ENVIRONMENTAL ASSESSMENT REGISTRATION

HOLYROOD
RESIDENTIAL PILOT SEWAGE TREATMENT SYSTEM

Submitted to:

Department of Environment
Environmental Assessment Division

April 2005

BAE ♦ NEWPLAN GROUP

ENVIRONMENTAL ASSESSMENT REGISTRATION

HOLYROOD RESIDENTIAL PILOT SEWAGE TREATMENT SYSTEM

Prepared for:
Department of Environment
Environmental Assessment Division
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April 2005

Project No.: 722152-CP2

Title: ENVIRONMENTAL ASSESSMENT REGISTRATION,
HOLYROOD RESIDENTIAL PILOT SEWAGE TREATMENT SYSTEM

Client: Town of Holyrood

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Rev.	Date yyyy/mm/dd	Page No.	Description	Prepared By	Reviewed By	Approved By

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1.0 NAME OF THE UNDERTAKING

HOLYROOD RESIDENTIAL PILOT SEWAGE TREATMENT SYSTEM

2.0 PROPONENT

2.1 Name of Corporate Body

Town of Holyrood

2.2 Address

Town of Holyrood
P. O. Box 100
Holyrood, NF
A0A 2R0

2.3 Contact

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3.0 THE UNDERTAKING

3.1 Nature of the Undertaking

To construct a residential pilot sewage treatment system on Country Path Road in Holyrood, NL (see Appendix A, Figure 1). The proposed treatment system consists of three pilot scale Kickuth bioreactors. The Kickuth bioreactor is a natural treatment process which consists of a subsurface flow wetland engineered to treat wastewater from a variety of sources (see Appendix A, Figure 2).

3.2 Need for the Undertaking

Country Path Road in the Town of Holyrood is not serviced by a municipal wastewater collection/treatment system. Currently, each residence is serviced by an on-site wastewater system (i.e. septic system) that is not performing well under local conditions. Country Path Road is connected to the Conception Bay Highway, which is serviced with a conventional gravity wastewater collection system and ocean outfall; however, wastewater services have not been extended out to Country Path Road. Its unique characteristics make the installation of conventional collection and treatment systems challenging.

A 2001 study by BAE-Newplan Group researched and analyzed various sewage treatment alternatives (see Appendix B to view report). Each system was reviewed based on the characteristics of the construction, operational requirements, automation, level of operator attention, footprint, etc., as well as the suitability for the application in terms of environment, geography and scale of treatment. The final outcome was that the Kickuth Bioreactor of Abydoz Environmental would be most suitable in application of three systems (see Appendix B for further details).

4.0 DESCRIPTION OF THE UNDERTAKING

4.1 Geographic Location

The proposed locations are adjacent to Country Path Road in the Town of Holyrood, NL (see Appendix A, Figures 1 & 3). The project will require a land area of 450 m^2 (4844 ft^2) for the installation of the septic tanks and treatment wetlands.

4.2 Physical Features of the Undertaking

The undertaking will consist of three pilot scale Kickuth bioreactors. The Kickuth Bioreactor is a natural treatment process, which consists of a subsurface flow wetland engineered to treat wastewater from a variety of sources. The wastewater would be collected from the residences and delivered to the plant using a conventional gravity collection system. It would then pass into an equalization/settling tank sized and designed by the plant manufacturer for the characteristics of the cluster. The effluent then passes into a reed bed that is comprised of engineered soil and specially selected plants contained in a sealed geomembrane. The wastewater flows under the soil surface through the root zone. Oxygen is delivered to the roots, which supplies the aerobic bacteria/micro-organisms that metabolize the contaminants (see Appendix A, Figure 2). Treated effluent will be discharged via an infiltration gallery into the surrounding soil.

4.3 Construction Activities

Construction of the sewage treatment system is proposed to begin in the spring of 2005 and be fully operational by the fall of 2005. Construction of the system will involve the removal of moderate vegetation, grubbing, and grading of soil material at the location of the three bioreactors. Realizing minor impacts on the areas are likely, the proponent is committed to keeping those impacts to a minimum. During the construction and operation of the disposal site, all efforts will be made to preserve and conserve the natural environment. Vegetation will be maintained to provide natural buffer zones and any exposed slopes will be stabilized with natural vegetation where possible. In fact, the vegetation which is removed for the placement of the bioreactors will be replaced with other planted vegetation (i.e. reeds) essential to the operation of the sewage system (see Appendix A, Figure 2).

All construction activities will be conducted involving mitigation measures as per Section 4.3.2.

Vegetation Clearing

Potential concerns associated with vegetation clearing include loss of habitat, as well as sedimentation of watercourses. All vegetation clearing and associated activities will adhere to all applicable acts, regulations, and permits. Also, mitigation measures will be implemented to reduce the potential effects of vegetation removal. Although tree removal is expected to be minimal, a cutting permit will be obtained prior to the start of any site clearing. Clearing and removal of trees will be restricted to the minimum areas needed for the site requirements and will not be outside the permitted limits. Limits of clearing will be shown on all drawings “Issued for Construction”.

Disposal of cleared timber and slash will be in compliance with the *Forest Fire Regulations*, *Environmental Code of Practice for Open Burning*, and the *Permit to Burn*.

Grubbing and Disposal of Related Debris

The principal concerns associated with grubbing are the potential effects of erosion on marine and freshwater ecosystems, as well as water quality. All grubbing and disposal of related debris near watercourses will adhere to relevant regulatory requirements, including permits from the Department of Environment and the formal “Letters of Advice” and *Authorizations for Works and Undertakings Affecting Fish Habitat* from the Department of Fisheries and Oceans. Grubbing activities shall be minimized where possible and limits of stripping shall be placed on all drawings “Issued for Construction”.

Measures will be implemented to minimize and control runoff of sediment-laden water during grubbing, and the re-spreading of the grubbed material. Erosion control measures will be implemented in areas prone to soil loss.

Grubbed materials will be stockpiled for use in other areas of the project. Areas used for stockpiling will not be adjacent to any water bodies.

Filling, Excavation, Embankments, and Grading

Excavation, embankment, and grading will only be completed upon conclusion of grubbing and stripping. Where engineering requirements do not require grubbing and stripping, filling shall occur without any disturbance to the vegetation or upper soil horizons. Excavation, embankment, and grading shall be done in a manner which ensures that erosion and sedimentation will not impact watercourses in the area.

4.3.1 Potential Source of Pollutants During Construction

The potential sources of pollutants are generally those associated with land development and construction. Adherence to permit conditions and application of sound construction practices will protect against the release of pollutants into the surrounding environment.

Strict monitoring and sound construction practices will control activities to minimize risks associated with:

- Silt and sediment
- Dust
- Construction debris
- Risk of fuel, lubricant and hydraulic fluid release
- Airborne emissions from construction equipment
- Noise pollution from construction activities

4.3.2 Mitigation Measures During Construction

Mitigation measures to reduce the environmental concerns associated with construction activities include:

- Silt laden runoff from construction areas will not be permitted to discharge directly into any body of water or watercourse. Runoff will be diverted to settling basins to ensure silt is settled out prior to release into the water. Silt fence construction of filter fabric will be used where necessary to preclude release of construction water directly into any body of water. The measures will include natural vegetation buffer, stone rip rap, wire mesh, settling ponds, and drainage channels.

- Efforts will be made to minimize dust generation during the construction phase of the project. Dust from construction activities will be controlled using the frequent application of water. Any application of calcium chloride will be in accordance with applicable guidelines from the Department of Transportation and Works.

- Solid waste disposal practices will be in compliance with the *Environmental Protection Act* and associated regulations. Any construction debris generated during the course of the project will not be permitted to be disposed of on site, but will be contained in steel boxes on site for disposal at a municipal solid waste disposal facility. Where possible, construction waste will be recycled.

- All machinery will be inspected for leakage of lubricants or fuel and must be in good working order. Any accidental spills or leaks will be promptly contained, cleaned up, and reported to the 24-hour environmental emergencies report system (1-800-563-2444).

- All fuel handling and storage will be in compliance with *The Storage and Handling of Gasoline and Associated Products Regulations.* Also, to minimize the risk of fuel, lubricant or hydrocarbon release, construction equipment will not be permitted to be re-fuelled within 30 m of any water body. If fuel storage is necessary, it will be stored only in approved containers with all necessary permits in place. Basic petroleum spill clean-up equipment will be on-site and made accessible to all contractors and/or employees.

- Equipment exhaust systems will be maintained to provide emissions meeting the standards designed for the equipment by the manufacturer.

- Exhaust systems will be maintained to ensure noise levels are within the design specifications of the machinery.

4.4 Operations

The three Kickuth bioreactors are expected to be in operation in the fall of 2005. The Kickuth Bioreactor is a natural treatment process, which consists of a subsurface flow wetland engineered to treat wastewater from a variety of sources. The wastewater would be collected from the residences and delivered to the plant using a conventional gravity collection system. It would then pass into an equalization/settling tank sized and designed by the plant manufacturer for the characteristics of the cluster. The effluent then passes into a reed bed that is comprised of engineered soil and specially selected plants contained in a sealed geomembrane. The wastewater flows under the soil surface through the root zone. Oxygen is delivered to the roots, which supplies the aerobic bacteria/micro-organisms that metabolize the contaminants (see Appendix A, Figure 2). Treated effluent will be discharged via an infiltration gallery into the surrounding soil (visit http://www.abydoz.com/tech01.html for further information).

The system requires minimal operation and maintenance and can have an operational life of up to 100 years.

4.4.1 Potential Source of Pollutants During Operations

The operation of this system is designed to be environmentally friendly and is not expected to impact the surrounding environment. The site will be strictly monitored and sampled throughout operations to ensure that treated effluents discharged into the adjacent environment will meet applicable environmental regulations and guidelines.

4.5 Potential Valued Ecosystem Interactions and Mitigation

Resource Conflicts

Fish & Fish Habitat

The three proposed bioreactor sites are located approximately 50 m to 200 m west of North Arm River (see Appendix A, Figure 3). Although a fish survey has not been conducted, North Arm River is a Scheduled Salmon River and is expected to be habitat for Atlantic salmon and various other fish species.

Construction activities will be conducted in such a manner as to prevent the release of sediment or other deleterious materials into water bodies. These measures are discussed in previous sections.

In addition, the treated effluent from the bioreactors which will discharge to adjacent soil is expected to meet applicable regulations pertaining to the Fisheries Act. The site will be strictly monitored and sampled throughout operations to ensure that treated effluents discharged into the adjacent environment will meet applicable environmental regulations and guidelines.

Human Activities

The entire sewage treatment system is near a residential area. However, the undertaking is not expected to impact everyday human activity given the location of the three sites and the environmentally-friendly process of the system. In addition, should there be any concerns with the accessibility of the sites, each can easily be enclosed with fencing to prevent unauthorized access.

5.0 OCCUPATIONS

5.1 Construction Phase

It is expected that approximately fifty (50) people will be employed during the construction phase of the project.

National Occupational Classification Group Title Code	Potential Positions (# Anticipated)	Description
0711	2	Construction Managers
2152	1	Landscape Architects
2154	2	Land Surveyors
7217	10	Contractors & Supervisors, Heavy Construction Equipment Crews
7219	10	Contractors & Supervisors, Other Construction Trades, Installers, Repairs & Services
72141	1	Electricians
7411	5	Truck Drivers
7412	2	Heavy Equipment Operators
7611	6	Construction Trades Helpers & Laborers
2264	1	Construction Health & Safety Inspectors
7612	10	Other Trades Helpers and Laborers

5.2 Operational Phase

The Kickuth bioreactor requires minimal operation and maintenance. The Town of Holyrood will be responsible for the system once it has been commissioned. It is expected that Holyrood's current town forces will handle any maintenance at the site.

6.0 APPROVAL REQUIRED FOR THE UNDERTAKING

The permits, approvals, and authorizations that may be necessary for the undertaking include:

PERMIT, APPROVAL OR AUTHORIZATION	ISSUING AGENCY
• Approval for the Undertaking	Minister of Environment and Conservation
• Construction (Site Drainage) Certificate of Approval • Culvert Installation, Certificate of Approval • Certificate of Approval – Water and Sewer Distribution System.	Water Resources Division, Department of Environment and Conservation

PERMIT, APPROVAL OR AUTHORIZATION	ISSUING AGENCY
• Crown Lands Applications/Licenses • Develop Land – Protected Road Zoning and Development Control Regulations – Preliminary Application to Develop Land • Electrical Permit	Customer Services, Department of Government Services
• Authorization for Works or Undertakings Affecting Fish Habitat	Fisheries and Oceans Canada
• Permit to Cut Crown Timber • Operating Permit/Fire Season	Newfoundland Forest Service, Department of Department of Natural Resources

7.0 BACKGROUND INFORMATION

7.1 Project Related Documents

Please refer to the following documents for further information:

- **Appendix B** - An Assessment of Alternative Sanitary Sewage Treatment Technologies, Country Path Road, Town of Holyrood, NL.
- **Appendix C** – Green Municipal Enabling Fund, Grant Agreement
- http://www.abydoz.com/tech01.html

8.0 SUMMARY

A study completed in 2001 by BAE-Newplan Group, evaluated both existing and emerging processes to address the specific concerns of Country Path Road. Conventional technologies reviewed included the SBR, RBC, oxidation ditch, and lagoons.

Innovative and emerging technologies reviewed included:

- Sludgemiser and the Blivet (Butler Manufacturing Services (BMS), Ireland);
- The Ecoflo Biofilter and the Rotofix (Premier Tech Environment Ltd., Quebec);
- The Bio-Fosse (Bioflo, Inc., Quebec), recirculating sand filter (ABL Environmental Inc., Nova Scotia);
- The Oxisequencer (Bio Process and Equipment Inc.);
- The Bio Reel (Hydro-logic Environmental Ltd., Ontario);
- The Kickuth Bioreactor (Abydoz Environmental, Newfoundland and Labrador);

Each system was reviewed based upon the characteristics of the construction, operational requirements, automation, level of operator attention, footprint, etc., as well as the suitability for the application in terms of environment, geography and scale of treatment.

The final outcome was that the Kickuth Bioreactor of Abydoz Environmental would be most suitable in application of three systems, one for each cluster. All three sites will be constructed within the same time frame (see Appendix B to view report).

In addition, the undertaking has met the requirements of the Green Municipal Enabling Fund administered by the Federation of Canadian Municipalities (see Appendix C for further details).

9.0 SCHEDULE FOR RELEASE FROM ENVIRONMENTAL ASSESSMENT

Construction of this project is scheduled to begin in June 2005 with a completion date of September 2005. In order to meet this proposed scheduling, the requirements of the *Environmental Assessment Act* must be completed as soon as possible.

10.0 FUNDING

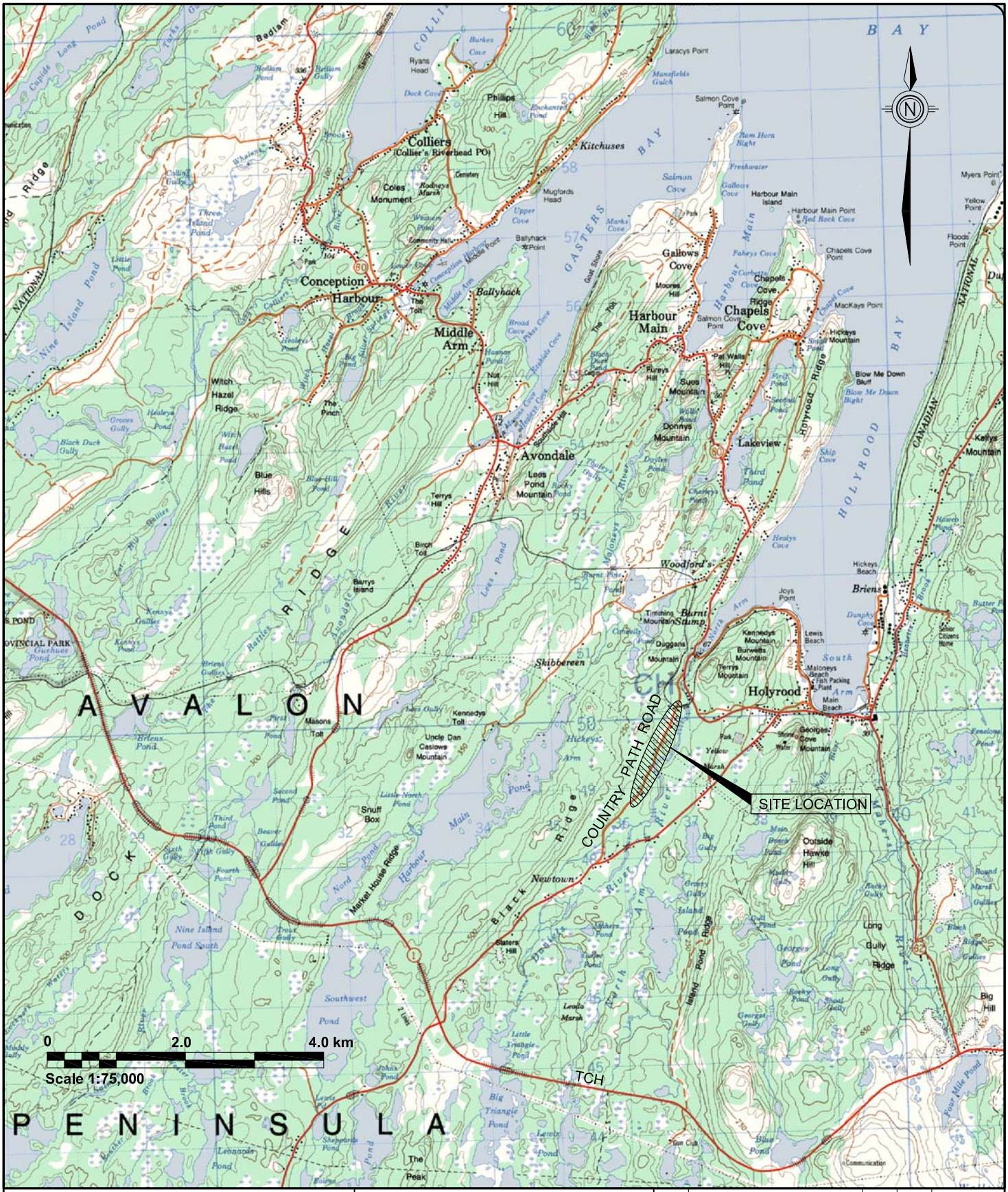
Funding has been provided through the Green Municipal Enabling Fund by the Federation of Canadian Municipalities and the Department of Municipal and Provincial Affairs Canadian Infrastructure Program.

Carole Gillingham, P. Eng. April 5, 2005
BAE-Newplan Group Limited Date

APPENDIX A

Maps and Sketches

Back to Report



REFERENCE FILES:2152CV02

CLIENT:
TOWN OF HOLYROOD
NEWFOUNDLAND & LABRADOR

PROJECT:
COUNTRY PATH ABYDOZ LOCATION OF KICKUTH BIOREACTIORS

DRAWING TITLE:
PROPOSED PROJECT LOCATION
FIGURE 1

BAE • NEWPLAN GROUP

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1133 TOPSAIL RD., MOUNT PEARL, NF, A1N 5G2
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REV.	REVISIONS	BY	APP.	DATE
A	ISSUED FOR REPORT			05-02-22

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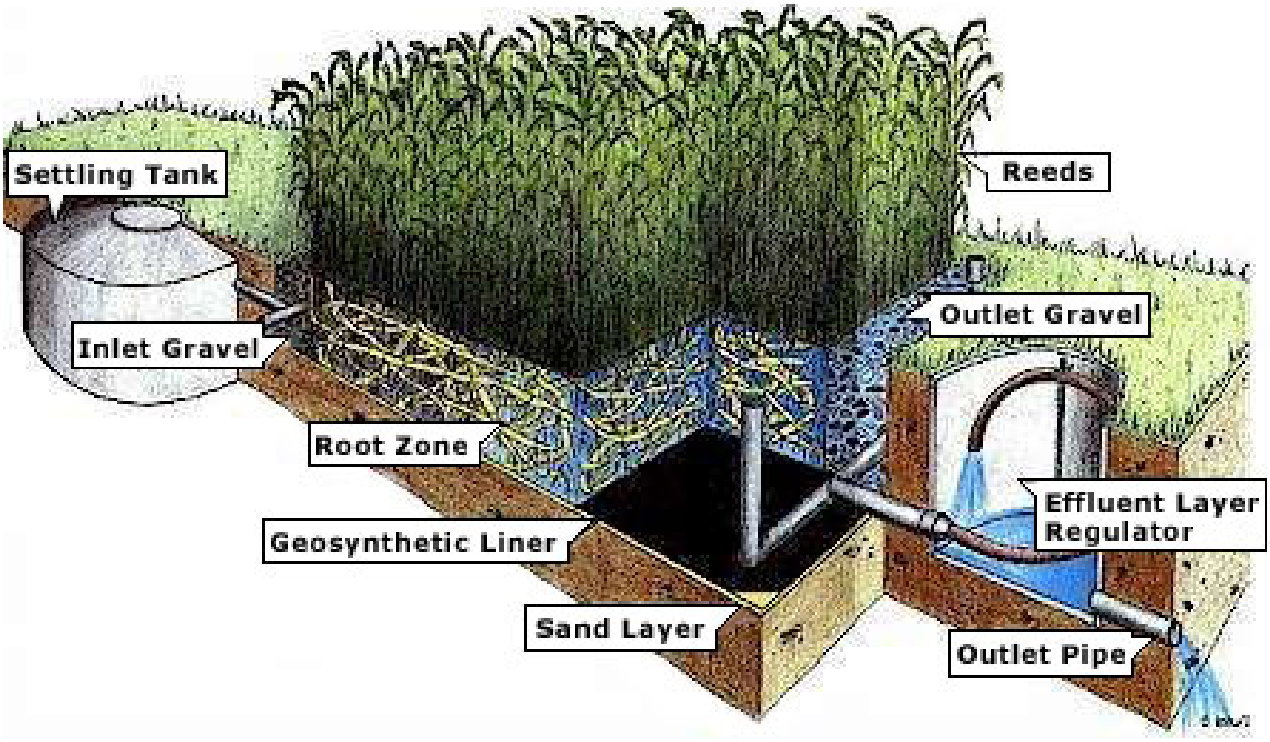

Figure 2

Kickuth Bioreactor

Source: http://www.abydoz.com/