

JOWA Group is pleased to provide this guide to drainage and wastewater disposal on non-sewered sites.



If you're building a new home, one of the first things you have to decide about is your new home's drainage and effluent disposal. Or, if it's time for an upgrade of your sanitation in an existing home, you need to choose a system which will give you years of trouble-free service.

Throughout Australia, very strict Government controls apply to sewage and "grey" water disposal, and each home must have a system which meets all the standards and regulations applying to the site.

JOWA Group has prepared this booklet to help you understand your drainage and effluent disposal options in non-sewered locations.

JOWA Group will be pleased to provide you with personalised advice on the most cost-effective and efficient solution for your particular site.

JOWA Group is a national market leader in providing sewage and wastewater treatment systems for homeowners. We operate throughout Australia as well as exporting our technology and expertise to four continents.

JOWA Group manufactures and distributes BioCycles - Australia's number one name in aerobic wastewater treatment systems, with over 20,000 already installed throughout the country.

Please don't hesitate to contact our friendly and experienced staff at any time if you have any queries about any aspect of your new home's drainage requirements.

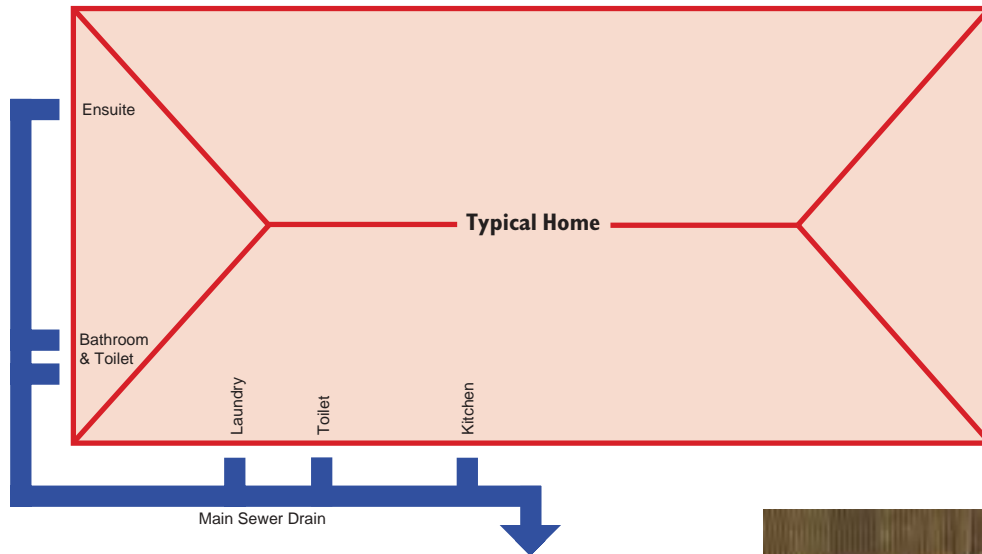


BioCycle system

John Watkins
Chief Executive

(November 2005)

What is “Wastewater” and what do you need to know about it?



Wastewater is the generic term for all the effluent and “grey” water produced inside your home. It includes the outflow from your:

- toilets
- baths and showers
- handbasins
- bathroom/laundry floor drains
- laundry troughs
- washing machines
- kitchen sinks
- dishwashers

This wastewater is heavily contaminated, not just by sewage but also by food residue from the kitchen, grime and grease from the laundry, etc. It must be disposed of through an approved system.

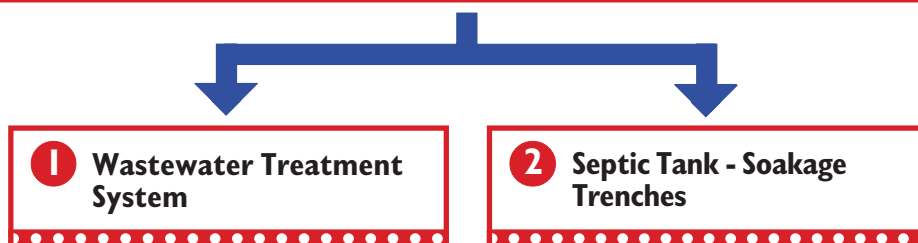
Wastewater empties into drainpipes running under the floor of your home, which all connect to an underground Main Sewer Drain running around the outside of the house.

A lot of water passes through these pipes - the average household uses 100-150 litres per person every day. The Main Sewer Drain leads away from the house, with a gradient so the wastewater and solids flow through it by gravity.

If you live in a city or township, the Main Sewer Drain will usually connect to a municipal sewer running past your property. If you're building in a non-sewered area, the Drain will usually end at one of the following:



Main Sewer Drain under construction



Aerobic Wastewater Treatment Systems - the Preferred Solution



BioCycle aerobic wastewater treatment systems efficiently separate the solid waste then treat the wastewater, in a series of accelerated and controlled biological processes, to a level of purity unattainable by conventional septic systems.

This non-drinking water - clean, odour-free and disinfected to international health and environmental standards - is then recycled through garden irrigation systems.

The system is installed in an excavated hole adjacent to the home, and connected to the home's main sewer drain. It also requires electrical connections.

Internally, the tank is divided into chambers in which the treatment processes occur. Wastewater and effluent from the home moves through the system's chambers by displacement. Treated water in the final chamber is automatically pumped out for garden irrigation - recycling it to benefit you and your property.

Aerobic systems are the preferred choice for many homeowners because they are environmentally responsible. Unlike other options, this method does not literally waste your wastewater, nor does it allow untreated waste to be released into the environment or to soak into the sub-soil, polluting our precious groundwater.

Local councils throughout Australia are increasingly showing a preference for aerobic systems in non-sewered areas.

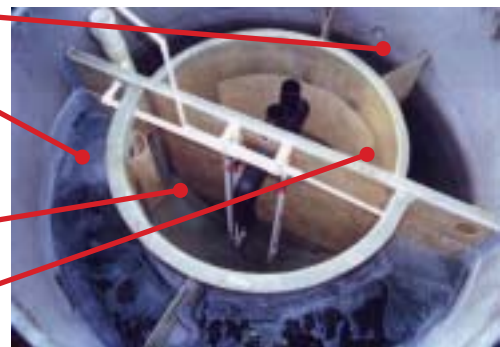
Wastewater and effluent enters the BioCycle by gravity flow through a single inlet drain, then moves through the system's chambers by displacement - i.e. as untreated water flows into one chamber, treated water flows through an outlet into the next chamber, where the water level is slightly lower.

Primary Treatment Chamber, where solid waste is separated by settling or floating, and digested by anaerobic bacterial action

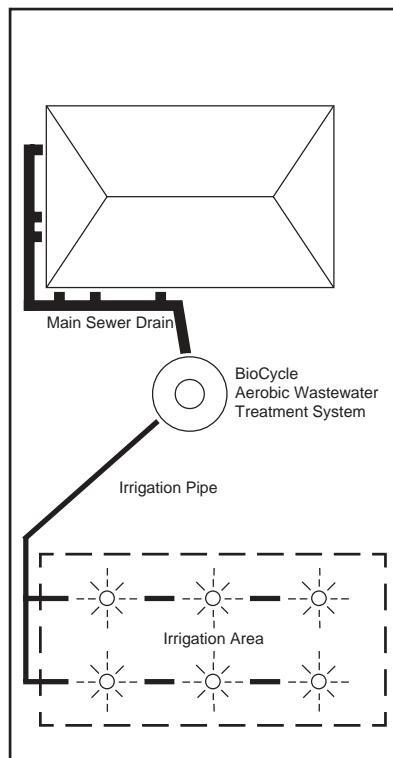
Secondary Treatment Chamber containing BioCycle Filter Media, where continuous oxygenation accelerates aerobic bacterial action, cleaning and removing contaminants from the wastewater

Clarification Chamber, where any remaining particles are removed back to the Primary Chamber

Pumpout Chamber, where the disinfected and purified water is automatically pumped out for recycling.

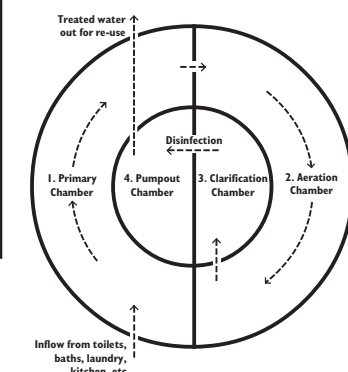
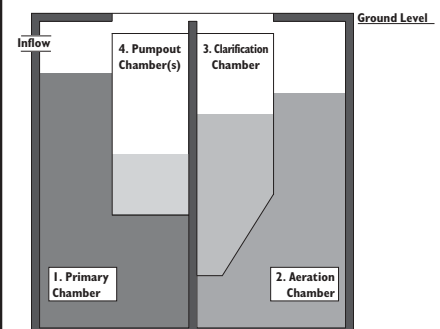


Note: Most current standard BioCycle models have a concrete centre wall.



Typical site layout
(November 2005)

BioCycle Aerobic Wastewater Treatment Systems are contained in tanks approx. 2.5m tall and wide. The tanks are placed in an excavated hole adjacent to the home and connected to the main sewer drain. The Cross-Section (below) and Top View (bottom) diagrams above show displacement and process flows within the tank.



Why a BioCycle?

BioCycle is Australia's Number One name in aerobic wastewater treatment systems - and we've gained that reputation through the quality and reliability of our products, the 'smartness' and simplicity of our technological processes and the excellence of our service.

We use only the highest-quality materials and electrical components such as pumps, blowers and electronic controls.

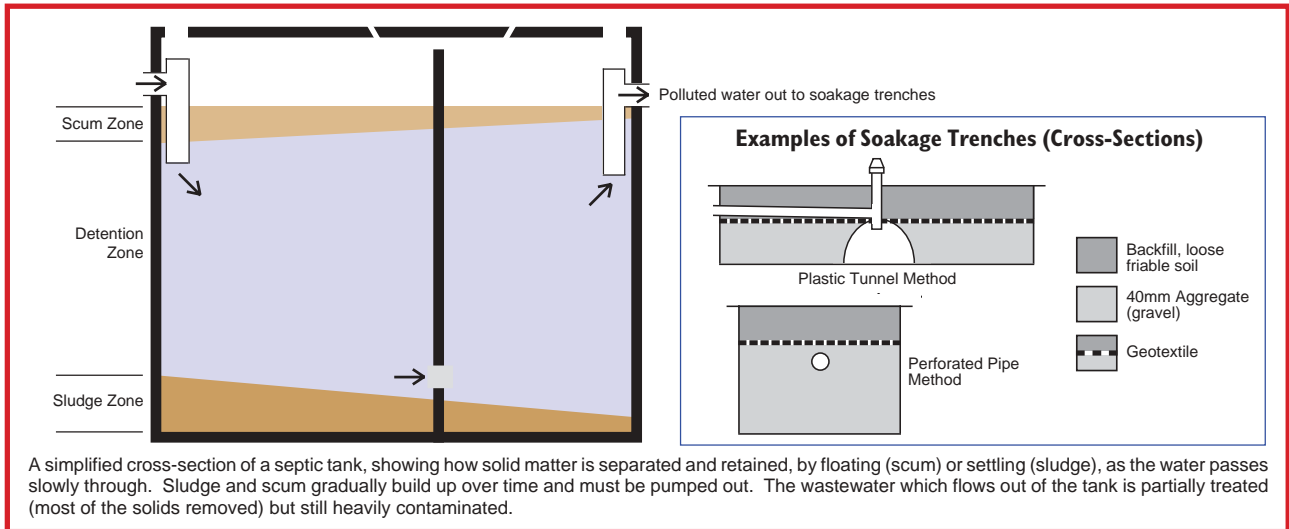
BioCycle systems are manufactured from high-grade concrete, reinforced with stainless steel fibres. Most models also have an integral centre concrete wall, increasing the overall strength of the tank.

Our standard models are single-tank concrete systems because:

- For systems which must have a long working life, concrete tanks are immensely robust and durable.
- Aerobic treatment systems are buried, and therefore subject to immense pressures from soil movement as well as internal pressures from tonnes of water. Concrete provides maximum resistance to these pressures.
- The weight and rigidity of properly-installed concrete tanks provide stability and resistance to movement or 'floating'.
- Treatment systems are often installed in bushfire-prone locations. Plastic tanks may be destroyed in a fire, posing a dangerous hazard to firefighters during the fire as well as necessitating their complete replacement afterwards.
- Single-tank systems are generally simpler and quicker to install than two-tank systems, which require more extensive excavation and plumbing connections.



Why not a Septic System?



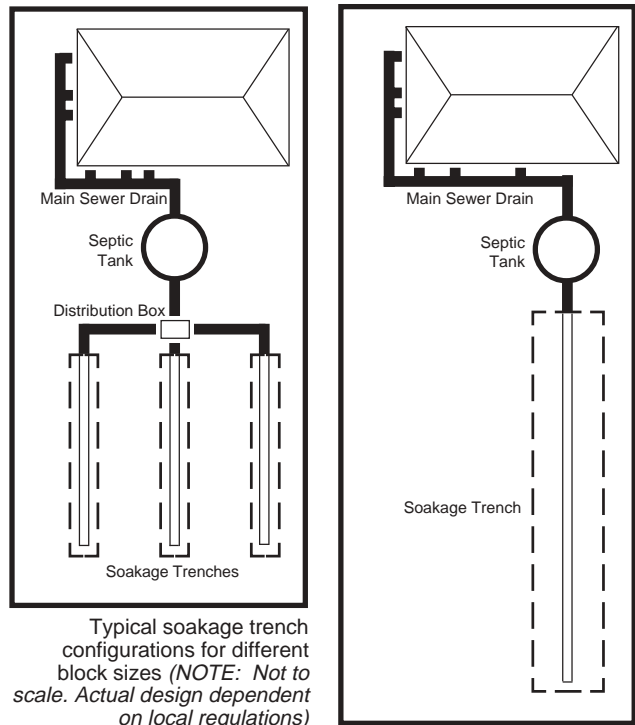
Septic/Soakage Trench Systems are the old-fashioned method of dealing with wastewater disposal. They have significant environmental drawbacks, and many Local Authorities and Councils throughout Australia have restricted or banned their use in new homes. Other Authorities are actively encouraging existing homeowners to replace old septic tanks with Aerobic Treatment Systems.

In a septic/soakage system, solid waste is separated and retained in the septic tank, and the untreated wastewater - still rich in contaminants - is dispersed through slotted pipe or tunnels buried in gravel-filled trenches, allowing it to soak into the ground.

This primitive process not only wastes the water, but can also lead to long-term pollution of sub-surface water reserves. If the tank or the soakage trenches clog up over time, they can flood or produce seepage, leading to untreated sewage pooling above ground or flowing directly to stormwater drains or natural watercourses.

Excavation and associated costs are a major factor in the final price of septic/soakage systems. The amount of excavation required can vary substantially depending on the site and soil conditions, and the requirements of local Councils.

Many Councils insist on a Soil Percolation Test (at the property owner's expense) before they will approve a septic/soakage system. If your site fails, an Aerobic Treatment System is usually your only alternative.



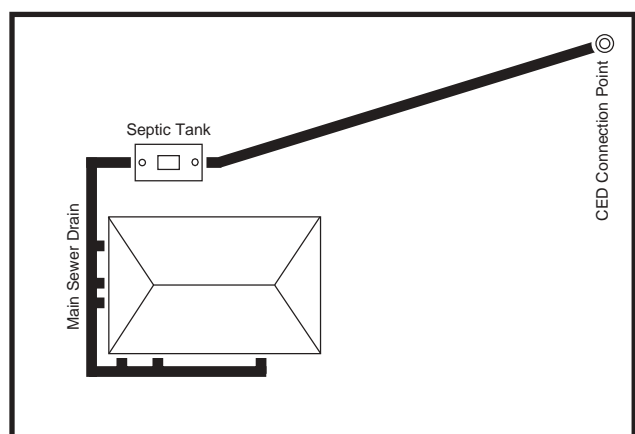
What are CED/EDS/STED Schemes?

If your new home is in a township or other area which has a CED (Common Effluent Disposal), EDS (Effluent Disposal System) or STED (Septic Tank Effluent Disposal) Scheme, you will usually have a Connection Point located somewhere on the perimeter of your property.

Your home's Main Sewer Drain leads into a septic tank on your property, where solids are separated and retained in the same way as a conventional septic/soakage system.

The untreated wastewater which flows out of the tank is piped through an underground drain to the CED Connection Point, from where it is carried away by sewer pipes to a community treatment facility such as a wetland.

Obviously, the main cost factors in this type of system are the relative locations of your home and the Connection Point - the distance between them, the nature of the terrain and the type of soil or rock encountered during excavation.



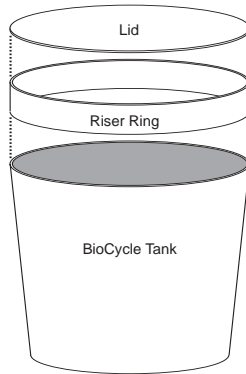
Extras

Apart from basic excavation, drainlaying, plumbing and installation costs, extra charges may also be incurred with all types of disposal methods, depending on the system configuration necessary to deal with conditions at your site and to comply with Government regulations. You should take potential extra charges into account when comparing the relative costs of different disposal methods (e.g. aerobic vs septic/soakage). Some possible extras are listed below.



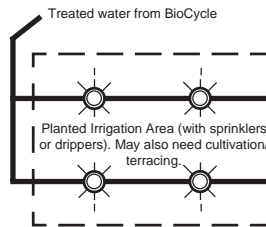
Riser Rings (Aerobic Systems)

BioCycle tanks have a flush-mounted lid which must be slightly above ground level. If your BioCycle has to be buried deeper than usual to allow gravity feed through the Main Sewer Drain into the system, it will require Riser Ring(s) to extend the height of the tank, so the lid can still be at the correct level.



Irrigation Area (Aerobic Systems)

Councils have differing regulations concerning Surface Disposal (Irrigation) Areas. The area may require additional preparation to comply. You will also need to buy plants (e.g. trees and shrubs) for your irrigation area.



Rock Excavation

Excavation for drains, septic tanks, soakage trenches or aerobic systems can be significantly more expensive in areas with surface or sub-surface rock, as this requires specialised machinery.

Site/Soil/Percolation Tests

Some Councils require site and soil testing and evaluation, at the landowner's expense, before installing any kind of wastewater disposal scheme. If your site fails for a septic/soakage system, your only option usually is an aerobic system.

Electrical Connections (Aerobic Systems)

You will need to engage a Licensed Electrical Contractor to make electrical Connections to your BioCycle and to install the Alarm Panel in your home.

Travel and Standby Time

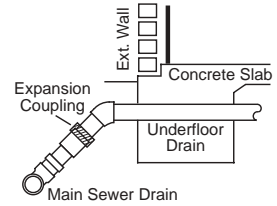
Depending on the location of your property, extra charges may apply for delivery and/or installation, because of the high cost of transporting tanks and machinery. Similarly, extra charges may apply if delays are caused which are not the fault of the contractor.

Government Fees and Statutory Charges

You will have to pay any fees for approvals (usually to local Council).

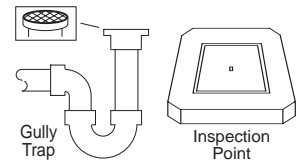
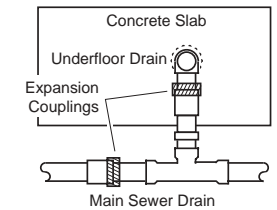
Sewer Drains

Base prices for installing aerobic or septic systems usually include a maximum length of Sewer Drain, based on average requirements. If additional Drain is required, e.g. for a longer than average connection to soakage trenches, this will increase costs. Regulations apply to the construction of Sewer Drains.



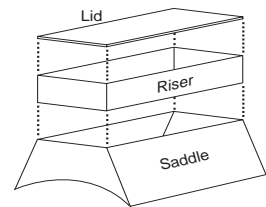
IP Boxes, Gully Traps and Expansion Couplings

Regulations apply to all the design details of your home's drainage system. You may require additional IPs (Inspection Points), Gully Traps and Expansion Couplings.



Saddles, Lids & Risers (Septic Tanks)

Septic tanks normally have a flush-mounted Access Cover (see drawings on previous page) which is covered with loose fill when the tank is buried. If you want an access point at ground level (and many Councils insist on this) you will require a Saddle, which sits on the tank as its name suggests, providing a horizontal top edge for a flat concrete lid.



If your tank has to be buried deeper than usual to allow gravity flow in through the Main Sewer Drain, it will require Riser(s) to extend the height of the Saddle so the lid can still be placed at ground level.

Septic/Soakage Trench Construction

Complying with Government and Council regulations can cause a lot of additional work in preparing soakage trenches.

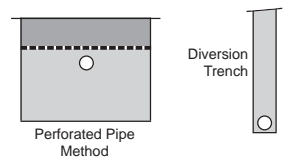
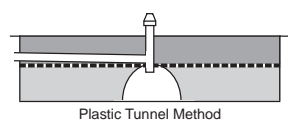
Depending on the final configuration, there can be substantial variations in excavation costs.

Deep diversion trenches may be needed to prevent groundwater entering the soakage area.

Distribution Boxes are required to ensure even dispersal if there are two or more soakage trenches.

Gravel for soakage trenches and pipe bedding can also be a major cost factor. Depending on site requirements, your gravel needs can vary by several tonnes.

Examples of Soakage and Diversion Trenches (Cross-Sections)



- Backfill, Loose Friable Soil
- 40mm Aggregate (Gravel)
- Geotextile

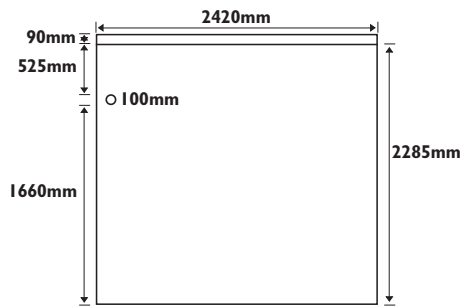
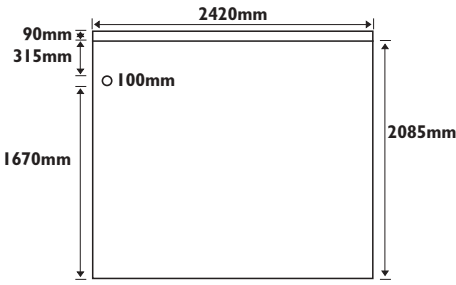
PLEASE NOTE: All diagrams and drawings in this brochure are simplified, not to scale, and for illustration purposes only. Government regulations apply to the design, configuration and construction of drainage systems, sewer and CED connections, septic tanks, soakage trenches, aerobic wastewater treatment systems and irrigation areas.

Tank Dimensions & Installation Instructions

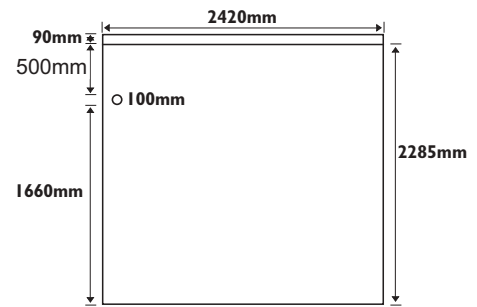
NOTE: All plumbing and drainage connections must be carried out by Licensed Tradespersons.



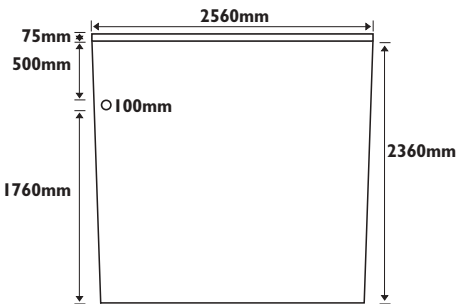
MODEL 6000S (Qld - 'Short Tank') MODEL 6000L (Qld - 'Long Tank')



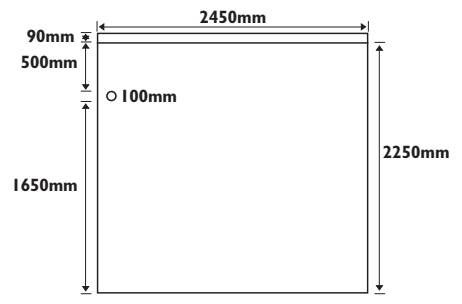
MODEL BIO 7000



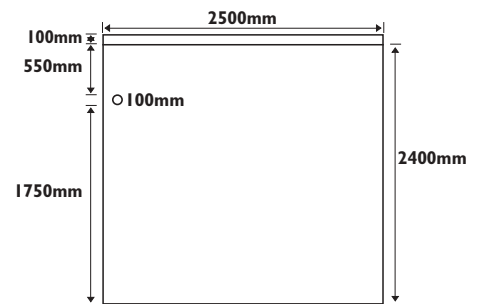
MODEL 5800 (Vic)



MODEL 6800 (SA)



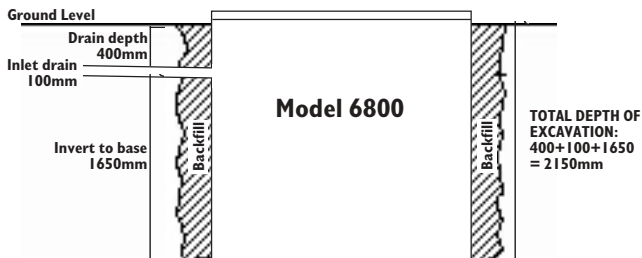
MODEL 8200 (SA)



Systems weigh approximately 5 tonnes. Delivery involves a truck crane placing the system into a prepared excavation. When determining the location of the system, always ensure there is a suitable adjacent area of firm ground for the delivery truck to gain access and be stable during craning (see our leaflet 'Crane Truck Access Guide', and if in any doubt phone the number below). If craning into the hole is not possible due to accessibility - or if the excavation is incomplete (if BioCycle is not carrying out the installation) - waiting charges will be incurred or the tank may be left at the closest practical spot to the excavation, at the driver's discretion. Any additional costs for moving and installing the system will be the customer's responsibility.

EXCAVATION DETAILS:

Square, with vertical sides.
 AREA: Minimum 3m x 3m at ground level.
 DEPTH: Ideally, the BioCycle should be positioned so the top lip of the tank is 50-150mm above ground level, with the inlet drain laid to the resulting invert depth.
 The overall depth of the excavation is determined by the depth below the ground of the inlet drain at the point where it enters (or will enter) the BioCycle.
 The depth from this point to the base of the excavation must equal the equivalent distance on the BioCycle, i.e. the "invert to base" figure as per the diagrams above.
 Thus the overall depth of the excavation is equal to the "invert to base" figure PLUS the depth of the inlet drain PLUS the drain diameter (as per typical example below).



If the inlet drain must be so deep that the top lip of the tank will be below ground level, Riser(s) must be added (see further explanation and illustration at right).

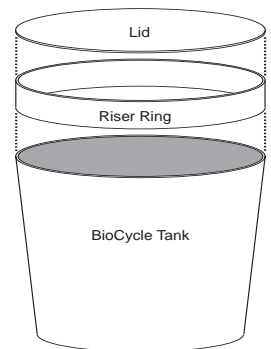
BASE: Must be level, firm, dry, free of broken rock, etc. If necessary over-excavate slightly, backfill with gravel and spread evenly to provide a suitable level base.

BEFORE BACKFILLING:

The three main chambers (Primary, Aeration and Clarification) should be progressively filled with water, adding around 400mm of water to each chamber in turn, until the water level is about 300mm below the main inlet point.
 The weight of this water stabilises the tank and prevents movement or floating after installation.
 Any lifting holes must be plugged before backfilling.
 Take care to leave the invert uncovered if the inlet drain has not been connected before backfilling.

RISERS:

If the depth of the inlet drain results in the top lip of the tank being below ground level, tank Riser(s) must be added until the necessary ground clearance is obtained.
 If this is necessary and the Riser has not been pre-ordered, it will involve additional delivery costs and site work at the customer's expense.



PLUMBING AND ELECTRICAL CONNECTIONS

These must be carried out by Licensed tradespeople (Electrical Circuit Diagram supplied).

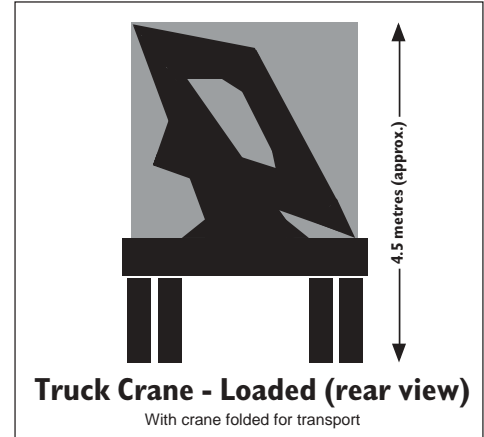
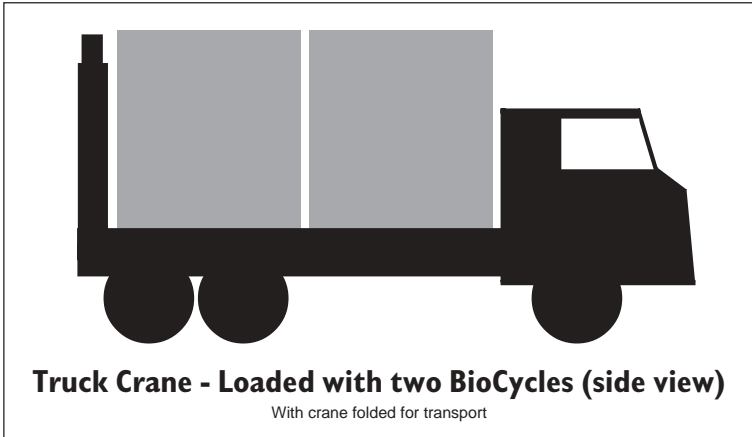
IRRIGATION

Must be laid out and connected BEFORE the electrical system is switched on, as pump may operate immediately.

FOR SAFETY ADVICE AND TO ENSURE THE SYSTEM'S WARRANTY IS NOT AFFECTED, ALWAYS CONSULT JOWA GROUP (PH 08 8381 9100) BEFORE ATTEMPTING TO MOVE OR INSTALL A BIOCYCLE.

JOWA Group Pty Ltd will not be responsible for any problems, malfunction, damage or any other consequences which result directly or indirectly from failure to comply with any of the instructions above. Tank dimensions are current at November 1, 2003 and may be subject to change without notice.

bioCYCLE™ Truck Crane: Access Guide



BioCycle residential systems weigh approximately 5 tonnes.

When determining the location of the system, always ensure there is a suitable adjacent area of flat, firm ground for the delivery truck to obtain access and be stable during craning.

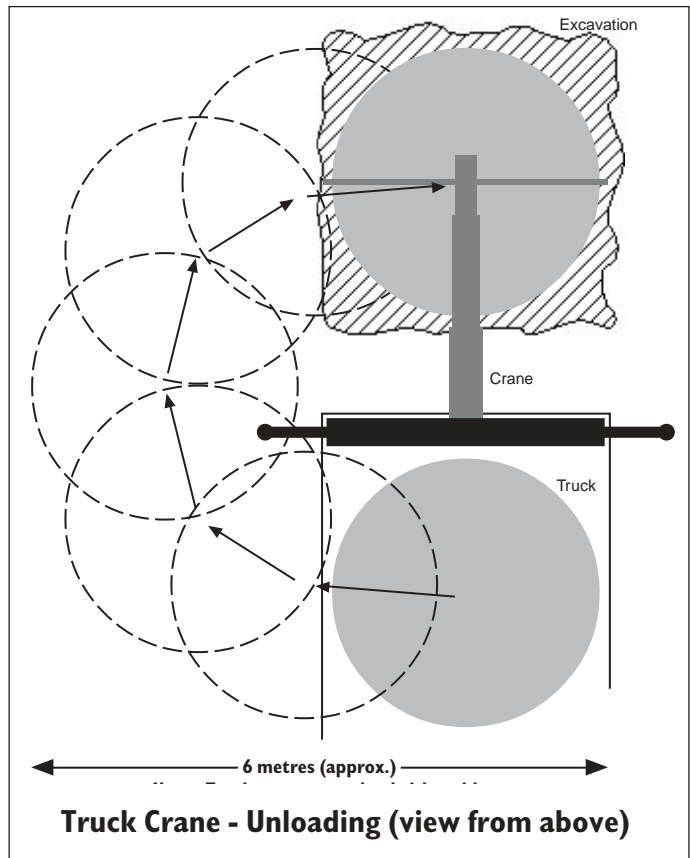
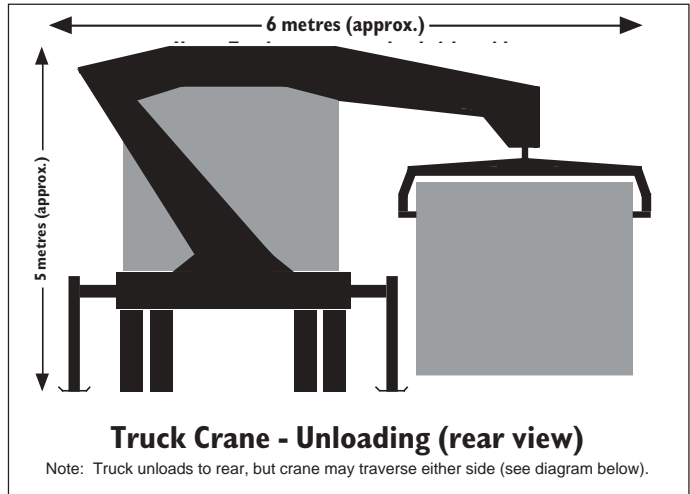
Always ensure there is sufficient side space for the tank to be unloaded, and that there are no overhead obstructions such as power lines or trees. The truck will normally reverse in to the excavation.

The following conditions apply to all deliveries:

- Standard delivery charge includes max. 45 minutes' site time. Additional time will be charged for.
- If there is no safe access to the excavation for craning in, the system will be unloaded and left at the closest accessible point. Any additional charges will be the customer's responsibility.
- Delivery and unloading are at the driver's discretion.

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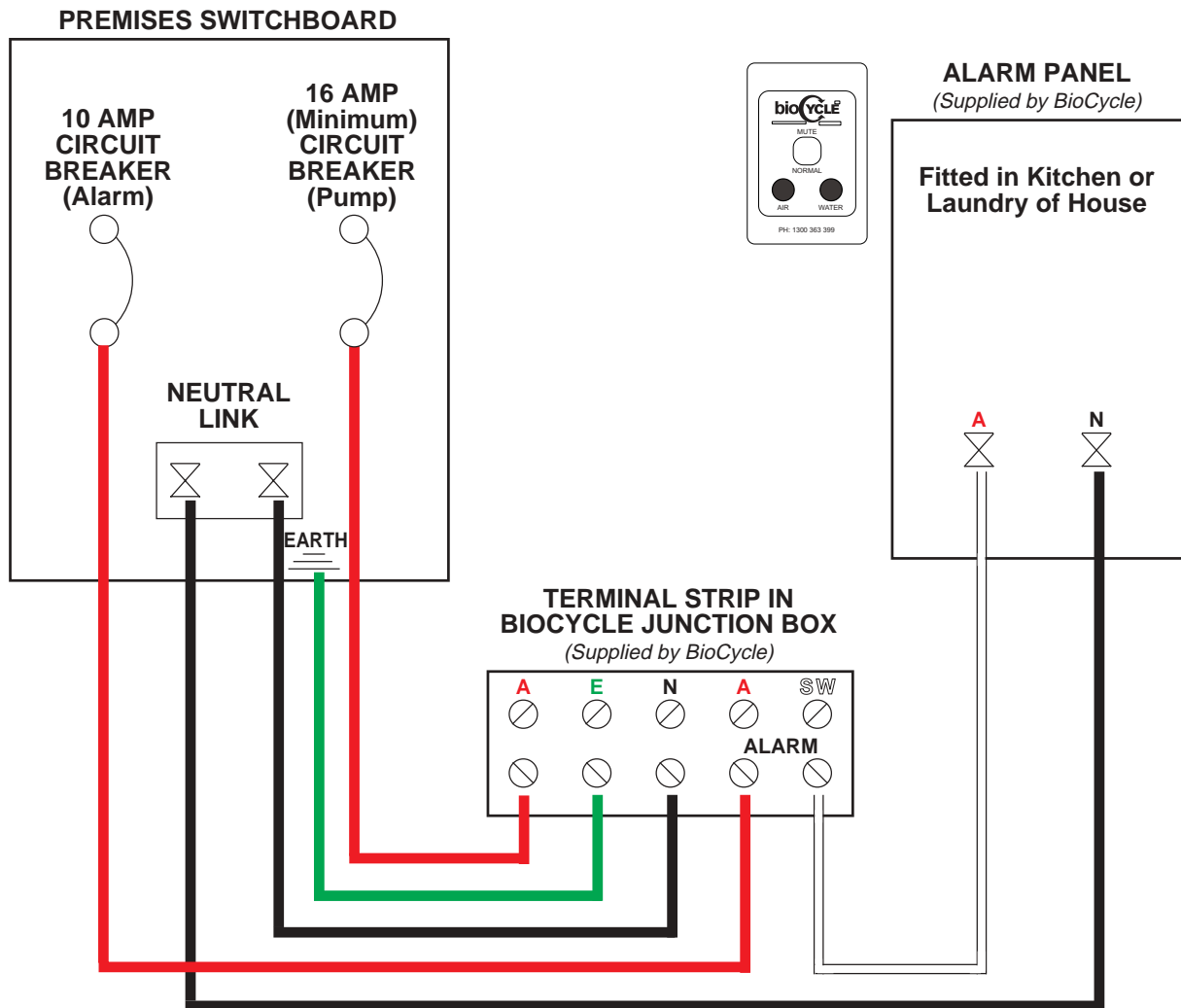
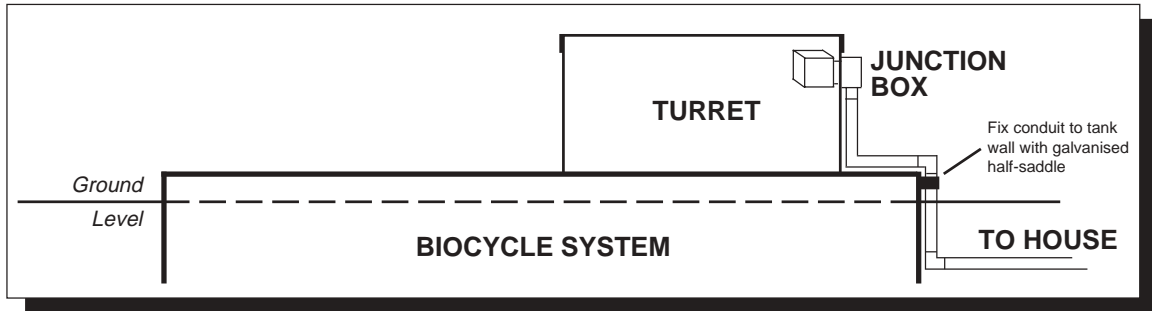
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ELECTRICAL INSTALLATION & CIRCUIT DIAGRAMS - RESIDENTIAL SYSTEMS

NOTE: All electrical connections must be carried out by Licensed Tradespersons.



IMPORTANT NOTE: DO NOT feed the system with one circuit and loop the two active terminals. If you only use one circuit to feed the system, under fault conditions the whole system will shut down and the alarm will not operate.

NOTE: We strongly recommend the use of Anaconda Flexi Conduit on all installations.

THE WARRANTY WILL BE VOID UNLESS TWO CIRCUITS ARE USED.

JOWA Group Pty Ltd will not be responsible for any problems, malfunction, damage or any other consequences which result directly or indirectly from failure to comply with any of the instructions above. Current at January 1, 2002 and subject to change without notice.



INSTALLATION ENQUIRIES PHONE: 08 8381 9100

(November 2005)