EQuilibrium™
HEALTHY HOUSING
FOR A HEALTHY ENVIRONMENT

# Project Overview: EchoHaven—Calgary, Alberta

This Project Overview highlights EchoHaven, one of the winning entries in the Canada Mortgage and Housing Corporation (CMHC) EQuilibrium™ Sustainable Housing Demonstration Initiative—a national initiative to design, build and demonstrate sustainable homes throughout Canada.[1]

Figure 1—Conceptual rendering of the southern façade of the EchoHaven EQuilibrium™ Project

**Key Features**

- Site sensitive building orientation and design;
- Highly energy efficient building envelope to reduce space conditioning needs;
- On-site active solar thermal heating panels, a dedicated 5.3 kW photovoltaic (PV) array, and a future 25 kW community PV array;
- Rain water harvesting for site irrigation, toilet flushing and clothes washing;
- Heat recovery ventilation and low pollutant emitting materials and finishes;
- Chemical free insecticides, herbicides, fertilizers and plant disease controls.

## Project Description

The EchoHaven EQuilibrium™ project is a new, one storey with basement, single family home located in a new 25 building lot development in the City of Calgary. The 2.6 hectare (6.4 acre) development features wetlands and indigenous vegetation such as aspen stands and prairie grasses. Echo-Logic Land Corporation created the vision for the community and is the developer. The corporation intends to preserve over 60% of these natural features, in part by clustering building lots in the least environmentally sensitive areas and minimizing site grading and other disturbances. Each lot is relatively small in order to reduce ecological footprint, and has good solar access. Homes are close to public transit and will share

[1] For more information on this initiative and the various EQuilibrium™ Housing projects, visit the CMHC website (www.cmhc.ca) and type the search keyword "EQuilibrium".

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community amenities such as a common 25 kW photovoltaic (PV) array, a greenhouse, a community building, and a composting and recycling centre.

In keeping with the vision of the CMHC EQuilibrium™ Sustainable Housing Demonstration Initiative, the key objective of the EchoHaven team is to design and build a home that features a healthy indoor environment, maximizes energy efficiency, reduces environmental impact, conserves resources, addresses affordability considerations, and produces as much energy as it consumes in a year (a net-zero energy home) from on-site renewable energy systems.

The site sensitive building orientation and design optimizes solar exposure, utilizes the terrain to shelter the home from the northern winds, preserves desirable views, and integrates the house with its natural surroundings.

The main floor of EchoHaven utilizes an open-concept design with a combined dining/living room, a kitchen with year-round cold closet (for food and beverages that do not require refrigeration), a 3 piece bathroom, a master bedroom with combined 5 piece ensuite and walk-in closet, a second bedroom, and a southeast facing deck.

The lower floor, which is wheel-chair accessible, contains a room that could function as an office, guest bedroom or, with modifications to the adjacent accessible two-piece bathroom, a secondary suite. This level also contains an open area, the laundry room, workshop and mechanical room, and an unheated garage and storage area.

The design focuses on the entire home as an integrated system. It takes into account a variety of factors including the home's impact on, and interaction with, the surrounding environment. The choice of building materials took into consideration their production, transportation, and the manner in which they would be used. The walls and roof trusses were prefabricated and shipped to the site. The well insulated, air-tight building envelope, and energy-efficient mechanical systems, appliances, and lighting fixtures are designed to reduce the household energy requirements to a fraction of the energy requirements of a typical Canadian home. In addition to the passive solar space heating, radiant electric panel heating with programmable room-by-room

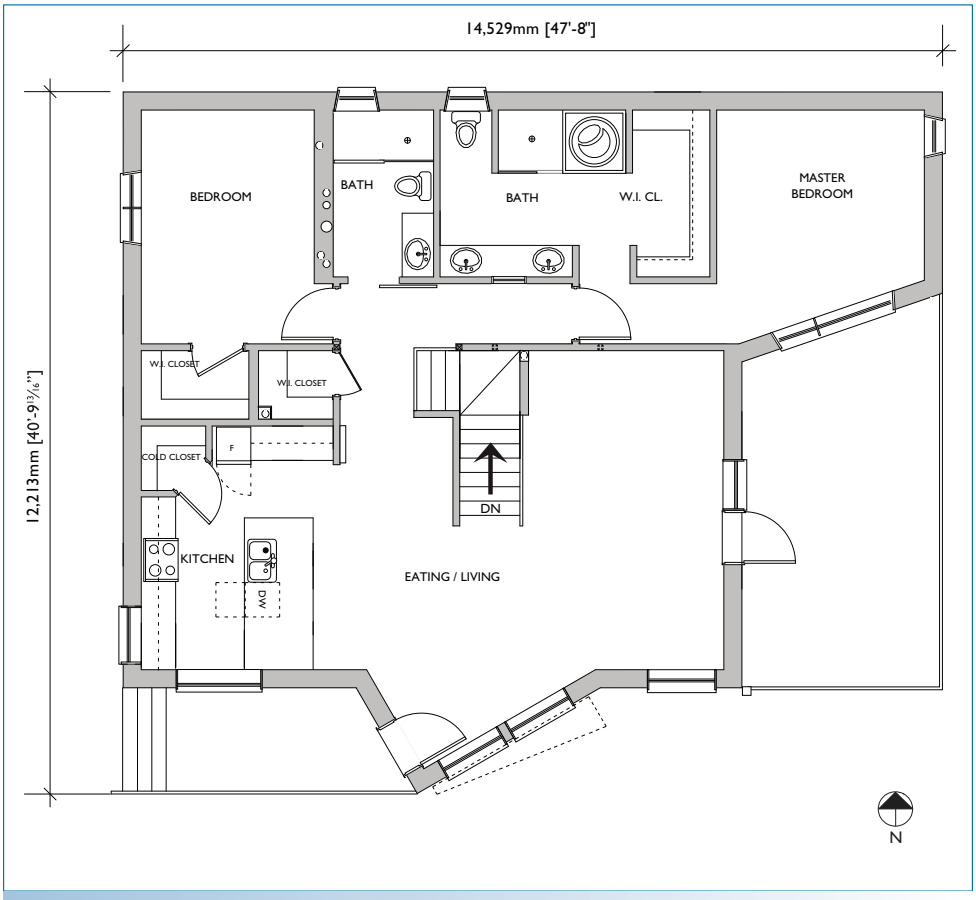


Figure 2—Main floor plan of the EchoHaven EQuilibrium™ Project

thermostats will meet space heating needs while providing maximum occupant comfort. Electricity for the space heating and other household needs will be provided, in part, by the dedicated 26 panel 5.3 kW PV array and future 25 KW community array, both of which are tied to the electrical utility grid. Two flat-plate solar hot water panels, connected to a 360 L (80 imp. gal.) hot water storage tank and a on-demand electric heater backup, provide domestic hot water.

High-performance triple glazed fibreglass frame windows have been sized and placed to ensure abundant daylighting in the living spaces, as well as solar gain in the colder seasons, while minimizing heat loss. The north, east and west facing windows have a single pane of low iron glass to enhance solar gain. The second pane of the south facing windows is also low iron glass to further increase the solar gain. Roof overhangs and light shelves are designed to provide optimal solar heat gain through the energy efficient glazing during the heating season while providing the necessary shading to help maintain comfortable interior conditions during the warmer months.

A heat recovery ventilator (HRV) and operable windows provide ventilation and contribute to thermal comfort and indoor air quality. The HRV system is activated by $CO_2$ sensors and includes in-line booster fans for the bathrooms and kitchen. The retention of natural site features in the development (e.g. trees) helps attenuate external noise, and the highly insulated exterior building envelope, triple glazed windows, and interior design further helps to limit the amount of exterior noise that can enter the house. Environmentally appropriate building materials, including locally salvaged steel and timbers, have been used. Natural materials and finishes with low levels of volatile organic compounds (VOCs) help to ensure good indoor air quality. Water conserving fixtures reduce potable water use, as will rain water harvesting which will be used for site irrigation, toilet flushing and clothes washing.

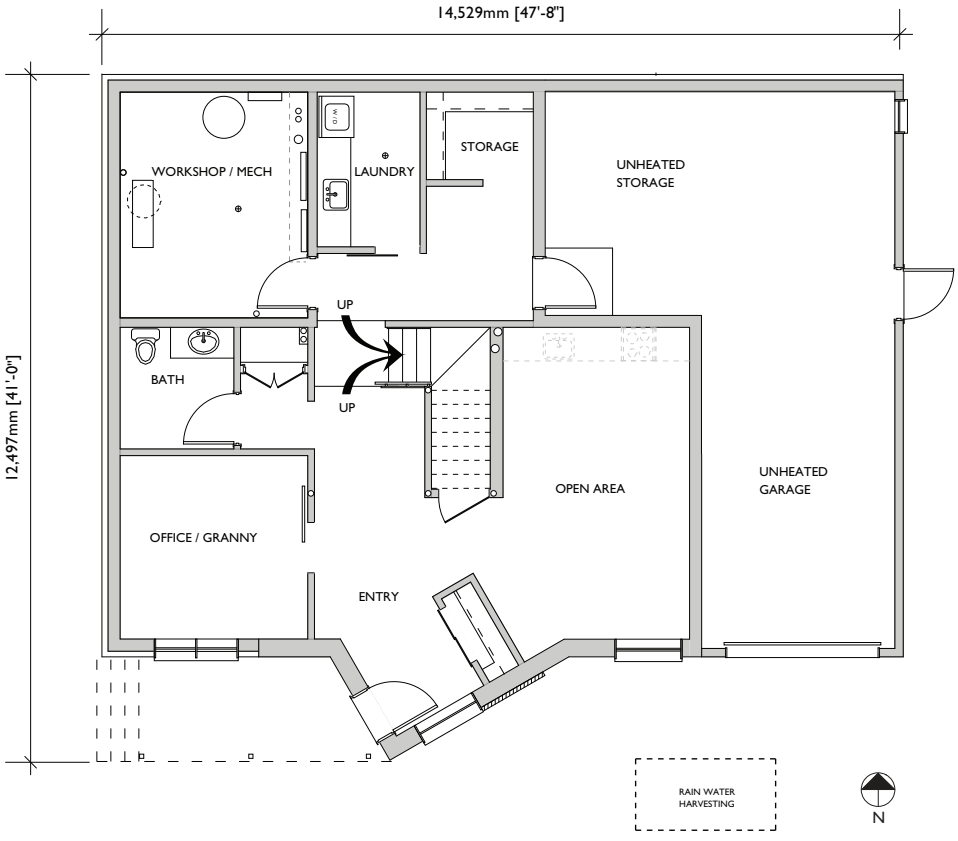


Figure 3 – Lower floor plan of the EchoHaven EQuilibrium™ Project

## Project Team

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## EQuilibrium™ Sustainable Housing Demonstration Initiative

**What is EQuilibrium™ Housing?**

EQuilibrium™ is a national sustainable housing demonstration initiative, created and led by Canada Mortgage and Housing Corporation (CMHC) that brings the private and public sectors together to develop homes, and eventually communities that address occupant health and comfort, energy efficiency, renewable energy production, resource conservation, reduced environmental impact and affordability.

CMHC's EQuilibrium™ housing initiative offers builders and developers across the country a powerful new approach to establish a reputation for building premium quality sustainable homes that will meet the needs of Canadians now and well into the future.

EQuilibrium™ housing combines a wide range of technologies, strategies, products and techniques designed to reduce a home's environmental impact to an absolute minimum. At the same time, EQuilibrium™ housing also features commercially available, on-site renewable energy systems to provide clean energy to help reduce annual consumption and costs.

The ultimate goal is a highly energy-efficient, low-environmental-impact house that provides healthy indoor living for its occupants and produces as much energy as it consumes on a yearly basis. As part of the initiative, all EQuilibrium™ projects will be open to the public for a minimum time period of six months and then monitored for performance with occupants for at least one year.

For more information on this project and on the CMHC EQuilibrium™ Sustainable Housing Demonstration Initiative, visit www.cmhc.ca

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