



Checklist 11.1 Installation of ETA beds for use by plumbers / installers and Council inspectors					
Type of system:					
Method of application		<input type="checkbox"/> Gravity	<input type="checkbox"/> Pump	<input type="checkbox"/> Siphon	
Configuration		<input type="checkbox"/> Trench	<input type="checkbox"/> Absorption bed		
Pre-construction considerations					
Is the soil moisture too wet for construction?				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Site preparation					
Bed area marked according to site plan / conditions of consent including buffer and setback distances				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Bed is positioned according to design requirements for contours				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Bed dimensions					
Number of beds:					
Width:	mm	Length:	mm	Depth:	mm
Bed dimensions are consistent with council's consent				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Confirm all system elevations				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Stake bed boundaries with elevations				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Method of excavation:					
Bed bottom graded to specifications				<input type="checkbox"/> Yes	<input type="checkbox"/> No
Inspection ports					
Type:			Diameter:		
			mm		
Perforations:		<input type="checkbox"/> Slotted	<input type="checkbox"/> Drilled		
Grade⁽¹⁾ from tank to trench		<input type="checkbox"/> Above grade (a pump will be needed)		<input type="checkbox"/> Below grade	
Media					
Coarse aggregate specifications and source:			Fine aggregate specifications and source:		
Gravel type:			Aggregate type:		
Depth:			Depth:		
Cleaned and graded	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Cleaned and graded	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Total media depth:			mm		
Amount of media used:			m ³		



Distribution system					
Distribution device:					
<input type="checkbox"/> Gravity			<input type="checkbox"/> Pressure		
Type: <input type="checkbox"/> Splitter box		<input type="checkbox"/> Drop box (for serial distribution)		Type: <input type="checkbox"/> Pump <input type="checkbox"/> Siphon	
Description of header:			Valve type: <input type="checkbox"/> Alternating / sequencing <input type="checkbox"/> Globe <input type="checkbox"/> Gate ball <input type="checkbox"/> Other		
Installation level:					
Type of stable bedding material used:					
Manual valve (describe):					
Access					
<input type="checkbox"/> Riser	<input type="checkbox"/> In valve box in the field	<input type="checkbox"/> In bedding material	<input type="checkbox"/> In dosing tank	<input type="checkbox"/> Other (give details):	<input type="checkbox"/> None
Pressure manifold			Specification:		
Lateral feed configuration					
<input type="checkbox"/> End <input type="checkbox"/> Top <input type="checkbox"/> Centre <input type="checkbox"/> Bottom <input type="checkbox"/> Other (give details):					
Type					
Diameter: _____ mm			Length: _____ mm		
Orifices specifications / spacing / size / orientation (describe):					
Access / protection: <input type="checkbox"/> Yes <input type="checkbox"/> No			Describe:		
Laterals					
Specification:			Type:		
Diameter: _____ mm		Spacing: _____ mm		Length: _____ mm	
Installation					
Geotextile/fabric cover placed over gravel			<input type="checkbox"/> Yes <input type="checkbox"/> No		
Final topsoil cover					
Depth of topsoil cover: _____ mm					
Imported material used			<input type="checkbox"/> Yes <input type="checkbox"/> No		
Nature of material (describe; should be clay loam-sandy loam):					
Stormwater diversion berm/drain constructed			<input type="checkbox"/> Yes <input type="checkbox"/> No		
Turf planted:					
Nature of protection of ETA beds (describe):					



Service provider:	
Contact number:	
Comments or repairs needed: (Where a response in the above Checklist needs extra information or action, specify the action plan and/or the process to fix the problem, or specify an alternative that is being offered)	
Name / title of inspector:	
Signature:	Date:

11.3 Testing

Test ETA beds with clean water before placing any media to ensure even distribution. If pressure-dosed, pressure test the piping to ensure uniform squirt height at each orifice and that any sequencing valve is working (Figure 11.2).

11.4 Operation

The owner should inspect the bed regularly. This detailed maintenance inspection should include:

- checking any pumps or siphons are working correctly. If the system includes a standby pump, it should be alternated with the working pump regularly to ensure that the work hours on both are approximately equal
- checking any splitter or drop down boxes are working effectively, and/or manual valves are switched between beds
- inspecting the control system and ensuring that it is set to deliver appropriate volumes of effluent to specific irrigation fields according to the design hydraulics
- checking around the bed for signs of leakage
- checking the water level in any inspection ports to ensure the bed is not flooded. Beds are designed to hold water for evapotranspiration, but if the bed becomes flooded the turf covering will die off.

General maintenance

The system owner must complete a number of general maintenance and operational tasks, including:

- addressing maintenance issues identified by the service provider
- ensuring all products used in the household are safe for the system (bleaches and many household cleaning products are not safe)
- ensuring the tank is regularly desludged to limit the amount of solids carried over into the bed. Section 3 of this Manual contains details on desludging a septic tank
- inspecting and cleaning the outlet filter of any septic tank every three months
- managing vegetation around the tank and bed (including mowing and trimming back bushes for maximum exposure)
- ensuring the system has a continuous power supply. The system power should not be turned off when the house is unoccupied
- ensuring a plumber is contacted as soon as practicable if an alarm activates.

11.5 Inspection

The ETA bed and all associated pipe and drainage work should be inspected by a Council inspector before backfilling, to ensure all components are correctly positioned and installed according to 'PCA 2004 Plumbing Code of Australia'. Council should make a final installation inspection to ensure compliance with all conditions of consent before issuing an approval to operate the system.

Checklist 11.2 can be used by plumbers, council inspectors and system owners to inspect operating ETA beds.

11.6 Common technical issues

Plumbers, property owners and regulatory authorities have observed a number of common problems with ETA bed installations including:

- inadequate hydraulic design resulting in undersized beds

- uneven distribution on flat sites, commonly caused by gravity feeding through a slotted pipe where most effluent escapes from the first few slots and is not evenly distributed throughout the bed. This can be fixed by pressure dosing through a smaller aperture drilled pipe
- inadequate 'in-bed' storage that causes surface saturation and surcharging
- beds that are built too large in surface area to sustain the surface vegetation in dry weather
- beds that are built too short along the contour (linear loading rate)
- inadequate exposure to wind, or shading by shrubs and trees lowering the rate of evapotranspiration
- accumulated salts due to a lack of deep seepage that is needed to ensure salts are periodically flushed from the system.



Checklist 11.2 Operation of ETA beds for use by plumbers, Council inspectors and system owners	
Is there evidence of surface water or soggy ground on the trench / bed area (eg after emptying a bath)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are some trenches or beds greener than others?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there evidence of stormwater intrusion?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there any indication that water on the surface of the trench or bed is effluent (can test for using Nessler's reagent)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there an indication of poor drainage on or near the bed area?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there evidence of vehicle, human or animal traffic over the trench / bed area?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there evidence of protective measures to prevent trench / bed damage (eg shrubs, fencing)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is a good vegetation cover established over the trench / bed surface?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does the trench / bed have good exposure to wind and sun?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are the inspection port interiors clear (ie no standing water suggesting trench flooding) and in good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the dosing siphon or splitter box working properly and not blocked or clogged?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is any pump or siphon operating correctly?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the control system set correctly to deliver appropriate volumes of effluent to specific irrigation fields according to the hydraulic design?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are regular desludges of the tank undertaken?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Has the septic tank outlet filter been cleaned by way of hosing the filter off?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Service provider:	
Contact number:	
Comments or repairs needed: (Where a response in the above Checklist needs extra information or action, specify the action plan and/or the process to fix the problem, or specify an alternative that is being offered)	
Name / title of inspector:	
Signature:	Date:

11.7 Case study

An ETA bed was installed on a flat site with limited available area for on-site wastewater management. A few months later the bed began to show signs of surface seepage at one end.

Problem

The bed was not pressure-dosed or dosed by a siphon. All effluent was seeping out of the first few holes in the distribution laterals and not reaching the other end of the bed. The soil at the upstream end of the bed became saturated and could not accommodate the daily wastewater load from the house. The other end of the bed was not receiving any effluent.

Solution

A pump well was installed to pump or siphon the clarified effluent to the ETA bed. The pump was hydraulically sized taking into account the head needed from the pump well to the bed, pressure loss in the pipes, and the desired flow pressure needed from the laterals to evenly distribute effluent throughout the bed. Once pressurised, the ETA bed was restored to operation and it continues to work well. Figure 11.2 shows the testing for squirt height from the distribution laterals to ensure even distribution of effluent. Gravity feeding a bed may be acceptable on sloping sites.



Figure 11.2 Pressure testing the distribution laterals for even distribution of effluent (www.inwater.com.au)