

**BUILDING MATERIALS EVALUATION COMMISSION  
(BMEC)  
AUTHORIZATION REPORT**

**DATE OF AUTHORIZATION  
BMEC AUTHORIZATION  
BMEC APPLICATION**

**APRIL 29, 1999  
BMEC # 99-08-236  
# A1998-07**

**DATE OF AMENDMENT**

**OCTOBER 25, 2001**

\* Denotes a new or amended clause October 25,2001

**A Resolution of the BMEC dated February 28, 2002 which amended this authorization was quashed by an order of the Divisional Court dated June 18, 2002.**

**WATERLOO BIOFILTER® AREA BED SYSTEM  
WATERLOO BIOFILTER SYSTEMS INC.**

**1. Applicant**

\* Waterloo Biofilter Systems Inc.  
143 Dennis Street  
PO Box 400  
Rockwood, Ontario  
N0B 2K0

**2. Manufacturing Facilities**

\* Waterloo Biofilter Systems Inc.  
143 Dennis Street  
PO Box 400  
Rockwood, Ontario  
N0B 2K0

**3. Description**

The Waterloo Biofilter® Area Bed System consists of a septic tank connected to a Waterloo Biofilter® treatment unit referenced in the Supplementary Guidelines to the 1997 Ontario Building Code, which delivers effluent to an absorption system other than a leaching bed as referred to in Article 8.6.1.2. of the Ontario Building Code ("OBC"). The system requires pretreatment of raw sewage with a standard two-compartment septic tank equipped with an effluent filter to screen out particles larger than 3.2 mm. Effluent from the septic tank overflows by gravity to a pump tank (pump vault in retrofit applications) providing demand or timed dosing to a biofilter treatment unit enclosed in an insulated-as-needed, waterproof, concrete or reinforced polyester or polyethylene structure with access hatches and screened vents.

An internal distribution system sprays the effluent over modules of plastic foam pieces (a patented biofilter medium) sized according to a maximum loading of 750 L daily design flow, per cubic metre of filter medium. The treated effluent is either

pumped to an absorption system or flows by gravity to an absorption system beneath the treatment unit. The absorption system is a layer of stone overlying a layer of sand.

#### **4. Authorization requested**

The applicant seeks to have the Waterloo Biofilter® Area Bed System, which incorporates a treatment unit designed so that the effluent meets the tertiary effluent quality criteria referenced in Table 8.6.2.2.A. of the OBC, authorized for use as a Class 4 System that is connected to an absorption system other than the leaching bed as referred to in Article 8.6.1.2. of the OBC.

#### **5. Assessment**

The Waterloo Biofilter® Area Bed System incorporates a treatment unit designed so that the effluent meets the tertiary effluent quality criteria referenced in Column 3 of Table 8.6.2.2.A. of the OBC and this treatment unit is connected to an absorption system other than a leaching bed as referred to in Article 8.6.1.2. of the OBC. Reports and assessments provided by the applicant demonstrate that if the Waterloo Biofilter® Area Bed System is constructed, installed, operated, maintained and monitored in accordance with the limitations of the manufacturer's specifications and the conditions stated in this Authorization, a level of performance equivalent to that required of a Class 4 Sewage System will be provided.

Reports submitted and reviewed:

1. Anti-Septic Solution. Cottage Life Magazine, July / August 1994.
2. Waterloo Biofilter™ System is New Technology Ready for Transfer. WCGR Newsletter, Spring 1994.
3. Alternative Septic Systems. Journal of Light Construction, January 1997.
4. On-Site Wastewater Treatment Using Unsaturated Absorbent Biofilters. Journal of Environmental Quality, Vol. 24, no. 1. January-February 1995.
5. Sewage and Leachate Wastewater Treatment Using the Absorbent Waterloo Biofilter. Site Characterization and Design of On-Site Septic Systems, ASTM STP 1324, 1997. Page 261-282
6. Potable Water Treatment and Reuse of Domestic Wastewater in the CMHC Toronto 'Healthy House'. Site Characterization and Design of On-Site Septic Systems, ASTM STP 1324, 1997. Page 176-187.
7. Cost-Effective Sewage and Leachate Wastewater Treatment Using the

Absorbent Waterloo Biofilter™. Korean Research Society of Rural Environmental Seminar, Seoul National University, June 27, 1997.

8. Communal-Size Sewage and Leachate Treatment Using Waterloo Biofilters in Process Trains. Environmental Science and Engineering, January 1998.
9. Removal of VOCs From Landfill Leachate Using Absorbent Aerobic Biofiltration. American Chemical Society, Ninth Annual Symposium on Emerging Technologies in Hazardous Waste Management, Pittsburgh, September 15-17, 1997.

## **6. Authorization**

The Waterloo Biofilter® Area Bed System which incorporates the Waterloo Biofilter® treatment unit, is authorized for use as a Class 4 sewage system that may be connected to an absorption system other than a leaching bed as referred to in Article 8.6.1.2. of the OBC, when designed, installed, operated, maintained and monitored in accordance with the manufacturer's recommendations and the following terms and conditions:

### **A. Specific Terms and Conditions**

1. Only manufacturer trained and authorized agents or employees shall install, maintain or service the Waterloo Biofilter® Area Bed System.
2. The Service and Maintenance Agreement prescribed by Sentence 8.9.2.3.(2) of the OBC shall require that the persons authorized by the manufacturer to service and maintain the Waterloo Biofilter® Area Bed System, and who have entered into the agreement with the person operating the treatment unit, shall:
  - a) conduct an annual maintenance service as specified by the manufacturer of the Waterloo Biofilter® Area Bed System, at least once during every twelve month period after the sewage system is put into use,
  - b) conduct sampling and testing in accordance with the requirements of Clauses 8.9.2.4.(1)(a) and (b) of the OBC;
    - i) once during the first 12 months after the Waterloo Biofilter® Area Bed System is put into use, and
    - ii) thereafter, once during every 48 month period after the previous sampling has been completed,
  - c) promptly submit the sampling test results to the person operating

the Waterloo Biofilter® Area Bed System and to the Applicant and Manufacturer named in Parts 1. and 2. respectively, of this Authorization, and

- d) promptly notify the chief building official in writing, if this maintenance agreement is terminated or access to permit any of the maintenance or monitoring requirements of this Authorization is denied by the person operating the Waterloo Biofilter® Area Bed System.
3. The Manufacturer named in Part 2. of this Authorization shall retain the records of the sampling test results for each Waterloo Biofilter® Area Bed System received pursuant to Condition A. 2. (c) above for a period of 10 years and shall promptly forward copies of those records to the chief building official upon request of the chief building official.
  4. The Waterloo Biofilter® Area Bed System shall only receive effluent from a septic tank or other treatment unit that:
    - a) is fitted with an effluent filter as recommended by the manufacturer, provided that at minimum such filter will screen out particles larger than 3.2 mm, and
    - b) has frost resistant and watertight maintenance ports accessible at grade.
  5. All pipe connections joining the Waterloo Biofilter® treatment unit to accessory treatment units, tanks and pumps where incorporated, shall be flexible and watertight. Where a pump is incorporated in a tank, the tank shall be made watertight.
  6. Only the Waterloo Biofilter® patented plastic foam medium may be used in the Waterloo Biofilter® Area Bed System. The internal distribution system shall spray the received effluent evenly over modules of the plastic foam medium, designed to a maximum loading rate of 750 L daily design flow per cubic metre of biofilter medium.

7. The Waterloo Biofilter® Area Bed System Enclosure shall be designed to be waterproof, insulated to the manufacturer's specifications and provide air and access to the enclosed biofilter medium. When such enclosures are totally or partially underground, the enclosure shall be concrete, fibreglass-reinforced polyester or polyethylene structures that:
  - a) meet the Strength Test requirements of CAN/CSA-B66-M90 for Prefabricated Septic Tanks and Sewage Holding Tanks, and
  - b) resist water infiltration and soil mineral degradation.
8. Effluent exiting the biofilter medium shall be evenly distributed over an absorption system comprised of a stone layer overlying an unsaturated sand layer and having a total minimum depth of 500 mm, and:
  - a) the stone layer shall be a minimum 200 mm in depth and comprised of stone meeting the requirements of either Subclause 8.7.3.3.(1)(b)(i) or (ii), and
  - b) the sand layer shall be a minimum 250 mm in depth and have a percolation time of six to 10 minutes per centimetre, provided that where the underlying native soil has a percolation time of less than six minutes per centimetre, the water table shall be a minimum of 600 mm below the bottom of the stone layer required in (a) above.
9. The stone layer required by Condition A. 8. (a) above, shall have a minimum area as specified by the manufacturer but be not less than the following:
  - a) where the total daily design sanitary sewage flow does not exceed 3 000 L, the area shall be such that the loading on the surface of the stone layer does not exceed 75 L/m<sup>2</sup> per day, or
  - b) where the total daily design sanitary sewage flow exceeds 3 000 L, the area shall be such that the loading on the surface of the stone layer does not exceed 50 L/m<sup>2</sup> per day.
10. The stone layer required by Condition A. 8. (a) above, shall be protected with a permeable geo-textile fabric covering all areas beyond the confines of the Waterloo Biofilter® Area Bed System Enclosure, in such a manner so as to prevent soil or leaching bed fill from entering the stone.
11. The sand layer required by Condition A.8. (b) above:
  - a) shall have a minimum area that is the greater of;
    - l) the area of the stone layer required by Condition A. 9. above, and

ii) the area calculated on the basis of the following formula:

$$A = QT/850$$

where:

A is the area of contact in m<sup>2</sup> between the base of the sand layer and the underlying native soil,

Q is the total daily design sanitary sewage flow in litres,

T is the percolation time of the underlying native soil in min/cm to a maximum of 50, and

b) in raised absorption systems shall extend at least 15 m beyond the perimeter of the Waterloo Biofilter® Area Bed System Enclosure and distribution pipes where utilized, in any direction which the effluent entering the soil will move horizontally.

12. Where the effluent exiting the biofilter medium, is pumped to an absorption system located other than beneath the biofilter, the effluent shall be evenly distributed by means of a header connecting to distribution pipes within the stone layer required by Condition A. 8. (a) above and the distribution pipes shall:

a) be spaced evenly and not greater than 1.2 m apart over the area required by Condition A. 9. above, and

b) comply with the requirements of Clauses 8.7.3.3.(1)(a)-(d) and Sentences 8.7.3.3.(3)-(4).

13. For purposes of determining the clearance distances prescribed by Article 8.2.1.6., where the absorption system required by Condition A. 8. above is:

a) directly beneath and in contact with the biofilter medium, the perimeter of the Waterloo Biofilter® Area Bed System Enclosure, shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.B. and these clearances shall be increased by twice the height that the stone layer stone layer required by Condition A. 8. (a) above, is raised above the original grade, or

- b) located other than beneath the biofilter medium and the biofilter effluent is pumped and distributed in accordance with Condition A. 12. above, no distribution pipe shall be located closer than the minimum horizontal distances set out in Table 8.2.1.6.B. and these clearances shall be increased by twice the height that the stone layer required by Condition A. 8. (a) above is raised above the original grade.
14. No part of the absorption system required by Condition A. 8. above shall:
- a) be located in an area that has an average slope that exceeds one unit vertically to four units horizontally,
  - b) be located in an area that is subject to flooding that may be expected to damage or impair the operation of the absorption system, or
  - c) be covered with any material having a hydraulic conductivity less than 0.01 m/day, other than the Waterloo Biofilter® Area Bed System Enclosure,
  - d) be sloped steeper than one unit vertically to four horizontally, or
  - e) be located in soil or leaching bed fill having a percolation time less than one minute or greater than 50 minutes.
15. The absorption system required by Condition A. 8. above shall be designed to be protected from compaction or any stress or pressure that may result in the impairment of the system function or the smearing of the soil or leaching bed fill.
16. All above-ground backfill and leaching bed fill added to the Waterloo Biofilter® Area Bed System installation shall be stabilized against erosion.

**B. General Conditions**

- 1. The use of the Waterloo Biofilter® area bed System must comply with the *Building Code Act, 1992* as amended or re-enacted from time to time and, except as specifically authorized herein, with the Ontario 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 BMEC may amend or revoke this Authorization where it determines that:
  - (a) any change has been made to:
    - (i) the material, system or building design that is the subject matter of this Authorization;
    - (ii) the address of the applicant specified in Section 1 of this

Authorization; or,

- (iii) the ownership of the company specified in Section 1 of this Authorization.
- (b) the use of the material, system or building design authorized herein;
  - (i) does not comply with the *Building Code Act, 1992* or any relevant legislation as may be amended or re-enacted from time to time; or
  - (ii) provides an unsatisfactory level of performance, in situ; or
- (c) any Ontario Building Code provision relevant to this Authorization has been amended or remade.

Dated at Toronto this 29th day of April, 1999

**BUILDING MATERIALS EVALUATION COMMISSION**

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per: Scott Richardson, Chairman