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**Building Materials Evaluation
Commission**
**Commission d'évaluation des
matériaux de construction**

BMEC Authorization Number 08-03-340
Date of Issuance September 25, 2008
BMEC Application A2005-18
Date of Expiration September 25, 2013

BMEC Application A2009-06
Date of Amendment July 30, 2009
A1 Denotes changes made on July 30, 2009

AUTHORIZATION REPORT – The Enviro-Septic® System

1. Applicant

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2. Manufacturing Facilities

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3. Description

The Enviro-Septic System® (the “System”) is primarily comprised of a septic tank, an effluent filter, Enviro-Septic® pipes, and a layer of system sand. The Enviro-Septic® System can be installed in-ground, partially raised, or fully raised.

The Enviro-Septic® pipes, initially act by separating the particles by flotation and decantation. Effluent is dispersed thereafter through perforations located along the circumference of the pipes and is filtered by two membranes of synthetic fabrics, which surround the pipe. The manufacturer states that these membranes facilitate the growth of bacteria that supports effluent treatment, as well as longitudinal distribution. The system sand surrounding the pipes continues treatment and facilitates the dispersal of the effluent before infiltration into the underlying soil.

The dispersal area size of the sand layer is determined based on the characteristics of the underlying soil.

4. Authorization Requested

The applicant sought authorization for use of the Enviro-Septic® System as an alternative to a “Class 4 Sewage System” regulated under Section 8.6. of Division B of the 2006 Building Code.

5. Assessment

Reports and assessments provided by the applicant show that if the Enviro-Septic® System is designed, performance tested, installed, operated, and maintained in accordance with the limitations in the manufacturer's instructions and the conditions stated in this authorization, a level of performance will be provided as required by the Building Code, for Class 4 sewage systems.

Reports submitted and reviewed:

1. DBO Expert Inc. “Presentation to the Building Material Evaluation Commission”, dated August 25, 2005.
2. DBO Expert Inc. “Answers to the BMEC Letter dated May 7 2008 – Appendices A, B, and C”, dated May 22, 2008.
3. DBO Expert Inc. “Answers to the BMEC Letter dated May 7 2008, Appendix A: Generic Design, Installation, Operation and Maintenance Manual”, dated May 22, 2008.
4. Bureau De Normalisation Du Quebec “NQ 3680-910/2000-06-16 M1 (2004-09-10) Wastewater Treatment – Stand Alone Wastewater Treatment System for Isolated Dwellings - Annex A” date July 2006.

5. Bureau De Normalisation Du Quebec "NQ 3680-910/2000-0616 M1 (2004-09-10) Wastewater Treatment – Stand Alone Wastewater Treatment System for Isolated Dwellings - Annex B" date July 2006.
6. DBO Expert Inc. "Presentation to the Building Material Evaluation Commission", dated May 28, 2008.
7. DBO Expert Inc. "Presentation to the Building Material Evaluation Commission", dated July 2008.
8. DBO Expert Inc. "Presentation to the Building Material Evaluation Commission", dated January 31, 2008.
9. DBO Expert Inc. "Enviro-Septic® BNQ Certification Summary" dated April 5, 2008.
10. Make-way Environmental Technologies Inc. "Envrio-Septic® System: Design and Installation Manual – Province of Ontario", dated July 17, 2008.
11. Make-way Environmental Technologies Inc. "Envrio-Septic® System: Design and Installation Manual – Province of Ontario", dated February 26, 2008.
12. DBO Expert Inc. "Enviro-Septic® System ESTP-T Model Tertiary level Treatment, Residential Application – Province of Ontario., dated February 26, 2008.
13. DBO Expert Inc. "Enviro-Septic® System ESTP-T Model Tertiary level Treatment, Residential Application – Province of Ontario: Owner's Guide, dated February 26, 2008.
14. Make-way Environmental Technologies Inc., Enviro-Septic System: Design and Installation Manual for the Province of Ontario, dated July 17, 2008.
15. Make-way Environmental Technologies Inc., Enviro-Septic System: Design and Installation Manual for the Province of Ontario, dated September 25, 2008.
- A1 16. Make-way Environmental Technologies Inc. "Envrio-Septic® System: Design and Installation Manual – Province of Ontario", dated June 1, 2009.
- A1 17. Letter Report, Gunnell Engineering Ltd. "Building Materials Evaluation Commission, Enviro-Septic® System Amendment to BMEC Authorization #08-03-340", dated July 13, 2009.
- A1 18. DBO Expert Inc. "Research and Development Sampling Devise Prototypes Design and Testing", dated June 9, 2009.

6. Authorization

The Enviro-Septic® System is authorized as an alternative to a “Class 4 Sewage System” regulated under Section 8.6. of Division B of the 2006 Building Code; all other requirements not specifically noted herein, pertaining to the design, performance testing, installation, operation, and maintenance are subject to the requirements of the Building Code, and are subject to the following terms and conditions contained in 6A and 6B below:

Note: This authorization is not intended to be used as an approval for tertiary treatment units, where treatment units are permitted for use with a Class 4 sewage system.

A. Specific Terms and Conditions

1.0 Administrative

- 1.1. This Authorization is valid only for Presby Environmental, Inc.’s Enviro-Septic® System.
- 1.2. This Authorization is valid only for use by Make-Way Environmental Technologies Inc. and DBO Expert Inc.
- 1.3. This Authorization expires on September 26, 2013.

2.0 Definitions

A word or phrase used in this Authorization has the following meaning for the purposes of this Authorization:

- 2.1. Raised or Partially Raised means a sewage system in which any part of the system is above the natural ground elevation.
- 2.2. Vertical Separation means the depth of unsaturated soil below the system, as measured from the bottom of the system sand of the Enviro-Septic System, to a limiting layer such as a high groundwater table, bedrock, or soil with a percolation time (T) greater than 50 min/cm.

3.0 Installation Requirements

- 3.1. The Enviro-Septic® System shall be installed as per the manufacturer’s installation instructions as found in the “Enviro-Septic® System Design and Installation Manual for the Province of Ontario” dated June 1, 2009.
- 3.2. No person shall operate the Enviro-Septic® System unless the person has entered into an agreement whereby the servicing and maintenance of the Enviro-Septic® System and its related components will be carried out by a person who is authorized by the manufacturer to service and maintain the Enviro-Septic® System and who:

Inspection

3.2.1. Conduct and record at least once during every twelve (12) month period, an inspection and servicing, as specified by the Applicant, Presby Environmental Inc. the "Enviro-Septic® System: Design and Installation Manual - Province of Ontario", dated June 1, 2009.

Testing

3.2.2. Every person operating an Enviro-Septic® System that is designed and constructed to produce effluent, as described in Table 3.2.2. below, shall take a sample of the effluent to determine whether it complies with maximum levels contained in Table 3.2.2., below:

Table 3.2.2.

Parameter	Effluent Quality Maximum concentration based on 30 day averages	Effluent Quality compliance with a single grab sample
BOD(mg/L)	15	30
Suspended Solids(mg/L)	10	20
E Coli (CFU/100 mL)	50 000	100 000
<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>

3.2.2.1. if a single grab sample is taken to demonstrate compliance with the values in Table 3.2.2. above, the results from a single grab sample shall not exceed the maximum concentrations listed in Column 3, above.

3.2.2.2. if the results of a sample do not comply with Table 3.2.2., then the Principal Authority shall be informed, by the operator (home owner), and the course of action to remedy the problem shall be identified.

3.2.2.2.(1) subsequent sampling, submitted to the Principal Authority, within six (6) months of the first non-compliant sample, must demonstrate the problem has been rectified.

3.2.3 The sampling required by 3.2.2. above shall be conducted:

3.2.3.1. once during the first twelve (12) months after the Enviro-Septic® System is put into use, and

3.2.3.2.. thereafter, once during every year after the previous sampling has been completed.

3.4. All sampling shall be promptly submitted to the person operating (home owner) the Enviro-Septic® System, and the Principal Authority.

- 3.5. Make-Way Environmental Technologies Inc. shall retain records of the sampling test results for each Enviro-Septic® System received pursuant to the terms and conditions set out in 3.2. above, for a period of ten (10) years and shall promptly forward copies of those records to the Principal Authority, when requested.

4.0 System Requirements

- 4.1. The Enviro-Septic System Components; there are six (6) main components to the Enviro-Septic System®. They are:

- 4.1.1. The septic tank,
- 4.1.2. The effluent filter,
- 4.1.3. The distribution device,
- 4.1.4. The Enviro-Septic pipe,
- 4.1.5. The Enviro-Septic System Sand, and
- 4.1.6. The sampling device

- 4.2. The Septic Tank

The Enviro-Septic System® is designed to receive septic tank effluent for treatment and dispersal. All raw sewage will enter into a septic tank sized in accordance with Article 8.2.2.3. of Division B, of the Building Code.

- 4.3. The Effluent Filter

An effluent filter, meeting NSF/ANSI 46-2005 "Evaluation of Components and Devices Used in Wastewater Treatment Systems", shall be connected to the outlet of the septic tank.

- 4.4. The Distribution Device

The distribution device may be a distribution box and equalizer, a combination of distribution valve and distribution box, or a low pressure distribution system.

- 4.5. The Enviro-Septic Pipe

- 4.5.1. The Enviro-Septic Pipe consists of:

- 4.5.1.1. a 300 mm diameter, high-density plastic pipe, which is corrugated and perforated; skimmer tabs extend into the pipe at the point of each perforation,
- 4.5.1.2. A dense mat of coarse, randomly oriented plastic fibres surrounding the outside of the pipe,
- 4.5.1.3. A Bio-Accelerator™ geo-textile fabric layer, which partially covers the fibres on the lower half of the pipes, located between the pipe and the plastic fibres, and
- 4.5.1.4. The outer layer of non-woven geo-textile fabric that holds the other components in place and provides a protected surface on which the biomat develops.

4.5.2. A row of Enviro-Septic® pipe is a combination of a single offset adaptor, Enviro-Septic® pipes, couplings, and double offset adaptor.

- 4.5.2.1. Each row of Enviro-Septic® pipe is fed with a PVC pipe through the opening of a single offset adaptor in the top position,
- 4.5.2.2. each row of the Enviro-Septic® pipe is completed with a piezometer or a horizontal pipe leading to a piezometer through the bottom opening of a double offset adaptor,
- 4.5.2.3. each row of the Enviro-Septic® pipe is completed with a vent or an aeration pipe leading to a vent through the top opening of a double offset adaptor, and
- 4.5.2.4. the minimum equivalent length of any row is 6.1 m of Enviro-Septic® pipe and the maximum length is 30 m.

4.6. The Enviro-Septic® System Sand

4.6.1. All Enviro-Septic® system configurations require system sand to surround the Enviro-Septic® pipe, herein after called system sand and shall be a minimum of:

- 4.6.1.1. 300 mm below the Enviro-Septic® pipes,
- 4.6.1.2. 150 mm between the Enviro-Septic® pipes,
- 4.6.1.3. 300 mm around the perimeter of the Enviro-Septic® pipe, and
- 4.6.1.4. 100 mm above the Enviro-Septic® pipe.

4.6.2. The system sand must meet all of the following requirements:

- 4.6.2.1. Effective diameter of between 0.20 and 0.50 mm,
- 4.6.2.2. Uniformity of Coefficient (Cu) less than or equal to 4.5,
- 4.6.2.3. less than 3% of the material smaller than 80 µm, and
- 4.6.2.4. less than 20% of material larger than 2.5. mm.

5.0 Design

Vertical Separation

5.1. The percolation time (T) of the natural soil shall determine the minimum vertical distance from the bottom of the Enviro-Septic® System Sand to the high ground water table, bedrock or soil with a percolation time (T) greater than 50 min/cm:

- 5.1.1. if T is less than or equal to 6 min/cm, or greater than 50 min/cm, then the vertical separation distance shall be at least 600 mm, or
- 5.1.2. if T is greater than 6 min/cm, or less than or equal to 50 min/cm, then the vertical separation shall be at least 450 mm.

Number of Enviro-Septic® Pipes Required

5.2. This step applies to all options for the Enviro-Septic® System. Each 3.0 m section of the Enviro-Septic® pipe has the capacity to treat 90 L of wastewater per day, or 30 L per metre of pipe. Thus, the number of Enviro-Septic® pipe required:

- 5.2.1. The formula to determine the number of Enviro-Septic® pipes (N_{esp}) required is $(N_{esp}) = Q/90$.
- 5.2.2. The number of Enviro-Septic® pipes obtained must be rounded up at all times.

Pipe Spacing Requirements

- 5.3. The Enviro-Septic® pipes shall be spaced using the following criteria:
 - 5.3.1 Centre to centre spacing is the horizontal distance from the centre of one Enviro-Septic® row to the centre of the adjacent row. The minimum centre to centre spacing is 0.45 m,
 - 5.3.2. Lateral Extension Distance is the distance filled with additional sand material extending from the centre of the last lateral row to the side of the Enviro-Septic® system. The minimum lateral extension is 0.45 m, and
 - 5.3.3. End Extension Distance is the distance filled with additional sand material extended from the end of a row to the side of the Enviro-Septic® system, the minimum end extension distance is 0.30 m.

Dispersal Surface (DS) – In-ground, partially raised, or above ground

- 5.4. The area (m^2) to be covered by the system sand in the Enviro-Septic system shall be equal or larger than the area determined by the formula $DS = QT/400$, in which the T is the percolation time (T) in min/cm of the native soil - to a maximum of 50 min/cm - and Q is the total daily design sewage flow in (L).
 - 5.4.1. In all Enviro-Septic system designs the minimum spacing requirement of 5.3. above, shall be met.
 - 5.4.2. Where the area determined using $QT/400$ is larger than that required by the minimum spacing required by 5.3. above, the Enviro-Septic pipes shall be evenly spaced over the entire area of the Enviro-Septic System sand.
 - 5.4.3. The dispersal surface shall have the long dimension perpendicular to the direction in which effluent entering the soil will move horizontally.
 - 5.4.4. When the native soil has a T of 50 min/cm or greater, the Enviro-Septic system must be fully raised such that all parts of the Enviro-Septic® System Sand are above grade.

Other

- 5.5. The Enviro-Septic® System shall be designed, installed, operated, and maintained using these criteria:
 - 5.5.1 The System sand shall extend a minimum of 300 mm around the perimeter of the Enviro-Septic® Pipe, for systems on ground sloping 10% or less.
 - 5.5.2 The System sand shall extend a minimum of 300 mm on three (3) sides and 1200 mm beyond the Enviro-Septic® pipe on the down-slope side, for systems on ground sloping greater than 10%.
 - 5.5.3 No System shall be installed in an area in which the original ground has a slope in excess of 25%.
 - 5.5.4 Enviro-Septic® rows shall be laid level, of equal lengths, and not greater than 30 m in any one row.

- 5.5.5 All pump systems shall use differential venting.
- 5.5.6 Except when used with a “Low Pressure Distribution System”, all Enviro-Septic® Systems that have a pump must use a velocity reducer.
- Venting*
- 5.5.7 Enviro-Septic® Systems shall have a venting system, which is connected to the end of each row of Enviro-Septic® Pipe, and
- 5.5.7.1. the entry vent must be at least 3000 mm lower than the exit vent,
- 5.5.7.2. not less than 2000 mm above the ground,
- 5.5.7.3. not less than 1000 mm above and not less than 3500 mm in any other direction from every other air inlet, openable window, or door, and
- 5.5.7.4. a minimum of one (1) vent is required for every 300 m of Enviro-Septic® pipe.
- 5.5.8 The Enviro-Septic® System shall have a sampling device, for the purpose of sampling the effluent and it shall be installed as described in the Make-way Environmental Technologies Inc. “Envrio-Septic ® System: Design and Installation Manual – Province of Ontario”, dated June 1, 2009.
- 5.5.9. The site shall be protected from erosion by proper grading, mulching, seeding, and runoff control.
- 5.5.10. The Enviro-Septic® pipes, measured from the centre of the pipes, shall meet the set back requirements outlined in Article 8.2.1.4. of Division B, of the Building Code.
- 5.5.11. No reduction in size of the Enviro-Septic® System is permitted with the use of treatment device beyond that of a septic tank.

B. General Conditions

1. The use of the Enviro-Septic® System must comply with the *Building Code Act, 1992*, (“BCA”) as amended or re-enacted from time to time and except as specifically authorized herein, with the Building Code as amended or remade from time to time.
2. A copy of this Authorization shall accompany each application for a building permit and shall be maintained on the site of the construction with the building permit.
3. The Applicant named in Part 1 hereof shall promptly notify the BMEC of:
 - (a) The failure of the Applicant or of the material, system or building design that is the subject matter of this Authorization, to comply with any of the terms and conditions set out in 6. A. above; or
 - (b) the occurrence of any of the events described in Conditions 6. B. 4. (a), or (b) (i), (v), (vi), (vii), or (viii) below.

4. The BMEC may:
- (a) revise an authorization if the BMEC finds that the following information has changed:
 - (i) the name of the applicant, as specified on the authorization;
 - (ii) the contact information, as specified on the authorization; or
 - (iii) the ownership of the applicant, as specified on the authorization
 - (b) amend an authorization if the BMEC determines that:
 - (i) there is a change to the material, system, or building design;
 - (ii) there is a change to the relevant provision(s) to the BCA;
 - (iii) there is a change to the relevant provision(s) to the Building Code;
 - (iv) there is a change to the relevant test method standards;
 - (v) the applicant has failed to comply with the terms and conditions set out in the authorization;
 - (vi) there, after receiving additional information, is a potential health and safety concern;
 - (vii) the material, system, or building design provides an unsatisfactory level of performance in situ; or
 - (viii) the information contained in, or forming a part of, the application was erroneous, or false.
 - (c) revoke an authorization if the BMEC determines that:
 - (i) the name of the applicant, as specified on the authorization has changed;
 - (ii) the contact information, as specified on the authorization, has changed;
 - (iii) the ownership of the applicant, as specified on the authorization has changed;
 - (iv) there is a change to the material, system, or building design;
 - (v) there is a change to the relevant provision(s) to the BCA;
 - (vi) there is a change to the relevant provision(s) to the Building Code;

- (vii) there is a change to the relevant test method standards;
 - (viii) the applicant has failed to comply with the terms and conditions set out in the authorization;
 - (ix) there, after receiving additional information, is a potential health and safety concern;
 - (x) the material, system, or building design provides an unsatisfactory level of performance in situ; or
 - (xi) the information contained in, or forming a part of, the application was erroneous, or false.
5. Where the BMEC receives additional information concerning the material, system or building design authorized herein, the BMEC may review this Authorization and the BMEC may after the review amend or revoke this Authorization as in the opinion of the BMEC may be necessary.

Dated at Toronto this 30th day of July 2009.

BUILDING MATERIALS EVALUATION COMMISSION

Edward Link, P. Eng.
Chair, Building Materials Evaluation Commission