CHIEF EXECUTIVE APPROVAL 27/2015
Plumbing and Drainage Act 2002, part 5.

Approval

1. The Advanced Enviro-Septic (AES 38) ("the System") described in the Specifications and Drawings in the attached Schedule and manufactured by Presby Environmental Inc. Whitefield, New Hampshire ("the manufacturer") and supplied by Chankar Environmental Pty Ltd (ACN 148 175 455) ("the supplier") has been assessed in accordance with the Queensland Plumbing and Wastewater Code (QPW Code) dated 15th January 2013.

2. Approval is granted for a secondary quality wastewater treatment system, subject to compliance by the manufacturer/supplier with the requirements of the Plumbing and Drainage Act 2002, part 5 and the conditions of approval detailed below.

3. This approval, the conditions of approval and the Schedule comprise the entire Chief Executive Approval document.

4. Any modification by the manufacturer/supplier to the design, drawings or specifications scheduled to this approval must be approved by the Chief Executive.

Conditions of approval

5. The manufacture, installation, operation, service and maintenance of the systems must be in conformity with the conditions of this Chief Executive Approval.

6. The secondary quality wastewater treatment system, which is an example of the approved systems, may only be used on premises that generate per day:
   
   (a) a maximum hydraulic loading of 38L per lineal metre length of AES piping system

   (b) a maximum organic loading of 300mg/L BODs

   (c) a maximum total suspended solids of 300mg/L.

7. The system must continue to meet the requirements of secondary quality wastewater treatment system, producing the following effluent quality —

   (d) 90% of the samples taken must have a BODs less than or equal to 20 g/m² with no sample greater than 30 g/m².

   (e) 90% of the samples taken must have total suspended solids less than or equal to 30g/m² with no sample greater than 45g/m².

8. Each system must be serviced in accordance with the details supplied in the owner's operation and maintenance manual.

9. The system design is based upon secondary quality effluent design loading rate as defined in AS/NZ1547 using the AES Design Calculator prepared by a qualified designer. System designs must be verified and signed by the supplier before being submitted to the Local Government.

Chief Executive Approval
10. A septic tank conforming to AS/NZ 1546.1 and sized in accordance with AS/NZ 1547 for the influent hydraulic load from the dwelling is a pre-requisite. Waste from the septic tank is to be diverted to the AES piping system prior to the system sand and basal area. The septic tank that feeds into the system must be regularly monitored and maintained (including de-sludging) in accordance with AS/NZ 1547 to ensure optimum operation of the system.

11. When granting a compliance permit, the local government must satisfy itself that the designer’s choice of the system configuration is optimal for the proposed use and site conditions and that the effluent can be retained within the land application area.

12. Each application for a compliance permit to install a system must also be accompanied by a copy of a completed Advanced Enviro-Septic Design Calculator Report endorsed by the supplier, showing the footprint/basal area of the proposed system and number of pipe modules for the site.

13. An inspection/sampling point must be installed permanently in the sand immediately below the half-way point of the AES piping system. Where a system is installed in a sloping basal area an additional inspection/sampling point must be installed at the lowest point of the system extension.

14. Routine maintenance of the system at set intervals, other than septic tank sludge levels, is not stipulated by the manufacturer/supplier. However, routine monitoring may be required by the Local Government. In the event of failure of the system’s land application area an AES authorised person may need to follow the rejuvenation procedures set out in the manufacturer/supplier’s Design and Installation Manual.

15. Where a system installed at a site, has been found not to operate satisfactorily during its service life, and as a result requires modification to achieve the required performance requirements, in particular, water quality limits, the installed system is to be modified accordingly. Any modifications including any of the supplier’s rejuvenation procedure outcomes must be recorded on the service report.

16. Permitted use of the effluent is for sub-surface absorption only.

17. Each system must be supplied with —

(a) a copy of this Chief Executive Approval document;
(b) details of the system;
(c) instructions for authorised persons for its installation;
(d) a copy of the owner’s manual to be given to the owner at the time of installation; and
(e) detailed instructions for authorised service personal for its operation and maintenance.

18. At each anniversary of the Chief Executive Approval date, the supplier must submit to the Chief Executive a list of all systems installed in Queensland during the previous 12 months. Where the Chief Executive is notified of any system failures the Chief Executive may randomly select a number of installed systems for audit. The Chief Executive will notify the supplier’s nominated NATA accredited laboratory which systems are to be audited for BODs and TSS. The sampling and testing of the selected systems, if required, is to be done at the supplier’s expense. The following results must be reported to the Chief Executive;

(a) Address of premises;
(b) Date inspected and sampled;
(c) Sample identification number;

[Signature]
(d) BODs for influent and effluent; and
(e) TSS for influent and effluent.

19. The Chief Executive may, by written notice, cancel this approval if the manufacturer/supplier fails —

(a) to comply with one or more of the conditions of approval; or
(b) within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

20. This approval may only be assigned with the prior written consent of the Chief Executive.

21. This approval expires on 9 November 2020 unless cancelled earlier in accordance with paragraph 19 above.

SCHEDULE

Attachment 1: Specifications

Attachment 2: Drawings

Attachment 3: Sample AES Design Calculator Report

Lindsay Walker
Director
Plumbing Drainage and Special Projects

Date approved: 9 November 2015
Chief Executive Approval 27/2015 approved on 9 November 2015 for the Advanced Enviro-Septic (AES 38) manufactured by Chankar Environmental Pty Ltd (ACN 148 175 455).

1. Copies of approvals may be viewed on the department web site at –


2. Copies of the Chief Executive Approval may be examined during business hours, free of charge, at the –

   Department of Housing and Public Works
   Floor 16
   41 George Street
   BRISBANE QLD 4000

3. Copies of approvals may be obtained from the Department by telephoning 07) 3008 2552.

Lindsay Walker
Director
Plumbing Drainage and Special Projects
Date approved: 9 November 2015
CHIEF EXECUTIVE APPROVAL No. 27/2015
Plumbing and Drainage Act 2002, part 5, division 1, section 93

SCHEDULE

Attachment 1

Specifications for the

Advanced Enviro-Septic (AES 38)
For details drawings of the components, see appendix A

Specifications of AES-38 Components

<table>
<thead>
<tr>
<th>AES Pipe</th>
<th>Length</th>
<th>Diameter</th>
<th>No. of Corrugation / 3m</th>
<th>No. of Skimmer Tap / 3m</th>
<th>Bio Accelerator</th>
<th>Fibers</th>
<th>Geotextile Fabric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. AES-38-Q</td>
<td>3 metre</td>
<td>0.3 metre</td>
<td>90</td>
<td>720</td>
<td>0.76 square metre</td>
<td>2.83 square metre</td>
<td>2.83 square metre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AES Coupling</th>
<th>Diameter</th>
<th>Width</th>
<th>No. of Engagement Ridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. AES-ESC</td>
<td>0.308 metre</td>
<td>0.178 metre</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AES Offset Adaptor</th>
<th>Diameter</th>
<th>Width</th>
<th>Inlet / Raised Connection</th>
<th>No. of Locking Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. AES-ESO</td>
<td>0.310 metre</td>
<td>0.12 metre</td>
<td>0.92mm</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxygen Demand Vent Cowl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. AES-ODV</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Each unit of AES-38 system pipe is 3 meter long and 0.3 metre in diameter. These pipes can be connected in a number configurations depending on the site and soil constrains. Advanced Enviro-Septic Design Calculator provided by the Chankar Environmental is an excellent tool for working out design configurations and bill of materials (see appendix B).

Where required land application area is greater than the system basal area, a layer of system sand extension is needed at the adjoining land application interface.
APPLICATION FOR PRODUCT ACCREDITATION  
(Onsite Wastewater Treatment System)

In the state of Queensland, Design, Installation and Management of On-Site Wastewater Management System must be compliant with Queensland Plumbing and Wastewater Code.

ADVANCED ENVIRO-SEPTIC (AES-38) SYSTEM COMPONENTS

Advanced Enviro-Septic™ is an effective, passive onsite wastewater treatment system for residential, commercial and community use. Each AES-38 unit is a 3 meter long engineered pipe with outer layers of randomly placed fibres, bio accelerator and non-woven geotextile fabric. The geotextile fabric is sewn together to hold the pipe, fibres and the bio accelerator for easy handling.

Main components of AES-38 system include:

1. AES Pipe unit (3 meter long pipe) – incorporates corrugation, perforated holes and internal skimmer taps
2. AES Couplings – patented connector to join the AES-38 pipe units as per the design requirements.
3. AES Offset Adaptor – 308mm diameter cap that has 1 x 92mm pre cut hole 9 (open to suit 100mm PVC pipe). This 92mm hole is for connection to the septic tank outlet and for raised connection between rows of AES pipes. Required number of offset adaptor depends on the resign requirements.
4. Oxygen Demand Vent – 100mm vent cowl with mosquito proof screen.
Example of AES-38 system being installed

Photo shows AES-38 pipes, offset adaptor and couplings. Photo also shows the wooden guide plates that used as a spacing aid. Guide plates were removed prior to back filling.
ON-SITE WASTEWATER TREATMENT SYSTEM USING ADVANCED ENVIRO-SEPTIC TECHNOLOGY

A typical gravity on-site wastewater treatment system using Advanced Enviro-Septic technology has the following components in its treatment chain.

1. All Purpose Septic Tank
2. Advanced Enviro-Septic system
3. Land application area

All Purpose Septic Tank

All purpose septic tank is a mandatory requirement of any on-site wastewater treatment system using Advanced Enviro-Technology. All purpose septic tank is to be located up-stream of the Advanced Enviro-Septic system and the Land Application Area. The main purpose of the septic tank is to collect raw wastewater (both black and grey water) form the premises and to provide a primary treatment prior to secondary treatment and disposal by AES-38 system. During the primary treatment process the sludge and the scum is separated and the primary treatment has occurs as an anaerobic process. Primary treated effluent form septic tank typically contains BOD of 120-240 mg/L and TSS of 65-180 mg/L.

Septic tank sizing and the location is calculated and specified by the certified wastewater system designer in accordance with AS/NZS 1547:2000 and any applicable regulations. Chankar Environmental do not supply all purpose tank and a suitable septic tank is usually sourced and supplied by the installer or the home owner. However, Chankar Environmental recommend that the all purpose septic tank be designed and constructed to AS/NZS 1546.1:2008 and installed as per the relevant regulations by a licensed plumber.
Use of septic tank outlet filter is not recommended by the manufacturer of Advanced Enviro-Septic systems, Presby Environmental, due to risks associated with poorly maintained outlet filters restricting the airflow. However, septic tank outlet filter can be used if required by the local authority having jurisdiction. In this event, a high vent is required at the AES-38 system to allow unrestricted airflow.

Use of a grease trap is not required for all purposes of septic with baffled wall for a domestic installations. However, grease trap can be used if required by the local authority having jurisdiction. Appropriately sized grease trap is required for all commercial installations.

Septic tank is required to pump out and maintained as per the local authority's guidelines.

**Advanced Enviro-septic System (AES-38)**

AES-38 system is a passive wastewater treatment system that further treats and improves primary quality wastewater to the wastewater quality standard of BOD of less than 20mg/L and TSS of less than 20mg/L. AES-38 system has been tested by NATA accredited lab and certified by SAI Global for achieving secondary effluent quality as per the Queensland Plumbing and Wastewater Code: 2013 (see appendix C).

Each 3m long AES pipe unit is tested with a hydraulic loading rate of 114 litres (38 litres per linear metre). AES calculator developed by Chankar Environmental is the best tool to calculate system requirements and bill of materials.

Due to AES-38 passive aerobic biological treatment process and its excellent ability to evenly distribute, treat and polish wastewater, AES-38 can be scaled up to treat different daily design loading.

For example, the system that has 1140 litres daily design load will require a minimum of 10 AES-38 unit (or) 30 linear metre of AES pipes for treatment. \((1140/114=10)\) AES-38 unit

AES-38 units can be easily joined together by AES Couplings with AES offset adaptors on each end of the row. AES calculator calculates the required couplings, offset adaptors and oxygen demand vents requirements as per the configuration design nominated by the system designer. AES design and installation manual provides system design options for the designers and site evaluators (see appendix D)

The Enviro-Septic system works in two ways. First, it facilitates the treatment of water coming from the septic tank by eliminating the pollutants, so that the water comes clean. Then, the system allows the drainage of wastewater into the ground using an infiltration process. Therefore, by protecting the infiltration surface, Enviro-Septic protects the environment!

**AES-38 System Organic Loading and Wastewater Parameters**
<table>
<thead>
<tr>
<th>Model No.</th>
<th>AES-38</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INFLUENT</strong></td>
<td></td>
</tr>
<tr>
<td>Hydraulic Load</td>
<td>114 litres per 3 metre long unit</td>
</tr>
<tr>
<td>BOD$_5$</td>
<td>160-300 mg/L</td>
</tr>
<tr>
<td>TSS</td>
<td>110-300 mg/L</td>
</tr>
<tr>
<td>FOG</td>
<td>50 mg/L (maximum)</td>
</tr>
<tr>
<td>PH</td>
<td>6-9</td>
</tr>
<tr>
<td>TEMP</td>
<td>5-30 degree celsius</td>
</tr>
<tr>
<td><strong>EFFLUENT</strong></td>
<td></td>
</tr>
<tr>
<td>BOD$_5$</td>
<td>≤ 20mg/L</td>
</tr>
<tr>
<td>TSS</td>
<td>≤ 20mg/L</td>
</tr>
</tbody>
</table>

* Wastewater that enters the AES system must be Primary Treated.

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Department of Housing and Public Works
Chief Executive Approval

Approval No: 27/2015
Date of Issue: 1/11/15
Delegate Signature: [Signature]

Building Codes Queensland
```
CHIEF EXECUTIVE APPROVAL No. 27/2015
Plumbing and Drainage Act 2002, part 5, division 1, section 93

SCHEDULE

Attachment 2

Drawings for the

Advanced Enviro-Septic (AES 38)
ADVANCED ENVIRO-SEPTIC WASTEWATER TREATMENT SYSTEM

TEN STEPS OF WASTEWATER TREATMENT: ADVANCED ENVIRO-SEPTIC™ TREATS EFFLUENT MORE EFFICIENTLY TO PROVIDE LONGER SYSTEM LIFE AND TO PROTECT THE ENVIRONMENT.

STAGE 1: WARM EFFLUENT ENTERS THE PIPE AND IS COOLED TO GROUND TEMPERATURE.
STAGE 2: SUSPENDED SOLIDS SEPARATE FROM THE COOLED LIQUID EFFLUENT.
STAGE 3: SKIMMERS FURTHER CAPTURE GREASE AND SUSPENDED SOLIDS FROM THE EXITING EFFLUENT.
STAGE 4: PIPE RIDGES ALLOW THE EFFLUENT TO FLOW UNINTERRUPTED AROUND THE CIRCUMFERENCE OF THE PIPE AND AID IN COOLING.
STAGE 5: BIO-ACCELERATOR™ FABRIC SCREENS ADDITIONAL SOLIDS FROM THE EFFLUENT AND DEVELOPS A BIOMAT WHICH PROVIDES TREATMENT AND ENSURES ACCELERATED BIOMAT DEVELOPMENT.
STAGE 6: A MAT OF COARSE RANDOM FIBERS SEPARATES MORE SUSPENDED SOLIDS FROM THE EFFLUENT.
STAGE 7: EFFLUENT PASSES INTO THE GEO-TEXTILE FABRICS AND GROWS A PROTECTED BACTERIAL SURFACE.
STAGE 8: SAND WICKS LIQUID FROM THE GEO-TEXTILE FABRICS AND ENABLES AIR TO TRANSFER TO THE BACTERIAL SURFACE.
STAGE 9: THE FABRICS AND FIBERS PROVIDE A LARGE BACTERIAL SURFACE TO BREAK DOWN SOLIDS.
STAGE 10: AN AMple AIR SUPPLY AND FLUCTUATING LIQUID LEVELS INCREASE BACTERIAL EFFICIENCY.
CHASE EXECUTIVE APPROVAL No. 27/2015
Plumbing and Drainage Act 2002, part 5, division 1, section 93

SCHEDULE

Attachment 3

Sample AES Design Calculator Report
Advanced Enviro-septic Design Calculator v8.1

"Always the BEST Option" until site and soil conditions rule it out.

Site Address: Exemplary Only

Client Name: [Redacted]

Design Firm: [Redacted]

Lic. Plumber Name: [Redacted]

Council Area: Sunshine Coast Regional

Date: 11/07/19

System Design Notes:

- This is a new home installation (Y or N)?
- Number of persons: 4
- Daily Design Flow Allowance: 140 liters/person/day
- Number of rows required to suit site conditions: 2
- Infiltration surface Soil Category as established by site and soil evaluation: Category C
- Design Loading Rate based on site & soil evaluation (LDR) (mm/day): 5
- Bearing depth below system base area: 800 mm
- Entry System Design Slope in % for standard AUS systems in cadastral estimation: 8
- Is this design a gravity system with no septic filter? (Y or N)
- Is the maximum depth of a single AUS pipe run 30 meters?
- Is the maximum depth of a single AUS pipe run 70 meters?
- Is the maximum depth of a single AUS pipe run 100 meters?

PLEASE CHECK YOU HAVE FALLEN FROM TANK TO AUS SYSTEM PIPE:

- COILS – The outcome must be important in estimation.
  - Loping of receiving surface is required in clay soil structures in Cel 4,5,6. In addition refer to AS 1547. Always excavate and rip parallel to the site slope/AUS pipe.
  - Specialist soils advice and special design techniques will be required for clay dominated soil having dispersive or shrink/swell behaviour. Refer AS1547
  - All sloping sites require special consideration and management through design of slope percentage, surface water and construction measures as per AS1547.
  - Numbers are rounded and will be adjusted to site dominated soil having dispersive or shrink/swell behaviour. Refer AS1547 & AUS Installation Instructions

AUS System / Production Values:

| Total System load – litres / day (Q) | 180 L/d |
| No. of rows required to suit site conditions | 2 |
| Infiltration surface Soil Category as established by site and soil evaluation, CATEGORY | C |
| Design Loading Rate based on site & soil evaluation (LDR) (mm/day) | 5 |
| Bearing depth below system base area | 800 mm |

DO YOU WISH TO USE CUTOFF LENGTHS OF PIPE IN THIS DESIGN (ENTER Y)?

<table>
<thead>
<tr>
<th>AUS Infiltration Footprint Area</th>
<th>L x Q</th>
<th>(L x D x H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total System Sand Required</td>
<td>22 m³</td>
<td></td>
</tr>
</tbody>
</table>

Requirements:

- L x Q = (L x D x H)

AUS System Dimension:

<table>
<thead>
<tr>
<th>AUS System</th>
<th>System Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>L x W x H</td>
<td>12.4 x 3.09 x 17.0</td>
</tr>
</tbody>
</table>

AUS Filter Footprint Width

| Filter Footprint Width | 14 |

AUS System Notes:

<table>
<thead>
<tr>
<th>AUS Code</th>
<th>Notes</th>
<th>Amount Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AESS</td>
<td>AES 3 not by requirement</td>
<td>0</td>
</tr>
<tr>
<td>AESC</td>
<td>AESC Couplings required</td>
<td>0</td>
</tr>
<tr>
<td>AESO</td>
<td>AESO Offset adaptors</td>
<td>4</td>
</tr>
<tr>
<td>AESS</td>
<td>AESS</td>
<td>1</td>
</tr>
<tr>
<td>AES-PS</td>
<td>AESPS Inspection port base</td>
<td>1</td>
</tr>
</tbody>
</table>

TOTAL SYSTEM SAND REQUIRED: 22 m³

Digital signature:

- Digitally signed by Jerry Myo-Min
- Date: 2015.08.14
- 14:38:37 +10'00'

Designreview@enviro-septic.com.au

Department of Housing and Public Works

Chief Executive Approval

Approval No: 27/2015

Date of Issue: 9/11/15

Delegate Signature: [Redacted]