

Rudd Residence: Elegant. Efficient. Ecological.

From early design considerations of habitat preservation and geopathic energy assessments through to the final stroke of paint, all features were considered for their effect on human health, environment and of course, comfort and beauty.

In our opinion, the Rudd Residence exemplifies that which Evolve strives to embody in every one of its projects, a home that is all of elegant, efficient and ecological.

Elegant

With its elliptical shape borrowed from the natural contours of its surroundings, the house gently perches on a hillside. The curved walls also welcome the sun's rays into more rooms, for more hours each day than traditional straight walls while simultaneously promoting views of a neighbouring pond. Adjacent shade trees are carefully maintained ensuring seasonal shading and provision of privacy.

Prior to construction, eco-architect, Ingrid Cryns, dowsed for the geopathic earth energy lines to find the best place to position the house to clear the bed, sitting areas for the couch & office as well as the kitchen sink. The architect and owner also identified a very large, three foot diameter, beneficial energy spot on the site and the house was placed so that this energy spot was located just inside at the corner between the living room/mediation room window and upstairs bedroom walls. A plastic line was embedded into the concrete floor slab to connect this spot to the centre of the house at the fireplace to secure the energetic centre of the house with the land. This was the most critical & significant energy enhancing aspect that was implemented. The design of the house with the two curves in plan creates an extremely strong beneficial energy. All together, this creates a very strong sense of well being, joy and calmness when inside the house that is very noticeable to anyone who visits.

Inside, soft finishes including customized sculpted relief work emerging from walls and fireplace surrounds together with luxuriously deep window sills replete with tiled mosaics, complete the unique look and allow personal expression for the Owner, who assisted with design and implementation of such details.

Efficient

Careful attention paid to sealing of all joints in the building envelope and upgraded conventional insulation are de rigeur for Evolve Builders Group Inc. Low- or no-VOC sealants and recycled under-floor insulation, instead of virgin polystyrene, are standard further steps taken by Evolve. Additionally, this home's strawbale insulated exterior walls, at R40, offer better than twice the operating performance of ordinary conventional construction methods.

While insulating is important, so too is the notion of massing: using dense materials in which to store and then slowly release heat. A heavy concrete subfloor as well as 1 ½" of plaster on the interior of the bale walls, combine to provide excellent thermal storage capacity. This mass absorbs heat when it is generated via the sun or the radiant floor heat distribution system, and then gently releases this heat again as the air temperature declines. Strategic use of mass provides comfort and efficiency. Working equally well in the summer by robbing the air of its heat as well as humidity to maintain user comfort, this home has no need for mechanical air conditioning.

Integration of an historic "kachelofen", or masonry fireplace, expands the use of mass in this home. Ordinary fireplaces or woodstoves regularly burn uncomfortably hot while also consuming wood inefficiently as up to 70% of the heat escapes through the chimney. Kachelofens incorporate many small channels into specially constructed masonry masses between the firebox and the chimney. These channels absorb the generated heat before it escapes to the chimney – improving efficiencies by a factor of 2x or 3x.

Better still, this mass radiates the captured heat for hours afterward at a slow, gentle pace, allowing the users to bask in a soft, warm glow with all the visual pleasure of an ordinary fireplace.

Ecological

Local sourcing and use of naturally occurring materials are vital components in reducing the impact of this home. And what could be more local than felling trees from the owner's surrounding woodlot, milling them on site, having them kiln dried nearby then turning the finished boards into all of the interior doors, cabinet doors, window sills, stair treads and baseboard. To top it all off, literally, natural oil finishes are applied and offer long lasting protection in lieu of ordinary petrochemical based urethanes.

More than simply "low-VOC", silicate dispersion paints – Canadian manufactured using silica sand and natural mineral pigments – are used throughout to provide rich colour and naturally mildew-free painted wall finishes. One room was even more specially treated with a clay veneer instead of any paint at all, leaving a suede-like texture that immediately attracts attention. Additionally, some baseboard was sculpted and the fireplace face's constructed using only earthen based plasters prepared on site from locally available clays. No cement, no polymeric binders...just rich, durable, natural materials.

Additional Project Details

Energy Savings

- Typical heating energy reduction of 30-50% compared to conventional construction
- Integration into landscape and existing mature trees to provide seasonal shading
- Orientation of windows primarily toward south for passive solar gains
- No mechanical air conditioning required
- Significant free "daylighting" through strategically located windows to reduce light use
- Further savings in heating costs achievable by owner use of Kachelofen enhanced further if using deadfall trees from own property
- Reduction in embodied energy in building materials through combination of: local sourcing, use of reclaimed/recycled materials and materials requiring fewer processing inputs
- Fibreglass framed windows provide longer life and higher insulating ratings
- Low E coatings on window glazing reduce heat energy from the sun in summer only
- Thermal edge spacers between window panes reduce thermal bridging
- "Massing" strategically used for efficient thermal storage and heat delivery
- Efficient radiant floor heat distribution on main floor and hot water radiators on second storey
- High-efficiency condensing boiler for domestic hot water and all space heating
- High efficiency Heat Recovery Ventilator (HRV), professionally balanced on start-up

Environmentally Preferred Materials

- Local, reused and reclaimed materials and minimally processed materials reduce embodied energy inherent in ordinary construction
- Reclaimed wide plank beech flooring
- Forest Stewardship Council (FSC) certified flooring
- Clay veneer wall finishes
- Earthen-based plaster fireplace facing and embellishments
- Strawbale exterior walls complete with hand-applied plaster finish
- Solid wood flooring
- Natural oil wood finishes
- VOC-free mineral based naturally pigmented paints
- Soy based polyurethane vaulted ceiling insulation
- Simulated, long lasting (50yr warranty) cedar shake roofing invented in Canada

- Locally made mineral wool attic insulation
- Interior doors, baseboard, window sills, kitchen cabinet doors and stair treads all made by local craftspeople from trees felled adjacent to house
- Kitchen counter top made from pressed and recycled post-consumer paper waste into resilient, satin finished surface

Waste Reduction

- Lumber off-cuts stored and sorted for reuse later in project
- Construction waste streamed appropriately for local municipal recycling programs
- No general waste construction bin used on site

Transportation

- House is walkable to community centre, shopping, banks and other amenities
- Staff carpool to site to reduce commuting energy costs; some staff stay temporarily on site during construction, eliminating the need for daily commute
- A south facing Potting Room will enable off-season vegetable greens and fruit to be grown while annuals get a head start on the outdoor planting season thereby reducing reliance on shipped in foodstuffs

3rd Party Labeling Programs Utilized

- Eco-logo™ certified drywall
- Energy Star™ rated windows
- FSC™ certified hard maple flooring
- HRI Institute™ approved heat recovery ventilator (HRV) unit

Technical Repeatability

- All materials selected currently available in the Ontario market
- Traditional trades can use existing skills applied to alternative materials
- Design strategies customized for this site and user though same rules can be applied differently as appropriate for varying circumstances

Affordability

- Super insulated, environmentally preferable straw bale wall system comparable price to ordinary frame wall with brick or stucco finish
- Site felled trees were prepared for use at similar cost to purchasing raw material with unknown provenance from ordinary lumber suppliers
- Mineral wool batt insulation costs just 5% more than fiberglass though with a higher insulating rating, easier install and advantageous hydro-phobic properties
- Our sustainably harvested hard maple flooring is consistent with clear grade ordinary maple from unknown sources at traditional retailers
- Quality, durable materials and careful construction detailing will ensure longevity of house to reduce ongoing repair and maintenance

Technical Innovation

- Evolve Builders has strategically systemized construction processes and details for straw bale walls to make this labour intensive building method cost-competitive with ordinary construction
- Simple, successful, repeatable “technologies” borrowed from historic building techniques then reformulated or adapted for modern expectations including: natural finishing oils for wood treatment, clay binders for wall finishes, mineral pigments for paint tinting

Builder's Commitment to "Green" & Social Engagement

- Evolve Builders Group Inc only performs work that has a purposeful intent of being more efficient, better for human health and/or more desirable for the environment
- When products desired by owners are not available in the local or Canadian market, Evolve either seeks to become dealers or finds other partners to bring them to market
- Evolve's procurement strategy favours social enterprises and family owned or local businesses
- Evolve's key subcontractors are routinely similarly interested in alternative construction
- Seasonal staff are hired from among students in related construction and design programs to provide hands-on learning opportunities and meaningful, paid work
- Sought after guest lecturers in related academic programs including: Ontario College of Art and Design, Ryerson University, Algonquin College, Sir Sanford Fleming College.
- Support others entering industry, co-op students, training new builders
- Deliver outreach workshops and seminars through various community, trade association, academic and environmental groups
- Lead participant in collaborative R&D programs with academic, government and other business partners including current pilot project studying greywater reuse systems and strategies with the City of Guelph and University of Guelph
- "Volunteer days" sometimes facilitated to permit prospective homeowner builders to try their hand at a key building element such as straw bale walls, in exchange for their labour on behalf of Evolve's client
- Provide limited amount of work free-of-charge in support of worthy related organizations or events

Potential Impact on Market Transformation

- Use of products certified under 3rd party verification programs at the exclusion of other similar products expected to drive more manufacturers to meet similar standards
- *The 100 Mile Diet* book is having a similar impact on some homeowners' material selections as it does on consumers grocery purchasing habits; supporting and encouraging use of local and family owned businesses should help build local networks of unique products and services
- Due to size, our own company impact on the market is never expected to be significant in of itself. Rather, we hope that by aiming to be at the cusp of that which is new, we will be among those who introduce new products and services until they too become normalized by bigger builders, by which time we will again have gained knowledge of something new.