ANNEXURE 9

Biolytix MultiPod - Wastewater Treatment System

Specifications

The Biolytix MultiPod is an onsite treatment system designed to treat wastewater from domestic sources. It uses a double tank configuration and is based on an enhanced trickling filter process which mimics a natural soil habitat. The MultiPod is designed to comply with AS/NZS 1546.3:2008 and must be operated in accordance with this standard.

Effluent Quality

The Biolytix MultiPod wastewater treatment system generates secondary treated effluent of the following quality:

- 5-day Biochemical Oxygen Demand (BOD_5) < 20 mg/L
- Suspended solids < 30 mg/L

The treated wastewater will usually be disposed of via a land application system. AS/NZS 1547:2012 describes various land application disposal options for secondary-treated effluent. Disposal systems must comply with the relevant Regional Authority rules and these should be consulted.

Key Facts

Parameter	Details
Maximum Hydraulic Loading	2400 litres per day
Maximum Organic and Solids Loading	1 Kg per day
Emergency Storage Capacity	3,100 Litres
Temperature and Humidity	Operates under normal temperature and humidity conditions experienced in Australia and New Zealand. (If required, systems installed in cold and hot climates use insulation.)
Noise	< 40 dB L_{Aeq} at a distance of 1 m
Power Consumption*[1]	Treatment process 44 kWh; effluent pump 135 kWh, transfer pump 135kWh (all per annum)
Maintenance	Requires one maintenance service per year
Minimum serviceable life	15 years

*[1] Power consumption values are typical and can vary significantly depending on the size and location of the dispersal system and household water usage.

Description of the Treatment Process

The MultiPod filter process (Figure 1) is contained in two Reln injection moulded high grade polypropylene tanks in series. The first tank receives all the household wastewater via standard gravity drainage. The tank contains 0.45m^3 of plastic treatment media which acts as a roughing filter reducing the solids and organic loading to the second tank. Effluent percolates though the media layer and through a 3mm filter screen to the underdrain system. Larger solids are captured and broken down in the filter bed with smaller particles and soluble organic waste filtering through to the underdrain. A submersible recycle pump or air lift pump located in the bottom of the first tank distributes the primary treated effluent to the top of the second tank. The second tank is a standard Bio-Pod and consists of alternating layers of drainage elements and organic elements. All layers contain plastic trickling filter media contained in open-mesh bags. In the filter bed there is in excess of 1.3m^3 of plastic filter media with a high porosity and a high specific surface area. The organic layers additionally contain coco peat, the fibrous structure of which significantly increases the available treatment surface. The layers are separated by a 3mm coarse HDPE mesh fabric.

The resulting filter bed mimics a natural soil habitat, containing a diverse ecosystem of micro and macro-organisms. These organisms aerobically treat the wastewater as it percolates through the bed. On commissioning, the filter is inoculated with 1 kg of tiger worms *(Eisenia Fetida)*. These worms propagate and burrow through the filter bed, thereby keeping its structure open and porous. A Schego M2K3 air pump is used to provide additional air to the bed at the rate of 350 L per hour.

A geotextile filter layer with a nominal pore size of 80 micron separates the filter bed from the effluent storage sump. Its purpose is to remove fine solids from the treated effluent. The bed drains into the underdrain and central pump well, from where the effluent is pumped using a submersible pump to a land dispersal system (e.g. subsurface drip irrigation). The pump is controlled by a factory set float switch. The total bed depth including sump is 1050 mm.

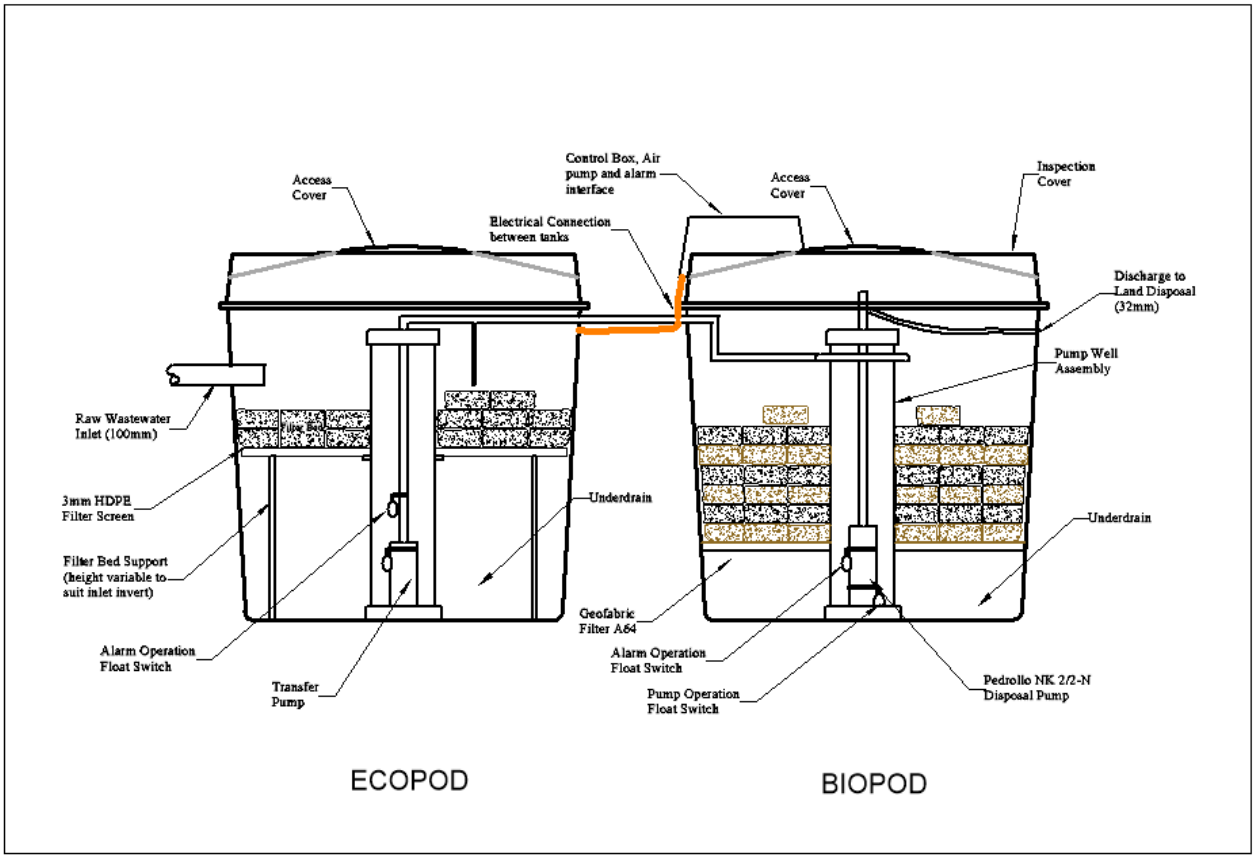

Figure 1 Biolytix MultiPod wastewater treatment system

Configuration Options

The Biolytix MultiPod can be installed in-ground or above ground. Local Council restrictions may apply to above-ground installations (Land Use/Building Consent conditions etc.). Available tank sizes are 3000 L and 4000 L. Both tanks have the same bed configuration and provide the same treatment capacity and performance, but use different inlet invert depths as follows:

- BF6-3000 tanks: 650 mm
- BF6-4000 tanks: 1100 mm

The MultiPod effluent is either gravity drained or pumped to a dispersal system. The pumpout (dose) volume is 220 L per cycle. The standard pump is a high-quality Pedrollo NK 2/2-N submersible pump, the characteristics of which are shown in Figure 2 below. Other Pedrollo pumps may be used instead to suit specific sites. Contact Biolytix to discuss your requirements and for information on the types of pumps available.

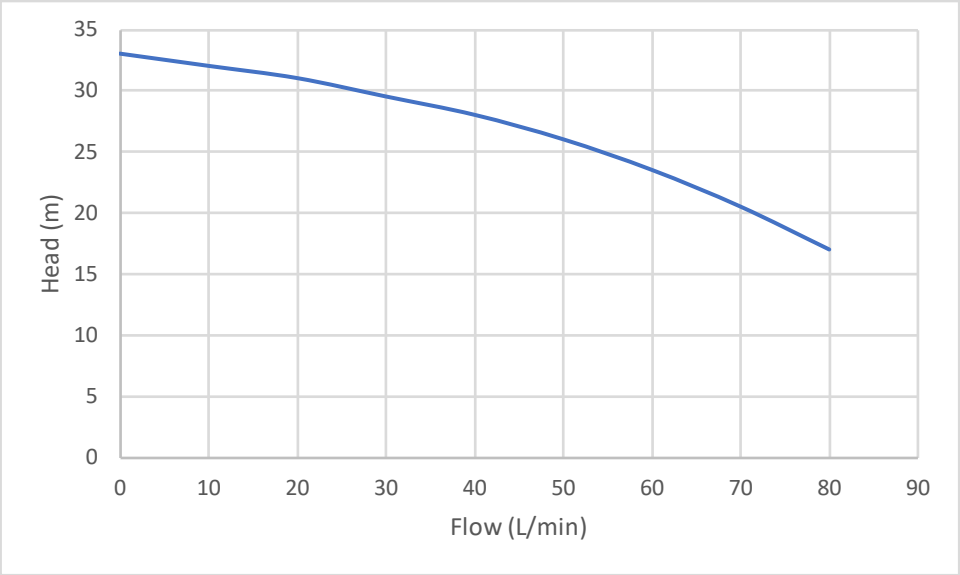

Figure 2 Pedrollo NK 2/2-N characteristic curve (power 0.37 kW)

Alarm System

The MultiPod is equipment with an AS/NZS 1546.3 compliant audible and visual alarm with a mutable audible signal and an alarm light. The alarm must be mounted in a location that is readily visible from within the dwelling.

Alarms are triggered by either a high-level float switch in the pump well or an air pressure switch on the air supply line.

Biolytix BioPod (BF6) Wastewater Treatment System

Specifications

The Biolytix BioPod (BF6) is an onsite treatment system designed to treat wastewater from domestic sources. It uses a single tank configuration based on an enhanced trickling filter process which mimics a natural soil habitat. The BF6 is certified to comply with AS/NZS 1546.3:2008 and must be operated in accordance with this standard.

Effluent Quality

The BF6 wastewater treatment system generates secondary treated effluent of the following quality:

- 5-day Biochemical Oxygen Demand (BOD_5) <20 mg/L
- Suspended solids <30 mg/L

The effluent must be disposed of as stipulated by the local Territorial Authority. AS/NZS 1547:2012 describes discharge options for secondary-treated effluent. However, the Territorial Authority regulations applying to a specific site may be different and more stringent and should be consulted before making a decision.

Maximum Loading

- Flow rate: 1600 L per day
- Organic loading as BOD_5: 700 g per day
- Suspended solids loading: 700 g per day

Important: The actual maximum loading of an installed BF6 is limited by the capacity of the dispersal system it discharges to. For example, if the BF6 is connected to a land dispersal system with a capacity of 800 L/day, then the BF6 must not be loaded at more than 800 L/day.

Operation

- Emergency storage capacity: 1650 L
- Temperature and humidity: Operates under normal temperature and humidity conditions experienced in New Zealand and the Pacific Islands.
- Noise < 40 dB L_{Aeq} at a distance of 1 m
- Electricity consumption (per year): Treatment process 44 kWh; effluent pump typically 165 kWh (per year). Effluent pump power use can vary significantly depending on the size and location of the dispersal system and the actual household water usage.
- Maintenance: Requires at least an annual service (Note: Some Regional Authorities require at least two services per year regardless of the type of on-site wastewater system)
- Minimum serviceable life: 15 years

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Treatment Process

The BF6 filter bed (Figure 1) is contained in an injection moulded high grade polypropylene tank and consists of six layers of drainage elements and peat/drainage elements. All layers contain plastic trickling filter media contained in open-mesh bags. In the filter bed there is in excess of $2m^3$ of plastic filter media with a high porosity and a high specific surface area. The peat layers additionally contain coco peat, the fibrous structure of which significantly increases the available treatment surface area and the ability to retain moisture. The layers are separated by coarse HDPE mesh fabric.

The resulting filter bed mimics a natural soil habitat, containing a diverse ecosystem of micro and macro-organisms. These organisms aerobically treat the wastewater as it percolates through the bed, prevent the accumulation of sludge, and keep the filter aerated. On commissioning, the filter is inoculated with a kilogram of tiger worms *(Eisenia Fetida)*. These worms propagate and burrow through the filter bed, thereby keeping its structure open and porous. A Schego M2K3 air pump is used to provide additional air to the bed at the rate of 350 L per hour.

A geotextile filter layer with a nominal pore size of 80 micron separates the filter bed from the effluent storage sump. Its purpose is to remove fine solids from the treated effluent. To support the bed, the sump is filled to a depth of 400 mm with a matrix of plastic media. It drains into the central pump well, from where the effluent is pumped using a submersible pump to a land dispersal system (e.g. subsurface drip irrigation). The pump is controlled by a factory set float switch. The total bed depth including sump is 1050 mm.

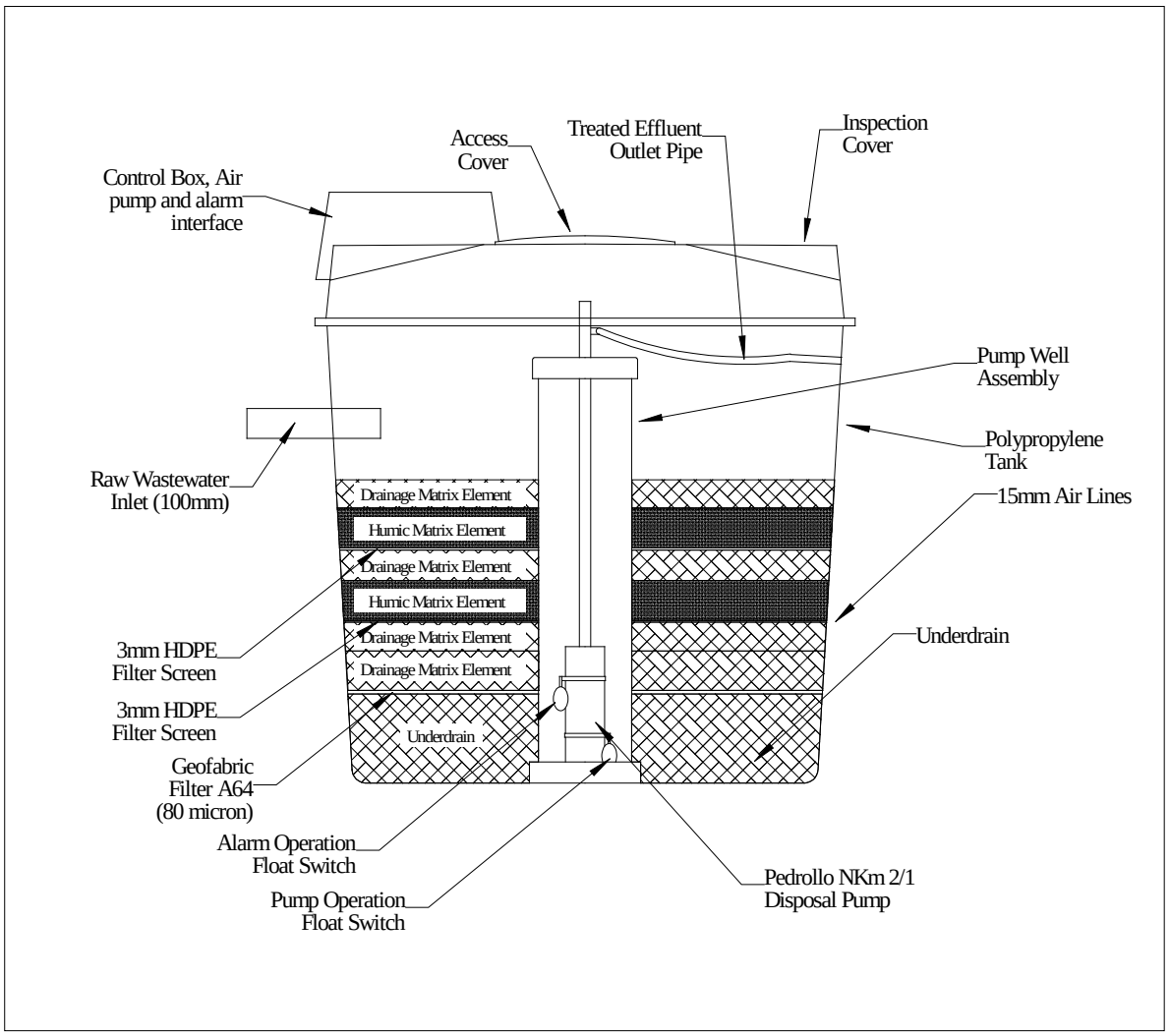

Figure 1 Biolytix BF6 wastewater treatment system

Configuration Options

The BF6 can be installed in-ground or above ground. Local Council restrictions may apply to above-ground installations (Land Use/Building Consent conditions etc). Available tank sizes are 3000 L and 4000 L. Both tanks have the same bed configuration and provide the same treatment capacity and performance, but use different inlet invert depths as follows:

- BF6-3000 tank: 650 mm
- BF6-4000 tank: 1100 mm

The BF6 effluent is either gravity drained or pumped to a dispersal system. The pumpout (dose) volume is 220 L per cycle. The standard pump is a high-quality Pedrollo NKm 2/1 submersible pump, the characteristics of which are shown in Figure 2 below. Other Pedrollo pumps may be used instead to suit specific sites. Contact Biolytix to discuss your requirements and for information on the types of pumps available.

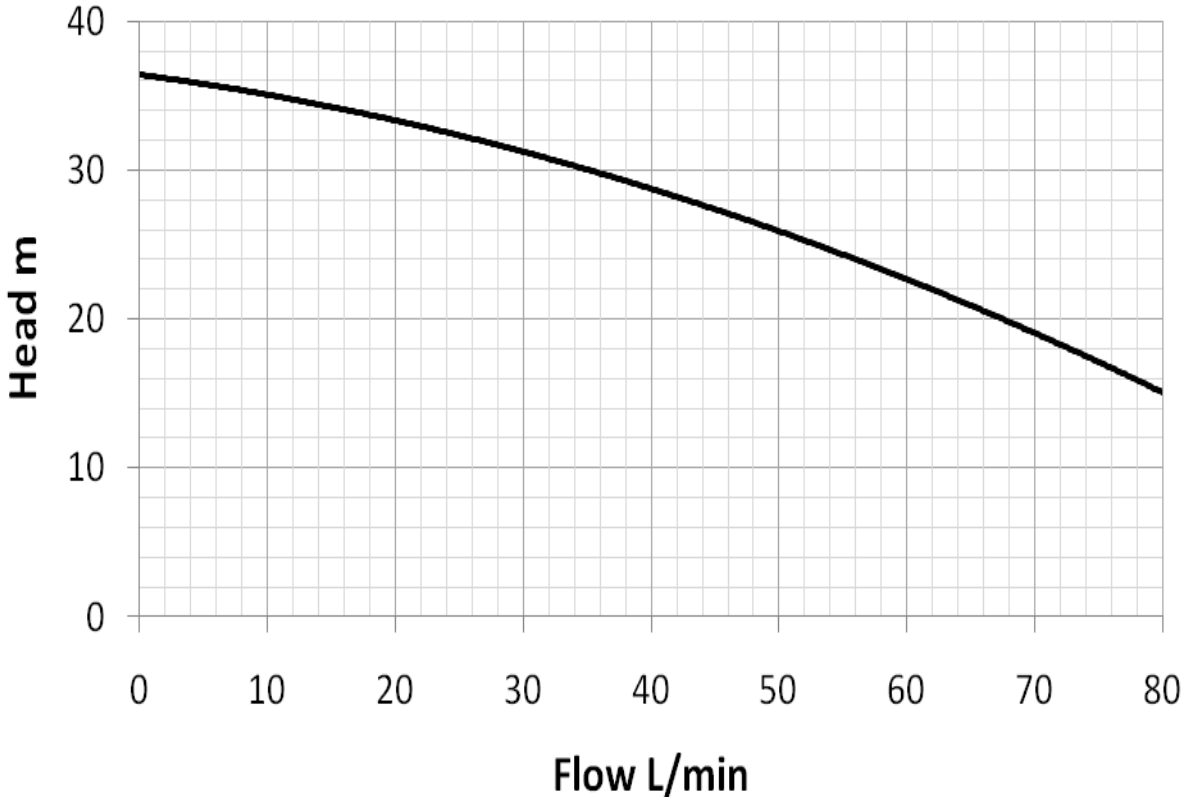

Figure 2 Pedrollo NKm 2/1 characteristic curve (power 0.45 kW)

Alarm System

The BF6 is equipped with an AS/NZS 1546.3 compliant audible and visual alarm with a mutable audible alarm signal and an alarm light. The alarm must be mounted in a location that is readily visible from within the dwelling.

Alarms are triggered by either a high-level float switch in the pump well or an air pressure switch on the air supply line.