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

BMEC AUTHORIZATION: 23-06-408
System O)) – Nested Pipe Configuration

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

1. Applicant

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2. Manufacturing Facility

Pipes
Presby Environmental Inc.
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Engineering and Design
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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)) – Nested Pipe Configuration is a combined treatment and dispersal system comprised of a septic tank, an effluent filter, pump chamber and pump, Nested Pipe distribution system, consisting of a 38 mm diameter pressurized distribution pipe, that is contained within the Advanced Enviro-Septic® pipe, sampling device, and System O)) Specified System Sand. System O)) – Nested Pipe 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)) – Nested Pipe 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 innovative system "System O)) – Nested Pipe Configuration " shall be deemed to not be a contravention of Division B, Section 8.6. “Class 4 Sewage System” and Section 8.7.3 “Absorption Trench Construction” and 8.7.6. “Shallow Buried Trench” 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)) – Nested Pipe 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; and,

4.2.3. System O)) – Nested Pipe 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)) – Nested Pipe 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)) – Nested Pipe Configuration unless the person has entered into an agreement whereby the servicing and maintenance of the System O)) – Nested Pipe Configuration and its related components will be carried out by a person who is authorized by the manufacturer to service and maintain System O)) – Nested Pipe Configuration.

4.4. System Requirements

4.4.1. There are six (6) main components to System O)) – Nested Pipe 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)) – Nested Pipe 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 – A time-dosed Nested Pipe Distribution System that may 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 perforated PVC pipe (38 mm diameter) through the small bottom opening of a double offset adaptor, while the top opening serves as an air circuit;

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 of Advanced Enviro-Septic® pipe is 3.05 m 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)) – Nested Pipe Configuration requires 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) 150 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)) – Nested Pipe 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)) – Nested Pipe Configuration shall meet the minimum spacing requirements of 4.5.6.2. below;

4.5.2. System O)) – Nested Pipe 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. System O)) – Nested Pipe 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;

4.5.2.6. For the purpose of sampling the treated effluent, System O)) – Nested Pipe 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;

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

4.5.2.8. 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;

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

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

4.5.3. Except as otherwise described in section 4.5.7, 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 4.4.7.2), 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 vertical separation distance from the bottom of the System O)) Specified System Sand to high groundwater table, bedrock or soil with a T (percolation time) less than or equal to 1 min/cm shall be at least 600 mm;

4.5.5. Number of Advanced Enviro-Septic® Pipes Required

4.5.5.1. The total length (in metres) of Advanced Enviro-Septic® pipe is determined by the greater of either:

(a) 30 metres;

(b) NAES = Q/126 X LAES (where NAES is the Number of Enviro-Septic pipes and LAES is 3.05, which is the length of an Enviro-Septic pipe), or

(c) Based on the table below:

Percolation Time of Natural Soil (min/cm)	Total Length of Enviro-Septic Piping (m)
$1 < T \leq 20$	Q/75
$20 < T \leq 50$	Q/50
$50 < T \leq 125$	Q/30

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 2.0 m;

(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 300 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. System O)) Specified System Sand and Dispersal Requirements

System O)) – Nested Pipe Configuration shall be constructed with a layer of System O)) Specified System Sand meeting all the requirements of Section 4.4.7, beneath the Advanced Enviro-Septic® pipes;

4.5.7.1. Where the T-time of the underlying soil is less than or equal to 20 min/cm, the System O)) Specified System Sand shall have a minimum thickness of 300 mm below the Advanced Enviro-Septic® pipes, and shall extend 150 mm beyond the sides of the pipes, and a minimum of 100 mm over the top of the pipes;

4.5.7.2. Where the T-time of the underlying soil is greater than 20 min/cm, the System O)) Specified System Sand shall be placed in a continuous layer of at least 300 mm thickness, beneath the entire area covered by the Advanced Enviro-Septic® pipes, and shall extend at least 150 mm beyond the sides of the outermost pipes, and 100 mm over the top of the pipes;

4.5.7.3. The total depth of cover over the Advanced Enviro-Septic® pipes, including the combined thickness of the specified System O)) Specified System Sand and topsoil, shall not exceed 300 mm;

4.5.8. Pump Chamber

4.5.8.1. The pump chamber shall be sized to provide sufficient storage volume so that the effluent is evenly dosed on an hourly basis over a 24-hour period;

4.5.8.2. Where more than one pump is employed within a pump chamber, the pumps shall alternate dosing, and dosing shall continue in the event that one pump fails;

4.5.8.3. The pump shall be equipped with an audible and visual alarm signal to indicate a high water level in the pump chamber; and

4.5.8.4. The pump shall be sized to provide a minimum pressure head of not less than 600 mm when measured to the most distant point of the Enviro-Septic piping from the pump.

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)) – Nested Pipe 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)) – Nested Pipe 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)) – Nested Pipe 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.