

**CURRENT  
HOUSING  
RESEARCH**

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*CURRENT HOUSING RESEARCH ORDER FORM*

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## INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "Housing Research Quarterly".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

*Current Housing Research* is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);
  
- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."
  
- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

## **CMHC's External Research Program**

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator  
CMHC External Research Program  
Research Division  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Room C7-307  
Ottawa, Ontario  
K1A 0P7

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## NOTE TO INTERNATIONAL CLIENTS

The "*Current Housing Research*" cites research reports and priced publications. **Availability and place of ordering varies with the type of report.**

### PRICED PUBLICATIONS

Publications with prices listed in the "*Current Housing Research*" are available for sale to international clients. Prices are payable in Canadian dollars. Orders can be placed and the exact price, with shipping and handling, can be obtained from the following address:

CMHC Information Products  
P.O. Box 35005  
Stn BRM B  
Toronto, Ontario  
M7Y 6E5  
Tel.: 613-748-2003  
Fax: 613-748-2016

### RESEARCH REPORTS

Research reports are listed without a price in the "*Current Housing Research*". They are free to Canadian residents. However, to recover some of our distribution costs there is a fee to mail research reports to locations outside of Canada. The price for research reports mailed to destinations in the United States is \$10.00 for each report. The price for research reports mailed to destinations in other countries is \$15.00 for each report. Prices are payable in Canadian dollars. Research reports can be ordered from the address listed below:

Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
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Tel.: 613-748-2367  
Fax.: 613-748-4069  
Internet: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

## **TECHNICAL RESEARCH**



## ABORIGINAL HOUSING

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### FIRST NATIONS BUILDERS' TRAINING.

This project was developed in partnership with the Ontario First Nations Technical Services Corporation. The product was a set of technical training materials relevant for First Nations communities. The three day curriculum includes a trainer's manual and a participant handbook containing sections on building envelopes, mechanical systems, flooring, walls and roofs. As well, the curriculum contains leading edge information on wood heating, slab-on-grade and shallow frost-protected preserved wood foundations. The curriculum has been successfully used in several training sessions in Ontario and Saskatchewan.

**CMHC Project Officer:** Alain Croteau

**CIDN:** 1750 0300002

**Division:** Assisted Housing Division

**STATUS:** Completed

**AVAILABILITY:** Publication available in conjunction with training sessions.

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## ACOUSTICS

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### IMPACT ANALYSIS OF INDUSTRIAL NOISE ON SURROUNDING RESIDENTIAL SECTORS: A PICTURE OF THE SITUATION FOR THE BEAUCE AND QUEBEC AREAS.

The research project is aimed at describing the current situation regarding the impact of industrial noise, with the testing being performed in the Quebec and Beauce areas, two regions where there are many industrial parks adjacent to residential sectors.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1845 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Jean-Gabriel Migneron, Université Laval  
1636 Pavillon Félix-Antoine-Savard  
Quebec, Quebec G1K 7P4

**AVAILABILITY:** Publication not yet available

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### NOISE ISOLATION PROVIDED BY EXTERIOR WALLS IN WOOD CONSTRUCTION.

The External Research Program of Canada Mortgage & Housing Corporation accepted the proposal by MJM Acoustical Consultants Inc. to conduct a study on the noise isolation provided by exterior walls in wood construction.

At the time the proposal for this research project was submitted, the acoustical data available on exterior walls was almost non-existent. The main objective of this project was to fill this void by investigating the sound attenuation properties of four exterior walls commonly used in Canadian low cost residential housing.

## ACOUSTICS

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A total of nine Sound Transmission Loss measurements were conducted on the four exterior walls selected: two walls with 38 mm x 140 mm (2" x 6") studs and two with 38 mm x 89 mm (2" x 4") studs. Five tests were carried out on walls with no exterior finishes, and four on walls with PVC cladding. All the wall compositions selected had a thermal insulation factor of RSI 3.5 (R20). In order to establish the effect of varying the stud spacing, one sound transmission loss test was performed on a wall whose studs were spaced 600 mm (24") apart; the rest of the specimens were constructed with studs spaced at 400 mm (16") o.c. which is presently the stud spacing most often used for exterior walls in Canadian construction. The interior finish was the same for all the walls tested: 13 mm (1/2") drywall located on the receiving room side (the large reverberation chamber). The exterior side of the wall was located on the source room side.

*Prepared by Michel Morin, MJM Acoustical Consultants Inc. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program).*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
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## BASEMENTS, FOUNDATIONS & CRAWLSPACES

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### **BASEMENT WALLS THAT DRY.**

Research has shown that finished basement walls, with chronic wetting, produce molds dangerous to human health. This research suggests that no basement with a history of dampness should be finished until the moisture problems are completely remedied. This project tested theoretically quick-drying basement wall systems, in hopes of being able to recommend these systems for marginal basements. They were subjected to a mid-wall leak and a 10 cm flood to measure the drainage and drying characteristics. A final report is in preparation. Only two of the ten wall types tested showed good drying response after wetting by leakage and flooding.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1797 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# BASEMENTS, FOUNDATIONS & CRAWLSPACES

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## IMPROVED BASEMENT PERFORMANCE.

Concerns have been expressed by a number of authorities about the quality of construction of new basements. Technical and cost issues pertaining to the overall performance of poured-in-place concrete basements will be examined. The Canadian Standards Association (CSA), with CMHC and industry support, will improve the standard CAN3-A438-M84: Concrete Construction for Housing and Small Buildings. This standard addresses requirements for poured-in-place concrete basements. Several task groups are working to update this standard.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1259 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## LATERAL BRACING OF FOUNDATION WALLS.

At the request of the Alberta Housing Industry Technical Committee (AHITC) this study was initiated to investigate the structural adequacy of typical concrete residential foundation walls to resist lateral earth pressures.

The study objectives were to include a review of the adequacy of current construction practices to resist lateral earth pressures. Both 8'-0" (2.44m) high and 9'-0" (2.74m) high concrete foundation walls were examined subject to four different backfill pressure intensities, and various backfill heights. Then, based on the results of the investigation, the second objective was to develop detailed, generic, practical, and cost effective solutions of lateral bracing details for the top of wall connections, where such details are required. These lateral bracing details were to be applicable to both conventionally framed and wood I-joist floor systems.

Overall the scope of the project was limited to typically constructed, residential concrete foundation walls 8" (200mm) thick by either 8'-0" (2.44m) or 9'-0" (2.74m) high. Maximum sidewall and endwall dimensions of 60'-0" (18.3m) and 30'-0" (9.14m) respectively were assumed. As well, deviations in the wall including short angled walls, beam pockets, areas adjacent to stairwell openings and areas surrounding large windows were studied. Based on the results of the study, a number of interesting points were revealed:

1. The recommended lateral earth pressures are significantly higher than the building code specified minimum value.
2. The nominal strength of the concrete wall is substantial and therefore vertical reinforcement may not be required in many situations; however for high backfills, suggestions for reinforcement are made.
3. The industry standard practice for top of wall connections is in general not adequate to resist the calculated lateral forces. Recommendations for improving this connection are made.
4. The use of short angled walls and beam pockets to laterally stabilize the wall were found to be neither practical nor effective ways to provide the required support.
5. The effects of window openings in the wall and stairwell openings adjacent to the wall were examined and recommendations for local reinforcement around these areas are provided, as well as lateral bracing requirements each side of such areas.

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

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*Prepared by Kelly Grubb, Bearden Engineering Consultants Ltd. CMHC Project Officer: Darrel R. Smith.  
Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

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### **PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS.**

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Guidelines will be developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. Field work is largely complete. The reports on various aspects are being written.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1421 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **SLIDE PRESENTATIONS ON TWO FOUNDATION TYPES AND TO MONITOR THE PERFORMANCE OF THE EXAMPLES OF THE TWO FOUNDATION SYSTEMS.**

The purpose of this project is to undertake and complete the development of two slide presentations and the monitoring of two foundations over a one-year period.

**CMHC Project Officer:** Tom Kerwin

**CIDN:** 1813 030000

**Division:** Research Division

**STATUS:** Ongoing Project

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## BUILDING CODES & STANDARDS

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### **THE FUTURE OF CANADIAN STANDARDS FOR RESIDENTIAL CONSTRUCTION.**

The objective of this project is to build on the March/97 report of the Joint Task Force of the Canadian Commission on Building and Fire Codes/Provincial/Territorial Committee on Building Standards (PTCBS/CCBFC) by documenting recent changes in standards specifically related to the housing industry.

**CMHC Project Officer:** Doug Pollard

**CIDN:** 2027 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## BUILDING MATERIALS

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### ADJUST-A-FORM.

The objective of this project is to develop ideas for adjustable, reusable forms. Specifically the project includes the inception to the development of a specific product ready for marketing. The end result will be a product that saves builders time and material and therefore project costs.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1501 0200001

**Division:** Research Division, Housing Technology Incentives Program

**STATUS:** Ongoing Project

**Grant Recipient:** Raymax Construction Limited  
1038 Lesperance Road  
Tecumseh, Ontario, N8N 1W8

**AVAILABILITY:** Publication not yet available

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### BUILDING AND RENOVATING WITH SALVAGED MATERIALS: A REUSE WORKPLAN.

The objective of this project is to develop and test design procedures and specification guidelines in the form of a workplan by which design professionals and builders can effectively salvage and reuse materials in building projects including demolition and renovation or new construction at a residential scale.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2023 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Mark Poddubiuk, Pearl Poddubiuk Architects  
995 Girouard  
Montreal, Quebec H4A 3B9

**AVAILABILITY:** Publication not yet available

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### COMPRESSED EARTH BLOCK CONSTRUCTION.

The objective of this project is to officially approve the material “earth”, to allow architects, builders and self-builders to make use of earth construction.

**CMHC Project Officer:** Chris Ives

**CIDN:** 2004 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Ginette Dupuy-Gouin  
5920 Louis-Hémon  
Montreal, Quebec H2G 2K6

**AVAILABILITY:** Publication not yet available



## BUILDING MATERIALS

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### INFORMATION ON DURABILITY AND SERVICE LIFE OF BUILDING ELEMENTS AND EQUIPMENT.

A Delphi study is currently underway to collect information from property managers, property management firms and experts in differing fields such as ventilation systems, elevators, walls, parking garages, etc., to determine, from their experience, the service life of these elements. The study is expected to provide data on building elements which in some cases would have low or high durability variances. Follow-up research could then be undertaken to investigate why those building elements have these high variances.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 1915 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### PERFORMANCE OF BOX BEAMS.

The objective of this project is to review the design specifications, production, assembly, and testing/monitoring criteria for box beams, and finalize the design and details of production and testing and monitoring protocol.

**CMHC Project Officer:** Glynis Kossatz

**CIDN:** 1176 0200001,  
1348 0200001

**Division:** Research Division, Housing Technology Incentives Program

**STATUS:** Ongoing Project

**Grant Recipient:** Art Wloski  
4133 Northcliffe Avenue  
Montreal, Quebec, H4X 3L2

**AVAILABILITY:** Publication not yet available

---

### RE-USE: INTEGRATION OF USED BUILDING MATERIALS INTO NEW CONSTRUCTION.

The objective of this project is to promote the practice of re-use of building materials as a viable approach in the 3Rs of sound environmental practice for the construction industry, presently including waste management through recycling and reduction. Research will address 4 main concerns: economic, environmental, legislative/practical and perceptual -- presently barriers to viability in practice.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1842 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Mark Poddubiuk, Pearl Poddubiuk Architects  
995 Girouard, Montreal, Quebec, H4A 3B9

**AVAILABILITY:** Publication not yet available

## BUILDING MATERIALS

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### **VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS.**

The objective of this project was to develop a bilingual web site which will serve as an on-line catalogue/sample room of building materials that provide low environmental impacts. It will serve anyone involved in the selection of the various building materials that go into residential buildings such as architects, builders, renovators, property managers, and homeowners. The site contains pictures of the products, the evaluation matrix, and the manufacturers information. This is a multi-partnered project including Public Works and Government Services Canada, Department of National Defense, Natural Resources Canada, Rural Municipality of Waterloo, and Human Resources Development Canada. The site is relatively small at present but it is expected to grow over the coming months following promotion of the site. It can be visited at [www.sampleroom.buygreen.com](http://www.sampleroom.buygreen.com).

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1986 0200001

**Division:** Research Division

**STATUS:** Completed

**AVAILABILITY:** See above.

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## CONCRETE

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### **DEVELOPMENT OF A NEW EDITION OF THE STANDARD FOR CONCRETE CONSTRUCTION FOR HOUSING AND SMALL BUILDINGS (CSA A438).**

The purpose of this project is:

- ◆ to carry out a review of the literature pertaining to current failures of concrete in residential basements, specifically addressing the high incidence of foundation wall cracking and water penetration.
- ◆ to determine how the delivered ready-mix might be improved in crack-resistance and how on-site concreting practices might be remedied; and
- ◆ to bring standard A438 into line with the requirements of the 1994 edition of CSA 23.1 Standard Concrete Materials and Construction.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1259 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available.

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### **INVESTIGATION AND REPAIR STRATEGIES FOR CONCRETE CONSTRUCTION AND CATALOGUE OF INNOVATIVE CONCRETE ASSESSMENT AND REPAIR TECHNOLOGIES.**

The purpose of this project is to create a survey questionnaire on concrete assessment, repair and monitoring strategies and report on existing protocols regarding concrete problems in multi-unit residential buildings.

**CMHC Project Officer:** Silvio Plescia

**CIDN:** 1890 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## CONCRETE

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### STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS.

This project will research current assessment, monitoring and repair strategies for concrete repair. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (eg. CSA) will be catalogued. This research will provide consultants, contractors and building owners with available protocols and concrete repair strategies.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1890 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## CONSUMER PROTECTION

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### ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION.

The Canadian Home Builders Association (CHBA) has expressed a concern that, in housing construction, it is becoming less clear who is liable for specific aspects relating to the house. They also are concerned that, as a result of cutbacks, municipalities are not carrying out inspections to the extent they once did and may be losing the capacity to properly enforce building regulations. This joint project, co-funded by CMHC and CHBA and managed by CHBA, will produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable. It will serve as the basis for discussion on these issues and for further study. The National Research Council (NRC) will also be a participating partner as the agency responsible for code development. An initial draft has been prepared and the project was extended to include provincial consultations at CHBA's request. A revised draft report is being reviewed.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 1920 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## CONTAMINATED LANDS

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### DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS.

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1946 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## DOORS AND WINDOWS

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### DESIGN OF DURABLE JOINTS BETWEEN THE WINDOWS AND THE ENVELOPE.

The objective of this project is to establish construction, parameter and calculation method concepts to improve the durability of joints between walls and windows.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1839 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient :** Mario Petrone, Petrone Architecte  
200-2545 Delorimier Street  
Longueuil, Québec J4K 3P7

**AVAILABILITY:** Publication not yet available

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### INFLUENCE OF AIR INFILTRATION ON THE ENERGY EFFICIENCY OF RESIDENTIAL WINDOWS.

The objective of this project is to propose a new way of accounting for air infiltration in energy efficiency calculations for windows.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 2002 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Michel Bernier  
Department of Mechanical Engineering, École Polytechnique  
P.O. Box 6079, Station CV  
Montreal, Quebec H3C 3A7

**AVAILABILITY:** Publication not yet available

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### RETROFIT AND REMEDIAL WORK ON EXISTING SLIDING DOORS AND WINDOWS.

Aluminum sliding windows and doors help clad a significant proportion of the residential building stock in Canada. Since their appearance on the market in the 1950's, they gained in popularity and use due to their relative low cost, simple installation, and ease of maintenance. Deterioration of the original weatherstripping results in assemblies with poor air leakage performance and other incidental anomalies. Nationwide replacement of these windows and doors with more energy efficient models is a difficult and expensive undertaking.

It was the purpose of this study to analyse the alternatives which can be used to upgrade these windows rather than to completely replace them. By simply changing or replacing certain components, it was found that significant improvements could be achieved to the air leakage resistance of these units. Most of these upgrades, such as changing deteriorated weatherstripping gaskets with more efficient models, are relatively simple tasks which could be carried out by a building superintendent with some special training. The modified or upgraded doors and windows could thus obtain air leakage performance comparable to new windows on the market today. The costs associated with the implementation of such modifications are considerably less than those expected for complete replacement.

## DOORS AND WINDOWS

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*Prepared by: Jozef Zorko, Desnoyers Mercure Inc. and Dominic Chiovitti, Patenaude Chiovitti Inc. CMHC  
Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External  
Research Program)*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

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## ENERGY CONSERVATION

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### **BUILDING ENERGY ESTIMATION METHOD BASED ON FUZZY LOGIC AND NEURON NETWORKS.**

The objective of this project is to establish a rapid building energy estimation method based on fuzzy logic and neuron networks.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1841 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Stanislaw Kajl, Université du Québec,  
INRS - Urbanisation in Montréal  
3465 Durocher Street  
Montreal, Quebec H2X 2C6

**AVAILABILITY:** Publication not yet available.

---

### **CMHC EMPTIED HEAT, AIR AND MOISTURE TRANSPORT MODELLING PROGRAM.**

The purpose of this project is to provide engineering services to upgrade the CMHC EMPTIED Program from a DOS to Windows environment and to compile the necessary weather data to allow the program to evaluate the performance of wall systems in major cities of the U.S.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1107 0300003

**Division:** Research Division

**STATUS:** Ongoing Project

# ENERGY CONSERVATION

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## COMMUNITY ENERGY SYSTEMS (CES).

This project, in partnership with the CES group at Natural Resources Canada (CANMET), was conceived to investigate optimization of building/CES infrastructure investment. A research contract has been awarded to develop guidelines on the design of residential building HVAC systems that would render them retrofit ready for CES or other sources of low temperature energy with particular attention given to its use in hydronic heating systems.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 1570 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available.

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## ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS.

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of the first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1899 0200002-3

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS.

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing, is in the process of developing a manual that details energy efficiency measures for existing multi-unit residential buildings. The document will be based on one originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual will offer proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A project steering committee consisting of members of the housing, utilities and government agencies has been formed to provide comment on the manual as it is developed. Publication of the manual is expected in 1999. The manual will be modularized and provided in such a format that will be easily updated over time.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1887 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## ENERGY CONSERVATION

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### **FIELD INVESTIGATION OF ENERGY IMPACT OF CORRIDOR AIR VENTILATION SYSTEMS.**

A research project has been initiated to study the seasonal impact of the operation of corridor air ventilation systems in multi-unit residential buildings on heating season energy consumption. Traditionally, it was assumed that corridor air systems should be shut down during periods of low occupancy and/or occupant activity in order to reduce energy consumption. However, it is also suspected that shutting off a natural gas-fired corridor air system in an electrically heated building, may actually increase energy consumption. Both of the aforementioned assumptions are based on the theory that corridor air systems are capable of effective and efficient air delivery - which is now known to be incorrect. The research will attempt to determine the influence that the operation of corridor air systems within 4 buildings has on energy consumption. The systems will be cycled on and off over a sufficient period to allow for an analysis of trends in resultant energy consumption. This study will help to characterize the costs of operating corridor air systems and will also serve to identify energy efficiency strategies.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1934 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **FOUNDATION PAPER ON COMMUNITY ENERGY PLANNING.**

Following the recent Kyoto summit on climate change, the federal government recently established fifteen "Issue/Sector Tables" to examine the costs and impacts of implementing Canada's greenhouse gas reduction targets. CMHC is a member of the "Municipalities Table" and co-chairs the subcommittee on "Community Energy Planning" (reporting to the Municipalities Table). CMHC recently funded the development of a Foundation Paper on Community Energy Planning to examine the potential energy savings and greenhouse gas emission reductions associated with integrated transportation and land-use planning, community energy systems (cogeneration, district heating, etc.), and other energy management options.

**CMHC Project Officer:** David D'Amour

**CIDN:** 2078 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **INTERNATIONAL ENERGY AGENCY (IEA) : ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS.**

This three-year project, scheduled to end in 1999, is an IEA activity in which 14 countries are collaborating in the development of life-cycle energy modelling. Information will be compiled and published on the methodology and life-cycle environmental impact data. Examples will be developed of how methods may be applied to different building types and sources of expertise, with the potential for extending the influence of the task directly into academia. CMHC is acting as the Operating Agency for this project.

**CMHC Project Officer:** Jim Robar

**CIDN:** 1629 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## ENERGY CONSERVATION

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### LABORATORY TESTING OF DENSE PACK CELLULOSE FOR ATTIC INSULATION.

Some insulators claim that dense packing of cellulose insulation into hard to reach cavities (e.g. flat roof attics) prevents air movement along with providing insulation. Hydro Québec looked at the technique for upgrading attic insulation of flat roof housing, largely in Montreal. CMHC and the Société d'habitation du Québec (SHQ) also contributed funds to this project. The field work is complete. CMHC is discussing with Hydro Québec ways of publishing the report or a condensation of its findings.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1377 02010001,  
1377 08010001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### OPTIMIZE: A METHOD FOR ESTIMATING THE LIFECYCLE ENERGY AND ENVIRONMENTAL IMPACT OF A HOUSE.

This computer program estimates the lifecycle energy requirements of a house as well as determining associated emissions. The program has been revised from a spreadsheet to a database to improve the instructions and user interface, and the computational speed. The application of the program is being expanded to include multiple, non part 9 national building code residential buildings by using Optimize to assess the lifecycle energy performance of the Conservation Co-op building in Ottawa.

**CMHC Project Officer:** Thomas Green

**CIDN:** 0865 0201002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### A PHYSICAL CONDITION AND IAQ CHECKLIST FOR NRCAN'S ENERGUIDE FOR HOUSES RATING SYSTEM.

Natural Resources Canada (NRCan) and a number of industry stakeholders have developed a Canadian home energy efficiency rating system for existing homes. The rating is based on a visual evaluation of the house condition, a blower door test and energy data collection which is analyzed using a computerized tool to identify the energy utilization of a new and/or existing home. The house is then plotted on an energy utilization scale as it compares with performance criteria and assigned a numerical rating. The overall goal of this system is to reduce CO2 emissions on the environment. This CMHC project involved the production of an evaluation "checklist" that is used to assess the physical condition and indoor environment of a house. This checklist is complete and will be incorporated as part of NRCan's EnerGuide for Houses Program.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1922 0200001

**Division:** Research Division

**STATUS:** Completed; see above



## ENERGY CONSERVATION

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### RE-INSULATING WITHOUT ANY CONDENSATION PROBLEMS - EFFECT OF ADDING INSULATION ON THE DISPERSAL OF EXFILTRATING AIR.

The objectives of this project are: 1. To test a method of characterizing air exfiltration, experimentally and analytically. 2. To determine the impact of two insulation strategies - from inside and from outside - on the dispersal of exfiltrating air through various types of joints.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1853 200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Dominique Derome, Concordia University  
1455 de Maisonneuve Blvd. West  
Montreal, Quebec H3G 1M8

**AVAILABILITY:** Publication not yet available

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### RENTAL STOCK ENVELOPE SURVEY.

The STAR Database, used for modelling Canadian housing performance, requires data from a representative number of rental houses. This project will look at rental housing stock to see how it differs from owner-occupied stock and will examine how rental stock could be suitably sampled for inclusion in the STAR Database.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1766 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### SUPPORT FOR THE ENERGETIC STUDENT TRAINING NETWORK.

CMHC is contributing to a project by SIRICON using the Internet to educate students in 20 Québec high schools on the principles of building science and house energy auditing. The WEB site is now complete and schools are participating. The Spring 1998 interim report showed that there were few schools who could participate over the 1997/98 school year. SIRICON intends to develop a larger sample of schools.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1822 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### UPDATING THE AIRTIGHTNESS TESTING STANDARD.

The airtightness testing standard, Canadian General Standards Board (CGSB) 149.10, was published in 1986 and requires updating and simplification. CMHC has engaged CGSB and a contractor to undertake this work in 1998/99. A draft standard has been submitted to CMHC for review and detailed appendices are being rewritten prior to sending the standard out for ballot.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1971 0200001,  
1971 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## FIRES & FIRE PREVENTION

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### **CLEANING UP YOUR HOUSE AFTER A FIRE.**

This booklet, one of a series, will offer practical advice on what should be done to avoid health problems when moisture problems or calamities occur. After a fire there can be ongoing smoke and mold problems that can seriously affect the health of occupants. A point-form reference card, that is intended to be hung by the furnace, is also being written and will be available from fire departments.

**CMHC Project Officer:** Ken Ruest

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **THE COSTS AND BENEFITS TO MUNICIPALITIES OF MANDATORY RESIDENTIAL FIRE SPRINKLERS.**

This multi-year study is examining the financial impact on municipalities if all new housing was required to have fire sprinklers. A complementary study is assessing the change in life risk from fire. The work is being undertaken by Arencon Inc., Clayton Research Associates, and the National Fire Laboratories/NRC and is funded by CMHC, the Ontario Ministry of Municipal Affairs & Housing and the Office of the Ontario Fire Marshall.

The study uses a case study approach to assess the changes in costs and benefits that could occur if municipalities were to adopt mandatory sprinkler requirements for all new residential construction. There are six case study sites: Barrie and Burlington, Ontario; Pitt Meadows, B.C; Edmonton, Alberta; Kawacatoose First Nation, Saskatchewan; and Gatineau, Québec. The data collection, interviews with municipal and fire officials, economic and risk analysis are completed. The results were presented for review at a stakeholder forum and the final draft has been circulated to stakeholders for a final review. The report is expected to be available by the end of 1998.

**CMHC Project Officer:** Mark Holzman

**CIDN:** 1235 0300002

**Division:** Research Division

**STATUS:** Completed

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### **INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION.**

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings will be evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. If successful, PPV may offer Fire Departments an effective, low cost life and property saving tool.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1983 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## FIRES & FIRE PREVENTION

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### **IT COULD NEVER HAPPEN TO ME, HIGH RISE FIRE SAFETY KIT.**

This high rise fire safety kit consists of a videotape training program for use within the fire service; a videotape targeted to the general public; and public service announcements for radio and television promotion. Appropriate safety messages include proper evacuation procedures, the importance of insurance coverage, and residential prevention measures, such as smoke alarms, fire extinguishers and a family escape plan. This information is applicable to all people who live in high-rise buildings, but also to persons who visit or stay in high rise buildings for short periods of time, such as in hotels. CMHC was a partner in the development of these materials as part of a national high-rise fire safety education campaign.

**CMHC Project Officer:** Thomas Green

**CIDN:** 1610 0300

**Division:** Research Division

**STATUS:** Completed Project

**AVAILABILITY:** Carleton Productions International  
P.O. Box 5069, Merivale Depot  
1500 Merivale Road, 5th Floor  
Ottawa, Ontario  
K2C 3H3  
Phone: (613) 224-9666

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### **LEARN NOT TO BURN CURRICULUM FOR ABORIGINAL COMMUNITIES.**

The purpose of this project is to modify the Learn Not to Burn curriculum, successfully developed and used by the U.S. National Fire Protection Agency (NFPA), for usage in Canadian First Nations communities. The Aboriginal curriculum has been developed by the Assembly of First Nations, with the assistance of the NFPA, the Aboriginal Firefighters' Association and CMHC, pilot tested in several First Nations classrooms, and will be available for K-2 modules in 1999.

**CMHC Project Officer:** Alain Croteau

**CIDN:** 1719 0300001

**Division:** Assisted Housing Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## FLOODS

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### **THE JULY 1996 DISASTER IN THE SAGUENAY: THE EXPERIENCE OF REDEFINING A HABITAT.**

The objective of this project is to understand and analyze the adaptation and integration mechanisms set up by families in rebuilding their homes following a natural disaster.

**CMHC Project Officer:** Marcel Boily, Chicoutimi Branch Office

**CIDN:** 1833 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Danielle Maltais, Université du Québec à Chicoutimi  
555 de l'Université Blvd.  
Chicoutimi, Quebec G7H 2B1

**AVAILABILITY:** Publication not yet available

## HEATING & VENTILATION

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### **CARPET STREAKING . ABOUT YOUR HOUSE; CE14**

Carpet streaking is permanent, dark staining near baseboards, air registers, under doorways, and in other areas where moving air may filter through rug fibres. What causes it, how to avoid it and what to do if you have it, are all covered in this handy fact sheet.

May be of interest to homeowners, builders and renovators, carpet retailers, carpet cleaners, property managers, building inspectors, etc.

*Ottawa: Canada Mortgage and Housing Corporation, 1999.*

**STATUS:** Completed Factsheet, 2-pages (8-1/2 x 11), black & white.

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

NOTE: Aussi disponible en français sous le titre: *Taches en traînée sur les moquettes.*

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### **EVALUATION OF RESIDENTIAL, IN-DUCT AIR FILTERS.**

There are many residential air filters that have appeared in the last several years, providing an abundance of choice for consumers. Unfortunately, consumers have little objective information on the relative performance of these filters. This project is testing the performance of different filters, from disposable fiberglass to electrostatic precipitators, in houses. The contractor has looked at how air filtration affects the levels of particulates (dust) in housing, and at the production of ozone by electrostatic precipitators. Testing is complete in the six sample houses and data analysis is in progress. Twenty houses with existing electrostatic precipitators have been sampled for indoor ozone concentrations in late Fall of 1998. Preliminary analysis shows that good filters do remove particulates at rates that are close to their rated performance. However, the use of a good filter will not necessarily render house air pristine due to large particulate sources both inside and outside the house.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1620 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HEATING & VENTILATION

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### FIELD SURVEY OF HEAT RECOVERY VENTILATION SYSTEMS.

This research assessed the ability of occupants to operate and maintain HRV systems and the effects of maintenance on system performance. It also evaluated the ventilation effectiveness of common HRV installation methods and several other innovative ventilation systems for new and retrofit installations. The project involved the inspection of 60 houses with heat recovery ventilation systems, a survey of the occupants to determine their understanding and usage of their ventilation systems, telephone surveys of a further 15 households and intensive performance testing of 20 conventional and four experimental ventilation systems.

The research concluded that common conventional approaches to HRV installation were capable of ventilating houses in an effective manner. The majority of the HRV systems inspected were used and the occupants believed that the use of the HRV system was beneficial. While most occupants understood the intent of the systems, few were fully aware of all of the considerations involved in the operation and maintenance of these relatively complex systems which was reflected in the condition of the HRV installations. The study found that considerable improvements are possible in installation practice, system performance, occupant understanding and interaction with their ventilation systems.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1376 0200001

**Division:** Research Division

**STATUS:** Completed

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### FIELD TESTING TO CHARACTERIZE SUITE VENTILATION IN RECENTLY CONSTRUCTED MID- AND HIGH-RISE RESIDENTIAL BUILDINGS

This report provides a snapshot of suite ventilation in recently constructed mid- and high-rise residential buildings in Canada. The purpose of this study was to clarify if current code requirements and HVAC design practices are ensuring that suites are being properly ventilated under typical operating conditions.

This study examined one suite in each of ten buildings that are located in major cities across Canada. Field performance tests showed suite ventilation to be highly influenced by weather, location within the building, and treatment of both interior and corridor access doors. As a result, ventilation within a suite at any given time is very difficult to predict. Furthermore, for all intents and purposes, ventilation in these buildings is uncontrolled.

The greatest concern raised by this study is the amount of transfer air that is part of ventilation air in the suites tested. Large amounts of transfer air from other occupied suites in the building may compromise the quality of ventilation air entering suites. Although not part of this study, large amounts of transfer air during a fire emergency may also increase the danger to occupants as fire and smoke spread within the building.

To ensure suite ventilation is both controlled and adequate under normal operating conditions, the building industry will need to develop and follow a strict set of ventilation design practices. New practices should not compromise safety or create excess energy use.

## HEATING & VENTILATION

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*Prepared by Sheltair Scientific Ltd. Prepared for Innovation Centre for High-rise and Multiples, Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Duncan Hill. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

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### **FIELD TESTS OF VENTILATION SYSTEMS DESIGNED TO MEET 1995 NBC.**

This study concerns new houses designed and built to provincial or municipal codes that require the 1995 National Building Code. Ventilation requirements in recent Canadian building codes have become more complex and problematic to builders. The ventilation design needs to balance fresh air and exhausting air, and to consider house depressurization factors. The research team is performing air testing on thirty new houses to verify their compliance with code required ventilation. Houses will be tested in the western provinces, the North, and the Maritimes.

**CMHC Project Officer:** Don Fugler

**CIDN:** 2062 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **HVAC SYSTEMS OF MID AND HIGH-RISE RESIDENTIAL BUILDINGS.**

An evaluation of the mechanical systems of 25 mid and high-rise residential buildings has been performed in order to determine the changes in design and installation practices required by the 1995 National Building and Energy Codes. Additionally, the performance of the mechanical ventilation systems has been assessed in 10 buildings in terms of design criteria, design procedures, system strategies and installed performance levels. The research found that air tends to move through apartment buildings more by accident than design. This is due to a lack of information on the environmental conditions and building physical characteristics that govern natural and mechanical air flow. Consequently, it is difficult to ensure that there is adequate fresh air delivery to any point in a building, given conventional mechanical air system design. This information will be used to produce advisory documents showing how to meet codes and improve system performance. Final report is in production.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1424 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HEATING & VENTILATION

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### IDENTIFYING AND REMOVING POLLUTANTS FROM HEAT RECOVERY VENTILATORS.

The objective of this project is to determine whether dedicated ventilation systems harbour unhealthy levels of dust, mould and/or fungi; whether existing duct cleaning methods are successful at lowering those levels; and to develop recommendations and guidelines for builders and homeowners for the maintenance of dedicated residential systems.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1652 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Terry Watters  
Rural Route #3, Comp 308  
Wolfville, Nova Scotia, B0P 1X0

**AVAILABILITY:** Publication not yet available

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### LOW TEMPERATURE HYDRONIC HEATING SYSTEMS.

The objective of this project is to investigate low temperature hydronic systems (LTHS) as an energy option and identify additional information and action needed to assess, document, and appropriately advance LTHS.

**CMHC Project Officer:** Peter Russell

**CIDN:** 1570 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### MARKET VIABILITY OF INTEGRATED APPLIANCES IN CANADIAN MULTI-FAMILY MARKETS.

The purpose of this project is to provide financial support to establish a research consortium made up of members of the housing research community, utilities, manufacturers and suppliers of heating, ventilating and air-conditioning equipment and other relevant public and private agencies to research, analyse and report on the technical and market viability of integrated natural gas-fired appliances for multi-unit residential buildings.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 2045 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### MONITORING A DUEL HEATING SYSTEM INSTALLATION.

This research will monitor and assess the performance of a dual fuel heating system in an 89 suite apartment building.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1899 0200004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HEATING & VENTILATION

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### **PART-LOAD AND FROSTING CONTROL FOR ROTARY ENERGY WHEELS USED IN RESIDENTIAL BUILDINGS.**

The objective of this research is to determine the performance of rotary energy wheels, also called enthalpy wheels, for ventilation air exchange in residential buildings while subjected to a wide range of operating conditions.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 2007 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Robert W. Besant  
Dept. of Mechanical Engineering, University of Saskatchewan  
57 Campus Drive  
Saskatoon, Saskatchewan S7N 5A9

**AVAILABILITY:** Publication not yet available

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### **PERFORMANCE QUANTIFICATION ON SINGLE WELL HEAT PUMP.**

The objective of this project is to quantify the performance of an existing open loop ground source heat pump system which uses a single domestic water well for both its supply and discharge requirements, and to demonstrate that a single well can be used as both the supply and discharge source for open loop ground water heat pump systems.

**CMHC Project Officer:** Chris Ives

**CIDN:** 1267 0200001

**Division:** Research Division, Housing Technology Incentives Program

**STATUS:** Ongoing Project

**Grant Recipient:** Bob Vasily and Associates  
RR #1  
Seeley's Bay, Ontario, K0H 2N0

**AVAILABILITY:** Publication not yet available

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### **RESIDENTIAL MECHANICAL VENTILATION SEMINARS.**

This was a partnership project between CMHC, HRAI and NRC. NRC was responsible for the development of the material as well as the promotion and delivery of the seminars. HRAI was the delivery agent. The objective was to develop and deliver a one day seminar on residential mechanical ventilation and the 1995 National Building Code requirements. It covered the need for ventilation in relation to indoor air quality and the benefits that it provides to the occupants. Common, affordable ventilation system options which satisfy the code requirements were discussed in detail. Options included systems that are coupled to ducted heating systems as well as those which were not. It was targeted to builders and home inspectors. The seminar was suitable for delivery in all provinces and territories which had adopted the 1995 NBC. CMHC is considering a partnership to continue offering these seminars throughout Canada in 1999.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1972 0200001

**Division:** Research Division

**STATUS:** Completed



## HEATING & VENTILATION

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### RETROFITTING VENTILATION.

This project is to examine how effectively ventilation can be retrofitted to existing houses, either as a stand-alone project or as part of a larger renovation. The research team will test the effectiveness of retrofitted ventilation systems in older homes and their effects on indoor air quality. It will also describe practical methods for installing ventilation equipment and ducting in older homes.

**CMHC Project Officer:** Don Fugler

**CIDN:** 2063 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### TESTING OF DOMESTIC OIL TANKS.

This report describes research to find a method to test domestic fuel oil tanks for potential leaks and suitability for future service. After an introductory statement the first section offers a description of the construction of the type of tank under study, an explanation of the failure mode addressed as well as some assumptions concerning the tests investigated. The next section explores inspection techniques currently practised by various organisations. The final section examines a number of potential test methods.

*Prepared by William Moody, Moody Engineering Consultants. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

# HEATING & VENTILATION

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## TESTING OF RESIDENTIAL HEATING AND VENTILATION SYSTEMS FOR THE NORTHERN ENVIRONMENT

Heating and ventilation have always been critical concerns of homeowners and the housing industry living and conducting business in the north.

With the rise in fuel prices in the mid 1970's there has been an ever increasing emphasis on energy efficiency. Along with the benefits of building dwellings in an energy efficient manner, come corresponding problems - the chief of those problems concerns maintaining a healthful level of indoor air quality.

Several heating and ventilation schemes have been developed to provide adequate fresh air to a dwelling, but none specifically for the Yukon environment. Equipment testing is generally not done below -20°C, which is sufficient for the larger Canadian market, but not for trouble free operation in the north with its extended periods of -40°C or colder temperatures.

As well, the lifestyle of Northerners is different from those in more southerly climes. Many Yukoners do not venture out of the home during cold snaps, and tend to sit close to the heat source, with all sources of cold draughts sealed tight against the cold - often including designated sources of fresh air to the dwelling.

The 1995 National Building Code created a further complication for homeowners and builders alike. The air change rates, which are mandatory through the 1995 code - even during times of severe cold - have been questioned by both builders/installers and knowledgeable homeowners as being excessive.

This report is the culmination of Phase I, of a four phase project, which will attempt to provide answers to many of those questions by installing several different configurations of heating/ventilating systems, and monitoring them. This will provide an opportunity, as well, to validate or disprove the requirements of the code as it applies in a northern environment and possibly make recommendations to the NBC Standing Committee on Heating, Ventilating and Air Conditioning.

This report contains the results of Phase I of the project described above. The phases of the project are:

- Phase I - Scope of the Problem
- Phase II - Background Research and Study Design
- Phase III - Field Research
- Phase IV - Evaluation and Reporting

Phase I consisted of the administering of two questionnaires, one to homeowners, and another to industry stakeholders. Their replies provide a true perspective of what problems and difficulties are being encountered with heating and ventilation systems and provide the project with an understanding of where attention should be focused. Various complaints are heard from homeowners and housing professionals in the north regarding heating and ventilation systems. These complaints cover a range of concerns and problems which the questionnaire results would verify or dispel.

*A joint venture research and development project undertaken by Canadian Home Builders Association - Yukon and Yukon Housing Corporation. Funding provided by Canada Mortgage and Housing Corporation. CMHC Project Manager: Darrel R. Smith. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### ADVISORY DOCUMENT ON MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS.

The technical report on the design of energy conserving equipment and systems providing plumbing, heating, ventilation and air conditioning, lighting and power in multiple-unit buildings has been reviewed by practitioners. The system design and installation practices noted in the report are being modified to reflect their comments. An advisory document to recommend "good engineering practice" for designers, owners and consultants should be available in 1999.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1774 0300004, 5, 7

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### BC MOISTURE PROBLEMS - COMPUTER SIMULATIONS.

This research will study, through the use of computer simulations using the WALLDRY computer program, the drying potential of various wall configurations and is intended to provide data to bolster recommendations to be incorporated in the "Best Practice Guide for the Coastal Area of British Columbia". The results of the work will also be used to guide in the development of the Envelope Drying Rate Analysis Project. As the cost of doing all the tests proposed is prohibitive, it was recommended that computer simulation WALLDRY be used to determine which walls might be more promising to test than others, potentially leading to a reduction in the cost of the test program.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1816 0300004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### BC MOISTURE PROBLEMS - ENVELOPE DRYING RATES EXPERIMENT.

Findings from the 'Survey of Building Envelope Failures in the Coastal Climate of British Columbia' revealed that the construction of walls with face seal or concealed barrier systems does not promote rapid drying of wall assemblies once the moisture has saturated the moisture barrier and passed into the sheathing. The solution to promote drying of the wall assembly has been to introduce an air cavity behind the claddings. The objective of this project is to identify, through laboratory work, a range of cavity and vent configurations which will provide wall drying capability characteristics necessary to deal with the coastal British Columbia climate. In addition to the vents, the effect of insulation, vapour barrier, type of building paper and type of cladding will be investigated.

**CMHC Project Officer:** Sylvio Plescia & Mark Salerno

**CIDN:** 1816 0300009

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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## **BC MOISTURE PROBLEMS - HYGROTHERMAL PERFORMANCE OF STUCCO.**

The project objectives are to develop fundamental and applied understanding of the hygrothermal performance of stucco based wall systems for Vancouver, B.C. weather conditions. The properties will be investigated through laboratory evaluation. The long term hygrothermal behaviour of the building envelope components will be simulated using the LATENITE computer program. The result of the work will guide the "Envelope Drying Rate Analysis" study. The work is being collaboratively funded with the NRC/Institute for Research in Construction and is part of the recently launched Consortium on Moisture Control Strategies of Wall Systems.

**CMHC Project Officer:** Jacques Rousseau & Mark Salerno

**CIDN:** 1816 0300007

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## **B.C. MOISTURE PROBLEMS - QUALITY ASSURANCE PROTOCOL.**

The objective of this study is to produce a protocol which will form the baseline quality management system for the exterior envelope of 3 and 4 storey wood frame construction in British Columbia. The protocol deals with the conclusion and recommendations identified in the "Survey of Building Envelope Failure in the Coastal Climate of British Columbia". The protocol will also tie into the "Best Practice Guide for Wood Frame Construction in the Coastal Climate of British Columbia". The draft protocol has been reviewed and will require a 'test drive' in a real project in order to refine it. Developers have been approached and they are willing to collaborate to this end.

**CMHC Project Officer:** Jacques Rousseau and Mark Salerno

**CIDN:** 1816 0300006

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## **BC MOISTURE PROBLEMS - SMALL SCALE TESTING AND DEVELOPMENT PROTOCOL.**

This work results from the conclusions and recommendations of the "Survey of Building Failures in the Coastal Climate of British Columbia". The intent of this initial testing project is to give the industry some sense of what will or will not work and examine the sensitivity of the various systems to specific variables. The testing will provide a relative comparison under a specific set of environmental conditions. Although the work will not provide a definitive solution, it will serve to provide guidance regarding the use of some proposed new assemblies. The work will also develop protocol for the "Envelope Drying Rate Analysis" which is currently planned. The work is being funded in collaboration with the NRC/Institute for Research in Construction, the City of Vancouver, Van Maren Limited, Centreville Limited and Aquastap Limited.

**CMHC Project Officer:** Jacques Rousseau and Mark Salerno

**CIDN:** 1816 0300005

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### **BEST PRACTICE GUIDE: BUILDING ENVELOPE DESIGN FOR WOOD FRAME WALL ASSEMBLIES.**

This "best practice" guide will present various exterior wall assemblies with wood frame construction. The document will contain construction details, specifications, sequence of construction and inspection/commissioning information. The document will be available in paper copy and on CD-ROM.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1930 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS.**

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. The document is being produced in collaboration with the NRC/IRC.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 1804 0300003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **CASE STUDIES FOR INNOVATIVE TECHNOLOGY AND SOLUTIONS IN SUCCESSFUL MULTI-FAMILY HOUSING.**

Successful innovative Canadian multi-family residential buildings are being identified and documented for future monitoring. Areas such as durable building envelope, energy savings, life-cycle costs and environmentally responsive solutions will be evaluated. One multi-family residential building, the Conservation Co-operative, was selected for evaluation and was presented at the Green Building Challenge in Vancouver in the Fall of 1998. Posters of several Canadian residential projects were prepared for the October GBC conference. The selected systems will be the subject of illustrated 2-page case stories.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1817 0300001, 2

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### **CASE STUDY OF THE RENOVATION OF AN APARTMENT BUILDING WITH SOLID MASONRY WALLS.**

A 90 year old commercial building with solid masonry walls has been gutted and renovated into a residential building for low income single persons. The renovation involved the addition of thermal insulation to the building envelope, the application of stucco to the exterior of three of the four sides of the building, restoration to the front masonry facade, installation of a balanced mechanical ventilation system and a combination hydronic baseboard/radiant floor heating system. The building envelope is being monitored to provide an indication of its potential long-term performance. Energy and water use and indoor air quality will also be monitored in the renovated building to assess the strengths and weaknesses of the renovation strategy. A case study will be produced to document the work undertaken and the results of the performance monitoring.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1730 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **COMPARATIVE ANALYSIS OF RESIDENTIAL CONSTRUCTION IN SEATTLE, WA AND VANCOUVER, B.C.**

This research will focus on the comparative differences (if any) in construction and determine if a similar cause of building envelope failure is occurring in the typical low rise multi-unit (3 to 4 storey) wood framed residential development built in the Seattle area.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1569 0300003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **ENVIRONMENTAL IMPACT ASSESSMENT TOOLS FOR MULTI-UNIT HOUSING.**

This project will assess 6 different environmental assessment tools to determine their applicability to multi unit residential buildings. The best features and limitations of each tool will be identified and transmitted to the authors of each tool. Four innovative buildings will then be assessed by one of the tools. This work was presented to the Green Building Challenge '98 (GBC) Committee as part of CMHC's contribution to the development of the residential component of the Green Building Challenge overall evaluation criteria for buildings of all types. The GBC is an international conference on the performance assessment of buildings held in Vancouver October 1998. Further work will be done in 1999 to develop a comprehensive environmental impact assessment tool for highrise buildings, including the identification of related benchmarks, and the associated costs and savings from reducing environmental damage.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1872 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### ESTABLISHING THE FEASIBILITY AND FRAMEWORK FOR A MULTI-FAMILY HOUSING DATABASE.

CMHC performed a project to evaluate the feasibility of establishing a nationally representative multi-family housing database. Anticipated uses for such a database include, studies of the impact of energy retrofits on the energy consumed and pollutants emitted by multi-family housing. With an appropriate level of data, repair and replacement trends impacting on condition and resource requirements for this form of housing, could be identified. The study concluded that there was insufficient data available to define the population of multis in Canada in terms of age, size, construction and location. Additionally, the quantity and quality of existing data on actual buildings is insufficient to populate a truly representative database. The study recommended a number of paths that could be taken to establish a multi-unit residential building database both for the near- and long-term.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1805 0800001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### EXPORTING CMHC'S TECHNICAL SEMINAR SERIES.

Over the past fifteen years, CMHC has undertaken research work into the development of technologies for highrise buildings. The work could be marketable in the US and other countries where they are being faced with similar concerns regarding energy efficiency, airtightness, noise control and rain penetration control of the building envelope. CMHC's research activities into the building sciences were undertaken by Canadian consulting firms who have gained considerable knowledge that could also be marketed in other countries. A pilot series of seminars is being developed to be conducted in the USA in partnership with the Building Environmental Thermal Envelope Council with funding from the Dept. of Energy.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1928 0200

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

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### GOVERNOR'S ROAD AND SPENCER CREEK VILLAGE PROJECT, DUNDAS, ONTARIO.

The purpose of this project was to carry out the CMHC Healthy Housing and IDEAS Challenge objectives on the Governor's Road and Spencer Creek Village project in Dundas, Ontario.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 0840 0309007

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS.

In cooperation with NRC's Institute for Research in Construction, a project has been initiated to assess common forms of solid masonry walls in commercial and residential buildings and current energy retrofit strategies. Investigations of previously retrofitted walls are being performed to determine the impact on the durability of the building envelope.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1730 0300003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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## IDEAS HIGH-RISE CHALLENGE.

The IDEAS Challenge is intended to demonstrate the benefits of innovative design and technology in the operation of high-rise residential buildings. The Challenge focuses on five aspects of building design: envelope durability, energy efficiency, indoor air quality, environmental conservation and accessibility. One project in Montreal is built and monitoring is being carried out. Acoustic details have been tested. Two booklets are available, one that describes the IDEAS Challenge and the features of the five finalist projects and another which is a "Better Building" guide to innovation in the design and construction of high-rise residential buildings. The design process of a building in Dundas, Ontario which is exploring the adaptation of the IDEAS Challenge goals and details of CMHC's Best Practice Guide, is being documented. Projects in Victoria, Vancouver and Edmonton are also ongoing.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 0840 0300

**Division:** Research Division

**STATUS:** Ongoing Project

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## MODELLING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS.

The purpose of this project is to develop knowledge to assess the impact of various wall designs, ventilation and indoor environment conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1934 0200003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS.

The innovative mechanical and electrical energy consuming and producing systems in high-rise housing at a recently completed housing project in Peel, west of Toronto, are being monitored. A gas-fired cogeneration system was installed that provides electricity and thermal heat to the building. The building's owners are concerned that the system is not performing in an economically viable manner. An extensive monitoring and performance assessment is underway to evaluate system performance. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided utility invoicing and other considerations will be assessed. The performance and cost of the cogeneration system will be compared to other alternative but more conventional options.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1260 0800001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available



## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### MONITORING THE RETROFIT OF A RESIDENTIAL HIGH-RISE BUILDING ENVELOPE.

A case study of a 20 year old high-rise building in Toronto has been undertaken to document and monitor the performance of the retrofitted walls. In November 1997, an Exterior Insulating Finish System (EIFS) was installed over the precast block walls as part of an overall building renewal project. Instrumentation to monitor heat, air and moisture regimes within the wall sections was installed which is currently being monitored for one year to assess the performance of the retrofit strategy. Preliminary results indicate that the walls are performing in a satisfactory manner but an assessment of the full year's monitoring will be necessary.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 1602 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### OPERATING AND MAINTENANCE BOOKS FOR MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT BUILDINGS.

Two publications, currently in 'draft' stage, on improving the operating performance of modern residential building systems have been developed. The first document, for owners and managers, links good operating practices with desirable investment strategies. The second, for building operating and maintenance staff, updates information on mechanical and electrical systems and incorporates preventative maintenance checklists for multi-unit residential buildings.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1774 0300004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### PERFORMANCE MONITORING: BRICK VENEER/STEEL STUD (BV/SS) WALL SYSTEM: PHASE 4.

Phase 4 of this study involves a fourth year (1997/98) of in-situ performance monitoring of a BV/SS wall system, with respect to air and moisture movements after the top vents in the brick veneer wall have been opened. The performance of a wall is being monitored using temperature, moisture and air pressure sensors connected to an automatic data logging system. Preliminary results indicate that the vent holes did not contribute to drying the wall but increased the moisture loading of the brick veneer. Even though the BV/SS wall system is typical of current practices and workmanship was satisfactory, the results of the study demonstrate that performance problems exist that may lead to significant distress over the long term. The more serious performance problems identified in this study are due to design weakness demonstrating the need to improve design and construction standards. Phase 1 & 2 reports are available from CMHC. The results of the Phase 3 research demonstrated no significant difference from Phase 1 and 2 and the Phase 4 draft report has been received.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 0787 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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## RAIN CONTROL BEST PRACTICE GUIDE.

This document, currently in the 'draft' stage, provides the latest information on controlling the penetration of rain into walls. It is based on CMHC's research and other information regarding rain penetration control. The work is being funded in collaboration with the American Architectural Manufacturers Association.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1258 0300004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## RAINSCREEN 2.1 COMPUTER PROGRAM.

The RAINSCREEN program was developed to assist in the design of rainscreen pressure equalized wall assemblies. This project is aimed at producing a new version of the RAINSCREEN computer program, including a tutorial program and a manual that will be much more user-friendly. The work involves adapting the existing program to Windows and Mac environments and validating the program to laboratory test results to increase user confidence in the program. The BETA IBM version of Rainscreen 2.1 (English only) is available through e-mail (jroussea@cmhc-schl.gc.ca). The program is being updated to offer a better interface to determine the effects of the air barrier and cladding flexibility.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1258 0300005

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## REMEDICATION OF B.C. MOISTURE TROUBLED BUILDINGS.

This project will research and prepare diagnostics and recommended procedures for the cost effective remediation of leaking condominiums in the lower mainland of B.C. The project will develop a standard method of damage assessment, to develop a solutions tool which considers technical, code compliance, financial implications and practicality of repair. A document will also be prepared for property managers and for strata councils - on maintenance and repair issues. The project duration is expected to be one year.

**CMHC Project Officer:** Ken Ruest & Mark Salerno

**CIDN:** 2061 0200

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is documenting repair and retrofit activities in multi-unit residential buildings. The first 30 case studies will document building characteristics, the type of problems that prompted the repairs and retrofits, costs, benefits, etc. A wide range of case studies will be included to reflect regional repair and retrofit priorities. The studies will be useful for other members of the multi-unit residential building industry to refer to when considering similar projects. An information template that can be used as a guideline for the type of information that should be extracted from a repair or retrofit project in a multi-unit residential building has been developed. CMHC is currently soliciting the building industry for case studies and will retain consultants to provide the necessary documentation. A compendium of case studies will be assembled and made available

**Project Officer:** Duncan Hill

**CIDN:** 1782 0300001-7

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

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### STUDY TO EVALUATE CAUSES OF MOISTURE PROBLEMS IN ALBERTA HOUSING.

In partnership with the Alberta Housing Technical Committee, this project is to investigate the alleged problem of moisture ingress into low-rise wood frame housing in Alberta. At the present time, industry opinion is divided on the source of moisture critical to the cause of reported water leakage incidents and this study will provide some clarity to the issue.

**Project Officer:** Ken Ruest and Halayna Tataryn

**CIDN:** 2066 0200001

**Division:** Research Division and Prairie Region Business Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### TECHNICAL AUDIT OF APARTMENT BUILDINGS IN TORONTO.

A representative sample of 63 multifamily rental buildings in Toronto have been audited in order to determine their condition. The buildings were examined to determine their durability, and health and fire safety aspects, and the related repair costs. The project is a joint initiative with the City of Toronto. Preliminary results show the average repair costs to be \$7,474 over ten years, not including regular maintenance or finishings. In the building envelope systems, complaints due to leaks rise from 12% in pre-60s construction to 45% in post-70s buildings. The results of this condition survey are presently being analyzed.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1537 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### WIND-DRIVEN RAIN FOR THE GOVERNOR'S ROAD PROJECT.

Continuing previous research, this project explores the impact of cornice design in providing protection from wind-driven rain at the top of a multi-family building in Dundas, Ontario in order to better optimize the roof design.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1123 0300013

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HOME OWNERSHIP

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### A CANADIAN HOMEOWNER'S MANUAL.

This project responded to the information needs of the housing consumer and developed an owner's manual that is comprehensive and can be made specific to each house. The manual is of interest to homebuilders as a marketing and service tool and for reducing callbacks; and to the warranty programs as a means of conveying good house maintenance and operation practices to the home owner. A national advisory committee oversaw the evolution of the manual and ensured that the views and experience of builders and warranty programs were considered. Focus group testing was conducted first on the idea of the manual and subsequently on the completed draft version. Consumers were enthusiastic about the idea and praised the product. The final, formatted text of the manual is ready and the publication is scheduled for release in 1999.

**CMHC Project Officer:** Fanis Grammenos **CIDN:** 1559 0200002 **STATUS:** Ongoing Project

**Division:** Research Division

**AVAILABILITY:** Publication not yet available

## HOUSE CONSTRUCTION

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### **APPLICATION OF STRUCTURAL STEEL TO SINGLE-FAMILY RESIDENTIAL CONSTRUCTION.**

The objective of this project is to investigate the use of structural steel in single-family residential construction, and analyze its applicability to Canada, taking into account technical requirements, cost-effectiveness and sustainability.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 1831 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Michel De Spot, Director, Node Engineering  
2703 124B Street  
Surrey, British Columbia, V4A 3N8

**AVAILABILITY:** Publication not yet available

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### **CSA Z-824 STANDARD.**

The objective of this project is to take the existing draft of the CSA Z-824 Log Standard, rationalize the organization of the standard contents, and produce a draft for comment.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 1811 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

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### **DEVELOPMENT OF COMMERCIALLY VIABLE CONCEPTS AND A DESIGN FOR A RESIDENTIAL FRAMING SYSTEM FOR A MONOCOQUE HOUSE.**

The purpose of this project is to undertake the development of commercially viable concepts and a design for a residential framing system for a monocoque house, to provide on-site guidance during the construction of prototypes of the design and to undertake post construction performance monitoring of the structures.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 0657 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **EASY-ACCESS THRESHOLDS TO BALCONIES: PROBLEMS AND POSSIBLE SOLUTIONS**

The objective of this project is to provide architects, builders, developers and regulatory agencies with a tool demonstrating the possibilities of producing easy-access thresholds to balconies in new or renovated residential buildings.

**CMHC Project Officer:** Sandra Marshall

**CIDN:** 1995 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Pierre Richard  
4800 Marquette Street  
Montreal, Quebec, H2J 3Y7

**AVAILABILITY:** Publication not yet available

# HOUSE CONSTRUCTION

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## LABOUR SHORTAGES IN RESIDENTIAL CONSTRUCTION.

The purpose of this project is to examine the available evidence concerning the extent of labour shortages in the residential construction industry; and document the overall labour supply situation in the residential construction industry.

**CMHC Project Officer:** Jamie Angus

**CIDN:** 1860 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## STUDY OF SEAM TELEGRAPHING IN RESIDENTIAL FLOORING.

A CHBA led research project was conducted, in partnership with Macmillan Bloedel, the Canadian Plywood Association, the Canadian Particleboard Association, the Industrial Research Assistance Program of N.R.C. and CMHC. This research identified that the seam telegraphing problems in residential flooring currently being experienced by the housing industry are predominantly attributable to site conditions which lead to complex interactions between layers of materials. Of greater significance than that of material type, are the installation practices followed. Moisture problems, for a number of different reasons from material acclimation to construction material generated moisture (i.e.: floor slabs), are the main reason for this problem. The findings have been incorporated into the new publication, "Building Solutions - A Problem Solving Guide for Builders and Renovators".

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1729 0300001

**Division:** Research Division

**STATUS:** Completed

**AVAILABILITY:** See above.

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## TALL WALL" CONSTRUCTION DETAILS.

The purpose of this project was to develop a series of cost-effective, common design and construction details, certified by a structural engineer registered in the province of Alberta, for typical "tall walls", such as walls exceeding the maximum height permitted by the building code. The project and development of the report/booklet was managed by the Alberta Home Builders' Association on behalf of the Alberta Housing Industry Technical Committee (AHITC). AHITC is an alliance of major organizations (builder associations, Alberta New Home Warranty Program, Municipal Authorities and CMHC) which serves as the technical forum for the residential sector in Alberta. AHITC is responsible for the production and the distribution of the booklet to their members.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2037 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOUSING DESIGN

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### **AFFORDABLE, VERSATILE HOUSING.**

This project identifies and describes house designs that enable a house to accommodate a range of household types, sizes and needs by means of their adaptability. It documents the features of designs from built examples and it explains their economic and use advantages. The set of designs to be included will cover all housing forms, from detached houses to apartments. This first guide on adaptable designs will be made available both in hard copy and electronic format via the Internet. Publication is expected in the Spring of 1999.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1783 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **FLEXHOUSING DESIGN DEMONSTRATION.**

CMHC's FlexHousing is a new and innovative approach to home design, renovation and construction, able to adapt and convert affordably as people's lifestyles change. This exciting and practical approach to designing and building housing of all kinds - from single family, duplexes, multi-unit and even apartments allows residents to convert space to meet their changing needs.

Imagine housing that is planned in advance for sub-dividing rooms, expanding space or converting attics and garages to bedrooms, family rooms, home offices or self contained suites. FlexHousing is housing for today, a modern trend in the United Kingdom, the United States and Europe. In January 1996, CMHC launched the FlexHousing Design Competition. The national winner was Nicholas Varias Architect of Nouvelle Development Corp., London Ontario. Awards of merit were given to: Ron Wickman Architects of Edmonton; McGill University, Avi Friedman, Anobid Construction of Montreal; Stephane Hazan Architects of Laval. The first demonstration house opened in Edmonton in October 1997.

The Canadian Centre for Housing Technology at the National Research Council will feature the winning FlexHouse Design in its Information Centre, opening in the Spring of 1999. More information will be available on the CMHC Home page.

**CMHC Project Officer:** Tom Parker

**CIDN:** 1389 0300

**Division:** Research Division

**STATUS:** Ongoing Project

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## INDOOR ENVIRONMENT

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### **DEVELOPMENT OF MATERIAL EMISSION TEST STANDARDS.**

Improved test standards for emissions from caulks and sealants and urethane foam are currently being developed. These standards, currently in draft, are now being considered within the American Society for Testing and Materials (ASTM) process. NRC/IRC has developed a draft emission test standard for VOCs from pressed wood products. Revisions are being made to these draft standards in response to an ASTM committee ballot and will be resubmitted again this year, using new CMHC support funding, as requested by the Task Force on Material Emissions. It is anticipated that the ballot will be passed for inclusion of these standards into the ASTM process.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1244 0201003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# INDOOR ENVIRONMENT

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## **A GUIDE TO MECHANICAL EQUIPMENT FOR CLEAN INDOOR ENVIRONMENTS.**

Complementing the "Building Materials for the Environmentally Hypersensitive", this publication deals with heating, ventilating, air and water purification equipment for housing requiring special attention to air quality. The document is a reference guide for selecting new mechanical equipment for new construction or retrofits. The document includes discussions of the applicability of the equipment to environmentally hypersensitive individuals. The guide will be available in 1999.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1031 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## **HEALTHY MATERIALS, AN INTERNATIONAL COMMUNIQUÉ ON MATERIAL EMISSIONS.**

This periodical, designed specifically for researchers (worldwide) on material emissions, is a communication vehicle on issues, progress, contacts and standards. It has been set-up on the Internet as a twice-yearly publication. Hard copies are also available from CMHC. Four issues are currently available, with two more expected in 1998.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1244 0201

**Division:** Research Division

**STATUS:** Ongoing Project

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## **INDOOR AIR POLLUTION FROM ATTACHED GARAGES.**

CMHC is contributing to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. The current work includes modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. So far, modeling has not been very successful. Further field testing will take place in the winter of 1998/99. Health Canada will be publishing the project reports.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1910 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## **INDOOR AIR QUALITY TRAINING PROGRAM.**

A program to train indoor air quality problem inspectors has been developed and piloted. The program consists of a three-day course, followed by a field training phase. Pilot testing indicated that candidates for the program should have some expertise in building science and mechanical systems. A one-day "Let's Clear the Air" seminar has also been developed for other industry interest groups. This one-day seminar is a prerequisite to the three-day evaluators' course. Eleven trainees took the first three-day course and are going through the apprenticeship stage.

The 1998 schedule will include a new one-day field training session for building officials and public health inspectors in addition to the one-day seminars and the three-day course.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1623 0300017

**Division:** Research Division

**STATUS:** Ongoing Project

## INDOOR ENVIRONMENT

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### THE PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES.

This joint study between CMHC, Agriculture Canada, Health Canada and others will ultimately look at several hundred homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. Ongoing sampling of the house biological matter will occur in a subset of the "good" and "bad" houses. The first year of the study has been completed. Indications are of a high incidence of health problems and high levels of moisture and mold in the houses. Data is being analyzed. Additional funding has been approved for a second round of house and occupant tests.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 1618 0300001- 2

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### RELIABLE METHODS FOR HEAT EXCHANGER LEAKAGE TESTING.

The goal of this project was to select, field test and demonstrate reliable and quantitative methods for furnace heat exchanger leakage testing. A survey was conducted on heat exchanger leakage test methods used by 40 Canadian and American utilities. This report is currently available from CMHC.

Research was also conducted on thirteen furnaces that had been "red-tagged" in the field. A test protocol was selected as being the most reliable for correctly predicting high levels of furnace heat exchanger leakage. The Canadian Gas Research Institute (CGRI), looked into variations upon this basic test, and found flaws in each test procedure. Additional test procedures were volunteered but did not prove more successful in the lab. If a more reliable test method is identified in the near future, it will be tested. However, in the research to date, no heat exchanger crack test method has shown itself to be worthy of promotion.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1505 0200004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### SOIL GAS VOC INTRUSION RESEARCH.

CMHC is contributing to a multi-agency project which is looking at the rate and predictability of volatile organic compounds (VOC) into buildings located on contaminated soils. The contractors have reviewed the available models and are collecting data at a BC test site.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1826 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Martin Adomait, President, Adomait Environmental Solutions Inc.  
160 Cyprus Drive  
Kitchener, Ontario, N2M 4R5

**AVAILABILITY:** Publication not yet available



## INDOOR ENVIRONMENT

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### **A STUDY OF HOUSE RETURN AIR SYSTEMS USING FLOOR JOIST SPACES.**

Research was conducted on air in houses that is distributed through the ducting system consisting of supply ducts and a return air plenum. Floor joist spaces are being used as return plenums in new construction and this study characterizes the indoor air in a number of houses with return air plenums made of all metal, combinations of metal, solid wood, plywood or oriented strand board. A Research and Development Highlight sheet is being prepared.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1704 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **A STUDY ON THE EFFECT OF CONTROLLING THE HOME ENVIRONMENT ON ASTHMA.**

Six houses having one or more individuals suffering from asthma and in which the occupant's symptoms are linked to the house were inspected following the CMHC Residential IAQ Investigation Protocol. All houses were found to be severely moldy. The houses were subjected to tests for various indoor air parameters - CO<sub>2</sub>, VOC's, dust mite allergens and molds. Mold tests confirmed the inspection findings. Five of the homeowners proceeded with a remediation. Compliance with recommendations of the study varied from partial to full. The health status of the asthmatic occupants was monitored during the study. Health improvement of the occupants correlated with the degree of improvement of the air quality of the houses.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1621 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available.

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### **SUPPORT FOR THE CONSORTIUM FOR MATERIAL EMISSIONS AND INDOOR AIR QUALITY MODELING.**

CMHC is an active supporting member on the steering committee and technical committee of a consortium established by the National Research Council, Institute for Research in Construction to develop protocols for testing materials and furnishings and for modeling the impact of those emissions on indoor air quality. Funds are being used to increase the database of materials tested to the new standards, in a house being built on the NRC campus.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 1244 0200004

**Division:** Research Division

**STATUS:** Ongoing project

## INDOOR ENVIRONMENT

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### TASK FORCE ON MATERIAL EMISSIONS.

This Task Force meets twice annually to discuss issues related to chemical emissions from building materials and to help direct Canadian efforts in this field, including prioritizing future activities. During a previous meeting held in the fall of 1995, three jointly-funded projects were approved. The draft final report, "Round-Robin Testing of Volatile Organic Compounds (VOC) Emissions from Common Building Materials" has been received. The final report is expected to be completed and available in May 1998.

The final of the paint report, "A Review of VOC Emissions and Drying Mechanisms for Interior Paints and Coatings" and the odor study, "Material Odor Emission Test Methods: Review and Evaluation" are available from CMHC's Canadian Housing Information Center. Seven additional resolutions concerning material emissions and health and future research were adopted by the Task Force during a January 1998 meeting. They also recommended setting up a Working Group on IAQ and health. Interested parties are solicited.

**CMHC Project Officer:** Jim Robar

**CIDN:** 1894 03000011244 0201008

**Division:** Research Division

**STATUS:** Ongoing project

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## LIGHTING

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### TESTING THE ADEQUACY OF RESIDENTIAL LIGHTING IN A CARE CENTRE: NEW AGE-ADJUSTED NORTH AMERICAN ILLUMINATION STANDARDS.

The objective of this research is to undertake a field study on the effectiveness of lighting in two residential centres with remarkably different lighting levels.

**CMHC Project Officer:** Virginia Salares

**CIDN:** 2020 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Dr. Doris L. Milke

The Capital Care Group, McConnell Place North  
9113-144 Avenue  
Edmonton, Alberta T5E

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## MANUFACTURED HOUSING

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### COMPARISON OF THE NATIONAL BUILDING CODE, CAN/CSA-Z240 MH AND HUD PART 3280 MOBILE HOMES.

In Canada, mobile homes are usually built to the CAN/CSA-Z240 MH standard, (Z240). The National Building Code, (NBC), forms the basis for regulating all site-built housing. In the United States, the mobile home industry operates under the Housing and Urban Development (HUD) code. The MHI of Canada (MHIC) has suggested that there may be situations where the NBC and its provincial equivalents or the Z240 standard have more stringent requirements than are required for occupant health and safety. MHIC also believes that there may be other approaches to the construction of housing that will deliver an equivalent unit of housing but at a reduced cost. CMHC, in association with MHI Canada and the Canadian Manufactured Housing Institute (CMHI), is undertaking a comparative study of practices under the three different approaches to examine if there are non-health and safety related code/standard differences that affect production costs.

**CMHC Project Officer:** Doug Pollard

**CIDN:** 1939 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## MANUFACTURED HOUSING

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### **MANUFACTURED HOUSING: CREATING COMMUNITIES.**

This short video was produced by the Canadian Manufactured Housing Institute with guidance from CMHC's Research Division and with financial support from CMHC. The goal of the video is to increase the range of housing choices available to Canadians. Featuring homes and communities from coast to coast, housing that provides lifestyle choices in land lease communities is visually demonstrated in this twelve minute video.

Incorporating affordable housing choices has become a real challenge for today's planners and officials. No longer sponsored by government agencies, the continuing supply of affordable housing options becomes the responsibility of local government officials and the private sector. Manufactured housing is ideally positioned to provide affordable housing choices in a quality home product.

Primarily an educational tool, this video encourages planners and zoning officials to explore affordable housing options by including manufactured housing communities in municipal and rural plans. Visual displays of successful communities, combined with standard models, testimonials from planners, developers and home buyers will dispel the myths and prejudices surrounding manufactured housing communities today.

Additional target audiences include developers, financial institutions, and government agencies.

*Ottawa: Canadian Manufactured Housing Institute, 1998.*

Price: \$10.00

**STATUS:** Completed Video

**AVAILABILITY:** Canadian Manufactured Housing Institute  
500 - 150 Laurier Avenue West  
Ottawa, Ontario K1P 5J4  
Tel.: 613-563-3520 Fax.: 613-232-8600  
Email: cmhi@cmhi.ca

**NOTE:** Disponible aussi en français sous le titre: *Habitation usinée: pour créer des communautés*

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### **OPTIMUM VALUE ENGINEERING STUDY OF THE CANADIAN MANUFACTURED HOUSING INDUSTRY.**

The Canadian Manufactured Housing Institute (CMHI), with CMHC, undertook an Optimum Value Engineering (OVE) study to examine the product engineering and manufacturing processes of the Canadian manufactured housing industry. Phase I of the project comprised literature reviews of international advances in manufactured housing, site visits to US and Canadian plants and an industry survey questionnaire. Among the important findings are the significantly expanded role for computers in the industry and the lack of use of foam adhesives in Canadian manufactured housing. Reports from Phase I can be obtained from the CMHI. Phase II began in August 1997 and undertook further studies of the potential for use of foamed adhesive to attach interior finish materials to framing, and less material-intensive floor-framing details that retain the necessary structural properties. Phase II is now complete. Contact the CMHI for information.

**CMHC Project Officer:** Silvio Plescia

**CIDN:** 1597 0200001

**Division:** Research Division

**STATUS:** Completed

**AVAILABILITY:** Publication not yet available



: See the following other studies on manufactured housing::

page 88 "Export Performance and Needs of the Canadian Manufactured Housing Industry"

page 89 "Opportunities for Canadian Factory Build Housing in the Southeastern United States"

## MOISTURE & MOLD

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### **ATTIC VENTING, ATTIC MOISTURE, AND ICE DAMS. ABOUT YOUR HOUSE; CE13.**

This informative factsheet tells the homeowner what to do if water is coming through the ceiling, if they have a wet attic or ice damming. It explains what they may expect to see in the attic and includes handy illustrations, tips on where to look for leaks and what to use to seal them. The article also recommends useful publications, web sites and alternate sources of information.

This handy article guides the homeowner through the steps for problem identification and presents solutions, in a friendly, easy-to-read format.

The primary audience is homeowners, but it may be of interest to property managers, municipalities, emergency planners, inspectors, etc.

*Ottawa: Canada Mortgage and Housing Corporation, 1999.*

**STATUS:** Completed Factsheet, 2 pages.

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)  
International clients see page 9 for order instructions.

**NOTE:** Aussi disponible en français sous le titre: *Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace.*

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### **B.C. MOISTURE PROBLEMS - PHASE II.**

Over the past 12 months CMHC has conducted research which has been instrumental in leading an industry wide consortium in the development of solutions to technical problems associated with wood frame apartment building envelope construction in the coastal areas of BC. The first part of the program, a field survey, has now been completed and has confirmed that the problem is likely attributed to incorrect wall design and construction, leading to ingress of exterior moisture followed by inadequate drying rates. Two steering committees are being formed from the Building Envelope Research Consortium's membership. The project will involve retaining the services of consultants to test and monitor new details and wall constructions; to adapt the two currently available Best Practice Guides for wood frame building envelopes and flashings for the coastal region of British Columbia; to develop a Quality Assurance Protocol which would be specific to the wood frame industry envelope design and construction process; and to develop a training program in partnership with the CHBA and the AIBC.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1816 0300006-8

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## MOISTURE & MOLD

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### **BASEMENT WALLS THAT DRY.**

Research has shown that finished basement walls, with chronic wetting, produce molds dangerous to human health. This research suggests that no basement with a history of dampness should be finished until the moisture problems are completely remedied. This project tested theoretically quick-drying basement wall systems, in hopes of being able to recommend these systems for marginal basements. They were subjected to a mid-wall leak and a 10 cm flood to measure the drainage and drying characteristics. A final report is in preparation. Only two of the ten wall types tested showed good drying response after wetting by leakage and flooding.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1797 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **FIELD TESTING OF MOISTURE IN STRAW BALE HOUSES.**

Straw bale construction is an innovative construction technique that is gaining popularity, particularly for rural houses. While these structures seem to be working well in the dry American southwest, the birthplace of the straw bale housing movement, it is unclear how well they will withstand extended periods of cold and damp conditions. This initiative is funding three small local investigations of straw bale house moisture content: one in several houses in Alberta/BC, one in older straw bale homes in the Gatineau area north of Hull, Québec and one in several houses in Nova Scotia. Several of the houses showed high levels of straw moisture, particularly when probes were located near the exterior walls. Further monitoring and analysis is necessary to determine whether these occurrences will jeopardize the longevity of the straw. More testing will take place in western Canada.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1867 0300002,  
1867 0300004

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** See above

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### **GUIDANCE DOCUMENT ON RESIDENTIAL DRAIN TILE INSTALLATION AND MAINTENANCE.**

The Center for Drainage Studies at McGill University, Montréal, Québec, drafted a publication on the installation and maintenance of drain tile around the foundation perimeter of Canadian houses. McGill surveyed contractors across the country to ascertain regional patterns of drain tile installation and failure. The publication will not be issued immediately as it may be modified as a result of further drainage research being conducted by the multi-agency basement committee.

**Project Officer:** Don Fugler

**CIDN:** 1797 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# MOISTURE & MOLD

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## MOISTURE IN STRAW BALE HOUSING: NOVA SCOTIA: FINAL REPORT

Given the use of straw bales as building materials in several houses in the Atlantic Canada region over the past few years, the investigators saw a need to test and monitor the performance of these houses vis a vis moisture issues. The two main areas of interest in this study were: to test the 'breathability' of straw bale walls finished with a cement-based stucco on interior and exterior surfaces; and to monitor for one year the moisture content in straw bale walls in occupied houses in the region.

Four houses in Nova Scotia were chosen for the study. Each house differs in construction and finish technique, as well as in the attention paid to air sealing techniques and roof/ceiling/floor insulation for energy efficiency. However, all four houses feature straw bale walls finished with a cement based stucco (one with a soil-cement stucco, the other three with a conventional three coat cement stucco).

'Breathability' was tested by using the CGSB standard for air tightness testing and the Minneapolis Blower Door Apparatus, as used on housing of all types and ages. The results of this test indicate how many times the volume of air within the building envelope changes at an induced pressure of 50Pa. This result is commonly used to gauge how 'leaky' any given house is, and also to discover the areas where the air leakage occurs. In all of the houses in the study, air leakage was found in the same areas as is typical to stick-frame construction of any vintage (to a greater or lesser degree): joist/header areas, wall/ceiling junction, penetrations through ceilings and walls, and incomplete air sealing at door and window frames. In the house with the lowest air test result (3.13ACH), the owner/builders had paid particular attention to air sealing in such areas as the wall/ceiling junction, the potlight and plumbing penetrations into the attic space and the spaces between the window units and the rough openings. Although this air test does not definitively prove or disprove claims of 'breathable' cement-based stuccoed straw bale walls, it does prove that air sealing techniques can be applied to any building media.

The results of the monitoring program indicate that the four houses tested have seasonal swings in moisture content, but apart from a few instances of actual water leakage into the walls (due to a leaky pipe in one case and a leaky roof in another), the average moisture content in the walls swings from readings of 6.8% in December/January to 12.2% in July, well under the 20% MC thought to be the threshold for structural and healthful damage to straw bale walls. These results auger well for those who wish to build with straw bale in this region where moisture issues due to climate can be problematic in the built environment.

*Prepared by S.H.E. Consultants, Shawna Henderson, Principal Investigator. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## MOISTURE & MOLD

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### **PERFORMANCE EVALUATION OF WATER REPELLENTS FOR ABOVE GRADE MASONRY.**

The objective of this project is to evaluate the performance of various water repellents for above grade masonry on a comparative basis and develop practical methods to evaluate their effectiveness. This evaluation will be based on lab analysis and field testing as well as a literature review to find available information on water repellent performance. The initial part of this study, Phase I will be conducted under the CMHC External Research Program and will examine the issue of water infiltration while Phase II will examine exfiltration.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 1696 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **PREVENTING MOISTURE AND MOLD PROBLEMS IN YOUR HOME; CONSUMER'S BROCHURE.**

This handout will advise consumers: a) how to hire a competent clean-up contractor; b) how to hire a moisture problem renovation contractor; and, c) what they must do to prevent future mold problems once a clean-up (and renovation) has been performed on their home. It covers occupant habits, maintenance, keeping indoor surfaces warm, use of ventilation systems, etc.

**CMHC Project Officer:** Ken Ruest

**CIDN:** 1030 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **RAIN PENETRATION CONTROL SEMINAR.**

Water penetration is a frequent, recurring problem for building owners, leading to damage of building components, interior finishes and building contents. It frequently leads to high repair costs and possible litigation. Over the past few years, research undertaken by CMHC, has contributed to the understanding and the prevention of rain penetration. In particular the pressure-equalized rainscreen has been applied and refined. In this seminar the causes of rain penetration will be examined. The results of CMHC research will be presented, along with design features and practical details, which will help prevent rain penetration in a variety of wall types. This full day seminar is targeted to architects, engineers, specifiers, builders, developers and building owners concerned about rain penetration and how to prevent it. The seminars will be presented in Toronto, Winnipeg, Edmonton, Vancouver, Montreal and Quebec City. This seminar was developed in cooperation with the Canadian Masonry Association, the Canadian Precast Concrete Institute and the Exterior Insulated Finish Systems (EIFS), curtain wall and steel manufacturers.

**CMHC Project Officer:** Jacques Rousseau

**CIDN:** 0838 0303005

**Division:** Research Division

**STATUS:** Ongoing Project

## MOISTURE & MOLD

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### RE-INSULATION OF EXISTING FLAT-ROOF MULTI-FAMILY BUILDINGS IN QUÉBEC.

A joint project with Hydro Québec to examine ways of re-insulating low-rise multi-family buildings for energy efficiency, without causing moisture problems in the attic. Field testing was complete in early summer 1997. A final report has been submitted. CMHC is discussing with Hydro Québec on the best way to disseminate the results.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1377 0801001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### REMOVING ICE ON ROOFS. ABOUT YOUR HOUSE; CE15

The ice storm that hit eastern Canada in January 1998 provided many cases on which to research the removal of ice accumulation on roofs. This factsheet identifies what to do in an ice storm emergency, explains how to tell when there is a problem with both sloped and flat roofs, and the best methods for ice removal. The article also identifies those methods which had no or only moderate success. Heavy emphasis is placed on personal safety, and the recommendation to leave the work in the hands of the professionals.

This article provides the homeowner with valuable information about the removal of ice, in an easy to read format. The primary audience is homeowners. It may also be of interest to property managers, municipalities, emergency planners, inspectors etc.

*Ottawa: Canada Mortgage and Housing Corporation, 1999.*

**STATUS:** Completed Factsheet, 5 pages, 8½ x 11, black and white

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

**NOTE:** Aussi disponible en français sous le titre: *L'enlèvement de la glace sur les toitures*

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### SOLVING MOISTURE PROBLEMS IN A HOME: A RENOVATOR'S GUIDE.

This guide for renovators includes renovation solutions required in moisture troubled houses to prevent the recurrence of moisture and related mold problems. Included in the guide will be sections on water entry control, insulation, ventilation and plumbing/piping tips relevant to Canadian housing, as well as information from the draft document, "Modifying Your House So It Won't Grow Mold." It is being reviewed and release is expected in the Winter of 1999.

**CMHC Project Officer:** Ken Ruest

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

☞ See also items in the *High-Rise and Multiple Unit Construction Section*, p. 36-44.



## NORTHERN HOUSING

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### **INNOVATIVE FOUNDATIONS, HEATING & VENTILATION.**

This R&D&C (research, development, commercialization) project and first stage monitoring is complete and a report due before the end of 1998. CMHC, Yukon Housing Corporation (YHC) and Yukon Energy partnered in building two research/demonstration houses in Dawson City, Yukon. This work is a continuation of previous successes in R&D&C of the space frame foundation technology now being exported to Alaska. The thrust of the current foundation work is to reduce cost, develop a technology that can be locally manufactured and reduce the height of the crawl space.

A torque tube HSS steel section is under one house. The other house will be an extension of the sheet metal reinforced plywood monocoque technology resting on three bearing points. Lots of ground movement has been reported so the test site is proving to be a good demonstration. After a review of northern and remote technology, the heating and ventilation systems incorporate and optimize energy efficiency, minimal equipment and sustainable ventilation operation. Construction is complete and the houses are occupied. Commissioning of the project was a large task and the systems appear to be running efficiently at about half the energy consumption of a typical northern house. The mechanical technology was used on another YHC project at substantial capital savings and with some modifications appears to be the technology of choice. Work is underway to develop a more cost effective and simple foundation system.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 1676 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **NoRTH WEB-SITE.**

The purpose of this partnership project is to design, establish and maintain a dedicated NoRTH Web-Site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, and Yukon College. The web-site includes relevant technical information such as factsheets of research reports and the Frostline newsletter. It also includes discussion groups to provide a means of ongoing and current communication. The web-site has links to other relevant web-sites and can be visited at [www.NoRTH-RTHN.org](http://www.NoRTH-RTHN.org).

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1886 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

# RENOVATION & INSPECTION

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## A BETTER WAY TO RENOVATE.

This booklet presents seven outstanding renovation projects with different sets of renovation challenges and solutions. These demonstrations are based on the concepts of the house-as-a system, energy retrofitting and healthy housing. Together, they demonstrate how a house of any age can be turned into a healthy, comfortable and energy-efficient home.

*Ottawa: Canada Mortgage and Housing Corporation : Natural Resources Canada : Canadien Home Builders' Association, c1998.*

Order no. NE2174

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069«  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

NOTE: Aussi disponible en français sous le titre: *Une meilleure façon de rénover*

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## THE CANADIAN ASSOCIATION OF HOME AND PROPERTY INSPECTORS INITIATIVE.

The Canadian Association of Home and Property Inspectors (CAHPI) is a newly formed association that will represent all of the private home inspectors in Canada. This association is comprised of a number of national and provincial associations, including some of the major franchises, and a number of independent inspection firms. CAHPI currently represents over 600 private home inspectors, but it is anticipated that other, non-affiliated private home inspectors will increase this number in the future. Formal agreements and establishing their future requirements is currently being undertaken. A CAHPI Board has been established and they are now proceeding with setting-up and determining the responsibilities of the various committees such as, By-Laws, Accreditation and Certification, Strategic Relations, Education, Standard of Practice and Code of Ethics, and Discipline. They have submitted a proposal to Human Resources and Development Canada requesting assistance to complete an occupational skills analysis. CMHC continues to support this initiative.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1962 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

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## THE CANADIAN RENOVATION INDUSTRY AND THE INTERNET: USAGE PATTERNS, 1998-2001.

The objective of this project is to survey renovators about their use of e-mail, web-sites, and interactive online communications.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2015 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Donald M. Caskie  
R.R.2  
Paris, Ontario N3L 3E2

**AVAILABILITY:** Publication not yet available

## RENOVATION & INSPECTION

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### **THE HEALTHY HOUSING RENOVATION PLANNER.**

The purpose of this project is to develop a consumer renovation book that will focus on Healthy Housing. This book will look at the various renovation projects commonly undertaken and will provide the consumer with the information they require to plan a Healthy Housing renovation. The book is expected to be available by the Spring of 1999.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1760 0300002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **HOMEOWNER MOTIVATION AND INNER CITY REVITALIZATION: AN EXAMINATION OF RELATED FACTORS IN WINNIPEG.**

The objective of this research is to identify the revitalization process underway (e.g.) incumbent upgrading or gentrification in inner city areas demonstrating a high level of renovation activity.

**CMHC Project Officer:** Glynis Kossatz

**CIDN:** 1277 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Tom Carter  
University of Winnipeg  
Dept. of Geography  
Winnipeg, Manitoba  
R3B 2E9

**AVAILABILITY:** Publication not yet available

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### **HOW HEALTHY IS YOUR HOUSE: CMHC HOMEOWNER'S AND HOMEBUYER'S CHECKLIST FOR MAINTENANCE AND REPAIR.**

The current CMHC's Homeowner's and Homebuyer's: Inspection Checklist for Maintenance and Repair is being revised to both update and include a Healthy Housing evaluation "tool". It will provide homeowners and homebuyers with a pre-purchase or pre-renovation guide for performing an inspection on their house. Physical condition, IAQ, energy and environmental and maintenance and repair information will be included in the document. It will be beneficial in enabling consumers and homebuyers to make more informed decisions prior to hiring the assistance of a private home inspector should the need arise. This advisory document will be available in the Spring of 1999.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1901 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## RENOVATION & INSPECTION

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### **PROMOTING HEALTHY HOUSING AND ENERGY EFFICIENCY APPROACHES IN MAJOR HOME RENOVATIONS: A CASE STUDY ANALYSIS. FINAL REPORT.**

The current and potential interest of renovating homeowners and renovation professionals in Healthy Housing concepts and approaches was explored through a set of twelve detailed case studies of recent renovations. For each renovation, an analysis of opportunities to integrate Healthy Housing approaches and features was used as a basis for exploring the issues in a concrete way. The intent was to gain insights on ways to better motivate and inform homeowners and professionals about how to improve renovations in relation to the Healthy Housing objectives of energy efficiency, air quality/occupant health, resource efficiency, environmental responsibility, and affordability/adaptability.

Based on the research, it appears that a limited number of Healthy Housing features have become, or are becoming, relatively common in renovations. On the other hand, awareness of many other Healthy Housing features was very low amongst both the homeowners and the renovation professionals interviewed. While it would likely be difficult to motivate and inform most homeowners to the point where they proactively make Healthy Housing choices -- especially in decisions related to building systems versus finishes -- many homeowners may be interested in simple tools that would provide them with a basis for raising Healthy Housing issues with their renovation professionals. Similarly, while renovation professionals may not see direct competitive advantage in promoting Healthy Housing approaches and options, many would likely be willing to provide objective (third party) information on Healthy Housing options to clients. The research points to a number of formats and venues for informing renovating homeowners and renovation professionals, and provides a set of recommendations on how to target efforts.

*Prepared by Marbek Resource Consultants. Marbek Project Manager: Rebecca Aird. Prepared for: Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Don Fugler. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

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### **RENOVATION OF GENERIC HOUSING STYLES - POST-WAR ONE-AND-A-HALF STOREY.**

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of post-war one-and-a-half storey houses. Criteria for these approaches will include occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. CMHC is preparing the document for publication, likely in mid 1999.

**CMHC Project Officer:** Don Fugler

**CIDN:** 1430 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## RENOVATION & INSPECTION

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### RENOVATOR TRAINING IN CANADA: AN EVALUATION AND SITUATION REPORT.

The purpose of this project was to investigate the current situation with respect to renovation contractor training in Canada. A situation report was produced to determine who else is providing training for the residential construction industry with a focus on the renovator. Other issues related to this include marketing, financing, existing materials, relationship to certification, native initiatives, and options for delivery that reach beyond current CHBA membership, (i.e.: community colleges, private firms, etc.). The format and method of delivery was also researched (i.e.: five day, correspondence, computer-based, etc.).

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2044 0200002

**Division:** Research Division

**STATUS:** Completed

**AVAILABILITY:** Publication not yet available

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### TOXIC MOLD CLEAN UP PROCEDURES: A GUIDE FOR CONTRACTORS.

This guide provides advice to speciality cleanup contractors on how to clean up a house contaminated with toxic molds, such as *Stachybotrys chartarum*, including how to protect workers and occupants. A separate guide will be developed on how to renovate to prevent moisture problems (ventilation, moisture source control and surface temperature control). The first three drafts have been reviewed by public health officials (including the Center for Disease Control in Atlanta, Georgia) and selected mold and building science researchers and their comments incorporated. The format of the document is designed so that it could be used contractually by public health agencies. The document is in production.

**CMHC Project Officer:** Ken Ruest

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

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### ACTION PLAN FOR REDUCING GREENHOUSE GASES IN RURAL COMMUNITIES.

The purpose of this project is to prepare an integrated planning strategy that would provide guidance for rural municipalities across Canada facing the challenges of developing action plans for achieving Kyoto targets for reducing greenhouse gas (GHG) emissions. A rural Canadian community that will be developing an action plan for reducing GHGs will be selected for study. Funding will be directed to documenting the development of the action plan to ensure that the appropriate actions are considered, implemented, monitored and the results disseminated. The objective is to provide an innovative, comprehensive planning approach for rural communities that integrates transportation planning, land use planning, new housing and retrofits, waste management, economic development and the regulatory environment.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2105 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

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### COMPARISON OF COSTS AND RESOURCE-EFFICIENCY OF SEVEN RESIDENTIAL LANDSCAPE OPTIONS.

This research study is to quantify and compare the annual horticultural inputs (i.e. materials), time, costs and environmental impacts associated with maintaining seven different landscape types. After annual inputs are determined, the capital and life-cycle costs for a typical residential lot will also be calculated. The seven landscape types will include (in post-establishment growth states): wildflower meadow/prairie; naturalized woodland/shade garden; xeriscape; lawn area with hardy, low maintenance species; manicured lawn with conventional species; ornamental shrubs and trees; and annuals and perennial borders. The study will assess the potential environmental impacts of each option as well as their aesthetic and functional implications. In addition, potential benefits, such as wildlife habitat, bio-diversity and reduced storm water run-off will be identified and quantified. The final product will be a publication intended for municipal decision makers, advisors in planning and environmental management departments, homeowners and property managers. It will show how they can save resources, reduce environmental impacts, as well as save money and time through reductions in horticultural inputs.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 1976 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II.

A private and public sector consortium has been established to develop a methodology for assisting industry to better understand, control and reduce the levels of construction, renovation and demolition (CRD) waste. To date, the partners include Industry Canada, Canada Mortgage and Housing Corporation, Alberta Environmental Protection, NWT Department of Resources, Dept. of National Defense, and PCL Constructors Canada Inc. Phase I, to be finalized by early 1999, is the development of a CRD training course that will be published in hard copy. The course will provide practical and comprehensive understanding of resource management issues in the Canadian CRD industry. It is intended for project managers which include, but are not limited to: engineers, architects and CRD contractors. Phase II will consist of an Internet based CRD project management course that will: provide current resource management information and case-specific solutions; contribute to the development of standard managerial practice; promote widespread communication of the best resource recovery techniques, contribute to economic growth and job creation; promote long-term behavioral change; and help industry associations and government departments meet mandated environmental targets. The project has a planned completion date for the Summer of 1999.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2032 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

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## DEMONSTRATION OF HEALTHY HOUSING ON RESERVE.

This project formerly reported as "Water & Sewage Disposal in Northern & Remote Locations" will now form part of the Northern Healthy House initiative. The objectives are to support the design, construction and demonstration of eight on-reserve Healthy Houses in 1999/2000 (Quebec, Ontario, Manitoba, Northwest Territories). This initiative will demonstrate alternative Healthy Housing designs with features appropriate for remote communities. Alternatives to conventional energy, water and sewer infrastructure will be researched, including a prototype "CHUM" - a Combined Heating & Utilities Module which can serve a single house or a cluster of houses. Several house designs are nearing completion (bungalow, one-and-a-half storey) and will be reviewed in community focus groups. Construction will commence in the Spring of 1999 with the public demonstration beginning in the Fall of 1999. House construction will be by locally trained trades and specialists. A CMHC report will be produced detailing house costs and benefits, designs and systems at the completion of the project.

**CMHC Project Officer:** Chris Ives

**CIDN:** 1969 0200001-2

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available.

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## HEALTHY HOUSING COST-BENEFIT STUDY.

The objective of this project was to identify the cost and the benefits of applying Healthy Housing principles, i.e. Occupant Health, Energy Efficiency, Resource Efficiency, Environmental Impact, and Affordability to the construction and renovation of homes. The cost benefit analysis treats the Healthy Housing features individually for the benefit of both the renovation market and for new construction. The study includes Healthy Housing capital costs and effects on the operating costs, such as reductions in energy or water consumption, and identifies the hidden benefits such as occupant health and durability of materials.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1905 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HEALTHY HOUSING SEMINAR.

A two and a half hour consumer Healthy Housing seminar, with a renovation focus, has been developed and packaged for delivery. The material was based on existing material produced by the CMHC Ontario and British Columbia Regional offices. It was also updated to include recent research and to give it a national scope. Examples of case studies were included by incorporating material from the 1994 and 1996 Renovation Demonstration projects. CMHC is currently negotiating a partnership with the building supply industry for delivery of these seminars. Reno Depot will be the partner for the province of Quebec. Presenters will consist of both private presenters and the training staff of our retail partners. The seminars are being offered now in Quebec and we expect they will be held in other parts of Canada starting early in 1999.

A condensed 30-minute presentation of the Healthy Housing Seminar was also produced. This material can be used at home builder association meetings, various industry shows and conferences and also in the preparation of background documents.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 1906 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

# SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

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## MULTIFAMILY HOUSING FOR COMMUNITY SUSTAINABILITY.

This project produced information to assist developers and municipalities in developing land at higher than current average densities by means of multiple housing forms. It assembled and developed exemplary multiple housing solutions and assessed consumer demand for these. It also identified market segments and strategies to attract them to medium density housing. The report provides advice on the likely clients for medium density, multiple housing and on the project design attributes that will entice them to choose medium density (townhouses and walk up apartments) over single detached housing. Publication is expected in the Spring of 1999.

**CMHC Project Officer:** Fanis Grammenos, Research Division

**CIDN:** 1628 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## OVERCOMING THE BARRIERS TO SUSTAINABLE REAL ESTATE DEVELOPMENT IN CANADA.

The research will develop criteria by which a community might be deemed to be considered sustainable. Using these criteria it will develop a clear picture of the status of sustainable development in Canada. With the same criteria it will develop a parallel analysis of successful international projects focusing on those which successfully address problems encountered in Canada. From this comparison it will generate potential directions which might assist Canadians in overcoming barriers to sustainable real estate development.

**CMHC Project Officer:** Doug Pollard

**CIDN:** 2051 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## PLANNING SUSTAINABLE COMMUNITIES.

The purpose of this project is to develop an updated advisory document on community planning and design. The updated document is intended to be a state-of-the-art report, reflecting the latest thinking in the field. The emphasis of the document will be on presenting best practices and case studies of innovative, sustainable and cost-effective approaches to community planning and design. It is anticipated to be available by mid - 1999.

**CMHC Project Officer:** David D'Amour, Research Division

**CIDN:** 1553 0200001

**AVAILABILITY:** Publication not yet available

**STATUS:** Ongoing Project

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## PROTOTYPE OF THE COMMUNITY SUSTAINABILITY INDICATORS SOFTWARE.

The purpose of this project is to develop and provide a working prototype of the Community Sustainability Indicators Software which will include a working demonstration of all the elements of the software concept.

**CMHC Project Officer:** John England, Research Division

**CIDN:** 1796 0200002

**AVAILABILITY:** Publication not yet available

**STATUS:** Ongoing Project



## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

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### STANDARDIZING THE PROCESS OF RESIDENTIAL DECONSTRUCTION.

The purpose of this project is to gather, review and analyze information on residential deconstruction, and determine what can contribute to ensuring that knowledgeable, appropriate and cost effective deconstruction applications and project decisions may be taken.

**CMHC Project Officer:** Darrel Smith

**CIDN:** 2022 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Derek Badger  
c/o byDesign Consultants  
24 Spruce Street  
Ottawa, Ontario K1R 6N7

**AVAILABILITY:** Publication not yet available

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### SUSTAINABLE DESIGN CHARRETTE FOR THE SOUTH EAST FALSE CREEK NEIGHBOURHOOD OF VANCOUVER.

This project will report on the rationale and results of a design charrette structured to test the viability of sustainable community development guidelines. The report will include a brief history of the guideline development, the reasons for holding a charrette, a synopsis of CMHC research that was used, a critique of the effectiveness and value of the charrette. The report will also include planning drawings of the development area contracted by the city before and after the charrette, drawings done at the charrette itself and recommendations for charrettes in other communities.

**CMHC Project Officer:** Doug Pollard

**CIDN:** 2076 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### SUSTAINABLE LANDSCAPE DESIGN FOR RESIDENTIAL DEVELOPMENTS.

The objective of this project is to highlight the link between sustainable development for housing with the condition, composition and use of native vegetation.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 1466 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Karen Vagelatos, Vagelatos Associates Landscape Architecture Ltd.

207-2211 West 4th Avenue  
Vancouver, British Columbia, V6K 4S2

**AVAILABILITY:** Publication not yet available



: Also see the following study on sustainable development

Page 89 : Sustainable Development in Canada

# WATER CONSERVATION, REUSE & MANAGEMENT

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## DISCUSSION PAPER ON WATER REUSE - NEEDS, TRENDS AND CASE STUDIES.

This project will serve as a basis for discussion with agencies involved with water infrastructure, research groups, potential manufacturers of water technologies, and the general public. The research will identify water technologies, discuss performance through case studies, and highlight areas in Canada that are in need of such technologies. The final report will be available in early 1999.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1927 0200003-4

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## GREYWATER TECHNOLOGY SOFTWARE DEVELOPMENT.

CMHC is participating with Water Technology International in this research project to further develop the TECHSPEX software package to address water use, reuse and treatment. This product will provide a number of technical solutions to onsite or small community water treatment requirements based on needs that the user specifies. Costs and availability for the items specified in the solution will also be provided in the completed software. The completed software will be available in early 1999.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1927 0200005

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## INNOVATIVE ON-SITE WASTEWATER TREATMENT.

This project studied the impact of residential water conservation and on-site wastewater management on groundwater quality. In particular, it addressed the issue of nitrates in groundwater. The test site was a new, occupied rental unit containing code-approved water-conserving fixtures coupled to a novel on-site wastewater treatment system. A monitoring program determined the impact of the reduced waterflow on the baseline ground water quality. Initial loading conditions for this single house system indicated that it was possible to increase the recycling level of effluent to the Biofilter. Subsequent changes to the installation's recycling level demonstrated the potential for capacity increases and/or cost reductions. The final report has been reviewed and will be available in Spring 1999.

**CMHC Project Officer:** Chris Ives

**CIDN:** 1047 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# WATER CONSERVATION, REUSE & MANAGEMENT

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## **INNOVATIVE RESIDENTIAL WATER AND WASTEWATER MANAGEMENT: WASTEWATER RECYCLING AND REUSE, RAINWATER CISTERN SYSTEMS, AND WATER CONSERVATION.**

The purpose of this report is to make those responsible for planning and management of water and wastewater systems aware of, and to provide information about, three technologies that have the potential to address water and wastewater problems that face, or will face, many Canadian communities: wastewater recycling and reuse, rainwater cistern systems (RWCS), and water conservation. Most of this report addresses recycling and reuse of wastewater for non-potable applications, because water conservation, and to a lesser extent RWCS, are more widely used and accepted and more completely documented.

Section 1 provides the background to and methodology used in this project, and reviews terminology used in discussion of wastewater reclamation, recycling, and reuse. Section 2 identifies areas and situations in Canada that might benefit from use of the technologies. Problems exist from coast to coast, from north to south, and in both urban and rural areas. Section 3 deals with innovative on-site systems. Examples and references are provided for residential water conservation and RWCS, but the emphasis is on recycling and reuse in residential and other single buildings. Seventeen case studies are provided, of systems in Canada and internationally, and 15 treatment components or systems are described, which have been used, or have the potential for use, in small-scale wastewater non-potable recycling and reuse systems. Section 4 provides examples of municipal innovations in water and wastewater management. A recent Canadian report provided a summary of Canadian municipal water conservation initiatives. Examples of wastewater renovation, recycling, and reuse are drawn from many references that provide examples from around the world.

Examples of direct and indirect potable reuse are reviewed, and information is included about systems where these options have been investigated or used; but most of the examples relate to wastewater reuse for non-potable purposes such as irrigation, or dual municipal systems for delivery of potable and non-potable water. Potential applications for dual systems include: areas where water resources are limited, and inter-basin transfer of raw water is less acceptable than in the past; locations where water demand is expected to exceed the yield from existing facilities, and non-potable uses can be met at lower cost by reclaimed wastewater; the possibility of treating raw water from a polluted source for non-potable uses; increasing treatment requirements to meet more stringent environmental standards; and the ready availability of wastewater as a potential source of reclaimed wastewater. Dual systems have been used for toilet flushing, and for other urban public, industrial, commercial, and residential uses that include irrigation, fire fighting, cooling and process waters, construction street cleaning, and car washing.

Section 5 draws on many recent references to review issues, obstacles, and opportunities related to wastewater recycling and reuse. These include: arguments related to the need for potable reuse, and merits of non-potable reuse; health and other water quality considerations; system planning and design; management of small scale and large scale systems; legislation, regulations, and criteria; economic considerations; and research and demonstration needs.

*Prepared by D.H. Waller, J.D. Mooers, A. Samostie, B. Sahely, Centre for Water Resources Studies, Dalhousie University. Prepared in collaboration with totten sims hubicki associates, Blue Heron Environmental Technology, Canadian Water and Wastewater Association. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Cate Soroczan. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)  
International clients see page 9 for order instructions.

## WATER CONSERVATION, REUSE & MANAGEMENT

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### THE LIVING BY WATER GUIDEBOOK.

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2040 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### ONSITE RECYCLED WATER QUALITY MONITORING.

This project will identify the available water quality monitoring technologies appropriate for on-site and small community reuse and treatment systems. The study will also examine issues of merit, cost of implementation and operational factors.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1936 0200

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

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### QUAYSIDE VILLAGE GREYWATER DEMONSTRATION PROJECT.

A greywater system similar to that of the Toronto Healthy House system is being implemented into a 19 unit cohousing project in North Vancouver, B.C. This system will be capable of treating greywater from sinks, laundry, and showers for reuse in showers, laundry and toilets. Initial testing will be restricted to toilet reuse only. Double plumbing has already been installed and the greywater system is being installed following the signing of a contractual agreement between the city and development regarding ongoing monitoring and maintenance. Upon completion the system will be subject to continuous online water quality monitoring and laboratory analysis to ensure that both the system and the online monitoring is working to satisfaction.

**CMHC Project Officer:** Cate Soroczan

**CIDN:** 1991 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### THE SUSTAINABLE HOME WATER SYSTEM.

The objective of this research is to develop a system which will collect rain water for non-potable uses in a house plus a grey water heat recovery and recycling system.

**CMHC Project Officer:** Stéphanie McFayden

**CIDN:** 1224 0200001

**Division:** Research Division, Housing Technology Incentives Program

**STATUS:** Ongoing Project

**Grant Recipient:** A.C.E. Alternative and Conservation Energies Inc.  
1909-10th Avenue S.W.  
Calgary, Alberta, T3C 0K3

**AVAILABILITY:** Publication not yet available

## **WATER CONSERVATION, REUSE & MANAGEMENT.**

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### **WATER RECYCLING DEMONSTRATION.**

Research and development of greywater reuse is being undertaken in the Conservation Co-op apartment building in Ottawa. A facility in the basement filters and disinfects shower and bath water from 8 units which is reused as toilet flushing water. Initial design and component shortcomings have been identified and further upgrades of the system are being proposed. Plant performance and water quality are being measured with a report anticipated towards early 1999.

**CMHC Project Officer:** Stéphanie McFadyen

**CIDN:** 1573 0201003,  
1573 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available



## **SOCIAL AND ECONOMIC RESEARCH**





# ABORIGINAL HOUSING

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## ABORIGINAL HOUSING AND COMMUNITY SCENARIOS IN URBAN PRAIRIE CITIES.

This research project will explore alternative futures for the housing situation of Aboriginal peoples in selected Prairie cities. The technique to be employed is to construct a number of future scenarios for each location and to present them to a group of key people in each location and to record and analyse the ensuing discussions. A wide range of inputs would be used to construct the scenarios. Three scenarios would be used for each location - each would have a theme or story line and the basic themes would be repeated at each location. While the themes of the scenarios would be common to each location, each scenario would be “tuned” to account for local circumstance. Inputs would include, for example, demographic trends, local housing market conditions, and community plans and preferences as well as local opportunities.

**CMHC Project Officer:** Philip Deacon

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

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## FEASIBILITY AND VIABILITY OF MANAGING THE POOLED REPLACEMENT RESERVE FUNDS OF FIRST NATIONS AND URBAN NATIVE HOUSING GROUPS.

The objective of this project is to research and prepare a report which examines the feasibility and viability of managing the pooled replacement reserve funds of First Nations and Urban Native Housing groups.

**CMHC Project Officer:** Tina Heal

**CIDN:** 2084 1500001

**Division:** B.C. & Yukon Business Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## URBAN ABORIGINAL ACCESS TO HOUSING (AND HOMELESSNESS).

This research study will develop a longitudinal profile of Aboriginal household mobility, access to housing and homelessness using a historical interview technique. Snapshot surveys tell us that Aboriginal households are significantly more mobile than non-Aboriginal. This hyper mobility includes not only movement between reserve or home community and urban areas, but also between urban areas and within urban areas. The hyper mobility may lead to frequent difficulties in accessing accommodation, especially when coupled with the low socio-economic status of many Aboriginal households and discriminatory practices of some landlords. Some literature suggest that this combination of circumstances could be a major factor leading to Aboriginal homelessness. About 45% of the Aboriginal population live in cities and this segment of the population is expected to grow by almost half by 2016, which will likely exacerbate the situation.

**CMHC Project Officer:** Philip Deacon

**CIDN:** Plan 7-9018

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

# CANADA MORTGAGE & HOUSING CORPORATION

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## **CMHC AND YOU: CHALLENGE, INNOVATION, TEAMWORK.**

The purpose of this 24 page book is to describe what the Canada Mortgage and Housing Corporation (CMHC) is all about, to outline the work opportunities available in its key business fields, and to list the qualities it is looking for when hiring new employees. The book describes the mission, vision, and values of the Corporation and tells of the challenging employment opportunities available to a wide spectrum of professionals in the following core business fields:

- housing finance;
- housing research and information transfer;
- the promotion of Canadian housing exports; and
- assisted housing.

*Ottawa: Canada Mortgage and Housing Corporation, 1998.*

Order number: NHA 2152

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)  
International clients see page 9 for order instructions.

NOTE: Aussi disponible en français sous le titre : *La SCHL et vous.*

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## **YOUR HOUSING EXPERTS.**

"Your Housing Experts" is a general-interest publication directed to those interested in an overview of CMHC information products, services and programs.

*Ottawa: Canada Mortgage and Housing Corporation, 1998.*

Order number.: NE2146

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)  
International clients see page 9 for order instructions.

NOTE: Aussi disponible en français sous le titre : *Les experts en habitation*

## CHILDREN'S ENVIRONMENTS

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### ENVIRONMENTAL SCAN: CHILD-CENTERED DESIGN.

This project will involve preparation of an environmental scan or background report on children and housing. This document will include information on demographics, social and economic characteristics, key players, references and potential consultants, as well as housing circumstances for children's housing and living environments.

**CMHC Project Officer:** Tom Kerwin

**CIDN:** Plan 7-6683

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

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## CITY PLANNING & HUMAN SETTLEMENTS

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### BRINGING THE HABITAT AGENDA HOME.

The purpose of this project is to publish a book to inform the membership and others in the Canadian Habitat NGO network about the outcome of the Habitat II Conference and the Habitat Agenda, as well as to provide information and ideas in order to facilitate the implementation of the Habitat Agenda.

**CMHC Project Officer:** Louis Musto

**CIDN:** 1965 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### THE EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM.

CMHC recently initiated two projects looking at the effects of development charges on urban form. The first project is based primarily on a national survey of builders and developers to determine how the structure of development charges in different jurisdictions is affecting private sector development decisions related to location, density, and so on. The second study is an econometric analysis looking at the impact of development charges on housing costs, consumer housing choices, the characteristics of the new stock, and ultimately urban form.

**CMHC Project Officer:** David D'Amour

**CIDN:** 1941 0200001-2

**Division:** Research Division

**STATUS:** Ongoing project

**AVAILABILITY:** Publication not yet available

## CITY PLANNING & HUMAN SETTLEMENTS

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### EVALUATION OF THE *ÉCO-QUARTIERS* PROGRAM.

The purpose of this project is to evaluate Montréal's *Éco-quartiers* program with regard to the management of the urban environment and the improvement of the living environment.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2001 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Gilles Sénécal, INRS-Urbanisation  
3465 Durocher Street  
Montréal, Quebec H2X 2C6

**AVAILABILITY:** Publication not yet available

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## COOPERATIVE AND NON-PROFIT HOUSING

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### BENCHMARKING PHYSICAL PLANT EXPENDITURES IN NON-PROFIT HOUSING.

The objective of this project is to assess expenditures and practices related to the physical plant in non-profit housing providers.

**CMHC Project Officer:** Duncan Hill

**CIDN:** 2003 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Marianne Moershel  
R.R. #2, 2242 Queensborough Road,  
Madoc, Ontario K0K 2K0

**AVAILABILITY:** Publication not yet available

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### CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION.

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

**CMHC Project Officer:** Marie Murphy

**CIDN:** 2018 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** André Fortin  
Confédération québécoise des coopératives d'habitation  
1085 de Salaberry Avenue  
Quebec, Quebec G1R 2V7

**AVAILABILITY:** Publication not yet available

## COOPERATIVE AND NON-PROFIT HOUSING

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### **L'HABILITATION (EMPOWERMENT) DANS LES ORGANISATIONS COOPÉRATIVES: CINQ CAS DE GESTION DE COOPÉRATIVES D'HABITATION**

People who otherwise never acquire the authority of an entrepreneur are afforded this opportunity in cooperatives. This form of collective entrepreneurship, however, does raise the question of how members actually partake in the activities of the cooperative and what authority they have within the organization. This research deals with the process of integrating and empowering members to take over the reins of their rental housing cooperatives. During the project performance phase, the founding members went through a number of experiences which enabled them to acquire the knowledge, skills and abilities to manage their cooperatives. The renewal of human resources in these types of organizations not only raises the issue of the training they can receive from the outside (cooperative network, groups of technical resources, etc.), but also the renewal of cooperative management practices in house, in particular, the renewal of experiences to foster the integration and empowerment of members with respect to the takeover of their organization.

The report is in two parts. The first part provides an analytical framework of participative management practices in rental housing cooperatives with emphasis on empowering members regarding the takeover of their organization. The second part contains five management cases based on real-life experiences in housing cooperatives. The report also includes a methodology and a bibliography.

*Prepared by Marie J. Bouchard and Marc Gagnon. CMHC Project Officer: Michel Brûlé. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program).*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

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## CRIME PREVENTION

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### **SAFE COMMUNITIES: INFORMATION PRODUCTS AND TRAINING MATERIALS.**

In partnership with the RCMP, CMHC is developing materials to promote the principles of crime prevention through environmental design (CPTED). Priorities were identified at a stakeholder forum held in the Spring of '97. Materials include case studies of success stories at the subdivision and community level, and the enhancement and adaptation of training materials for a variety of distinct audiences, including builders and developers. The advisory document is expected to be available in the Spring of 1999.

**CMHC Project Officer:** Mark Holtzman

**CIDN:** 1938 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## DISCRIMINATION IN HOUSING

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### HOUSING AND DISCRIMINATION: A REVIEW OF CURRENT KNOWLEDGE.

The objective of this research is to identify and examine what knowledge and expertise regarding housing-related discrimination is available in or applicable to Canada.

**CMHC Project Officer:** Teresa Van Den Boogaard

**CIDN:** 1792 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### HOUSING AND DISCRIMINATION: THE LEGAL FRAMEWORK.

The purpose of this project is to examine housing-related discrimination from a legal perspective to understand how housing-related discrimination fits in Canada's legal framework.

**CMHC Project Officer:** Teresa Van Den Boogaard

**CIDN:** 1793 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HOME OWNERSHIP

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### METHODS USED ABROAD TO SUPPORT ACCESS TO HOME OWNERSHIP.

The objective of this research is to investigate significant and novel mechanisms which other nations have employed, encouraged and/or are considering that support and facilitate access to home ownership in general or to target populations. The intent is to identify new mechanisms that might be implemented in Canada that hold promise to improve access to home ownership. The review will cover the U.S., U.K., Germany, France, Australia and New Zealand. The research is being managed under the direction of an advisory committee composed of representatives from the Canadian Home Builder's Association, a Vice President of a major Canadian bank, the Mortgage Insurance Fund, CMHC's Market Analysis Centre and Research Division. This project will be of interest to the construction and renovation industry, the real estate sales sector, mortgage lenders and insurers as well as federal and provincial housing policy analysts.

**CMHC Project Officer:** David Metzack

**CIDN:** 1931 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HOMELESSNESS

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## **BEST PRACTICES ADDRESSING HOMELESSNESS: DOCUMENTATION.**

This project will document a cross-section of 6 to 10 projects that have successfully addressed the needs of the Canadian homeless population. Best practices will represent the range of approaches to homelessness across Canada and will reflect the regions of the country, the variety of initiative types (e.g., emergency shelters, rooming houses, shelter and service support) and populations served (e.g., youth, single women, single men, and families).

**CMHC Project Officer:** Tom Kerwin

**CIDN:** 1978 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## **CHRONIC HOMELESSNESS AMONG WOMEN: A DECADE OF CHANGING NEEDS AND SERVICES.**

The objective of this project is to undertake a retrospective review of the changing patterns of women's homelessness in the Toronto area with a focus on chronically homeless women and innovative services, based on the observations and expertise of those who have worked closely with homeless women over the past decade.

**CMHC Project Officer:** Brenda Baxter

**CIDN:** 2000 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Sylvia Novac  
593A Melita Crescent  
Toronto, Ontario  
M6G 3Y7

**AVAILABILITY:** Publication not yet available

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## **ROUNDTABLES ON BEST PRACTICES ADDRESSING HOMELESSNESS.**

CMHC will co-host five regional roundtables in early 1999 and a national roundtable in May or June 1999 on best practices addressing homelessness, using the "Best Practices Addressing Homelessness: Documentation" as a basis for discussion. Roundtables will allow opportunities for network building and exchange of information on effective best practices.

**CMHC Project Officer:** Tom Kerwin

**CIDN:** 2064 0200

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOMELESSNESS

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### **SERVICES FOR CHILDREN AND YOUTH IN CANADIAN SHELTERS FOR HOMELESS FAMILIES.**

This project will investigate space allocations and services for youth and children available in emergency family shelters (i.e., family units in homeless shelters, temporary and satellite shelters such as hotels, and shelters for victims of family violence).

**CMHC Project Officer:** Tom Kerwin

**CIDN:** 2085 0200

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HOUSING

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### **HOUSING AND POPULATION HEALTH.**

This research project will explore the links between housing and population health. Population health is a way of conceptualizing and acting on health, by focusing on why some groups in society are more prone to illness than other groups. This study will look at the extent to which housing is or may be a factor. The study will commence with a comprehensive and critical review of the literature. This will be followed by an assessment of the evidence to date and the potential for evidence in the future, with an emphasis on the methodological and measurement issues. The project will conclude with a set of ideas for future research directions.

**CMHC Project Officer:** Philip Deacon

**CIDN:** 1926 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **RESIDENTIAL PROJECTS AND ROAD SAFETY.**

The objective of this research is to make an inventory of the proposed residential development principles in view of ensuring the safety of the different road users and the quality of life of residents.

**CMHC Project Officer:** Leigh Howell

**CIDN:** 0925 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Denise Piché, Université Laval  
School of Architecture  
Québec, Québec  
G1K 7P4

**AVAILABILITY:** Publication not yet available



## HOUSING AFFORDABILITY

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### "AFFORDABLE PROJECT OF THE MONTH" WEB PAGE.

This project determined the feasibility, content and method of maintaining a monthly page on the CMHC web site that portrays successful, affordable housing projects. It examined the interests of the development community, especially the non-profit sector, with regard to information on affordability, generated a structure and format that responds to their needs and created an initial database of appropriate projects that could be posted. Six projects that were selected for posting are currently being written up and formatted for the web site. The Web page is expected to be operational by January 1999.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1878 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

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### AFFORDABLE HOUSING INITIATIVES FROM THE CANADIAN NON-PROFIT HOUSING SECTOR.

The objective of this project is to document innovative approaches and "best practices" for creating affordable housing from the Canadian non-profit and municipal housing sector and to disseminate this information throughout the housing sector.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1794 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### AFFORDABLE, VERSATILE HOUSING.

This project identifies and describes house designs that enable a house to accommodate a range of household types, sizes and needs by means of their adaptability. It documents the features of designs that have been built and it explains their economic and use advantages. The set of designs to be included will cover all housing forms, from detached houses to apartments. This first guide on adaptable designs will be made available both in hard copy and electronic format via the Internet. Publication is expected in the Spring of 1999.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1783 0300001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOUSING AFFORDABILITY

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### ALTERNATE TENURE ARRANGEMENTS.

The project has two broad objectives: (1) to develop an up-to-date consolidated source of information on the range of alternate tenure arrangements that can be used to implement affordable housing through partnerships; (2) to assess the extent to which projects utilizing alternate tenure arrangements have successfully met client needs, preferences and expectations. It is intended to be of interest to municipal and provincial officials, and not-for-profit and community groups. Work on the project will include a review of the types of alternate tenure arrangements that exist in Canada, as well as a more focused examination of specific Canadian alternate tenure arrangement projects.

**CMHC Project Officer:** David Scherlowski

**Division:** Research Division

**STATUS:** Planned

**AVAILABILITY:** Publication not yet available

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### BACKGROUND RESEARCH ON PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING.

The recent Part IX research project entitled “The Role of Public-Private Partnerships (PPPs) in Producing Affordable Housing: Assessment of the U.S. Experience and Lessons for Canada” noted that philanthropies “... have been a critical participant in the development of the PPP affordable housing system in the U.S... .” The project will address the considerable information gap with respect to the role that philanthropic support has played and could potentially play in the provision of affordable housing in Canada. The project will provide organizations involved in either creating or supporting the creation of affordable housing through PPPs with an understanding of the opportunities, as well as alternative ways and means of obtaining financial support from the gamut of potential donor sources in the philanthropic sector. The research is being managed under the direction of an advisory committee that includes members from the Canadian Housing Renewal Association’s Board, the CCPPPH National Advisory Committee, a former Director of the Canadian Centre for Philanthropy, CMHC national office and field staff from the CCPPPH as well as Research Division.

**CMHC Project Officer:** David Metzak

**CIDN:** 2073 200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### BLENDED INCOME HOUSING: LITERATURE REVIEW AND ANALYSIS.

The purpose of this project is to provide a summary of the range of housing, social and economic issues and thinking on income blended housing projects. It is a jointly funded CMHC-Revenue Canada initiative. An advisory committee composed of officials from both organizations is to oversee the conduct of the project. The final report will be of interest to third sector housing providers and homebuilders, as well as municipal and provincial officials. The first phase of the project will focus on the development of an analytical framework and will be used in the review of literature on blended income housing. Literature from Canada, the United States, Britain and other western industrialized countries will be reviewed in the second phase. Findings from the second phase will be analyzed so a comprehensive picture of the range of issues on income blending in housing projects can be presented.

**CMHC Project Officer:** David Scherlowski

**CIDN:** 1925 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HOUSING AFFORDABILITY

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## GUIDE TO AFFORDABLE HOUSING PARTNERSHIPS.

The purpose of this project is to prepare the content of a guide to creating affordable housing partnerships in Canada. The guide is intended to be used by individuals and organizations in the non-profit, public and private sectors who have an interest in providing affordable housing for families, single persons, seniors and people with disabilities. The publication will be of most use to organizations with less experience in partnering approaches to the provision of affordable housing. The guide is presently being prepared for publication and should be available during the first quarter of 1999.

**CMHC Project Officer:** Steve Mennill

**CIDN:** 1874 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## MARKET ANALYSIS AFFORDABILITY SOFTWARE PROJECT.

The objective of this project is to make modifications to Affordability to keep the software current with the latest technology; provide customization for interested clients/partners; create a fully functional Internet version should it be feasible; and provide technical support and expertise to help solve issues and problems that cannot be resolved by CMHC's help desk.

**CMHC Project Officer:** Greg Goy

**CIDN:** 1536 1000002

**Division:** Market Analysis Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## MUNICIPAL REGULATION, LAND USE PLANNING AND FINANCIAL MEASURES FOR NEW AFFORDABLE HOUSING PRODUCTION.

The overall objective of this project is to raise awareness, primarily among planners, of the range of alternative regulatory (inclusionary zoning, density bonusing, alternative development standards), land use planning (performance based planning) and financial measures (exaction programs) that can be used by municipalities during the development approval process to implement new affordable housing. It is intended to identify and describe the range of alternative regulatory, land use planning and financial measures that can be used by municipalities to create new affordable housing. It is also intended to review initiatives that have been undertaken to implement affordable housing. This will be a study at the conceptual level of how the various measures interact and how they could be used together to encourage the creation of new affordable housing. In addition to being of benefit to planners, the project is expected to benefit homebuilders, land developers, third sector housing providers, as well as municipal finance officials.

**CMHC Project Officer:** David Scherlowski

**CIDN:** 2080 0200

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOUSING AFFORDABILITY

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### **MUNICIPAL REGULATORY INITIATIVES: PROVIDING FOR AFFORDABLE HOUSING.**

This study examines regulatory initiatives - namely inclusionary zoning, “linkage” or other development fees, and density bonusing - associated with the development approval process that have been used to provide for housing affordable to lower-income households. The findings are presented primarily through detailed profiles of the activities of two dozen municipalities that have the most representative, productive or other relevant housing programs in the U.S. and Canada. These profiles reviewed the main regulations used in each of these programs, and their overall achievements to date. The report is expected to be of interest to planners, third sector housing providers and builders.

**CMHC Project Officer:** David Scherlowski

**CIDN:** 1670 0200002

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **THE NATURE, APPLICABILITY AND POTENTIAL OF HOUSING TRUST FUNDS IN CANADA**

The objective of this project is to examine the nature and applicability of housing trust funds and the potential to establish them in Canada for the purpose of funding affordable housing development. The beneficiaries of this work will be municipal and provincial policy analysts, and finance officers, as well as non-profit and social housing providers.

**CMHC Project Officer:** David Scherlowski

**CIDN:** 2071 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **THE ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN PRODUCING AFFORDABLE HOUSING: ASSESSMENT OF THE U.S. EXPERIENCE AND LESSONS FOR CANADA.**

In order to strengthen and broaden current efforts to initiate affordable housing public-private partnerships (PPPs) in Canada, research was undertaken to examine the U.S. experience with public-private partnerships. The research found that the US approach to partnerships is “system-wide”: it encourages widespread participation from corporations, philanthropies, foundations, lenders, financial investors, and the non-profit sector in producing affordable rental and home ownership housing. The report outlines a range of initiatives and mechanisms that have evolved in the US that work together to lever limited public-sector funds to produce affordable housing. The U.S. system works to reduce mortgage debt costs so that carrying costs are affordable and the housing is financially viable without the need for ongoing subsidy assistance. This report will be of interest to Canadian housing authorities, non-profit agencies and government housing policy makers interested in learning of alternative measures that could be used to support the provision of affordable housing in Canada.

**CMHC Project Officer:** David Metzack

**CIDN:** 1790 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

# HOUSING AFFORDABILITY

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## **SHELTER AFFORDABILITY AND HOUSING NEEDS: A STUDY OF WINNIPEG FOOD BANK USERS: FINAL REPORT**

The purpose of this study was to examine the phenomenon associated with increased use of food banks in Manitoba and to develop a profile of the typical food bank user with respect to shelter needs and other sociodemographic variables. Specifically, the study sought to develop a research instrument and interview methodology that would address the unique sampling difficulties encountered when surveying this group and accurately assess the housing needs of local food bank users relating to shelter affordability, adequacy, and suitability. A random sample of 1,019 food bank users, stratified proportionally across 34 Winnipeg agencies, was used to answer questions regarding financial status, housing conditions and satisfactions, food bank usage, employment history, health and perceptions of prospects for the future and other sociodemographic information.

There was 582 men and 433 women who participated in face-to-face interviews during the winter of 1993-94. Results of this study showed that over 75 percent of the respondents in this study were receiving social assistance. The majority of the food bank users were young, single, employable males on welfare living in rented accommodations that consumed well over 50 percent of their monthly income.

The housing situations of all of the respondents were examined using the affordability, suitability and adequacy indicators from Canada Mortgage and Housing Corporation's core housing need model. Survey results on income and affordability issues indicated that food bank users do not have sufficient income to exist without some form of supplementary aid. Although shelter costs were low in terms of absolute dollar amounts, once shelter costs were subtracted from the food bank user's monthly income, there was very little left to obtain the basic requirements for existence. In other words, the majority of food banks users were shelter poor. While housing conditions were modest, they were reported satisfactory for the most part. Despite this high rate of general satisfaction with housing and neighbourhood, 25 percent of the respondents reported a lack of space and 20 percent reported housing in need of major repair.

Sub-populations selected for additional analysis included: welfare recipients; single parent families; families without children; single male, and single female households; households with seniors and persons with disabilities. Content analysis was performed on open-ended responses and on written observations made by interviewers during the interviews.

Data from the survey were combined with Statistics Canada 1991 Census data aggregated across forward sortation areas (FSAs) for 18 Winnipeg neighbourhoods. Results indicate a strong relationship between the socioeconomic status of a neighbourhood and the amount of food bank activity. Neighbourhoods in the core area, specifically R2W, R3B and R3C had the strongest relationship between low socioeconomic status and high food bank use.

The findings hold implications for the remaking of housing policy and social welfare policy in Canada.

*Prepared by: Jeff A. Sloan and Dana G. Stewart. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 1997 (External Research Program)*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## HOUSING AND IMMIGRATION

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### IMMIGRANTS' GUIDE TO CANADIAN HOUSING.

The purpose of this project is to produce a guide that will assist immigrants in understanding Canadian housing and housing systems. The guide will include general information on Canadian housing as well as detailed information on how to obtain rental housing and how to buy a home. It will also provide information on contacts including government agencies and immigrant aid organizations. The substantive content for the guide is almost complete and publication is expected in mid-1999.

**CMHC Project Officer:** Steve Mennill

**CIDN:** 1802 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HOUSING EXPORT OPPORTUNITIES

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### ADAPTING CANADIAN HOUSING TO INTERNATIONAL MARKET REQUIREMENTS.

The objectives of this project are to develop a qualitative and quantitative presentation on the extent of off-the-shelf versus adapted offerings of industry at present; develop a sector-by-sector picture of the feasibility of adaptation, based on considerations to be taken into account in each, and on specific case studies; and, develop a ranked list of practical steps which can be taken by Canadian industry to adapt to foreign customer requirements and expectations. Publication will be available early in 1999.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 2008 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** David Crenna  
82 Bayswater Avenue  
Ottawa, Ontario, K1Y 2E9

**AVAILABILITY:** Publication not yet available

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### ATTENDANCE AND REPORT ON THE ENERGY EFFICIENT RETROFITTING OPPORTUNITIES IN RUSSIA - BUSINESS BRIEFING.

The objective of this project is to attend, monitor, network and report on the Business Briefing concerning the Energy Efficient Retrofitting Opportunities in Russia to take place at the University of South California on Thursday, July 9/98.

**CMHC Project Officer:** Jeremy Melhuish

**CIDN:** 2057 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOUSING EXPORT OPPORTUNITIES

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### **CANADIAN/JAPANESE CONSTRUCTION COST ANALYSIS OF A TYPICAL 2X4 FRAMED HOUSE PLAN.**

The purpose of this project is to develop a costing spreadsheet tool for use on all soft and hard costs forming part of the delivered turn key project including at minimum, design; permits and approvals; materials; etc.

**CMHC Project Officer:** Jay Thakar

**CIDN:** 1596 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Completed

**AVAILABILITY:** Publication not yet available

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### **CRITERIA TO HELP FORGE SUCCESSFUL CANADIAN HOUSING ALLIANCES.**

The purpose of this project is to develop and validate criteria to help determine what makes alliances successful in the housing export market.

**CMHC Project Officer:** Louis Musto

**CIDN:** 1770 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **EVALUATION OF CODES, REGULATIONS, DESIGN & BUILDING METHODS IN PRIORITY MARKETS (USA, RUSSIA, SOUTH KOREA, CHILE).**

Canadian exporters of pre-packaged housing and components can compete in off shore markets if they can understand and access their market. Exporters must negotiate foreign markets, regulatory systems and familiarize themselves with local design practices and construction technologies, interpret the local vernacular and housing preferences and then market and distribute their product. The first step in managing these obstacles is to fully understand them so that strategies can be developed to overcome them. Some of this information has already been researched or is in the process of being researched by CMHC and other agencies such as DFAIT, NRCan and NRC. In other cases, especially in emerging markets, little information is available to guide exporters.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 1949 0200002 (USA),  
1949 0200003 (Russia),  
1949 0200004 (South Korea),  
1949 0200005 (Chile)

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publications not yet available

## HOUSING EXPORT OPPORTUNITIES

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### EXPORT HOME SEISMIC SLAB FOUNDATION.

The purpose of this project is to identify and develop a new seismic resistive foundation system for use in Japan, which could be "packaged" with Canada's housing technology and exports to create a value-added and thus more attractive export housing product.

**CMHC Project Officer:** Rob Duncan

**CIDN:** 2019 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Ian B. Bazley  
32 Bello Road  
Kelowna, British Columbia V1V 1C1

**AVAILABILITY:** Publication not yet available

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### EXPORT PERFORMANCE AND NEEDS OF THE CANADIAN MANUFACTURED HOUSING INDUSTRY.

The objective of this research is to develop a statistical profile and to identify the export performance and needs of the Canadian manufactured housing industry.

**CMHC Project Officer:** Louis Musto

**CIDN:** 1909 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### FEASIBILITY STUDY ON AFTER-SALES SERVICES AND ESTABLISHMENT OF A WAREHOUSE FOR CANADIAN HOUSING EXPORTS IN JAPAN.

The objectives of this project are to identify existing programs for after-sales services; to provide options for after-sales services; to study Japanese laws and regulations governing the establishment of a warehousing facility in Japan by a foreign company; and to do a cost-benefit analysis for the recommended option.

**CMHC Project Officer:** Jay Thakar

**CIDN:** 2056 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### INTERNATIONALIZATION OF CANADIAN HOUSING SECTOR BUSINESSES: A PERCEPTUAL ANALYSIS.

The objective of this project is to conduct directed interviews with forty business executives throughout the country, working in three sub-sectors of the housing industry: professional construction services, housing manufacturers and product and material makers.

**CMHC Project Officer:** Joanne Hallée

**CIDN:** 1999 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** François Cadotte, FC Recherche  
2238 Belgrave Avenue  
Montreal, Québec H4A 2L8

**AVAILABILITY:** Publication not yet available



## HOUSING EXPORT OPPORTUNITIES

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### **OPPORTUNITIES FOR CANADIAN FACTORY BUILT HOUSING IN THE SOUTHEASTERN UNITED STATES.**

The purpose of this project is to identify the opportunities and impediments to the penetration of Canadian factory built housing in the southeastern United States.

**CMHC Project Officer:** Louis Musto

**CIDN:** 1953 0900002

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **RETROFITTING RUSSIA'S HOUSING STOCK: OPPORTUNITIES AND OBSTACLES FOR CANADIAN EXPORTERS.**

The purpose of this project is to identify several basic business development strategies which could be employed by Canadian firms to practically and realistically respond to the market opportunities represented by the Russian housing sector.

**CMHC Project Officer:** Oliver Drerup

**CIDN:** 1830 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **SEMINAR CURRICULUM ON THE CANADIAN HOUSING SYSTEM AND THE ESTABLISHMENT OF AN INTERNATIONAL TRAINING TEAM.**

The objective of this project is to develop a seminar curriculum on the Canadian housing system to establish an international training team.

**CMHC Project Officer:** Louis Musto

**CIDN:** 1973 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **SUSTAINABLE DEVELOPMENT IN CANADA.**

The objective of this project is to investigate the application of Canadian sustainable development in the Japanese market.

**CMHC Project Officer:** Jay Thakar

**CIDN:** 2092 0900001

**Division:** Canadian Housing Export Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## HOUSING MARKET

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### EMPLOYMENT AND HOUSING ACTIVITY: A CYCLICAL ANALYSIS.

The objective of this project is to review the economic literature, prepare an estimation strategy, analyze the past cycles of retained employment indicators and estimate the elasticities of housing starts and MLS sales in relation to the employment indicators.

**CMHC Project Officer:** Louis Trottier

**CIDN:** 1952 1000002

**Division:** Market Analysis Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## HOUSING SURVEYS

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### FIVE PILOT SURVEYS OF CONSUMER INTENTIONS TO BUY OR RENOVATE.

The objective of this project is to undertake and complete five pilot surveys of Consumer Intentions to Buy or Renovate.

**CMHC Project Officer:** Greg Goy

**CIDN:** 1587 1000003

**Division:** Market Analysis Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### HOUSING INTENTIONS SURVEYS OTTAWA-CARLETON, 1998

The Corporate Research Group Ltd. was commissioned by the Canada Mortgage and Housing Corporation (CMHC) to conduct surveys with owner and renter households in Ottawa-Carleton.

The objective of the surveys was to identify "Housing Intentions" of a cross section of owner and renter households, in the Ottawa-Carleton Region. More specifically, to gauge future housing plans of local residents and to obtain a variety of housing and economic related information including respondents expectations for the coming year.

All surveys were conducted by telephone, using trained bilingual staff, during November 1998, and from the Nepean offices of the Corporate Research Group Ltd. Renter households participating in the survey were selected at random. Owner households consisted exclusively of those attempting to sell their homes and were identified using various means.

The main highlights of the survey, a copy of the survey instruments, the detailed findings and the statistical tables and graphs are presented. A summary of the survey results was delivered during CMHC's Housing Outlook Conference, held in Ottawa, Monday November 30, 1998.

*Prepared by The Corporate Research Group Ltd. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Novak Jankovic. Ottawa: CMHC, 1998.*

\*\* Price: \$50.00 + GST and handling charges

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## HOUSING SURVEYS

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### REVIEW OF DATA SOURCES AND INDICATORS.

The purpose of this project is to undertake a review of the major national data sources that include housing information which will assist in examining the role each might play in monitoring housing and community trends and developing related indicators.

**CMHC Project Officer:** Roger Lewis

**CIDN:** 1988 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### SEASONAL ADJUSTMENT OF HOUSING STARTS TIME SERIES.

The objective of this project is to introduce reliable estimates of seasonally adjusted series at the beginning of the new year, at the time when all other CMHC survey data are revised and updated.

**CMHC Project Officer:** Michel Laurence

**CIDN:** 1967 1000002

**Division:** Market Analysis Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## INFRASTRUCTURE

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### ALTERNATIVE METHODS OF FINANCING MUNICIPAL INFRASTRUCTURE.

This paper is the first in a series of three CMHC studies looking at infrastructure finance. The paper looks at the evolution of the issues, the challenges confronting municipalities, and different financing methods. The second and third papers in this series explore in more detail the potential for public-private partnerships, and demand-side management to fund the provision, operation and maintenance of municipal infrastructure. The papers will be available in April 1999.

**CMHC Project Officer:** David D'Amour

**Division:** Research Division

**STATUS:** Ongoing project

**AVAILABILITY:** Publication not yet available

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### PROVISION OF MUNICIPAL INFRASTRUCTURE THROUGH DEMAND MANAGEMENT: GUIDEBOOK AND CASE STUDIES

This paper is the second in a series of three CMHC studies looking at infrastructure finance. The paper looks at the ability of Demand Management (DM) measures to contribute to meeting future water and wastewater infrastructure demands. It will be available in April 1999.

**CMHC Project Officer:** David D'Amour

**CIDN:** 1916 0200001

**Division:** Research Division

**STATUS:** Ongoing project

**AVAILABILITY:** Publication not yet available

## INFRASTRUCTURE

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### **PUBLIC-PRIVATE PARTNERSHIPS IN MUNICIPAL INFRASTRUCTURE.**

This paper is the third in a series of three CMHC studies looking at infrastructure finance. The paper explores the potential for public-private partnerships to fund the provision, operation and maintenance of municipal infrastructure. It will be available in April 1999.

**CMHC Project Officer:** David D'Amour

**CIDN:** 1788 0200001

**Division:** Research Division

**STATUS:** Ongoing project

**AVAILABILITY:** Publication not yet available

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## MORTGAGES AND HOUSING FINANCE

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### **EXAMINATION OF THE PROSPECTS FOR, AND POTENTIAL IMPACTS OF REAL ESTATE INVESTMENT TRUSTS ON THE MULTI-FAMILY RENTAL MARKET IN CANADA.**

A Real Estate Investment Trust (REIT) is a tax advantaged investment vehicle set up to own and manage real estate. REITs raise money through publicly listed partnership units (Canada) or through shares (U.S.).

REITs have shown phenomenal growth in the U.S. in recent years. REITs focusing on residential apartments in the U.S. now hold a total of around 1 million rental units. The Canadian REIT industry is very small in comparison. The first two Canadian REITs focusing on residential apartment properties were formed in 1997.

The purpose of this paper is to explore whether the U.S. pattern of REIT growth is likely to be followed in Canada and to assess whether REITs represent a financing mechanism which can improve rental affordability and the financial viability of regenerating or constructing residential rental units in Canada.

The report concludes that use of the REIT structure in the U.S. has enabled real estate operators and developers to achieve greater access to capital, and lower cost financing for acquisition, construction and renovation. The resulting ability to grow has also enabled them to achieve economies of scale in purchasing, marketing and operations.

The lower costs and greater availability of capital has reduced cost pressure on rents for existing owners and enabled projects (including renovation) to go ahead, thereby increasing supply and further moderating pressure on market rents.

REITs could assist in revitalizing the Canadian rental sector by drawing additional players and a new source of funding into the market, and contributing to upgrading the stock particularly in areas where renovation has been discouraged through rent controls.

The potential for REITs in Canada, however, is limited by legislative and regulatory factors. In addition, a number of market and economic factors are not as conducive to REITs obtaining the competitive advantages that they enjoy in the U.S.

*Prepared by Tony Wellman. CMHC Project Officer: David Metzke. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
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## MORTGAGES AND HOUSING FINANCE

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### **FEASIBILITY STUDY ON THE COMMERCIAL VIABILITY OF LAND-ONLY MORTGAGE LOAN INSURANCE.**

Canada Mortgage and Housing Corporation (CMHC) is interested in assessing the commercial viability of land-only mortgage loan insurance, which is generally not available in the marketplace today. Land-only mortgage loan insurance is defined as insurance protection to obtain financing to acquire and/or service land for housing related purposes.

The purpose of this study was to enable CMHC to better assess the potential demand for land-only mortgage loan insurance, the risk to CMHC in offering land-only mortgage insurance and what means are available to CMHC to mitigate associated risks.

Through questionnaires and face-to-face interviews, data was collected to permit the analysis of the critical success and failure factors and to identify financing gaps in the land development process. This information set the framework within which the insurance parameters were subsequently developed. Specific areas within two provinces were selected for analysis; one where there is a high degree of housing market activity and where land prices can be volatile (The Greater Toronto Area of Ontario) and one with a relatively stable housing market activity (the Winnipeg Region of Manitoba).

*Ottawa: Canada Mortgage and Housing Corporation, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
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### **MANAGING THE RISKS ASSOCIATED WITH A REVERSE EQUITY MORTGAGE (REM) LOAN INSURANCE PORTFOLIO.**

The purpose of this project is to complete a study on the management of risks associated with an insured reverse equity mortgage (REM) portfolio.

**CMHC Project Officer:** Brian Davidson

**CIDN:** 1728 0100002

**Division:** Strategic Planning, Policy & Marketing

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **MORTGAGE AND INTEREST RATES MODELING AND FORECASTING.**

The purpose of this research is to review and evaluate current approaches and practices to modeling and forecasting mortgage and interest rates, and to construct a set of models to provide CMHC with accurate forecasts of these rates.

**CMHC Project Officer:** Ali Manouchehri

**CIDN:** 1858 1000001

**Division:** Market Analysis Centre

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## MORTGAGES AND HOUSING FINANCE

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### PERSONAL FINANCIAL MANAGEMENT FOR HOME OWNERSHIP IN TRANSITIONAL SOCIETIES.

The objective of this project is to contribute to the efficiency of the mortgage credit and housing markets of Visegard countries by evaluating the situation which has evolved since 1989 and by making recommendations on what might be done to improve the working of those markets. The project will enable the Canadian housing and financial industries to understand the challenges and opportunities confronting them when dealing with the Visegard markets.

**CMHC Project Officer:** Doug Dennis

**CIDN:** 1997 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Professor John L. Pratschke  
Department of Consumer Studies  
University of Guelph  
Guelph, Ontario N1G 2W1

**AVAILABILITY:** Publication not yet available

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## PERSONS WITH DISABILITIES

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### ACCESSIBLE DOWNTOWN RESIDENTIAL COMMUNITIES: A CASE STUDY OF WINNIPEG, MANITOBA.

The purpose of this project is to examine housing and community design needs of persons with disabilities, including the elderly, to determine how these needs could be met in a downtown residential location as part of the revitalization of a downtown area.

**CMHC Project Officer:** Tom Parker

**CIDN:** 2017 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Nancy Klos, Institute of Urban Studies  
University of Winnipeg, 346 Portage Avenue  
Winnipeg, Manitoba R3C 0C3

**AVAILABILITY:** Publication not yet available

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### HOUSING NEEDS OF PEOPLE WITH DISABILITIES.

The objective of this project is to provide a profile of the housing characteristics and needs of people with disabilities using data from the 1991 Census and post-censal Health and Activity Limitations Survey (HALS).

**CMHC Project Officer:** Jamie Angus

**CIDN:** 1045 0200003

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## PERSONS WITH DISABILITIES

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### **MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS.**

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

**CMHC Project Officer:** Sophie Bang, Succursale de Montreal

**CIDN:** 2021 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Sophie Lanctôt. c/o Société Logique Inc.  
3250, boul. St-Joseph Est  
Montréal, Quebec H1Y 3G2

**AVAILABILITY:** Publication not yet available

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### **NARRATIVES ON DEDICATED MIXED AND INTEGRATED HOUSING.**

It is widely acknowledged that the key components of any comprehensive community support and rehabilitative approach for consumers of psychiatric services include decent, stable housing and the availability of a wide variety of supports. There has been growing evidence that mental health consumers' perceptions of what they need in a living environment are the best predictors of success in housing. The objective of this study was to examine mental health consumer and mental health provider preferences for and perceptions of three housing types: dedicated, mixed and integrated housing. Forty-five interviews were conducted with consumers of mental health services living in each of the three types of housing and 24 interviews were conducted with mental health providers.

The results of this study indicate that mental health consumers have varied needs and preferences for housing and that the availability of a wide range of housing choices is important to both mental health consumers and service providers.

*Prepared by: K.M. Boydell, B.M. Gladstone, E.K. Crawford, J. Trainor. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 1998 (CMHC External Research Program).*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Ottawa, Ontario, K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## PERSONS WITH DISABILITIES

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### AN OUTLOOK ON MENTAL HEALTH CONSUMERS HOUSING NEEDS.

The objective of this research is to examine the supportive housing needs of the severely chronically mentally ill in the Manitoulin-Sudbury District by location and by language, culture and gender.

**CMHC Project Officer:** Teresa van den Boogaard

**CIDN:** 1852 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Geneviève Gibbons, Canadian Mental Health Association  
111 Elm Street  
Sudbury, Ontario, P3C 1T3

**AVAILABILITY:** Publication not yet available

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### SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS.

The objective of this project is to evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

**CMHC Project Officer:** Tom Parker

**CIDN:** 2009 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Gloria Gutman  
Gerontology Research Centre, Simon Fraser University  
2800-515 West Hastings Street  
Vancouver, British Columbia V6B 5K3

**AVAILABILITY:** Publication not yet available

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## PROPERTY MANAGEMENT

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### CURRENT CONDITIONS IN THE RESIDENTIAL PROPERTY MANAGEMENT INDUSTRY.

This project is intended to result in a profile of the residential property management industry. It will contain statistical and descriptive information on the size and concentration of the industry, the roles and responsibilities of the key players, and any available data on how the industry is positioned internationally. It is intended to focus on a number of social and economic topics associated with residential property management. Results of the project will determine the nature and depth of associated information gaps and research needs. The project will be of interest to residential property managers.

**CMHC Project Officer:** David Scherlowski

**CIDN:** 1966 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available



## REGULATORY REFORM

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### **ACT IN ACTION: AFFORDABILITY AND CHOICE TODAY -- LESSONS LEARNED: FINAL REPORT.**

Affordability and Choice Today (ACT) is a federally funded program that encourages municipalities and the housing sector to work in partnership to conceive, test and implement changes to the existing web of building and development regulations. The belief is that some change is necessary - even essential - to foster the development of more affordable housing and to widen the range of housing choices. This report looks at a number of projects completed under the program. It identifies elements in each that have led to positive changes. In doing so, it gives decision-makers the information they need to assess, not only the value of alternative approaches, but also their relevance and transferability to their communities.

*Prepared by David Bruce. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Scherlowski. Ottawa, CMHC, 1998.*

*Order number: PE0309. \*\* Price \$12.95 + GST and handling charges.*

**STATUS:** Completed Report

**AVAILABILITY:** CMHC Information Products  
P.O. Box 35005  
Stn BRM B  
Toronto, Ontario M7Y 6E5Tel  
Telephone: 1-800-668-2642  
Email: chic@cmhc-schl.gc.ca  
Fax orders from Canada 1-800-245-9274  
International clients see page 9 for order instructions.

NOTE: Aussi disponible en français sous le titre : *ACT en action: Abordabilité et choix toujours: leçons apprises.*

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### **THE CITY OF YELLOWKNIFE DEVELOPMENT APPROVAL PROCESS REVIEW AND STREAMLINING : CASE STUDY. = ÉTUDE ET RATIONALISATION DU PROCESSUS D'APPROBATION DES DEMANDES D'AMÉNAGEMENT DE LA VILLE DE YELLOWKNIFE : ÉTUDE DE CAS.**

In 1992, the City of Yellowknife, Northwest Territories, undertook a Development Approval Process Review to find out how well its method of approving and issuing building and development permits was working and where it might be improved.

Having a well-oiled approval process is desirable anywhere but is particularly important in the North. Builders there face a short construction season so delays could force them to work in winter weather or to postpone jobs until the next building season. Either alternative drives up costs and eventually makes housing and commercial space less affordable.

In June 1993, the City hired the Yellowknife consultancy firm of Ferguson, Simek, Clark (FSC) Engineers and Architects to undertake the investigative phase of the project and to make recommendations for improvements. The consultants interviewed Yellowknife civic officials who manage the approvals process, members of the public who used the system, and officials in other municipalities who could describe how their permit approval processes operated.

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In general, the consultants found that Yellowknife's system worked well. When applicants understood the process - mostly because they were old hands at obtaining approvals - there were few problems. When problems occurred, it was usually due to a lack of information. Those interviewed felt it was imperative that the City publish information to help users understand how the approval process operates and what is required of them. Those interviewed also advocated various measures to improve efficiency.

As a result of the Development Approval Process Review and a coincidental amendment to its building by-law, the City of Yellowknife implemented several reforms to its permit approval process. First and foremost was the publication of six brochures that guide applicants through the approval process. Four of these brochures relate to specific types of construction while the other two are general guides to obtaining building permits and mechanical permits.

The City also eliminated the need for building permits for several types of small-scale projects and introduced administrative efficiencies. A review of the zoning by-law, still underway when this report was written in 1997, may generate additional reforms.

*Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Department of Planning and Lands, City of Yellowknife, N.W.T. Prepared by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa. The Federation; The Associations, CMHC, 1997.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

*NOTE:* Bilingual/bilingue.

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### **HOW THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH STREAMLINED ITS DEVELOPMENT APPROVAL PROCESS: CASE STUDY = MUNICIPALITÉ RÉGIONALE DE HAMILTON-WENTWORTH, PROCESSUS D'APPROBATION DES DEMANDES D'AMÉNAGEMENT: PROJET DE RATIONALISATION DU PROCESSUS : ÉTUDES DE CAS.**

Between 1994 and 1997, the Regional Municipality of Hamilton-Wentworth (RMHW) in Ontario streamlined its development approval process. It slashed red tape, reduced obstacles to growth, adopted innovative measures to resolve disputes over land use and took measures to stimulate the construction of innovative and affordable housing.

The project had these key objectives:

- eliminate procedural bottlenecks
- reduce or eliminate duplication through better cooperation and coordination among Regional departments
- fast-track innovative and/or affordable housing initiatives
- establish a mediation process at the regional level as a means of alternative dispute resolution

## REGULATORY REFORM

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- extend the Region's streamlined methodology to the lower tier municipalities within the region.

The reformed RMHW development approval process features:

1. Adherence to established time frames for approvals.
2. A checklist built into each type of application form to ensure applications arrive complete.
3. Pre-consultation meetings to identify potential problems upfront with development proposals so that issues can be addressed early in the process.
4. A Regional Mediation office that offers alternative dispute resolution services when they are needed.
5. Regional planners and engineers dealing with subdivision plans are working in the same division.
6. Delegation of some responsibilities to the lower tier municipalities.
7. Expanded authority for Regional staff to approve undisputed applications.

The streamlining projects also produced four publications. One guides applicants through the revamped planning process, another through the standards for engineering submissions, the third encourages innovative housing developments and the fourth stimulates the production of affordable housing.

This reformed development approval process has been implemented across the entire Region, offering a standardized service at both the regional and local levels. Builders and developers in Hamilton-Wentworth now have the advantage of improved service delivery, faster application turnaround times, pre-consultation and checklists to ensure everything is in order. All these improvements translate into lower builder/developer input costs that can be passed on to housing consumers.

*Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Development Division, Regional Environment Department, Regional Municipality of Hamilton-Wentworth, Ont. Prepared by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.*

**STATUS:** Completed Report

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International clients see page 9 for order instructions.

NOTE: Bilingual/bilingue

## REGULATORY REFORM

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### **1998 ASSESSMENT OF THE AFFORDABILITY AND CHOICE TODAY (ACT) PROGRAM.**

The objective of the project is to assess the ACT program to assist CMHC Senior Management in its decision to extend, modify or discontinue the program. It will also recommend future directions for the program to enhance its relevance, success and cost-effectiveness. The study method will involve a hybrid data collection strategy consisting of a review of ACT project files, a fax-out/fax-back survey of 150 key participants in ACT projects as well as 150 industry representatives and municipal officials from non-ACT communities, and 10 structured information interviews with ACT program managers and management committee members. As a follow-up to the formal evaluation undertaken in 1995, the study will determine the success with which the recommendations from that evaluation were implemented.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2059 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **PLANNING AN ARTISAN COMMUNITY: CASE STUDY = PLANIFICATION D'UNE COMMUNAUTÉ ARTISANALE : ÉTUDE DE CAS.**

In 1994, the City of Sainte-Geneviève, a small municipality located on Montreal's West Island, was awarded an A.C.T. grant to carry out a demonstration project that would encourage the development of affordable, mixed-use artisan accommodation. The project was part of an initiative called *Sainte-Geneviève, Ville artisanale*, aimed at encouraging artisans to establish themselves in the community. The municipality conceived this plan to revitalize its downtown core and stimulate economic growth. With many centrally located buildings vacant, businesses closing and a working population migrating to neighbouring towns, the project was considered critical to the community's survival.

The project involved consultations with local artisans, property owners, and representatives of other municipalities with sizable artisan communities.

The City of Sainte-Geneviève introduced two innovative regulatory changes in order to encourage the development of accommodation that would meet the needs of artisans:

- The Municipal Development Plan was modified to permit artisans to live, work and sell their products from their workshop or residence; and to create artisan districts or zones.
- A Siting and Architectural Integration Plan was adopted that would allow flexibility in applying regulations, while preserving heritage, character and standard of living quality objectives through specialized criteria.

The demonstration building is a converted garage on property owned by a cabinetmaker and his family. The cabinetmaker, in consultation with the project team, added a second floor over the garage adjacent to his heritage home to display and store furniture. The ground floor of the building was converted into a workshop and an office. The building's new façade harmonizes with the City's architectural heritage, providing an attractive example and stimulus for other artisans and property owners. The A.C.T. renovation project fully embodied the City's objectives in establishing mixed-use accommodation for artisans.

Sainte-Geneviève, in encouraging mixed-use accommodation, is reviving a tradition of working artisans that is very much part of the community's heritage. The initiative is also encouraging small business, the primary area of employment growth in Canada, and making home-based businesses an important part of local development.

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*Affordability and Choice Today (A.C.T.) Demonstration Project / City of Sainte-Geneviève, Sainte Geneviève, Quebec. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre, Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
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### **SHARED OWNERSHIP HOUSING PILOT PROJECT: CASE STUDY = PROPRIÉTÉ PARTAGÉE PROJET PILOTE : ÉTUDE DE CAS**

In 1991, the City of Trois-Rivières, Quebec, initiated a strategy to revitalize its older residential neighbourhoods. One of the City's primary aims was to make downtown living more attractive to young families, with a view to reversing the loss of population to the suburbs and urban periphery. Trois-Rivières' centrally located neighbourhoods offer residents many advantages, including proximity to urban amenities such as schools, parks, medical services and the recently developed Old Port.

A non-profit housing organization, Habitations populaires Desjardins du Centre du Québec (HPDCQ), has worked in cooperation with the city of Trois-Rivières on a number of renewal projects. As part of the City's revitalization efforts, HPDCQ decided to use a novel approach to the provision of affordable housing, called "shared ownership". By allowing the home buyer to purchase the building first, and the land several years later, at no interest, shared ownership makes homeownership more accessible and affordable. This is especially true in downtown areas where the high cost of land can discourage the construction of smaller affordable homes suitable for first-time buyers.

In spring 1993, HPDCQ was sponsored by A.C.T. to design and construct two small, semi-detached single-family homes in one of Trois-Rivières' older neighbourhoods, using the shared ownership approach. Municipal regulations currently do not permit the development of this type of small-lot housing. In order to construct the two demonstration homes, modifications to various municipal zoning and land development bylaws were required. In particular, the City amended its zoning bylaw to permit the construction of semi-detached single-family homes on a site previously zoned for multi-family housing. Zoning regulations were also modified to reduce side and rear setbacks, minimum lot size and building size. Furthermore, the land development bylaw was amended in order to subdivide the site into two smaller parcels.

This A.C.T. initiative combined innovative financing with a small-house design suitable for low- and middle-income households. By deferring the payment for the land component of a house for several years, shared ownership reduces the upfront cost of purchasing a home, thereby making homeownership more accessible. Small-home infill projects such as this A.C.T. demonstration project not only make more effective use of land in built-up areas, they also increase housing choice in downtown neighbourhoods.

Due to the success of the pilot project, HPDCQ plans to build more affordable shared-ownership housing on a site owned by the City of Trois-Rivières. Other Canadian municipalities can benefit from the lessons learned from this A.C.T. project.

## REGULATORY REFORM

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*Affordability and Choice Today (A.C.T.) Demonstration Project / Habitations populaires Desjardins du Centre du Québec, Trois-Rivières, Québec. Prepared by Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.*

**STATUS:** Completed Report

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### **SMALL LOT HOUSING: CASE STUDY = CONSTRUCTION SUR LOTS DE PETITE DIMENSION : ÉTUDE DE CAS**

Urban intensification has become an increasingly important strategy for maximizing land use within existing municipal boundaries. By the late 1980s, the City of Charlottetown was giving intensification through small lot infill development careful consideration. As in many other municipalities, urban development in Charlottetown had become very constrained, and lengthy delays in the approval process indicated the City needed to review its zoning and development by-law and investigate intensification options.

The City of Charlottetown was awarded an A.C.T. grant in 1992 to meet its objectives by developing guidelines for infill housing and revising its zoning by-law to accommodate this housing form. One of the key findings of the project was Charlottetown's reliance on variances and re-zoning related to infill development. This reflected a lack of flexibility in the zoning by-law, and unnecessarily complicated and lengthened the approval process.

The project team noted that many municipalities have shifted from relying on rigid requirements to allowing flexible performance standards. A number of municipalities have revised their by-laws to combine fixed requirements with flexible performance standards. The project team advised that community input would be an important factor in establishing practical and acceptable performance criteria. The project team concluded that the City could meet its objectives and achieve flexibility through relatively minor adjustments to, and fine-tuning of, existing regulations. Selected sections of the zoning by-law could be amended, and architectural and site development criteria could be established.

*Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / City of Charlottetown, Charlottetown, P.E.I. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.*

**STATUS:** Completed Report

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*NOTE:* Bilingual/bilingue.

# REGULATORY REFORM

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## **SUBDIVISION REGULATION: MEETING SMALL-TOWN NEEDS: CASE STUDY = RÉGLEMENTATION DU LOTISSEMENT : RÉPONDRE AUX BESOINS DES PETITES VILLES : ÉTUDE DE CAS**

In 1991, the Town of Sackville and the Tantramar Planning District Commission were awarded an A.C.T. grant to undertake a project that would provide a small-town model for subdivision regulation, and that would address environmental concerns with regard to subdivision development.

The project involved four phases, the first being a literature review of subdivision planning approaches and regulations in Canada and the U.S. The next phase involved an assessment of the existing subdivision by-law and approval process, in light of the literature review and with further consultation. The third and fourth phases involved revising and adopting a new subdivision by-law; making changes to and documenting the approval process; preparing a subdivision guidebook for use by planning staff; and compiling engineering standards into a single document.

In adopting the revised Subdivision By-law No. 121, Sackville made significant changes intended to improve land affordability and land use efficiency, and permit a variety of servicing options:

- Subdivisions with private roads were permitted, subject to approval by the Tantramar Planning District Commission.
- Road classifications were defined and width requirements decreased.
- Flag lots were permitted by right.

The project team found the environmental provisions could not be incorporated into the Subdivision By-law due to legislative restrictions. Suggestions regarding environmental features and design guidelines were included in a subdivision guidebook prepared for municipal planning staff, and environmental policies were prepared for consideration in the future review and revision of Sackville's Municipal Plan.

Actions undertaken to streamline the approval process included both changes to the process, and clear documentation of the process. Sackville implemented the A.C.T. project team's recommendation that representatives from both its planning and its engineering departments would attend any initial meeting with a developer.

A lack of clear documentation outlining Sackville's approval process and requirements had contributed to confusion and delays. In order to facilitate understanding, compliance, and speedy approval, the team prepared flowcharts and checklists for use by applicants and staff, and developed two detailed documents:

- *Town of Sackville Standard Municipal Specification* - This consolidates all engineering requirements into a single, comprehensive document.
- *Sackville Subdivision Guidebook* - This outlines the approval process, discusses regulatory requirements, and provides design guidelines related to environmental considerations.

Finally, the project team determined that the terminology of the existing subdivision by-law could be confusing to, and not easily understood by, many readers. The revised Subdivision By-law was written in "plain language," for everyone to understand.

## REGULATORY REFORM

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*Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / The Town of Sackville and the Tantramar Planning District Commission Sackville, New Brunswick. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

*NOTE:* Bilingual/bilingue.

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## RENTAL HOUSING

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### **FEASIBILITY OF CREATING A CANADIAN MULTIPLE-UNIT RENTAL HOUSING DATA BASE.**

The objective of this project is to assess the feasibility of developing a Canadian multiple-unit rental housing database. To that end, the following four questions will be addressed: (i) Should CMHC initiate the development of a multiple-unit data base? (ii) What opportunities would there be to partner with other organizations? (iii) Should a Canadian initiative be linked in some way with the U.S. effort being managed by the Multifamily Housing Institute? and, (iv) What are the options for proceeding?

**CMHC Project Officer:** David Scherlowski

**CIDN:** 2095 0200

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **RENTERS AND THEIR HOUSING CONDITIONS: FROM THE 1980s INTO THE 1990s.**

The purpose of this project is to examine how and why the circumstance of renter households changed over the last fifteen years, with special focus on housing conditions, and the social and economic factors associated with changes in the level and nature of housing need.

**CMHC Project Officer:** John Engeland

**CIDN:** 1582 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available



## RENTAL HOUSING

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### **REVIEW OF METHODS GOVERNMENTS HAVE EMPLOYED TO SUPPORT PRIVATE RENTAL HOUSING.**

In the current fiscal environment, the federal and provincial governments have limited resources to use in directly supporting the availability of affordable rental housing and must rely on the private sector to achieve this objective. As part of CMHC's efforts to enhance and broaden the understanding of rental housing, this project examines alternative programs and policies employed by governments internationally to support private rental housing, particularly those programs and policies intended to improve the quality, prolong the life or increase the supply of such housing. The review will cover the U.S., U.K., Western Europe, Scandinavian countries, Australia and Japan. This project will be of interest to property developers, private rental landlords and investors, the construction and renovation industry, mortgage lenders and insurers as well as federal and provincial housing policy analysts.

**CMHC Project Officer:** David Metzack

**CIDN:** 1885 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **LE SECTEUR LOCATIF PRIVÉ ET SA NOUVELLE CLIENTÈLE**

This study examines the practices and concerns of multi-rental building owners in Montreal in a context of changing clientèle. Thirty randomly selected owners were interviewed by telephone during July 1998. The owners interviewed own buildings in four Montreal districts.

In theory if not in practice, there seems to be discrimination towards the social status, targeted especially at social welfare recipients. This reflects problems of residualization, i.e., tenants find themselves increasingly as the poorest households. The interviews also indicate that there is discrimination towards immigrants, especially Blacks. Although this study is not statistically valid, it seems nonetheless to indicate that segregation exists. The interviews lead one to believe that discrimination plays a role in having access to housing for certain populations.

The purpose of the study was to determine whether there were ways to support the owners in relation to this new clientèle. Very few owners see the need for support in their work. Several spoke of tenants' rights, difficulties with regard to social welfare recipients, but, except for legislative changes to collect rent from this population, they offered very few solutions. As regards inter-ethnic cohabitation, according to owners, there are few problems. On the one hand, this could confirm the "success story" that other studies have shown in Montréal and on the other hand, that the problems encountered, similar to those identified in the social sector are minimal. However, this lack of problems may also reflect the choice of the owners who try to satisfy their current tenants by choosing other tenants who are not too different.

*Prepared by: Luba Serge. CMHC Project Officer: Benoît Sanscartier. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program).*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## RENTAL HOUSING

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### UNDERSTANDING PRIVATE RENTAL HOUSING INVESTMENT IN CANADA.

The project will investigate rental housing investment in Canada and establish a basis from which public and private decision makers can clearly understand the environment for investment in, and development of, rental housing.

**CMHC Project Officer:** Tim Elliot

**CIDN:** 1748 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## RESIDENTIAL DEVELOPMENT

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### ALTERNATIVE PLANNING AND REGULATORY APPROACHES USED IN OTHER COUNTRIES.

The purpose of this study is to investigate and document international approaches to planning and development regulation, specifically, the use of performance based planning and financial/economic incentives. These approaches may offer useful lessons and insights in improving the flexibility and effectiveness of the development environment in Canada. In addition to existing documentation, the research will be based on interviews with government, development and academic informants in Australia, New Zealand, the United States and Europe. The information gathering stage of this project is complete and a report is being drafted for publication next year.

**CMHC Project Officer:** Steve Mennill

**CIDN:** 1775 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL.

This research addresses how Land Use Density stipulations can impact and/or interplay with various other system components (such as open space) of community plan-making. It will result in a Sustainable Community Design Tool component that will inform the process of “negotiated urban design” in arriving at midrange density prototypes acceptable to the broad community.

**CMHC Project Officer:** Doug Pollard

**CIDN:** 1998 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** William T. Perks  
William Perks Professional Services & Brooke Associates Collaborative  
201908 17th Avenue  
Calgary, Alberta, T2S 2S2

**AVAILABILITY:** Publication not yet available

## RESIDENTIAL DEVELOPMENT

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### CRITICAL SUCCESS FACTORS ENABLING ALTERNATIVE RESIDENTIAL DEVELOPMENT STANDARDS.

The purpose of this project is to study innovative examples of the application of alternative development standards. It will determine what the critical success factors are to enable the new standards to be implemented.

**CMHC Project Officer:** David D'Amour

**CIDN:** 2006 020001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Teresa Paul  
10937-79th Avenue  
Edmonton, Alberta, T6G 0P1

**AVAILABILITY:** Publication not yet available

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### THE ECONOMIC IMPACT OF SECONDARY SUITES ON URBAN INFRASTRUCTURE & SERVICES.

The purpose of this research is to investigate and summarize different approaches for determining the municipal servicing costs, both capital and operating, of secondary suites in established neighbourhoods and new subdivisions, through a literature review and key interviews.

**CMHC Project Officer:** Steve Mennill

**CIDN:** 2010 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Vanessa Geary  
Tenants Rights Action Coalition  
2681 East Hastings  
Vancouver, British Columbia V5X 1Z5

**AVAILABILITY:** Publication not yet available

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### INCREASING URBAN DENSITIES TO ACCOMMODATE POPULATION GROWTH.

This project examines the issue of urban density in order to deal with population growth pressures, taking into account public policy and regulations, private development decisions, and urban form, with a view toward projecting the implications of growth in terms of built form, land consumption, infrastructure, and the distribution of housing.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1844 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Gerald Daly, Daly & Associates  
Box 139, RR #4, Flesherton  
Ontario, N0C 1E0

**AVAILABILITY:** Publication not yet available

## RESIDENTIAL DEVELOPMENT

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### THE INFORMATION REVOLUTION AND RESIDENTIAL DEVELOPMENT.

The objective of this research is to examine residential development within the context of the information revolution.

**CMHC Project Officer:** Benoit Sanscartier

**CIDN:** 2014 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Pamela Blais  
182 Crawford Street  
Toronto, Ontario M6J 2V6

**AVAILABILITY:** Publication not yet available

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### RESIDENTIAL INTENSIFICATION IN CENTRAL DISTRICTS.

The objective of this research is to examine the phenomenon of residential intensification in a dense urban sector using data on the new housing built there in the last five years and on the new residents of those dwellings. The study will focus on the Mile End neighbourhood of Montreal with the view to drawing lessons for the renewal of central districts in other Canadian cities.

**CMHC Project Officer:** Mark Holzman

**CIDN:** 2012 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Jocelyn Duff, Habitat sur mesure  
4626 Bordeaux Street  
Montreal, Quebec, H2H 2A1

**AVAILABILITY:** Publication not yet available

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### RESIDENTIAL STREET DESIGN: LEARNING FROM SUBURBIA.

The purpose of this research project is to generate concrete residential street design solutions based upon a thorough understanding of precedents, and introduce and stimulate new ideas for land developers and design professionals.

**CMHC Project Officer:** Fanis Grammenos

**CIDN:** 1644 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Sevag Pogharian , Sevag Pogharian Design  
4643 Sherbrooke Street West, Suite 12  
Montreal, Quebec, H3Z 1G2

**AVAILABILITY:** Publication not yet available

## ROOFTOP GARDENS

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### **ROOFTOP AND VERTICAL GARDENS: IDENTIFYING OPPORTUNITIES AND BARRIERS TO WIDESPREAD USE.**

The purpose of this project is to develop a Canadian "status report" on rooftop and vertical gardens.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2005 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Steven Peck  
35-859 Millwood Road  
Toronto, Ontario, M4G 1W7

**AVAILABILITY:** Publication not yet available.

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## SENIORS

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### **ÉVALUATION DU PROJET DE RÉAMÉNAGEMENT DE L'ENSEMBLE BENNY FARM: RAPPORT FINAL**

The Benny Farm project in Montreal's Notre-Dame-de-Grâce district is made up of 384 housing units. The buildings in which these units are located date from the end of the Second World War. The units are in need of major repairs and increasingly less responsive to the needs of current tenants, since they were designed for families and are now occupied by small households and seniors. In addition to the low occupancy rate of these units, there is under-utilization of the available site (64 units per hectare).

For these reasons, CMHC has decided to refit the site and create 1,200 new housing units, approximately one-fifth of which will be reserved for current occupants, the majority of whom are veterans. Construction of the first phase of the project was completed in the Spring of 1997. This first phase made it possible to move a number of current residents (91 households) to new buildings designed specifically for seniors. The objectives of this research were to assess the relevance and efficacy of various aspects of the resident relocation strategy adopted by CMHC and the degree of appropriateness achieved with respect to residents' needs and expectations on the one hand and the new buildings to which they were relocated on the other.

This research was quasi-experimental in nature, since a pre-survey in the old units and a post-survey in the new made it possible to identify residents' attitudes and behaviours before and after the move. A questionnaire was also completed by eight of the major stakeholders to determine their views on the development and relocation process adopted by CMHC.

This research contributes valuable information, both on the resident relocation strategy adopted by CMHC and on the impacts of the new buildings and new apartments. It demonstrates a high level of respondent satisfaction with respect to the relocation process. The fact that the new units are universally accessible, modern and offer a set of amenities essential to an aging population also proved to be well-advised. Above all, the change of residence had positive effects for Benny Farm seniors, who improved their quality of life while participating in the various project development phases. These positive effects may be summarized as follows: increased mobility, physical and psychological health, residential satisfaction and satisfaction with their social life.

*Prepared by Pierre Teasdale, Architect with the collaboration of the firm Écho Sondage and Danielle Maltais. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Luis Rodriguez. Ottawa: CMHC, 1998.*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre, Canada Mortgage and Housing Corporation  
700 Montreal Road Ottawa, Ontario K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642 Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.

## SENIORS

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### HOME ENVIRONMENTS AND FALLS BY SENIORS.

The purpose of this project is to determine the significance of environmental factors that are likely to cause falls among independent and active seniors living in their own homes within the territory of the Québec Urban Community.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1843 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Benoît Lévesque  
Centre de santé publique de Québec  
2050 René-Lévesque Blvd.  
Sainte-Foy, Quebec G1V 2K8

**AVAILABILITY:** Publication not yet available.

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### HOUSING FOR OLDER CANADIANS.

The objective of this project is to produce a comprehensive guide to planning, designing, developing, managing and marketing housing for older Canadians.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 0869 0200001

**Division:** Research Division

**STATUS:** Completed Report

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### HOUSING OPTIONS FOR PEOPLE WITH DEMENTIA.

The objective of this project is to produce an illustrated and practical publication documenting innovative housing options for people with dementia.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1251 0200001

**Division:** Research Division

**STATUS:** Completed

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### INTERVENTION MODELS: SAFETY IN CASES OF EMERGENCY OF PERSONS WITH REDUCED MOBILITY AND SENIORS LOSING THEIR INDEPENDENCE LIVING IN REGULAR RESIDENTIAL ENVIRONMENTS

This study is aimed at integrating current knowledge and reflections concerning the problems associated with the safety of seniors and persons with disabilities living in regular residential environments, in order to apply them to the development of intervention models for three multiple-family buildings equipped with elevators.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 460 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Sylvie Quintin, Société d'habitations communautaires logique inc.  
3250 St-Joseph Blvd. East, Montreal, Quebec H1Y 3G2

**AVAILABILITY:** Publication not yet available

## SENIORS

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### **LIVING AT HOME OR IN A RESIDENCE: A CHALLENGE FOR SENIORS AND WORKERS**

The objective of this project is to examine, in Quebec's Saguenay area, the circumstances, constraints, limitations and difficulties encountered by clients who receive home care and the organizations that provide it.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1641 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Danielle Maltais  
Université du Québec à Chicoutimi  
555 de l'Université Blvd.  
Chicoutimi, Quebec  
G7H 2B1

**AVAILABILITY:** Publication not yet available

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### **PLANNING HOUSING AND SUPPORT SERVICES FOR SENIORS.**

The objective of this project is to produce a new and improved version of the current CMHC publication "Maintaining Seniors Independence in Rural Areas: A Guide to Planning for Housing and Support Services" (NHA 6298).

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1780 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **PREDICTING THE ADJUSTMENT OF ELDERLY PERSONS TO CONGREGATE CARE HOUSING.**

The purpose of this project is to undertake research to complement the conventional post-occupancy studies which tend to emphasize assessing the housing environment rather than the well-being of individual occupants.

**CMHC Project Officer:** Glynis Kossatz

**CIDN:** 1827 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Dr. Robert Gifford, Optimal Environment Inc.  
2311 Edgelow Street  
Victoria, British Columbia, V8N 1R6

**AVAILABILITY:** Publication not yet available

## SENIORS

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### **THE PRIVATE RENTAL MARKET: ADAPTING TO THE NEEDS OF AGING TENANTS.**

This research will identify the extent to which landlords in the private rental market across Canada are accommodating the needs of aging tenants, and describe and develop measures that would help landlords deal more effectively with tenant needs.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1996 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Kathleen Mancer, DKM Housing Consultants  
141-6200 McKay Avenue  
Burnaby, British Columbia, V5H 4M9

**AVAILABILITY:** Publication not yet available

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### **LES RESSOURCES D'HÉBERGEMENT PRIVÉES DE LA PROVINCE DE QUÉBEC**

This study, financed under the External Research Program of Canada Mortgage and Housing Corporation, achieves two main objectives. The study first presents an overview of the regional stocks of private retirement accommodation resources in the province of Quebec based on the inventory taken by the Centres locaux de services communautaires (local community service centres) in 1994-95. It then explores the results of a postal survey on home safety measures adopted in a sample of private accommodation resources in order to better meet the needs of their aging clients.

In its analysis of the provincial inventory data, the study highlights major disparities between regions in terms of the distribution of accommodation resources, particularly when these resources are classified according to size (i.e. the number of places offered). It should be noted here that nearly three quarters (1,432) of the 1,962 resources inventoried offer fewer than 25 places and yet these resources only provide 19.6% (12,913) of the 65,842 places offered in this market. It should also be mentioned that the Montreal and Laval regions offer close to 52.6% (34,631/65,842) of the places in the province and that slightly over 85% of these places are in resources with over 60 residents. Regional stocks of private accommodation resources are therefore structured or developed on the basis of very different profiles.

As for home safety, the study also shows disparities between smaller and larger resources. While a series of safety measures are generally adopted right away by the majority of retirement homes, the measures in place to meet the needs of seniors with cognitive difficulties are very limited.

*Prepared by: Daniel Pelletier. CMHC Project Officer: Jean-François Dion. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program).*

**STATUS:** Completed Report

**AVAILABILITY:** Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa, Ontario  
K1A 0P7  
Tel.: 613-748-2367 or 1-800-668-2642  
Fax.: 613-748-4069  
Email: chic@cmhc-schl.gc.ca  
International clients see page 9 for order instructions.



## SENIORS

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### **USER SATISFACTION STUDY OF HOUSING OPTIONS FOR OLDER CANADIANS.**

The objective of this research is to carry out user satisfaction studies of some of the newer housing options that are currently available to older Canadians, and to produce an objective and detailed report based on the results of the research.

**CMHC Project Officer:** Luis Rodriguez

**CIDN:** 1583 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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## URBAN TRANSPORTATION

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### **THE IMPACT OF URBAN FORM AND TRAVEL ACCESSIBILITY UPON PRIVATE VEHICLE TRAVEL.**

The purpose of this study is to measure the influence of land use patterns and urban form on household travel demand and behaviour.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 1752 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **METHODOLOGY TO ASSESS TRANSPORTATION GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL.**

The purpose of this study is to compare the greenhouse gas (GHG) emissions from personal urban transportation given variations in community planning and design variables such as density and land use mix. The final product will be a quantitative tool that would be used by CMHC and its clients to evaluate development proposals for GHG emissions from private automobile use.

**CMHC Project Officer:** Susan Fisher

**CIDN:** 2041 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## WOMEN & HOUSING

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### **CHRONIC HOMELESSNESS AMONG WOMEN: A DECADE OF CHANGING NEEDS AND SERVICES.**

This research will constitute a retrospective review of the changing patterns of women's homelessness in the Toronto area. It will focus on chronically homeless women and innovative services, based on the observations and expertise of those who have worked closely with homeless women over the past decade (1987-1997).

**CMHC Project Officer:** Brenda Baxter

**CIDN:** 2000 0200001

**Division:** Research Division, External Research Program

**STATUS:** Ongoing Project

**Grant Recipient:** Sylvia Novac  
593A Melita Crescent  
Toronto, Ontario  
M5G 3Y7

**AVAILABILITY:** Publication not yet available

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### **INVESTIGATION OF ISSUES FOR THE EVALUATION OF THE NEXT STEP PROGRAM.**

The purpose of this project is to conduct a literature review on second-stage housing for the Next Step Program.

**CMHC Project Officer:** Patricia Streich

**CIDN:** 1507 0500001

**Division:** Audit and Program Evaluation Services

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **WOMEN'S HEALTH AND WELL-BEING FROM A HOUSING PERSPECTIVE.**

The objective of this project is to undertake and complete the study on the "State of Women and Their Housing: 1997," which develops a profile of women and their health and well-being from a housing perspective.

**CMHC Project Officer:** Tom Kerwin

**CIDN:** 1615 0100001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

## YOUTH & HOUSING

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### **HOUSING CANADA'S YOUTH.**

The objective of this project is to develop social, economic, and demographic profiles of youth with an in-depth review of their current and past housing conditions, and identification and assessment of housing issues and trends into the future. The youth and rental repair studies should be out by the end of the year.

**CMHC Project Officer:** Roger Lewis

**CIDN:** 1786 0200001

**Division:** Research Division

**STATUS:** Ongoing Project

**AVAILABILITY:** Publication not yet available

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### **"OUT FROM THE SHADOWS" - INTERNATIONAL SUMMIT OF SEXUALLY EXPLOITED YOUTH.**

The purpose of this project is to gain knowledge regarding the housing-related options which can help address the key factors contributing to commercially, sexually exploited youth and the main obstacles to alleviating such circumstances.

**CMHC Project Officer:** Teresa van den Boogaard

**CIDN:** 1921 0200001

**Division:** Research Division

**STATUS:** Completed



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Analysis of the Hygrothermal Behavior of Residential High-Rise Building Components

Anti-carbonation Coatings for Use on Canadian Buildings

An Application Guide for Water Reuse Systems

Assessment of the Indoor Air Quality of a Suite for an Environmentally Hypersensitive Occupant

Before You Renovate: Renovation Guide and Catalogue

Building a Model for Affordable Home Ownership: New Dawn Enterprises:  
Documentation and Analysis of Two Assisted Mini-home Ownership Projects

Building Adaptability: A Survey of Systems and Components

CMHC's Healthy House in Toronto

Canadian Response to Urban Governance Survey: OECD Group on Urban Affairs

Chattel Loan Insurance Program: Evaluation Report

The Community/Privacy Trade-Off in Supportive Housing: A Qualitative Study of  
Consumer Preferences

A Comparative Study of Immigrant Housing, Neighbourhoods and Social Networks in  
Toronto and Montreal

Compartmentalization of Existing High Rise Apartment Buildings

Construction Standards for Accessory Suites

Crawl Spaces: How to Avoid Moisture and Soil Gas Problems

Designing for Disassembly

Developing a Profile of Market Renters Living in Social housing

Development & Testing of Floor Drain with a Valve to Block Sewer Gas for Residential  
Applications

Development of Community-Based Social Marketing Approaches for Achieving  
Sustainability

Directory of Sources of Support for Canada's Housing Exporters

Effectiveness of a Corrosion Potential Method for Evaluating Post-Tensioned Tendons: An  
Evaluation Report

Effectiveness of an Acoustic Continuous Monitoring System for Post-Tensioned Buildings:  
An Evaluation Report

Effectiveness of an Electromagnetic Wave Propagation Technique for the Condition  
Assessment of Unbonded Post-Tensioned Tendons: An Evaluation Report

Energy Performance Contracting and the Residential Sector

Energy Performance Contracting in Multi-unit Residential Buildings

Estimating the Concentrations of Soil Gas Pollutants in Housing: A Step-By-Step Method

Evaluating the Performance of On-Site Sewage Disposal Systems

Evaluation of Housing Initiatives Under the National Strategy for the Integration of Persons with Disabilities

Evaluation of Pollutant Source Strengths and Control Strategies in an Innovative Residential High-Rise Building

Evaluation of Pollutant Source Strengths and Control Strategies in Conventional and R-2000 Houses

Evaluation of the Barrhaven Multi-unit Housing Project for the Environmentally Hypersensitive

The Evaluation Study of the Affordability and Choice Today (A.C.T) Program

Expanding the Korean Market for Residential Wood-Frame Construction

Farewell to Cockroaches: Getting Rid of Cockroaches the Least Toxic Way

Feasibility Study for a Survey of Consumer Intentions to Buy or Renovate

Field Investigations of Indoor Environment and Energy Usage in Mid-rise Residential Buildings

A Flexible Regulatory Tool: Model Garden Suite Bylaw: Case Study

Garden Suites Pilot Project: Case Study

Gimme Shelter: Housing for Youth: CMHC Housing Awards: Sharing Successes in Housing for Youth

Gimme Shelter: Sharing Successes in Housing for Youth: CMHC Housing Awards Forum: Forum Highlights

Guiding Applicants Through the Approval Process

Habitation et flexibilité au Canada : Bilan 1991 : La flexibilité vue par les architectes

Home Business in Social Housing: A Policy and Program Implementation Strategy

Homebuying Step By Step: A Consumer Guide and Workbook

Home Occupation Scenarios and Their Regulatory Requirements: A Case Study

A Housing Co-operative for Self-employed Workers

Housing Design Needs of Deaf People

Housing Needs of the Environmentally Hypersensitive: Socio-economic/Health Factors

Housing Needs of the Metis People

Increasing the Volume of Used Building Materials in Canadian Construction: A Report to Assist Homeowners, Contractors, Building Officials and Operators of Used Building Material Centres in Canada

International Covenant on Economic, Social and Cultural Rights Background Report:  
Third Report of Canada, Article 11: Housing

Legalisation of Secondary Suites in Surrey, B.C.: Case Study

Levying Development Cost Charges on a Square-Foot Basis: Case Study

Light, Site Density and Form: A Study of Daylight Availability in Canadian Residential  
Buildings

Literature Review: Aboriginal Peoples and Homelessness

Macroeconomic Impacts of the Housing Sector

Mediation as a Tool to Resolve Land-Use Disputes: How Kamloops Integrated Mediation  
Into Its Land Development Approval Process

More Great Housing Projects for and by Youth: 1997 CMHC Housing Awards

Mount Pearl Residential Intensification Study

Neighbourhood Group Homes for the Elderly: The Planning, Design and Development  
Process

New Beginnings Housing Co-operative: Home Ownership Made Easier

New Ways to Create Affordable Housing: Results of a National Survey of Housing  
Providers

Orchard Neighbourhood: A Model for Community Architecture

Overheating as a Factor in House Design

Passive Monitoring of VOC in Air Using ACC

A Place to Go: An Evaluation of the Next Step Program for Second-Stage Housing in  
Canada

Planning and Managing Traffic Noise on Urban Roads: International and Canadian  
Experience

Planning Cohousing

Planning Study of Native Northern Communities

Portable Pneumatic Lift Seat

The Potential for Water Efficiency Improvements in Multi-family Residential Buildings in  
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Protecting Gypsum Sheathing in Insulated Steel Stud Walls

Public Initiatives in Housing: Their Contribution to Security Improvement and Crime  
Prevention: The Case of Montreal Neighbourhoods

“RORO” Modular Home Shipping System

Radon: A Guide for Canadian Homeowners

Regulatory Barriers to On-site Water Reuse

Renovators and Technological Change in the Single Family Housing Market in Canada,  
1990-2005



Residualization of Rental Tenure: Attitudes of Private Landlords Towards Housing Low Income Households

Review of Performance-Based Zoning, Town of Morinville, Alberta: Case Study

Second Dwelling Units in Rural and Village Settings

Self Build Aboriginal Housing Using Balewall Construction: Cumberland House, Saskatchewan

Seniors Helping Seniors with Rural Housing: Final Report

Serviceability of Floor Systems with Wood-I-Joists and Concrete Topping

Small-Lot Single Family Infill Housing: Case Study

Southwest Site of La Petite Patrie Seeking Collective Solutions for Better Housing in La Petite Patrie

Sprout: Infill Housing for Young, Middle-Income Families: Case Study

Study of Home Adaptations Carried Out Under the RRAP-D and HASI Programs: Final Report

A Study of Recurring Mold Problems in the Roseau River Reserve, Manitoba

Sustainability in Practice: Reducing Construction Waste in the Ontario Residential Construction Industry

Two-Generational Housing

Urban Brownfields: Case Studies for Sustainable Economic Development: The Canadian Example

Using the Land Trust Model to Facilitate an Integrated Development: St. Albert Project: Documentation and Analysis

Voices for Safe Neighbourhoods

