# RESEARCH HIGHLIGHT

Technical Series 01-135

# Shared Servicing for Rural Cohousing: A Sustainable Approach to Rural Habitation

## INTRODUCTION

*Shared Servicing for Rural Cohousing: A Sustainable Approach to Rural Habitation* examines the feasibility of developing alternative forms of rural housing based on ecologically sound principles. More specifically, it considers issues relating to the provision of servicing and demonstrates that appropriate methods for developing sustainable rural housing exist.

In Ontario, the development of sustainable housing in rural areas is becoming increasingly important for the following reasons:

- Nitrate contamination of groundwater is common in rural areas and, to some degree, is a result of too many septic tile fields in concentrated areas.
- In rural subdivisions, run-off from an increasing number of impervious surfaces is creating similar problems to those experienced in cities. However, the lakes and streams that receive the run-off are more affected due to their sensitivity.
- Land-use practices are allowing low-density residential housing to be built on Class 1 and 2 farmland.
- The price of rural housing is increasing because urban families are moving to rural areas. As a result, there is a need for affordable rural housing for local people.
- The aging of the population is expected to increase the demand for rural property and the pressure for development.
- Legislation to control the adverse environmental affects of conventional servicing systems is putting more restrictions on the type of properties that can be developed and the form the development can take.

## OBJECTIVES

This report focusses on factors relating to the design, development and servicing of a small rural community. Its primary objective is to investigate and assess the options available for shared servicing for a co-housing community development of 30 dwellings. Co-housing is communal housing created and perpetuated by its members. While the concept can take a variety of forms, it is most often a cluster of dwellings combined with other multipurpose spaces such as daycare and common facilities. By definition, co-housing is a good social model for housing that is compatible with the concept of sustainable development.

A secondary objective of the research is to create a theoretical co-housing community (referred to as Hamlet-Co X) to serve as a basis for analyzing the proposed servicing options in a modelled application.

## RESEARCH PROGRAM

### Methodology

The authors reviewed much of the available information sources from Canada and the United States, including the work of public, private and institutional groups. In addition, corporations and individuals played important advisory roles in the assessment of new and existing servicing alternatives.

The report examines the various options available for water, storm water, heating and energy, and sewerage systems to provide a comprehensive view of the factors involved in creating a sustainable community. It then evaluates the options based on the criteria of energy-efficiency, cost-effectiveness, environmental sustainability and design integration. Finally, it recommends the most appropriate systems for Hamlet Co-X.

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## FINDINGS

### Water

The researchers considered both a groundwater system and surface water supply. Since most rural communities do not have a suitable surface water supply, the groundwater option is proposed for Hamlet Co-X. A surface water supply also has an additional cost for filtration. In addition, a communal groundwater system would be more cost-effective than individual wells because of the economies of scale available by providing water from one source to 30 dwelling units.

### Storm water

The report looks at a number of alternatives for managing storm water including conventional collection systems, modified conventional systems, grassed swales, impoundment, wetlands, infiltration systems, and site, building and landscape design.

For Hamlet Co-X, it recommends a variety of storm water management strategies. These include the following:

- conventional and alternative methods for controlling surface run-off;
- roof leaders discharging into a landscaped depression to allow for infiltration and plant absorption;
- the common building roof tied into drywells for immediate infiltration;
- paved roadways lined with grass swales with infiltration systems; and
- structural means to collect run-off from parking lots and route it into a three-stage wetland system integrated into the design of the site.

### Heating and energy

A variety of energy sources are available to rural homeowners for heating, cooling and operating appliances. These include biofuels such as wood and agricultural waste, electricity, oil, heat pumps, water source heat pumps, ground source heat pumps and heat recovery ventilators. Energy-efficient design, however, is the most effective way to control energy usage for heating and cooling. It includes building technology, passive solar heating and site design, district heating systems, wind power, solar power and cogeneration.

For Hamlet Co-X, the authors propose a ground source heat pump in a district heating system. The savings in capital installation costs for this system could amount to 36 per cent over individual systems.

### Sewerage

Several collection, treatment and disposal systems would be suitable for a rural sustainable housing development. For example, small diameter sewer systems, which are a good alternative to conventional gravity flow collection systems, have proven effective in terms of both cost and performance.

For the treatment of water, a Solar Aquatic system and a Peat Filter system are the most viable options for Hamlet Co-X.

The Peat Filter system offers the highest degree of nitrification while using the least amount of energy. On the other hand, the Solar Aquatic system provides the most all-encompassing treatment, processing all the waste and removing heavy metals.

The system recommended for Hamlet Co-X is Solar Aquatic system with a greenhouse and wetland because its social, economic and environmental attributes provide the most desirable solution.

A communal sewage system using either the Solar Aquatic or the Peat Filter system would cost approximately $100,000 less than individual septic or tile fields.

## IMPLICATIONS FOR THE HOUSING INDUSTRY

While trends in the land development industry in Ontario are shifting towards more sustainable approaches, existing standards for the provisioning of servicing lag behind and restrict the development of alternative communities.

Sustainable rural housing can take many forms, and use a variety of servicing options. One such alternative is clustered, higher-density housing. This form of housing would have less affect on the environment, provide an opportunity for shared servicing and offer significant cost and performance advantages.

For the purposes of this study, the researchers devised a hypothetical community to assist in their analysis of appropriate servicing options for rural applications. They emphasize, however, that an alternative form of rural housing in another context may have other design constraints and different system requirements.

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**Housing Research at CMHC**

Under Part IX of the ***National Housing Act***, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

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