

# AUTOMATED WASTE COLLECTION SYSTEMS WASTE MANAGEMENT GUIDELINES

## 1. SYSTEM OVERVIEW

Automated Waste Collection Systems (AWCS) is a network of underground pipes that transport municipal and/or industrial/commercial waste at high speeds (60-70 km/hour) to a designated waste collection point.

The system can be broken down into three components:

1. The user interface (inlets)
2. The transportation method (pipe network)
3. The waste disposal interface (the collection station)

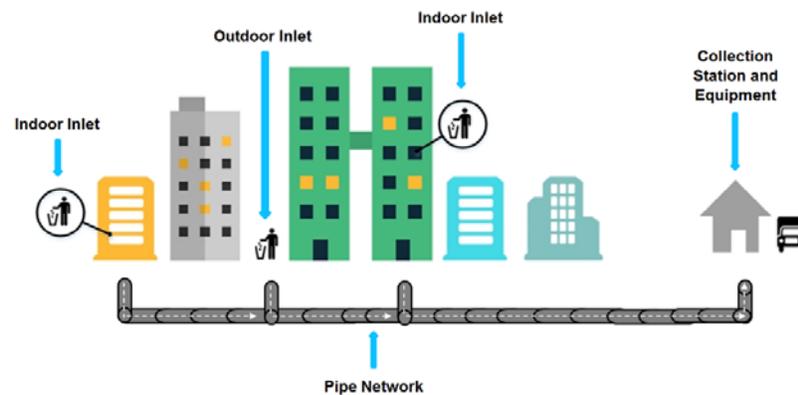


Figure 1: Automated Waste Collection System schematic identifying key infrastructure

### 1.1 INLETS

Inlets can be located indoors (most commonly wall mounted) and/or outdoors (most commonly free-standing). This flexibility allows maximum user accessibility.



Figure 2: Wall mounted and free standing inlets

The location and quantity of inlets implemented in each development will be determined following consultation with individual suppliers. This will take into consideration the estimated waste generation rates, frequency of collection and the safe/convenient access for users.

The systems are regulated by a control system housed in the collection station. This allows the automated opening of pipes once a pre-determined volume of waste is placed in the inlet. This is designed to reduce the cross contamination of waste streams.

### 1.2 PIPE NETWORK

The underground pipe network transports waste from the inlet to the collection station, where waste is separated, compacted and stored in sealed containers. When full the containers are collected by hook lift trucks and transported to Council's processing/recycling facilities.

The pipe network is commonly constructed of steel (carbon and aluminum stainless steel) with a pipe diameter generally between 200-500mm and buried 1-2m deep. The thickness and curve radius of the underground pipe system is directly dependent on the type and quantity of waste proposed.



Figure 3: Composite piping used for the underground pipe network

### 1.3 COLLECTION STATIONS

The location of the collection station can be incorporated into the development or located outside the proposed site. However it must be no more than 4km from the original disposal point (inlet).



Figure 4: Collection stations located within buildings on ground floor



**Figure 5: Stand-alone collection stations**

## **2. DEVELOPER INCENTIVES**

### **2.1 BENEFITS TO DEVELOPERS**

An AWCS offers numerous environmental, social and technical advantages. It allows a developer to showcase innovation in design, construction and operational practices, and is a sustainable choice which reduces the development's impact on the environment.

It also has the potential to:

- lower basement heights
- save floor space
- lower operational costs
- increase asset value and return on investment
- enhance marketability
- offer a competitive advantage
- achieve higher sale and rental values and tenant retention.

Further benefits can be seen on the following page:

<b>Environmental Advantages</b>	<b>Social Advantages</b>	<b>Technical Advantages</b>
Increased recycling and landfill diversion rates	Elimination of spillage during traditional collection	24/7 service availability with flexible collection hours and reduced service time
Noise reduction related to waste collection in local areas	Reduced traffic congestion and increased safety on local roads through removal of heavy rigid vehicles	Ability to adjust to fluctuations in waste generation
Removal of odour and vermin through the removal of standard bins	Reduced risks associated with collection vehicles	Minimal collection vehicle access specifications and requirements
Greenhouse gas emissions reduction	Improved driver safety and OH&S	Joint residential and commercial collection opportunities
Improved localised air quality	Improved hygiene through minimal handling of waste and exposure to pathogens by users and collection contractors	Minimal requirements for caretaker intervention in system operations
Increased visual amenity through the removal of traditional kerbside presentation/ collection		

### 3. TECHNICAL CONSIDERATIONS

#### 3.1 THINGS TO CONSIDER

The key areas to consider when looking to install an AWCS into future developments are:

- The number of waste fractions to be serviced.
- The management of waste streams that cannot be accommodated or serviced by an AWCS:
  - bulky household waste
  - combustible and flammable substances
  - hard wastes (stones or metal scraps)
  - viscous waste (binders and adhesives)
  - spongy waste (cushions, pillows, blankets etc)
  - large volumes of liquids and
  - dangerous chemicals.
- Frequent system cleaning/ventilation to manage odour and noise.
- Location of the collection station (onsite or offsite) and size
- Correct and safe use of the system by all users accompanied by education to minimise system misuse and blockages.
- Service and maintenance agreements.

### 3.2 INFRASTRUCTURE REQUIREMENTS

Safe and efficient operation of the AWCS requires a development to have:

- a waste service room
- interim storage areas for larger recyclable goods on each residential level
- separate indoor and outdoor inlets for the collection of waste
- separate waste chutes for the specific streams ('fractions') being serviced
- underground pipe network
- separate waste containers for residual and recyclable waste
- road/hardstand space for container changeover and service vehicle loading, and
- storage space for surplus waste items.

It also requires a collection station and associated equipment/areas such as:

- collection containers for each waste fraction (stream)
- waste separator (if required for fractions such as organics)
- compactor
- exhaust room
- pump, filter and carbon units
- dust filter
- air exhaust pipe, and
- control/electrical room.

### 3.3 JOINT USAGE

To facilitate the joint usage of the AWCS in mixed use developments, a Radio-Frequency Identification (RFID) card reader system can be used to control and restrict system access. RFID cards can measure the waste disposal data of users in mixed use developments. The system can regulate areas by waste type and potentially invoice residential and/or commercial streams based on the volumes of waste disposed.



Figure 6: Waste inlet's with the RFID System

### 3.4 MAINTENANCE & CARETAKER RESPONSIBILITY

An AWCS requires ongoing operation and system maintenance by a caretaker and/or AWCS staff member to ensure the system's longevity.

The primary role of the caretaker for an AWCS involves:

- **Monitoring:** The caretaker is responsible for determining collection terminal frequencies in conjunction with Council based upon the waste generation data available. Depending on the system's scale, the caretaker should be part time (2hrs a day) with the ability to contract out responsibilities.
- **Maintenance:** The system's maintenance involves programmed and emergency maintenance as outlined by the system's supplier

### 3.5 SAFETY REQUIREMENTS

In order to improve inlet safety, there are four main strategies:

1. Where inlets have unlimited access in residential areas (indoor and outdoor inlets), the inlet opening should not be larger than 30cm
2. The inlet door should be positioned a minimum 110-120cm above the ground.
3. Where larger inlet doors are required (for some retail and commercial users) restricted access is needed through the implementation of a RFID system's or alternative technologies.
4. Electrical locking of inlets during emptying

## 4. SYSTEM SUITABILITY

### 4.1 SUITABILITY CONSIDERATIONS

AWCS are primarily suitable for greenfield developments where there is no need to work within the constraints of existing buildings or infrastructure. This allows the pipe network to be installed with other essential services (water, electricity, sewerage). However an AWCS can be retrofitted into existing developments and buildings if required.

The system can be installed in areas with a few hundred dwellings. However it is typically financially feasible over 1,000 dwellings with medium-high density and a mixture of retail and residential uses.

In developments where the number and density of units is a concern, an AWCS has the ability to service multiple developments through the staging of the underground pipe network. The AWCS can operate on a relatively small base load initially with the understanding that additional loads over time will be managed as future developments are connected.

The technical and financial suitability of an AWCS for a specific development needs to be assessed individually based upon:

- the scale of the development
- type of retail and residential premises and
- site specific constraints.

## 5. FURTHER INFORMATION

### 5.1 COUNCILS WASTE SERVICES DEPARTMENT

Contact Waste Services on **4732 7615** for more information.

Developers considering implementing AWCS within a proposed development are encouraged to arrange a pre-lodgment meeting. This will allow Council and respective Waste Services staff to help assess whether it is a viable option.