

Draft Automated Waste Collection Systems for Kensington to Kingsford Town Centres

Automated Waste Collection Systems

1. SYSTEM OVERVIEW

Automated Waste Collection Systems (AWCS) is a network of underground pipes that transport waste at high speeds through underground pneumatic pipes or tubes to a collection tank. Multiple waste streams can be collected, each with its own underground tank, and a separate collection vehicle. Containers are emptied using a waste collection vehicle fitted with automatic suction equipment. The collection docking points are typically located in, or at the edge of, the development at a convenient access point for the vehicles. Each docking point can be connected to a number of tanks. Examples are shown in Figure 1-1 and Figure 1-2 below.

Figure 1-1. Schematic of Local Collection System Underground Tanks and Mobile Vacuum Truck



Source: ENVAC

Figure 1-2. Local Collection System Using a Mobile Vacuum Collection Vehicle and Docking Point



Source: ENVAC

1.1 Inlet Connection

Waste is deposited into the AWCS via the use of inlets. One inlet point can host one or several inlets dedicated to serve that building and/or adjacent buildings. Inlets can be located external to buildings, for example, on street, in courtyards, or in buildings. For inlets in buildings, a single inlet point can be installed at ground floor (lobby) level or multiple inlet points installed at various levels in the building using a vertical chute type system, commonly found in high rise residential buildings.

Figure 2-1. Examples of Inlets Located on Street



Source: ENVAC

Figure 2-2. Example of Inlets Located in Buildings



1.2 Underground Pipework

Straight pipes are generally made of carbon steel at different thicknesses depending upon the expected waste loads and their erosion properties. Bends are especially sensitive and therefore often made of boron steel. The expected erosion factor is the most critical factor for the design of an installation. The standard diameter of steel pipes for AWCS is 500 mm, although smaller diameters of 400 mm are occasionally used.

Pipes can be installed in the road or the pavement. Linking pipework will be required from the main pipe to the inlets, which as previously identified, could be located external to the building or internal.

Figure 3-1. Installed Pipework Showing Cabling for Electric and Compressed Gas



Source: ENVAC

Figure 3-2. Installed Pipework Showing Bends and Branch Connections

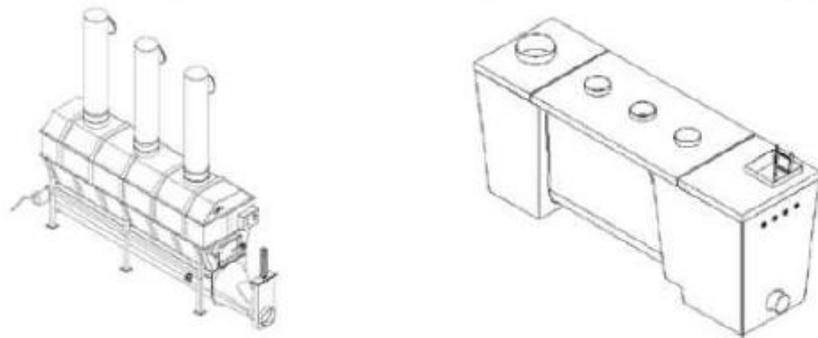


Source: ENVAC

1.3 Collection Point

The underground storage tanks can either be located in building basements or external to buildings, as shown in the photos in Figure 4 which also includes tank design drawings and typical tank sizes and volumes.

Figure 4. Local Collection System Using a Mobile Vacuum Collection Vehicle and Docking Point



Storage tanks – facts				
Screw tanks	SCT - B2	SCT - A2	SCT - B4	SCT - A4
Minimum floor area, Length x Width	4000x1850 mm	4000x1850 mm	6000x1850 mm	6000x1850 mm
Theoretical storage volumes	2.8 m ³	3.9 m ³	5.4 m ³	7.7 m ³

2. BENEFITS

The AWCS will deliver improved aesthetics by removing the need for bins to line streets awaiting collection, reduced truck movements around development, offer better hygiene though reduced odour and pests, and the efficient use of space with no waste storage rooms needed in residential developments.

2.1 Benefits for new development

The AWCS has the potential to:

- Free up potentially large floor space
- Reduce the visual impact of bin stores and overflowing bins
- Reduce the requirement for cleaners moving bins
- Reduce noise from vehicle movements and emptying of bins
- Enhance marketability

3. TECHNICAL FACTORS

3.1 System considerations

The key considerations for future developments are:

- The number of waste streams to be serviced
- The waste materials that are AWCS prohibited or are not serviced by AWCS (Table 1)
- System maintenance and servicing agreements
- Location of collection tanks and outlets
- Education of correct and safe use of the system is required to prevent blockages and system misuse

Table 1. AWCS Prohibited Materials

Waste type	Description
Bulky waste	Furniture, refrigerators and others, should be collected separately
Combustible articles likely to cause fire or explosions	Charcoals, burning cigarette butts, oil, such as gasoline, kerosene, cooking oil, portable and disposable spray cans.
Hard materials	Stones, lumps of metal scraps such as scrap iron, large quantities of glass and others
Viscous materials	Binders and adhesives such as paste and rapid binding adhesives.
Spongy materials	Sponges, cushions, and others, which tend to expand and block the chute and/or the transport pipe.
Materials emitting an offensive odour	Animal faeces and urine, bodies of house pets and rats
Dangerous chemicals	Acidic and alkaline solutions among others
Highly moist waste	Food waste from residents can be handled by the system in a separate chute. Large quantities of very liquid food waste will require a separate pipe.
Christmas trees and garden waste	Will become wedged in the pipework

3.2 Bulky waste

A minimum storage area of 20m² shall be provided for the temporary storage of bulky items suitable for Council's clean up service.

3.3 Green waste

Sufficient space must be provided to adequately house a minimum of two 240L green waste bins needed to store all green waste arising from the premises.

3.4 Infrastructure requirements

The entire AWCS system, including inlets located in buildings, can be installed as part of new build development. The AWCS system may require building basements to be sufficiently sized to accommodate interim storage tanks unless tanks are external to the building.

3.5 Shared system with other developments

Multiple buildings within proximity can be connected to a single AWCS docking point thus sharing the cost of installation.

3.6 Maintenance responsibilities

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

3.7 Safety requirements

All safety requirements must be adhered to according to AWCS specifications.

4. SYSTEM SUITABILITY

Local AWCS are suitable for one building or a small number of proximate buildings with multiple waste streams, each building with its own underground tank.

The collection docking points are typically located in, or at the edge of, the development at a convenient access point for the vehicles. Each docking point can be connected to several tanks.

The number of properties which can be served by one docking point will be dependent upon several project specific factors, and will be assessed individually based on:

- property type
- the number of waste streams separated
- the number of households per tank
- site specific constraints

5. FURTHER INFORMATION

Consideration of a local AWCS will require discussions with Council's Strategic Planning and Strategic Waste Departments.

