SOLARES
ARCHITECTURE

***REPORTS* ON ENVIRONMENTALLY INTEGRATED HOMES**

CLEAR WATER LODGE

GOING OFF-GRID IN THE FOREST

September 2015

After many years of hard work, our Clear Water Lodge project near Bancroft is complete, and our clients, Art and Mary, couldn't be more excited with the finished product. Previously located in Brampton, the couple decided post-retirement to move to rural Ontario, where they could enjoy the outdoors, spend time with family and friends, and live off the grid. They purchased a beautiful 40-acre property rich with delicate poplar trees and unserviced by electrical, gas or water and sewage mains. With PV solar panels, a small battery backup and a propane generator to keep all modern-day comforts possible, Clear Water Lodge is an exciting, high-performance home.

Our clients love to travel, often spending months on the road in their refurnished retro Airstream trailer. Therefore, this home had to survive during the harsh Bancroft winters, even when left unattended. Art and Mary didn't want a house they had to take care of, – but rather a house that could take care of them: This is an important Solares mantra!

The materials used had to be durable, long-lasting, and utilitarian. The floor and walls are concrete and the roofing and wall cladding is made of steel. Our clients wanted to be a major part of the building process, so they acted as their own general contractors and performed much of the labour themselves. This, as well as the building's remote location, affected many of our design choices; we specified off-the-shelf materials easily sourced from the local building center whenever possible. We also made sure that all materials, products and systems were, for the most part, "DIY".

This "T" shaped house is one-storey, with no basement. The top of the T faces south, and the stem faces east/west. The Great Room makes up the entire south-facing branch, with a quilting space, kitchen and dining area, living room and screened-in porch. Mary is an avid quilter, so instead of hiding her quilting room away in a dark corner of the house, as is common, we decided to place her front and center. Her quilting space has windows on three sides, so she has all the natural light she needs to quilt from morning to night!

Next to the quilting area sits the dining area and open concept kitchen. This wide space can hold a dining room table and large kitchen island with ease, making it a great space for large community get-togethers and family gatherings. Beyond the kitchen is the living area, with a wood-burning stove that keeps the space cozy and warm in the winter.

A screened in porch extends off the eastern side of this south branch, with a seating area and a table, for relaxed meals on the enclosed porch.

We've placed the foyer where both branches of the "T" meet, with two entrances that lead in from outside. The main front door is located on the west end of the building, where the driveway and garage are located. The other entrance sits next to the screened in porch, providing direct access to the forest for a quick getaway to explore the outdoors all year round. Since both entrances lead off the same room, our clients will always know where they left their shoes and coats!

A hallway makes up the long stem of the "T", where the bedrooms, bathrooms, and service areas lead off from. A small office, a bathroom, and two guest bedrooms face the east, catching the morning light. Across from these rooms are the laundry room and a large mechanical room, facing west. The master bedroom is at the end of the hallway, facing east and north, across from a west-facing second bathroom.

As for our structure and envelope, we used ICF (Insulated Concrete Forms) from Durisol, which acts as both structure and insulation. These concrete blocks do not use foam or polystyrene, but instead use post-industrial recycled wood fibers bonded together with cement. No certification is required to build with Durisol which made it attractive for this build-it-yourself project. To ensure an air-tight seal and to add more R-value to the high-performance house, we sprayed 2" of closed-cell foam on the outside of the blocks. The foam is then cladding with factory-painted steel panels.

This home's energy comes from PV (photovoltaic) solar panels which have a battery bank and a propane generator to run the house on sun-less days. The solar panels are a 4kw ground mounted array installed on a tracker.

For heating and cooling, we installed in-floor heating, powered by a propane boiler. There is a separate HRV for ventilation, and a fully separate air-handling system which draws hot air from the ceiling of the great room and dispenses it into the bedrooms. This uses very little energy. Instead of heating the cool air in the bedrooms with the in-floor, we simply circulate the hot air that naturally collects in the great room. The great room is the warmest room in the house, thanks to the passive solar heat, heat gained through cooking and people (ever been to a quilting bee?), and the wood stove. By circulating this air and replacing it with the cooler air from the bedrooms, we heat up the rest of the house while maintaining a comfortable temperature in the great room. All in all, the amount of energy used in heating is very small. Our clients have kept us informed in their energy use, and are surprised at how little propane they use, as the home's passive solar design keeps the house warm with very little need for the in-floor heating. We received word from our client, when propane costs rose last winter.

"I'm sure you are aware of the spike in propane costs this winter in Ontario. Regardless of the reasons the current price (winter 2014) paid by consumers is really hurting many folks, especially those on fixed incomes. Passive solar design was what you so wisely pointed out when we first started discussing house construction. We couldn't have been more fortunate to have followed your advice. Thanks to your insistence in exceeding the insulation codes by considerable margins we have avoided the sticker shock as energy cost have sky-rocked. Our last propane fill-up was in October at a cost of $0.65/litre. (current price $1.30/litre) Our tank currently sits at 36% full (Feb 23, 2014) and remember they only fill your tank to 80% when you get a fill-up. We have passed the highest winter consumption months and I calculate we can wait until July before requesting another delivery."

The house has no AC system. It's location in a dense poplar forest keeps the house cool even on the hottest days.

After 5 years of DIY building, our clients could not be happier with the end results. They love their new home, especially how warm it stays in the cold winters. Here are some more kind words from our clients!

"Every client who is considering building in rural locations should consider their energy cost on a long term basis and utilize whatever strategies you can suggest to reduce or eliminate those costs. Your passive solar design should be mandatory in this climate.

Just keeping you informed of developments here in the bush.

We love our house.

Thanks for keeping our energy costs so low."

*"Just wanted you to know that it was -20*C here this morning. Right now it is +22*C in our Great Room with just the wood stove and we will let it burn down and go out as the sun is beaming in here and we are in T-shirts. All houses should be this efficient. My sister and brother-in-law were here for 4 days and were amazed at how comfortable the house was with just the sun and wood stove for heat. Called our place the Bancroft Resort.*

*"Although it is -30*C outside the sun pouring in through the south windows is keeping us very comfortable without the use of additional heat source. Our neighbours are amazed at how comfortable the house is."*