, while DMR and organics bins will be transferred to the L01 bin compound.

It is anticipated that relatively small quantities of waste will be generated in the offices, artist and crew areas. Waste from these areas will therefore be stored locally on event days in small bins and will be segregated into the following two streams: residual waste and DMR. When convenient, bags will be collected and moved to the compactors at ground floor (residual) or the L01 bin compound (DMR) by the venue’s FM team.

**3.4 Waste Collection**

As outlined in Section 3.2, a portion of the venue’s waste will be compacted on-site and collected from the ground floor service yard, with the remainder moved to the Etihad Campus waste compound for collection. At this stage, it is anticipated that residual waste will be compacted on-site, with DMR, organics and glass collected from the off-site compound. The collection strategy for the venue is summarised in Figure 3.7.

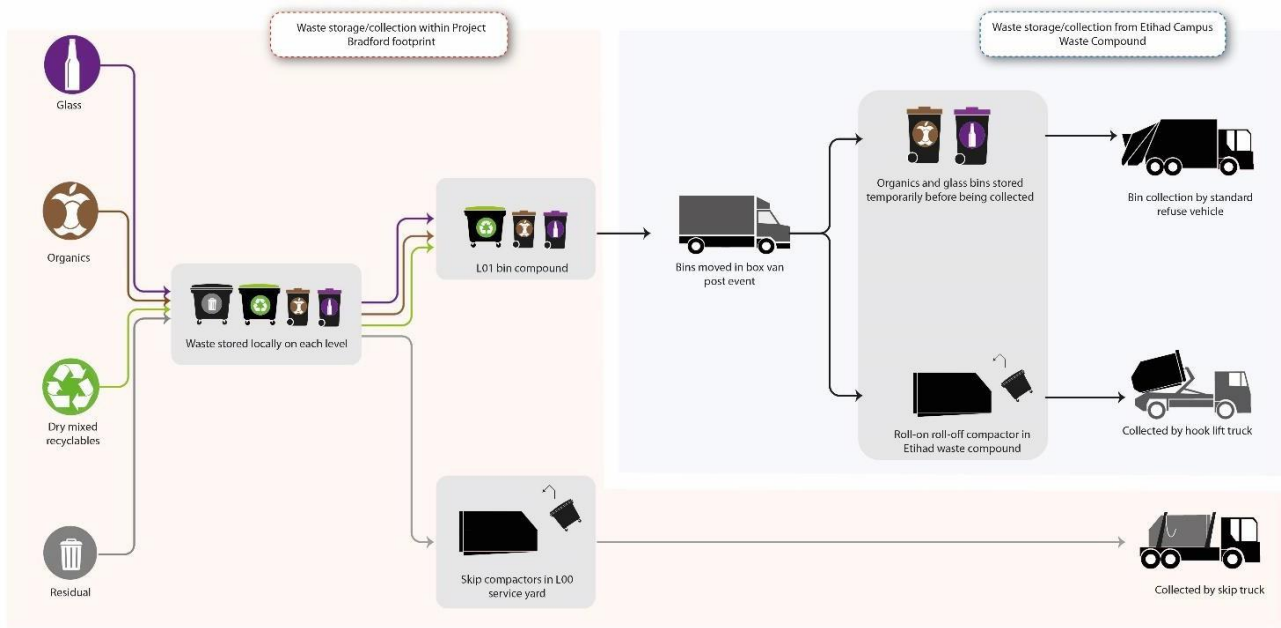


**Figure 3.7 Illustration of waste collection strategy for the venue**

Space has been provided in the ground floor service yard for two skip compactors, each with an approximate capacity of 11m³ and the following approximate dimensions (including bin hoist): 2.19m (H) x 1.89m (W) x 5.73m (L). Further details on the compactors are set out in Section 4.4.

The compactors will be collected by a private contractor, with collection vehicles accessing and exiting the service yard via Sportcity Way to the north. Access to the service yard will be controlled and secure, with vehicles stopped at a point external to the building to allow them to be identified and checked before entering.

A skip-lift truck will be used to collect each of the compactors, an example of which is shown in Figure 3.8.



**Figure 3.8 Example of skip-lift swing-arm truck**

A minimum head clearance of 5.0m has been provided above and in front of the compactors to enable the compactor lift. The positioning and orientation of the compactors has been carefully assessed to mitigate any health and safety risks to staff and to ensure that the trucks do not obstruct the main servicing circulation route when making collections. The compactors will be collected at separate times to minimise the risk of any vehicle clashes. To help further mitigate this risk, a banksman will also be present to supervise all waste collections.

Swept path analysis has been undertaken to demonstrate how the compactors will be collected from the ground floor service yard, as is shown in Appendix C. For the purposes of this analysis, a skip-lift truck with the following dimensions has been tested: 3.66m (H) x 2.48m (W) x 7.10m (L).

As outlined in Section 3.2, DMR, organics and glass will be moved to a 'recycling zone' in the L01 bin compound, before being transferred to the Etihad Campus waste compound for consolidation and collection. To maximise the efficiency of operations, it is recommended that a 3.5t box van is used for transferring bins (see example in Figure 3.9). This vehicle must be fitted with a tail-lift and should have the following approximate dimensions: 6.51m (L) x 2.20m (W) x 3.10m (H). A vehicle of this size will be able to transport a minimum of four 660 litre bins or ten 240 litre bins at a time.



**Figure 3.9 Example of 3.5t box van**

Swept path analysis has been undertaken to demonstrate how bins will be collected from the L01 bin compound, as is shown in Appendix C. The box vans will follow the route shown in Figure 3.10 when transferring waste to the Etihad Campus waste compound. In order to avoid any adverse impact on users of the campus, waste will be moved in the early hours, when levels of pedestrian activity are at their lowest.

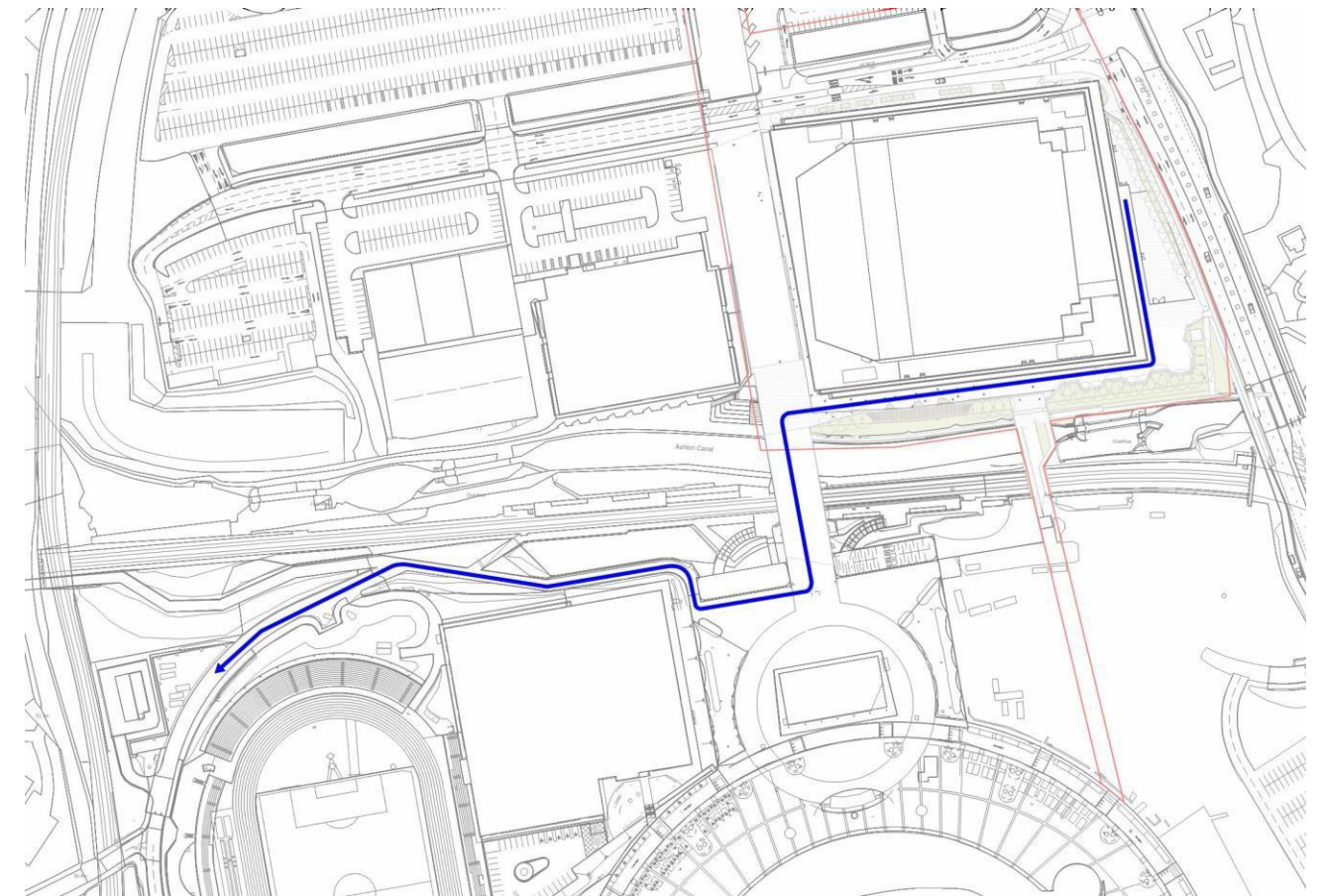


**Figure 3.10 Indicative route used to transfer waste from L01 bin compound to Etihad Campus waste compound**

Organics and glass waste will not be compacted and will instead be collected from the Etihad Campus waste compound by a rear-end loader refuse vehicle. It is therefore recommended that these bins are transferred across to the Etihad Campus waste compound first, to allow maximum time for them to be collected and returned to the venue before pedestrians once again begin circulating the campus.

In contrast, mixed recyclables will be compacted at the Etihad Campus waste compound, meaning that the DMR bins can be emptied on arrival and returned to the venue immediately. To minimise the number of waste vehicle trips, it is proposed that this waste stream is stored in a large portable roll-on roll-off compactor and collected by a hook-lift truck.

### 3.5 Waste Treatment/Disposal

As outlined in Section 2.1, the applicant will look to apply the principles of the waste hierarchy to all aspects of their operations, prioritising waste prevention, reduction, re-use, recycling and energy recovery over landfill disposal.

In line with this, DMR will be directed to a materials recovery facility (MRF) for sorting and onward transfer to recycling processing facilities. There are a number of MRFs in the region serving the commercial and industrial (C&I) sectors, one example being the Fresh Start MRF just outside the M60 ring road.

It is proposed that organic wastes are sent for treatment at either an anaerobic digestion (AD) plant or an appropriate composting facility. AD is the process by which organic waste is broken down in the absence of oxygen in sealed tanks to produce biogas and bio-fertiliser. Meanwhile, composting can take several forms, with in-vessel composting (IVC) systems most prevalent in urban areas. These systems involve aerobically breaking down organic waste in a contained environment.

The Greater Manchester Joint Waste Development Plan Document (see Appendix A) states that there will be sufficient recycling capacity and sufficient organic waste treatment capacity for managing waste generated by the region's C&I sectors, at least until 2028.

In terms of residual waste, the applicant's first priority will be to minimise the amount of this material that is generated. Any residual waste that is produced should be diverted to energy recovery facilities, either directly or after being pre-treated at a mechanical biological treatment (MBT) facility. This strategy aligns with the applicant's aspiration to consign as little waste as possible to landfill.

MBT plants use mechanical and biological processes to convert residual material into refuse-derived fuel (RDF). The thermal treatment of this fuel can then be used to generate energy. Much of the RDF output from Manchester's MBT facilities can be sent to the Viridor energy recovery facility in Runcorn, which serves Liverpool, Cheshire and Greater Manchester, and can treat approximately 850,000 tonnes of RDF per year.

The applicant should undertake regular auditing and inspection of waste treatment facilities to ensure that they are maximising recycling rates and landfill diversion rates.

## 4 Waste Generation and Storage Requirements

### 4.1 Introduction

In order to determine the spatial requirements for waste storage, outline waste quantities have been estimated. These have been based on the seating manifest for the venue, along with a number of additional assumptions informed by benchmarking work on other music-focused arena developments. These assumptions are outlined in Section 4.2.

It should be noted that the current proposed seating manifest may be subject to minor changes in future design stages. However, any alterations are unlikely to result in significant changes to operational waste generation quantities.

### 4.2 Key Working Assumptions

#### Venue-Wide

- To estimate the total quantity of waste generated by the venue, a venue-wide waste generation rate has been used. This has been based on waste generation data for a range of other music-focused arena developments. It has been assumed that 0.31kg of waste will be generated per guest per event. On the basis of the data that has been analysed, this generation rate is deemed to be conservative and represent a reasonable worst case;
- Based on the frozen seating manifest, the maximum potential capacity of the venue has been estimated at 23,275. This maximum capacity will occur during a ‘Concert Terraces Centre Stage Standing’ event. While this is likely to represent an absolute worst case in terms of waste generation, it should be emphasised that this type of event is only likely to occur on a very rare basis. While sufficient storage space will be provided across the venue for the waste generated during this type of event, the intermediate waste stores on each level are intended to accommodate a more ‘typical’ event scenario. On the rare occasions that the capacity of the venue reaches 23,275, a number of strategies will be implemented to manage the uplift in waste generation and ensure that waste does not cause a significant detrimental impact (see Section 4.4);
- The composition split for the venue has been based on existing operations at a range of existing music-focused arenas. The assumed composition split (by mass) is as follows: 50% residual waste; 30% dry mixed recyclables; 10% organics; and 10% glass; and
- A 60% high quality recycling capture rate has been applied, as, based on past project experience, it is expected that some guests will incorrectly dispose of recyclables in the residual waste stream.

#### General Admission Areas

Outline bin numbers for the GA intermediate storage areas have been based on the following assumptions, which have been informed by benchmarking work done on a range of other music-focused arena developments:

- Waste generated within the GA concessions and bars will be stored locally within the units themselves for the duration of an event;
- Waste from the GA concourses and litter bins will be cleared by the venue’s FM team and stored temporarily in intermediate waste rooms on each level;
- A separate specific generation rate for GA guests has been used to help estimate the amount of waste generated in the GA concourses. It has been assumed that 0.23kg of waste will be generated per GA guest per event, based on operations at a range of existing music-focused arenas;
- The amount of waste generated in the GA concourses has in large part been based on a ‘Concert Terraces End Stage Full Standing 220’ event. This type of event will occur on a regular basis and will have a capacity of 20,455 – the maximum capacity for events that occur on a rare, occasional, regular or very regular basis;

- The amount of waste generated in the L01 concourses has been estimated based on a ‘Concert Terraces End Stage Seated 220 Degree’ event. This type of event will occur on a very regular basis. While the total capacity for this type of event will be lower than a ‘Concert Terraces End Stage Full Standing 220’ event, the number of guests and amount of waste generated in the L01 concourse is likely to be higher;
- In the concourse areas, it has been assumed that residual waste and DMR will be segregated, with an assumed composition split (by mass) of 62.5% residual to 37.5% DMR. A 60% recycling capture rate applied;
- It has been assumed that both waste streams will be stored in the intermediate waste rooms in 660 litre Eurobins, each with an assumed maximum fill weight of 80kg;
- The total mass of waste for each concourse has been estimated by multiplying the GA guest generation rate by the number of guests using each concourse; and
- It has been assumed that 70% of this waste will be accessible to the FM team during an event, with the remaining 30% left by guests in the arena bowl (to be cleared post-event).

#### Hospitality Areas

- Waste from the hospitality areas will be ‘backhauled’ by hospitality staff to the bars/satellite kitchens on each level, where space for waste storage will be provided;
- It is anticipated that less packaging waste will be generated in the hospitality areas compared to in the GA concourses due to the plated (washable) service and use of washable glassware; and
- While some residual waste and dry mixed recyclables will be generated, it is expected that the majority of waste will arise from organics (from plate waste) and glass. All four waste streams will be segregated in the kitchens and stored in bins.

#### Other Areas

- It has been assumed that the remainder of the venue’s waste will be generated in other areas, namely the arena bowl, main commissary kitchen, crew and artist facilities, offices, etc; and
- It has been assumed that waste generated in the arena bowl will accumulate on the floor during an event (to be cleared once guests have left the venue).

#### L01 Bin Compound

- The main purpose of the bin compound on the L01 podium will be to temporarily hold DMR, organics and glass bins before they are transferred to the Etihad Campus waste compound; and
- At this stage, it has been assumed that DMR will be stored in 660 litre Eurobins (with a maximum fill weight of 80kg) while organics and glass will be stored in 240 litre Eurobins (with a maximum fill weight of 50kg).

### 4.3 Waste Generation

#### Venue-Wide

Based on the assumptions set out in Section 4.2, it is expected that approximately 7,300kg of waste will be generated during a ‘Concert Terraces Centre Stage Standing’ event, as is illustrated in Table 4.1. This represents an absolute worst case in terms of waste generation during an event.

Table 4.1 Estimated waste generation per ‘Concert Terraces Centre Stage Standing’ event

| Land use   | Maximum capacity | Estimated waste generation (kg/event) |             |          |       |       |
|------------|------------------|---------------------------------------|-------------|----------|-------|-------|
|            |                  | Residual*                             | Recyclables | Organics | Glass | Total |
| Venue-wide | 23,275           | 4,502                                 | 1,307       | 726      | 726   | 7,262 |

\*assuming 60% recycling capture rate

General Admission Areas

In the concourse areas, it is proposed that two primary waste streams will be segregated: residual waste and DMR. Table 4.2 details the expected waste generation for each concourse area for a ‘Concert Terraces End Stage Full Standing 220’ event. This type of event represents a more ‘typical’ scenario and has been used to help estimate the number of bins required in the intermediate waste stores.

Table 4.2 Estimated waste generation per ‘Concert Terraces End Stage Full Standing 220’ event (general concourse guests only)

| Level     | No. of GA guests using concourses* | Estimated waste generated by GA guests (kg/event) |                   |       |
|-----------|------------------------------------|---------------------------------------------------|-------------------|-------|
|           |                                    | Residual**                                        | Mixed recyclables | Total |
| GF HALL   | 7,746                              | 1,353                                             | 393               | 1,745 |
| L01 DECK  | 2,836                              | 495                                               | 144               | 639   |
| L02 CLUB  | 0                                  | 0                                                 | 0                 | 0     |
| L03 LOFT  | 7,743                              | 1,352                                             | 393               | 1,745 |
| L04 ATTIC | 0                                  | 0                                                 | 0                 | 0     |
| Total     | 18,325                             | 3,200                                             | 929               | 4,129 |

\*these numbers do not include those seated in the hospitality areas, as these areas will not be served by the GA intermediate waste stores. Waste from the hospitality areas will instead be backhauled to the bars/kitchens, where space for waste storage will be provided.

\*\*assuming 60% recycling capture rate

Waste quantities have also been estimated for a ‘Concert Terraces End Stage Seated 220 Degree’ event, as the number of guests using the L01 concourse will be higher during this type of event, as is shown in Table 4.3.

Table 4.3 Estimated waste generation per ‘Concert Terraces End Stage Seated 220 Degree’ event (general concourse guests only)

| Level     | No. of GA guests using concourses* | Estimated waste generated by GA guests (kg/event) |                   |       |
|-----------|------------------------------------|---------------------------------------------------|-------------------|-------|
|           |                                    | Residual**                                        | Mixed recyclables | Total |
| GF HALL   | 3,474                              | 607                                               | 176               | 783   |
| L01 DECK  | 4,916                              | 858                                               | 249               | 1,108 |
| L02 CLUB  | 0                                  | 0                                                 | 0                 | 0     |
| L03 LOFT  | 7,743                              | 1,352                                             | 393               | 1,745 |
| L04 ATTIC | 0                                  | 0                                                 | 0                 | 0     |
| Total     | 16,133                             | 2,817                                             | 818               | 3,635 |

\*these numbers do not include those seated in the hospitality areas, as these areas will not be served by the GA intermediate waste stores. Waste from the hospitality areas will instead be backhauled to the bars/kitchens, where space for waste storage will be provided.

\*\*assuming 60% recycling capture rate

As specified in Section 4.2, it is anticipated that approximately 70% of GA waste will be accessible to the FM team for collection during an event, with the remaining waste from guests using these areas left in the arena bowl, and therefore inaccessible during event mode. The total estimated quantity of waste which could potentially be stored in each of the GA intermediate stores is shown in Table 4.4. The numbers for ground floor and L03 have been based on a ‘Concert Terraces End Stage Full Standing 220’ event, while the numbers for L01 have been based on a ‘Concert Terraces End Stage Seated 220 Degree’ event.

Table 4.4 Estimated quantity of waste to be stored in GA intermediate waste rooms

| Level     | Estimated waste generated by GA guests (kg/event) | Waste which can be stored in intermediate rooms (kg/event) |                   |       |
|-----------|---------------------------------------------------|------------------------------------------------------------|-------------------|-------|
|           |                                                   | Residual                                                   | Mixed recyclables | Total |
| GF HALL   | 1,745                                             | 947                                                        | 275               | 1,221 |
| L01 DECK  | 1,108                                             | 601                                                        | 174               | 775   |
| L02 CLUB  | 0                                                 | 0                                                          | 0                 | 0     |
| L03 LOFT  | 1,745                                             | 947                                                        | 275               | 1,221 |
| L04 ATTIC | 0                                                 | 0                                                          | 0                 | 0     |

4.4 Waste Storage

General Admission Areas

Intermediate waste stores will be provided in close proximity to the GA concourses. These stores will help to reduce the risk of litter bins overflowing and will improve the efficiency of waste management operations.

If the stores were to hold waste for the duration of a ‘typical’ high-capacity event, then they would need to accommodate the bin numbers shown in Table 4.5. The numbers for ground floor and L03 have been based on a ‘Concert Terraces End Stage Full Standing 220’ event, while the numbers for L01 have been based on a ‘Concert Terraces End Stage Seated 220 Degree’ event.

Table 4.5 Expected intermediate waste storage requirement (concourses)

| Level     | Waste which can be stored in intermediate rooms (kg/event) | No. of 660 litre Eurobins required |                   |       |
|-----------|------------------------------------------------------------|------------------------------------|-------------------|-------|
|           |                                                            | Residual                           | Mixed recyclables | Total |
| GF HALL   | 1,221                                                      | 12                                 | 4                 | 16    |
| L01 DECK  | 775                                                        | 8                                  | 2                 | 10    |
| L02 CLUB  | 0                                                          | 0                                  | 0                 | 0     |
| L03 LOFT  | 1,221                                                      | 12                                 | 4                 | 16    |
| L04 ATTIC | 0                                                          | 0                                  | 0                 | 0     |

The intermediate stores will be designed to hold waste for the duration of an event. However, where spatial constraints preclude this, a number of options are available for preventing the build-up of waste. For example, the FM team could move waste from the stores to the ground floor compactors and L01 bin compound during the course of an event. An indicative layout for one of the potential storage spaces on L03, with waste containers drawn in situ, is shown in Figure 4.1.



Figure 4.1 Indicative layout of potential L03 intermediate waste store

All waste rooms will have adequate ventilation and lighting. Drainage need not be provided; however, rooms will be fitted out to be easily cleaned and maintained. Rubber buffers or stainless steel plating should also be incorporated in all waste rooms and service lifts to avoid damaging the walls.

L01 Bin Compound

The L01 bin compound will be used to temporarily hold DMR, organics and glass bins before they are transferred to the Etihad Campus waste compound. The compound has been sized to provide sufficient space to store all DMR, organics and glass bins for the venue.

Based on the assumptions set out in Section 4.2 and the waste generation values for a worst-case event (see Table 4.1), it is recommended that the L01 bin compound provides adequate space to accommodate the bin numbers shown in Table 4.6.

Table 4.6 Estimated number of Eurobins required in the L01 bin compound

|                                                       | DMR<br>660 litre Eurobins | Organics<br>240 litre Eurobins | Glass<br>240 litre Eurobins |
|-------------------------------------------------------|---------------------------|--------------------------------|-----------------------------|
| Total estimated waste generation (kg/event)           | 1,307                     | 726                            | 726                         |
| Total number of Eurobins required in L01 bin compound | 17                        | 15                             | 15                          |

Space will also be provided in the L01 bin compound for the following:

- An area for temporarily holding bins before they are moved across to the Etihad Campus waste compound;
- An area for temporarily holding empty bins that have been returned from the Etihad Campus waste compound. To maximise the efficiency of operations, full bins ready for dispatch should be separated from empty bins returned; and
- A bin wash-down area with appropriate drainage provision. Drainage should be by means of a trapped gully connected to the foul sewer.

An indicative layout of the L01 bin compound with the containers drawn in situ is shown in Figure 4.2.

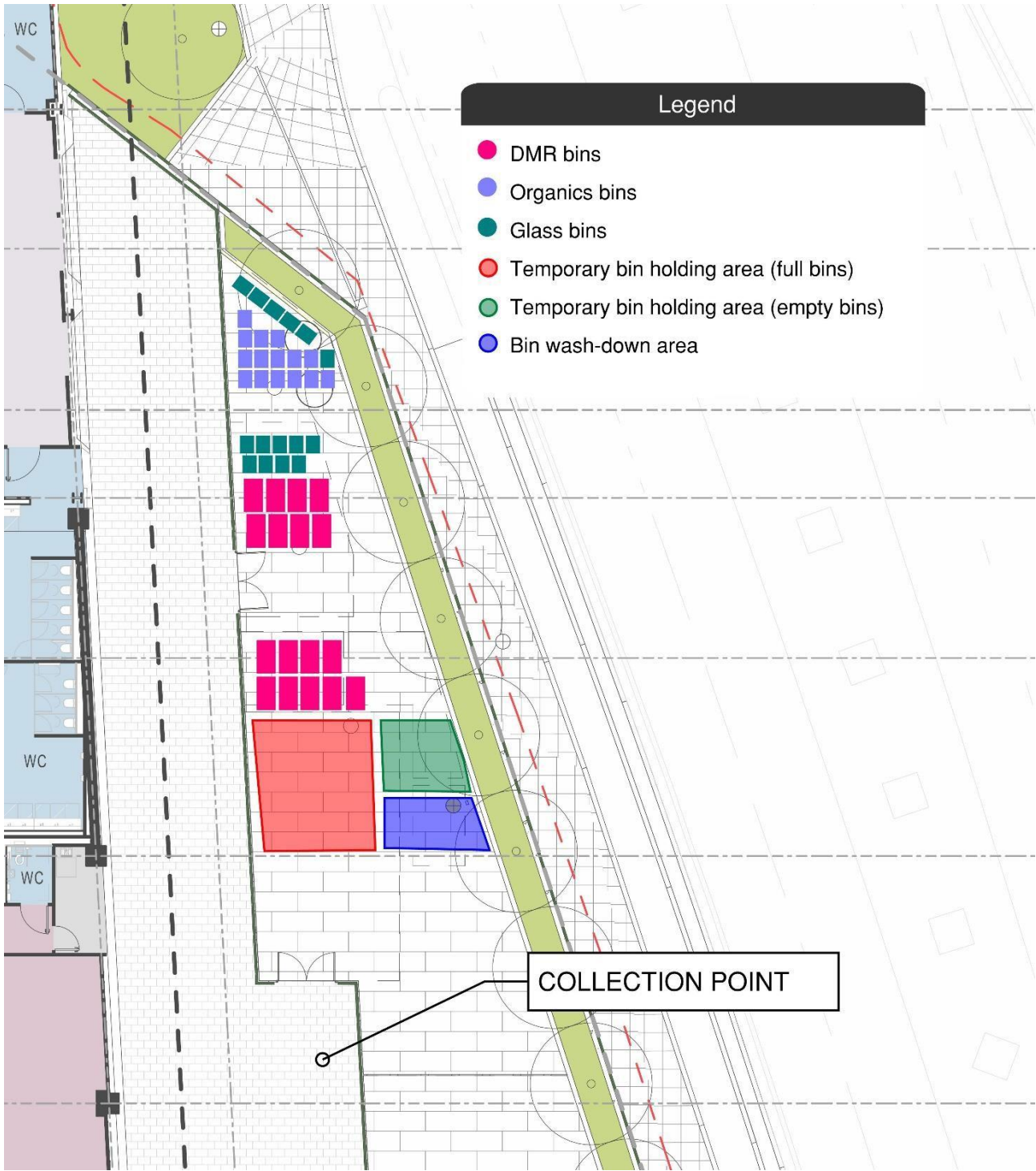


Figure 4.2 Indicative layout of L01 bin compound

The L01 bin compound will be secured and adequately lit to prevent unauthorised access. It is recommended that the walls of the compound are formed of non-combustible material that is robust, so as to prevent vermin entering.

Ground Floor Service Yard

At this stage, it is proposed that all of the venue’s residual waste is compacted on-site and collected from the ground floor service yard. However, as outlined in Section 3.2, it should be emphasised that there is flexibility to adapt the strategy, if required.

As with the L01 bin compound, the ground floor service yard must be properly equipped and maintained, with adequate pedestrian buffer zones, markings and signage, supervision and security.

The compactor store in the ground floor service yard includes space for the following:

- A dedicated secure cabinet for the storage of any hazardous wastes. All areas for hazardous waste storage are to be properly marked, with safe and secure containers used. Safe working methods are to be adopted by any operatives handling hazardous wastes;
- 2 no. portable skip compactors (with an approximate capacity of 11m<sup>3</sup> and payload of up to 3,000kg). The typical dimensions for this piece of equipment are as follows: 2.19m (H) x 1.89m (W) x 3.93m (L) (5.73m long with bin hoist). These compactors have an operating height clearance of 5.0m. The bin hoists will need to be folded up and over the compactors at collection times to avoid clashing with the collection vehicles. The applicant will ensure that a compactor and bin hoist model is selected that allows for this; and
- Space for the storage of a small quantity of Waste Electrical and Electronic Equipment (WEEE) wastes that will be generated.

It is anticipated that at least one of the compactors will need to be collected between each event, as is shown in Table 4.7, with the second compactor providing capacity for any additional residual waste. It should be noted, however, that there is flexibility to adapt the compactor collection frequency depending on the events that are scheduled for each week.

Table 4.7 Residual compactor requirements

|                                                            | Residual |
|------------------------------------------------------------|----------|
| Estimated waste generation (kg/event)*                     | 4,502    |
| Maximum compactor payload (kg)                             | 3,000    |
| Compactor fill level                                       | 150%     |
| Number of compactors required in ground floor service yard | 2        |

\*assuming 60% recycling capture rate

An indicative plan of the compactor store in the ground floor service yard, with the compactors drawn in situ, is shown in Figure 4.3. In order to mitigate health and safety risks and facilitate vehicle movements in the service yard, one of the compactors has been positioned at an angle. The column layout and roller shutter will be adjusted in future design stages to accommodate this. To mitigate the risk of any vehicle clashes, the compactors will be collected at separate times. In addition, a banksman will be present to supervise all waste collections.

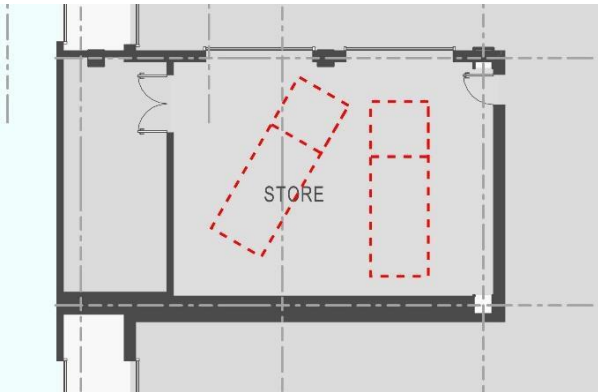


Figure 4.3 Indicative layout of compactor store in ground floor service yard

**Etihad Campus Waste Compound**

DMR, organics and glass bins will be transferred from the L01 bin compound to the Etihad Campus waste compound in the early hours, when levels of pedestrian activity are at their lowest. At this stage, it has been assumed that waste generated from the proposed development will be stored separately from waste generated by the rest of the Etihad Campus, as a further study of campus waste quantities will need to be undertaken if waste storage equipment is to be shared between different elements of the masterplan.

On this basis, the applicant and City Football Group (CFG) will ensure that adequate space is set aside for the proposed development's waste operations on top of what is currently provided in the compound to serve other parts of the masterplan. Space will therefore be provided in the Etihad Campus waste compound for the following:

- 1 no. portable roll-on roll-off compactor for DMR. At this stage, it is recommended that a compactor with an approximate capacity of 24m<sup>3</sup> is used. The approximate dimensions of this compactor (with bin hoist) are as follows: 2.56m (H) x 2.55m (W) x 8.92m (L). Sufficient manoeuvring space will also be provided so that the compactor can be collected by a hook-lift truck;
- Space for holding 30 no. 240 litre bins. Sufficient manoeuvring space will also be provided so that the bins can be collected by a rear-end loader dustcart; and
- A bin wash-down area with appropriate drainage provision.

## 5 Conclusions

This OWMS has described how operational waste generated from Co-op Live will be managed in compliance with relevant national, regional and local waste management policy requirements

The waste management strategy has been formulated with the guiding vision of helping the venue to operate efficiently, sustainably and safely, all while minimising impacts on building performance, the users of the site, and the application site environment. In line with Manchester's Local Development Framework Core Strategy Development Plan Document (MCC, 2012), the strategy will promote the principles of the waste hierarchy and a circular economy. The emphasis will first and foremost be on minimising the amount of waste that is generated. Product procurement will play a key role in achieving this, with particular consideration given to how goods are packaged (e.g. using no packaging, edible materials, less packaging or packaging that is made up of a proportion of recycled materials).

In line with the requirements set out in the National Planning Policy for Waste (Ministry of Housing, Communities and Local Government, 2014), the waste management strategy will then look to maximise recycling and re-use, with waste segregated at source into a number of streams. As a minimum, residual waste and mixed recyclables will be separated, although some areas will also segregate glass and organic waste.

The venue will be at its busiest during a 'Concert Terraces Centre Stage Standing' event and it is at this type of event that most waste will be generated. In total, it is estimated that approximately 7,300kg of waste will be produced when the venue reaches maximum capacity.

Adequate provision has been made in the venue's ground floor compactor store and L01 bin compound for the on-site storage of all operational waste. The provision of intermediate waste storage rooms in various locations across the venue will provide further resilience and also improve the efficiency of waste management operations. These rooms will be located in close proximity to those areas that generate the most significant quantities of waste (i.e. the GA concourses), and will enable waste to be held locally until the guest circulation areas are less congested. Bins will be moved down to the ground floor compactors and L01 bin compound during the course of an event when the concourse areas are less congested.

At this stage, it is proposed that residual waste will be compacted on-site and collected from the ground floor service yard, while DMR, glass and organics will be moved to the Etihad Campus waste compound for collection, via the bin compound on the L01 podium. However, it should be emphasised that there is flexibility to adapt which waste streams are collected from the service yard at ground floor level, for example, if DMR were to comprise a higher proportion of the venue's waste stream than initially expected.