



# Building Better Homes and Communities

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## ACT Solutions

### *Sustainable Aboriginal Demonstration Project Challenges Traditional Practices, Julia Bourke Architecture Inc., Montreal, Quebec*

#### **Issue**

The Mohawk community of Kahnawake, 10 kilometres southwest of Montreal on the south shore of the St. Lawrence River, wanted to develop a culturally and environmentally appropriate community.

The “Kanata Healthy Neighbourhood”, a collaborative initiative of the Kahnawake Environment Protection Office and Kahnawake Housing Department, would be located on a four-hectare (10-acre) parcel of common land in a rural part of the community. This placed the neighbourhood too far from the community’s existing sewage treatment plant for it to be connected to that facility.

Traditionally, sanitary treatment systems for Kahnawake’s rural residential sites consisted of a septic tank connected to a leeching pit. This system was inadequate, though, because of the area’s high water table and clay soil.

An alternative system, and other development aspects of the Kanata Healthy Neighbourhood,

would require changes to Kahnawake’s regulations. It would also require close cooperation between Band Council departments that previously had little interaction.

#### **Plan**

With the assistance of an ACT grant, the project team would undertake the following tasks:

1. analyze construction costs and recommend design or construction changes to stay within the budget of \$65,000 per dwelling for on-reserve housing, to ensure the principles of the demonstration home could be replicated;
2. achieve consensus among Band Council members and the community’s service departments to permit a biological wastewater treatment system; and
3. build consensus among the community’s departments responsible for development to ensure sustained interest in and commitment to the demonstration home and development of the Kanata Healthy Neighbourhood.



**Digger prepares site behind house for biofilter waste treatment installation.**

*Source: Fiset Miller Bourke Architectes*

#### **ACT Project Team**

- Kahnawake Environment Protection Office, Kahnawake Housing Department and Lands Unit advisory steering committee
- Architects, planners, engineers, environmentalists and local builders, led by Julia Bourke, Architect

#### **Results**

##### **Demonstration House**

The initial budget for the house totaled \$89,000, excluding sweat equity and extras that were not

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part of the original design (e.g., earth block wall, slab pigment, milk paint, solar hot water). To meet a base budget of \$65,000, the consultant determined that it would be necessary to employ the following strategies:

- ❑ phase elements — flooring on second level and conversion of ground floor storage to a bathroom to be done at a later time; vestibule and finished attic would be future options;
- ❑ reduce footprint by excluding vestibule;
- ❑ reduce labour and materials — use simpler technologies; reduce the structure and footings to one central post instead of four; eliminate a second bathroom; and
- ❑ increase sweat equity.

### **Wastewater Treatment System**

An engineering study recommended installation of a mechanical aeration system, to provide advanced secondary treatment of wastewater, combined with a reed bed and pond to provide tertiary treatment.

A Waterloo Biofilter® system was favoured by some of the project team members. This system uses a synthetic foam medium to filter and treat the sewage. The foam is similar to what you would find in a mattress, except it is specially formulated to provide ideal living conditions for beneficial microbes.

As sewage from a septic tank trickles through the filter medium, the microbes remove organic contaminants before the water flows into a tile bed. Because the biofilter medium is contained in a tank, it is effective under all soil or drainage conditions and substantially outperforms sand filter beds. It also reduces the need



**Installation of biofilter waste treatment system.**

Source: Fiset Miller Bourke Architectes

to import soil or sand and reduces the space required for tile beds. The treatment system, though, fell between two departmental jurisdictions. Consequently, there was no capacity to evaluate its merits and therefore no immediate support to proceed with installing the Waterloo system. Instead, the demonstration house was initially equipped with a conventional tank and leaching pit system, so that it could be occupied.

The proponents of the Waterloo system didn't give up, however. They eventually obtained \$10,000 from the territory's executive committee to install the Waterloo system, a year after the house was first occupied. It went in without the reed bed and pond called for in the original design.

In the executive committee's view, the pond was not needed because the Waterloo system's advanced secondary treatment already exceeded the standards of the day. The system's proponents, though, still think the reed bed, at least, should be created to remove phosphorous from the treated effluent.

### **Issues and Recommendations**

The project revealed a number of interrelated and complex factors that presented obstacles at various stages of the project. There were administrative issues concerning jurisdiction; a lack of political will, probably due to a lack of solid understanding of the benefits of the Kanata Healthy Housing Project; and the funding rules of Indian and Northern Affairs Canada (INAC) favoured more conventional, centralized sewage treatment systems.

It was thought that acceptance by the Quebec Ministry of the Environment might have favourably influenced the Kahnawake departments responsible for water and sewer systems. Accordingly, it was recommended that Waterloo, and other manufacturers of similar products, obtain Ministry acceptance.

It was also recommended that the Kahnawake Band Council and its departments update their regulations to permit wastewater treatment systems that offer better results than the systems currently permitted. As well, INAC funding

should support the use of alternative solutions that improve environmental quality at less cost than the conventional, centralized model.

Two other infrastructure-related recommendations were:

1. to permit clustering of four to eight houses, with gravel road access rather than paved road; and
2. to reduce road widths for secondary roads not handling through-traffic, as per the Kanata Healthy Neighbourhood design specifications.

Subsequent to construction of the demonstration house, Kanata Healthy Housing proponents held events to raise public awareness and acceptance for their vision. They staged an Open House in June 2001 and have provided tours for members of the community and other interested persons.

The project has also received local media coverage. Ongoing requests for information about the project from outside the community show the public's interest in innovations.

"The housing options, as well as the supporting research and regulatory revision developed through this project, will not only benefit First Nations communities," observed project planner Julia Bourke, "they will have universal application with regard to housing construction and municipal planning procedures."

### **Kanata Healthy Neighbourhood: Six Development Strategies**

1. Achieve economical land use by opting for cluster housing, narrow roads and natural habitat.
2. Employ alternative servicing for 35 homes by using water supplied from two deep wells, two biological treatment systems with mechanical aeration and a polishing pond.
3. Share services for cost efficiencies, better system performance and social benefits through increased interdependency.
4. Plant and grade for technical, social, ecological and economic benefits — employ minimal site clearing and re-grading; use indigenous plants, including edible ones; arrange trees to permit winter passive solar gain, summer shade and wind breaks; eliminate culverts and manage storm water run-off with planted swales.
5. Design for growth by siting houses to permit addition of second homes on quarter-acre plots and additions to individual dwellings to accommodate extended families.
6. Position dwellings to take advantage of passive solar energy.

### **Related reports**

*Kanata Healthy Housing Project: Sustainable First Nations Housing and Development in Kahnawake* (Julia Bourke, Fiset Miller Bourke Architectes, Montreal, 2004)

This report is available from the ACT website. See "ACT projects & solutions".

### **Contact**

Lynn Jacobs  
Environmental Advisor  
Kahnawake Environment Protection  
Office  
Lynn.Jacobs@mck.ca  
450-635-3035

Julia Bourke  
Project Architect  
Julia Bourke Architecture Inc.  
julia@juliabourke.com  
514 931-7501

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c/o The Federation of Canadian  
Municipalities  
Tel: 613-241-5221 ext. 242  
Fax: 613-244-1515  
E-mail: info@actprogram.com

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