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

BMEC AUTHORIZATION: 23-05-407
System O)) – Standard Configuration

Date of Authorization: **July 26, 2023**
Date of Expiry[1]: **July 26, 2028**

1. Applicant

DBO Expert Inc.

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2. Manufacturing Facility

Pipes
Presby Environmental Inc.
143 Airport Road, Whitefield, NH
USA, 03598

Engineering and Design
Make-Way Environmental
Technologies Inc.
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1 This Authorization expires on the date shown. It is the responsibility of Authorization holders to make a complete application considering the time for review and complexity of the new application.

3. Authorization

System O)) – Standard Configuration is a combined treatment and dispersal system comprised of a septic tank, an effluent filter, distribution device, Advanced Enviro-Septic® pipes, sampling device, and System O)) Specified System Sand.
System O)) – Standard Configuration can be installed in-ground, partially raised, or fully raised.

Additional descriptive information is provided in documents supplied by the Applicant which are listed in Appendix A.

Reports and assessments provided by the Applicant demonstrate that if System O)) – Standard Configuration is manufactured, designed, constructed, installed, operated and maintained in accordance with the manufacturer's instructions and limitations, and the specific terms and conditions stated in this authorization, the use of the System O)) – Standard Configuration shall be deemed to not be a contravention of Division B, Section 8.6. “Class 4 Sewage System” and Section 8.7.7. “Type A Dispersal Beds” of Division B of the Building Code.

All other requirements pertaining to the manufacture, design, construction, testing, and installation are subject to the requirements of the Building Code, and subject to the following terms and conditions contained below.

4. Specific Terms and Conditions

4.1. General

4.1.1. This Authorization is valid only for DBO Expert Inc.’s System O)) – Standard Configuration;

4.1.2. This Authorization is contingent on maintenance of the CAN/BNQ 3680-600 certification, including annual CAN/BNQ certification audits.

4.2. Definitions

4.2.1. Raised or Partially Raised means a sewage system in which any part of the system is above the natural ground elevation;

4.2.2. Vertical Separation means the depth of unsaturated soil below the system, as measured from the bottom of the System O)) Specified System Sand at 300 mm below the Advanced Enviro-Septic® pipes, to a limiting layer such as high groundwater table, bedrock, or soil with a percolation time (T) less than 1 min/cm greater than 50 min/cm; and

4.2.3. System O)) – Standard Configuration “System O)) Specified System Sand” is defined in Section 4.4.7 of this Authorization.

4.3. Installation Requirements

4.3.1. System O)) – Standard Configuration shall be installed as per the manufacturer's installation instructions found in the "System O)) Design and Installation Manual – Province of Ontario", Version 5.1 dated June 2023";

4.3.2. No person shall operate System O)) – Standard Configuration unless the person has entered into an agreement whereby the servicing and maintenance of the System O)) – Standard Configuration and its related components will be carried out by a person who is authorized by the manufacturer to service and maintain System O)) – Standard Configuration.

4.4. System Requirements

4.4.1. There are six (6) main components to System O)) – Standard Configuration:

1. Primary/Septic tank;
2. Effluent filter;
3. Distribution Device;
4. Advanced Enviro-Septic® pipe;
5. The System O)) Specified System Sand; and
6. Sampling device.

4.4.2. The Septic Tank – System O)) – Standard Configuration 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;

4.4.3. The Effluent Filter – An effluent filter, meeting the requirements of Article 8.6.2.1. of Division B of the Building Code, shall be connected to the outlet of the septic tank;

4.4.4. The Distribution Device – The distribution device may be a distribution box and equalizers or a low-pressure distribution system. Either of these distribution devices can also include a distribution valve;

4.4.5. The Advanced Enviro-Septic® pipe consists of

4.4.5.1. 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;

4.4.5.2. A dense mat of coarse, randomly oriented plastic fibres surrounding the outside of the pipe;

4.4.5.3. 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

4.4.5.4. 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;

4.4.6. A row of Advanced Enviro-Septic® pipe is a combination of an adaptor, Advanced Enviro-Septic® pipes, couplings and piezovent;

4.4.6.1. Each row of Advanced Enviro-Septic® pipe is fed with a PVC pipe (100 mm diameter) through the opening of a single offset adaptor in the top position when gravity-fed, or through a low-pressure adaptor when low-pressure-fed;

4.4.6.2. Each row of the Advanced Enviro-Septic® pipe is completed with a piezometer through the top opening of a piezovent;

4.4.6.3. Each row of Advanced Enviro-Septic® pipe is completed with a vent or an aeration pipe leading to a vent through the side openings of a piezovent; and

4.4.6.4. The minimum equivalent length of any row is 3.05 m of Advanced Enviro-Septic® pipe and the maximum length is 30.5 m;

4.4.7. The System O)) Specified System Sand and Imported Sand

4.4.7.1. System O)) – Standard Configuration require System O)) Specified System Sand to surround the Advanced Enviro-Septic® pipe and shall be a minimum of:

(a) 300 mm under the Advanced Enviro-Septic® pipes;
(b) 75 mm beside each of the Advanced Enviro-Septic® pipes;
(c) 300 mm from the ends of the Advanced Enviro-Septic® pipes; and
(d) 100 mm above the Advanced Enviro-Septic® pipe;

4.4.7.2. System O)) Specified System Sand must meet all the following requirements:

(a) Effective diameter of between 0.20 and 0.50 mm;
(b) Uniformity coefficient (C_u) less than or equal to 4.5;
(c) Less than 3% of the material smaller than 80 µm; and
(d) Less than 20% of the material larger than 2.5 mm;

4.4.7.3. Imported sand must meet all the following requirements:
(a) A percolation time of between 6 and 10 min/cm; and
(b) Not more than 5% of fines passing through a 0.074 mm (No. 200) sieve;

4.4.7.4. For each System O)) – Standard Configuration project, the system installer is to receive a copy of both the sieve analysis and System O)) Specified System Sand analyzer results, and these results are to be available upon request to the Principal Authority and the operator (homeowner);

4.4.8. The sampling device includes the following:

(a) A collector that consists of a thermoformed trough in which a collector pipe is installed; and

(b) A sample port that is used to take the treated effluent samples for analysis.

4.5. Design Requirements

4.5.1. System O)) – Standard Configuration shall meet the minimum spacing requirements of 4.5.6.2. below;

4.5.2. System O)) – Standard Configuration shall be designed, installed, operated and maintained using these criteria:

4.5.2.1. For systems on ground sloping greater than 10%, the System O)) Specified System Sand shall extend a minimum of 300 mm on three (3) sides and 1200 mm beyond the Advanced Enviro-Septic® pipe on the down-slope side;

4.5.2.2. No system shall be installed in an area where the original ground has a slope in excess of 25%;

4.5.2.3. The rows of Advanced Enviro-Septic® pipe shall be of approximately equal lengths, shall be laid level within each row, and the length shall not be greater than 30.5 m in any one row;

4.5.2.4. The system shall use differential venting or a shunt pipe (air bypass pipe);

4.5.2.5. Except when used with a Low-Pressure Distribution System, System O)) systems that have a pump must use a velocity reducer;

4.5.2.6. System O)) – Standard Configuration shall have a venting system including a manifold that connects to each row of Advanced Enviro-Septic® pipe, and:

(a) The entry vent must be at least 3 m lower than the exit vent;
(b) The entry vent must be a minimum of 100 mm above ground and high enough to rise above snow during winter;
(c) A minimum of one (1) vent is required for every 300 m of Advanced Enviro-Septic® pipe;

4.5.2.7. For the purpose of sampling the treated effluent, System O)) – Standard Configuration shall have a sampling device installed at the bottom of the System O)) Specified System Sand and directly below the first length of Advanced Enviro-Septic pipe on an outside row;

4.5.2.8. The site shall be protected from erosion by proper grading, mulching, seeding and runoff control;

4.5.2.9. The Advanced Enviro-Septic® pipes, measured from the centre of the pipes, shall meet the clearance distance requirements outlined in Article 8.2.1.4. of Division B of the Building Code;

4.5.2.10. No reduction in size of the System O)) – Standard Configuration system is permitted with the use of a treatment device beyond that of a septic tank;

4.5.2.11. System O)) – Standard Configuration shall comply with the requirements of Article 8.7.2.2. of Division B of Ontario's Building Code;

4.5.3. Following installation of the System O)) Specified System Sand for each row of Advanced Enviro-Septic® pipe, imported sand or system sand must be used to fill in the area between the rows of advanced Enviro-Septic pipe (complete with system sand as per 4.4.7.1), to cover the complete dispersal surface/ contact area. The thickness of imported sand/System O)) Specified System Sand between the rows of Advanced Enviro-Septic® pipes/System O)) Specified System Sand shall be a minimum of 700 mm.

4.5.4. Vertical Separation

4.5.4.1. The percolation time (T) of the natural soil shall determine the minimum vertical distance from the bottom of the System O)) Specified System Sand to the high groundwater table, bedrock, or soil with a percolation time (T) less than 1 min/cm or greater than 50 min/cm;

4.5.4.2. If T is less than or equal to 6 min/cm, or greater than 50 min/cm, the vertical separation distance shall be at least 600 mm;

4.5.4.3. If T is greater than 6 min/cm, and less than or equal to 50 min/cm, the vertical separation distance shall be at least 450 mm;

4.5.5. Number of Advanced Enviro-Septic® Pipes Required

4.5.5.1. For System O)) – Standard Configuration, each 3.05m section of the Advanced Enviro-Septic® pipe has the capacity to treat 126 L of wastewater per day, or 41.3 L per metre of pipe. Therefore, the number of Advanced Enviro-Septic® pipes (NAES) required is determined by:

NAES = Q/126.

The number of Advanced Enviro-Septic® pipes must be rounded up at all times;

4.5.6. Pipe Spacing Requirements

4.5.6.1. The Advanced Enviro-Septic® pipes shall be placed level within each row;

4.5.6.2. When multiple rows are used, Advanced Enviro-Septic® pipes shall be spaced using the following criteria:

(a) Centre-to-centre spacing is the horizontal distance from the centre of one row of Enviro-Septic® pipes to the centre of the adjacent row. The minimum center-to-centre spacing is 450 mm;

(b) Lateral extension distance is the distance extending from the centre of the last lateral row to the side of the System O)) Specified System Sand. The minimum lateral extension is 450 mm; and

(c) End extension distance is the distance extended from the end of a row to the end of the System O)) Specified System Sand. The minimum end extension distance is 300 mm;

4.5.7. Dispersal Surface

4.5.7.1. Where the percolation time (T) of the native soil is greater than 15 min/cm, the area (m^2) to be covered by the System O)) Specified System Sand/imported sand in the System O)) shall be equal to or larger than the area determined by the formula DS = QT/400, in which. DS is the dispersal surface in m^2, 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);

4.5.7.2. Where the percolation time (T) of the native soil is less than or equal to 15 min/cm, the area (m^2) to be covered by the System O)) Specified System Sand imported sand in the System O)) shall be equal to the larger of the area determined by the formula DS = QT/850 or the total minimum area required considering the minimum separation distances provided in 4.5.6.2. above;

4.5.7.2.1. Where the daily design sewage flow exceeds 3,000 L/day, the size of the dispersal surface shall in no case be less than the area calculated by Q/50;

4.5.7.3. The dispersal surface should have the long dimension parallel to the site contours;

4.5.7.4. The minimum spacing requirement of 4.5.6.2. above shall be met. Where the area determined using QT/400 is larger than that required by the minimum pipe spacing, the Advanced Enviro-Septic® pipes shall be evenly spaced over the dispersal surface, subject to adjustment to ensure:

(a) Minimum clearances are provided in accordance with Article 8.2.1.6. of Division of the Building Code; and

(b) Minimum separation distances are provided as required in 4.4.7 above.

4.6. Maintenance Requirements

4.6.1. Conduct and record at least once during every twelve (12) month period, an inspection and servicing, as specified by the Applicant, DBO Expert Inc. in the "System O)) Design and Installation Manual – Province of Ontario", Version 5.1 dated June 2023";

4.6.2. Every person operating a System O)) – Standard Configuration that is designed and constructed to produce effluent, as described in Table 4.6.2. below, shall take a sample of the effluent to determine whether it complies with maximum levels contained in Table 4.6.2. below:

Table 4.6.2. – Effluent concentration of parameters

Parameter	Effluent quality maximum concentration based on a 30 day averages	Effluent quality compliance with a single grab sample
cBOD5 (mg/L)	10	20
Suspended Solids (mg/L)	10	20
Colum n 1	*Colum n 2*	*Colum n 3*

4.6.2.1. If a single grab sample is taken to demonstrate compliance with the values in Table 4.6.2. above, the results from a single grab sample shall not exceed the maximum concentrations listed in Column 3, above;

4.6.2.2. If the results of a sample do not comply with Table 4.6.2., then the Principal Authority shall be informed by the operator (homeowner), and the course of action to remedy the problem shall be identified;

4.6.2.3. Subsequent sampling results, submitted to the Principal Authority, within six (6) months of the first non-compliant sample, must demonstrate the problem has been rectified;

4.6.3. Effluent sampling shall be performed in accordance with the requirements of Sentence 8.9.2.4.(1) of Division B of the Ontario Building Code, as follows:

(a) initially, once during the first 12 months after the sewage system was put into use, and
(b) thereafter, once during every 12 month period, at least 10 months and not more than 18 months after the previous sampling has been completed;

4.6.4. DBO Expert Inc. or their Authorized Agents shall retain records of the sampling test results for each System O)) – Standard Configuration received pursuant to the terms and conditions set out in 4.3.2 above, for a period of ten (10) years and shall promptly forward copies of those records to the Principal Authority, when requested.

5. General Conditions

5.1. The use of the System O)) – Standard Configuration as described in Section 3. and the Specific Terms and Conditions set out in Section 4. must comply with:

(a) the *Building Code Act, 1992,* (the "Act") as amended or re-enacted,
(b) except as specifically authorized herein, the Building Code as amended or remade, and
(c) all other applicable legislation.

5.2. 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.

5.3. The Applicant specified in Section 1. shall promptly notify the BMEC of:

(a) the failure of the Applicant to comply with any of the Specific Terms and Conditions set out in Section 4.,
(b) the failure of the material, system or building design that is the subject matter of this Authorization to
    i. comply with any of the Specific Terms and Conditions set out in Section 4., or
    ii. provide a satisfactory level of performance in situ, or
(c) the occurrence of any of the events described in General Conditions 5.4.(a), (b), or (e).

5.4. The BMEC may amend or revoke this Authorization at any time on its own initiative, or at the request of the Applicant specified in Section 1. Without restricting the foregoing, the BMEC may amend or revoke this Authorization where it determines that:

(a) any change has been made to:
    (i) the name of the Applicant specified in Section 1.,
    (ii) the address or other contact name information of the Applicant specified in Section 1.,
    (iii) the ownership of the Applicant specified in Section 2.,
    (iv) the manufacturing facilities specified in Section 2,
    (v) the material, system, or building design that is the subject matter of this Authorization, or
    (vi) a test method relevant to this Authorization,

(b) the Applicant has failed to comply with any of the terms and conditions set out in this Authorization,
(c) in the opinion of the BMEC, the use of the material, system or building design authorized herein provides an unsatisfactory level of performance in situ,
(d) in the opinion of the BMEC, amendment or revocation of the Authorization is appropriate on the basis of potential danger to public health and safety,
(e) the *Act* or Building Code has been amended, re-enacted or remade in a manner relevant to this Authorization,
(f) this Authorization was issued on mistaken, false or incorrect information, or
(g) a revision of an editorial nature is appropriate.

Dated at Toronto this July 26, 2023

BUILDING MATERIALS EVALUATION COMMISSION

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CHAIR, BUILDING MATERIALS EVALUATION COMMISSION

attached – “Appendix A – Supporting Information”

Appendix A – Supporting Information

The following is a list of the documents that were submitted and reviewed, but were not limited to:

1. Application, DBO Expert Inc., “System O)) BMEC Application” as amended;
2. Certification, Bureau de normalisation du Québec, “Performance Report in accordance with Annex A, Class B-IV, D-I” dated July 2018;
3. Certification, Bureau de normalisation du Québec, “Performance Report in accordance with Annex A, Class B-IV” dated June 2019;
4. Certification, Bureau de normalisation du Québec, “Seasonal Reliability Report in accordance with Annex B, Class B-IV, D-I” dated May 2019;
5. Certification, Bureau de normalisation du Québec, “Seasonal Reliability Report in accordance with Annex B, Class B-IV” dated June 2019;
6. Description, DBO Expert Inc. “Nested pipe configuration”; dated February 3, 2023
7. Design and Installation Guide, DBO Expert Inc., “System O)): Design and Installation Manual Province of Ontario”, as amended;
8. Engineer’s Report, R.J. Burnside & Associates Limited, “Application for Renewal of BMEC Authorization No. 18-05-386 System O)) – Enviro-Septic® System”, dated February 3, 2023;
9. Letter, DBO Expert Inc., “Response to BMEC Follow up questions” dated April 14, 2023;
10. Letter, DBO Expert Inc., “Response to letter 1” dated June 1, 2023;
11. Maintenance Manual, DBO Expert Inc., “Ontario Maintenance Guide System O))”, as amended;
12. Results, MakeWay Environmental Technologies Inc., “Enviro-Septic System Sampling Results Percentage Summary”, 2010-2022;
13. Support document, DBO Expert Inc. “Infiltration area”, dated January 2023;
14. Support document, DBO Expert Inc. “Nested area”, dated January 2023;
15. User Guide, DBO Expert Inc., “Ontario User Guide System O))”, as amended.