

# THE **Owner Builder**

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# The Ecomobile

*Affordable, self-built, ecological housing*



*The Ecomobile is a bespoke, one-bedroom mobile home built to stringent ecological specifications.*

*Completed in 2008, the building is highly energy efficient (zero carbon) with a well-appointed interior that's healthy, spacious and light. The construction cost (per square metre) was about half that of new-built architect-designed houses in the area.*

*Affordability was due, in large part, to the Ecomobile being owner built.*

**BY GRAHAM MELTZER**

## **Catering for community**

The Findhorn Foundation (FF) is an educational trust located in North Scotland, with the purpose of facilitating personal and social change toward a more conscious and sustainable world. With a staff of about 100, it holds courses and conferences on a wide range of spiritual and ecological topics continuously throughout the year. A wider community of around 500 lives in and around an

associated ecovillage, creatively exploring new ways of living in harmony with each other and the environment.

The community began in 1962 when its founders settled in a caravan park on a windswept peninsular in North Scotland. The group was committed to practicing spiritual principles in everyday life, including co-creation with nature and the interconnectedness of all life. This resulted in amazing gardens, which attracted thousands of visitors from around the world. Many stayed and the community grew, based on values of love, service and spiritual practice.

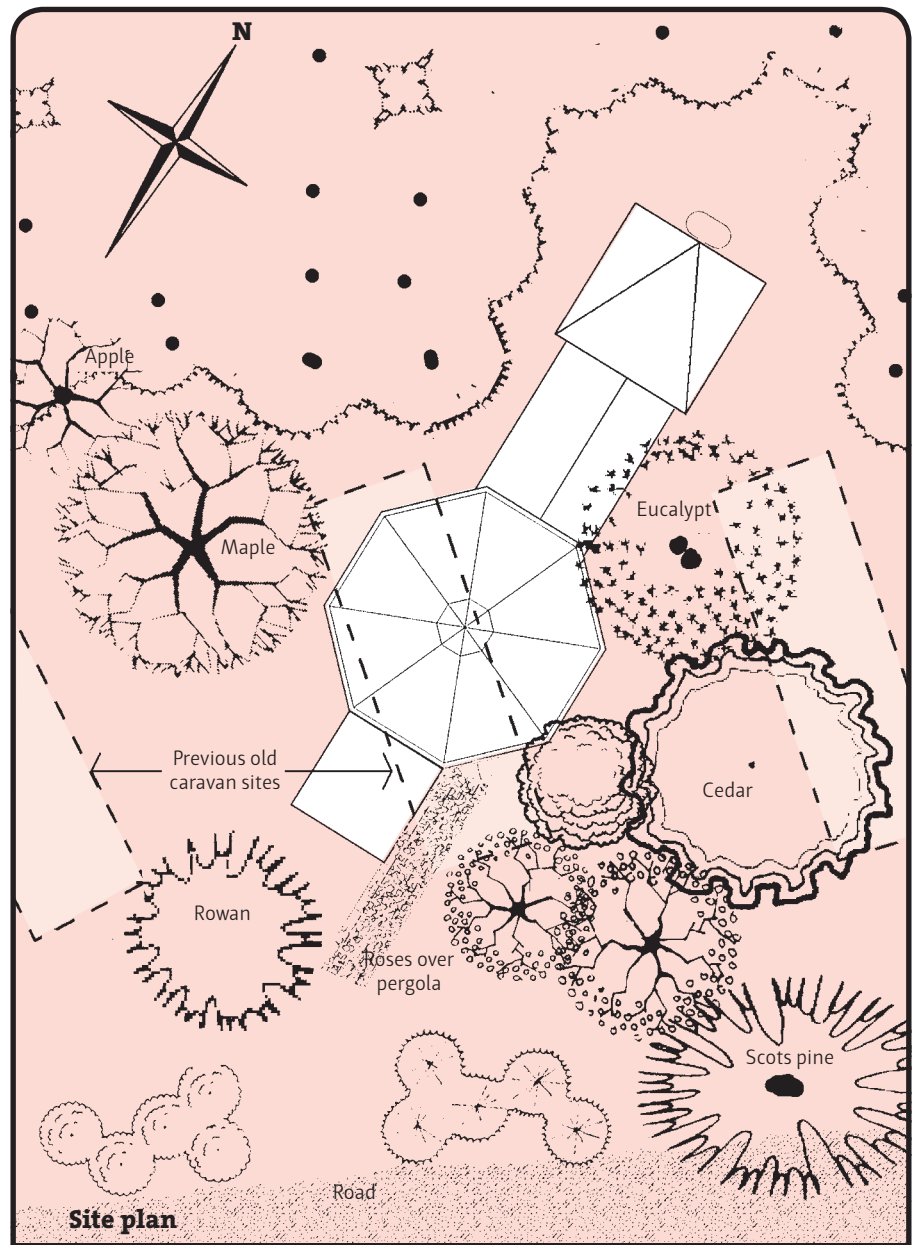


The Foundation eventually purchased the caravan park and began replacing pre-existing caravans with more energy efficient and healthy buildings – a process that continues to this day. The community has become world famous for its innovative buildings, many of which have pushed the boundaries of community and ecological architecture. However, a shortfall still exists in the provision of staff accommodation, with a few members still living in poorly insulated and unhealthy caravans.

The Foundation has planning permission to replace caravans with new dwellings, one for one. And, if the replacement dwelling is a mobile home (complies with certain dimensional limitations and is able to be relocated to a different site), it can be replaced without further Council submissions, expediting the process while saving time and money. The Foundation has used this opportunity to build what it calls Ecomobiles. Four have so far been built; the design having evolved from a 35m<sup>2</sup> studio to the latest version described here, a one-bedroom unit of 55m<sup>2</sup>.

### Site specific design

The Ecomobile is located in an area of considerable ecological value and sensitivity where numerous full-grow specimen trees form a nature corridor linking two areas of wildlife habitat. Because the building has a small footprint and touches the ground lightly, it can be set amongst the trees with minimal impact. There are currently three such mobile buildings in the area.





The building comprises a single main living space, a separate bedroom and a link between them incorporating a bathroom, services and storage. The spaces were designed to deliver qualities appropriate for co-workers of a spiritual community, who often seek peace and tranquillity in their dwellings, away from the intensity of community life.

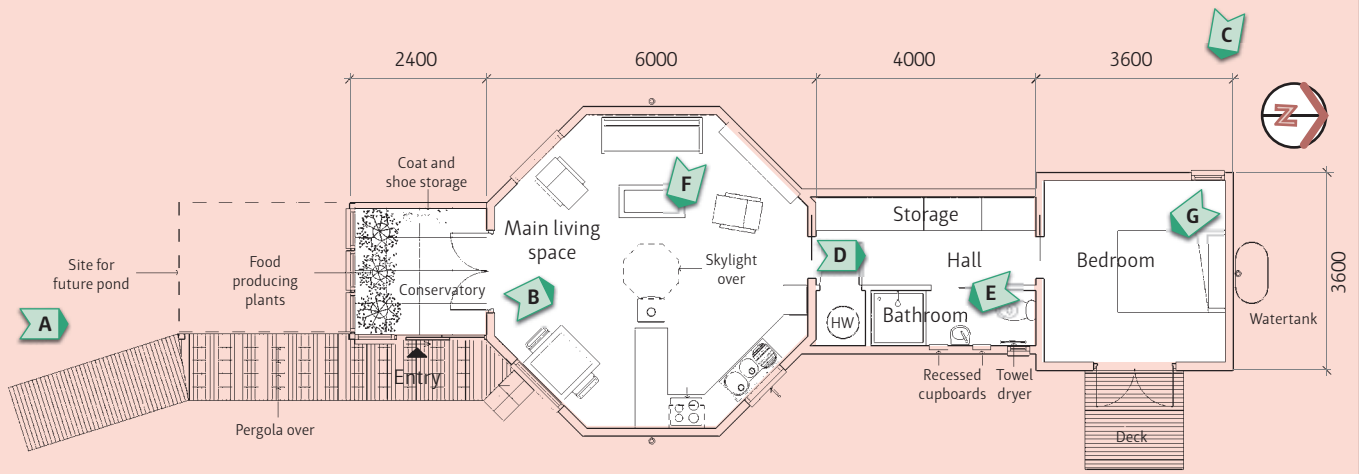
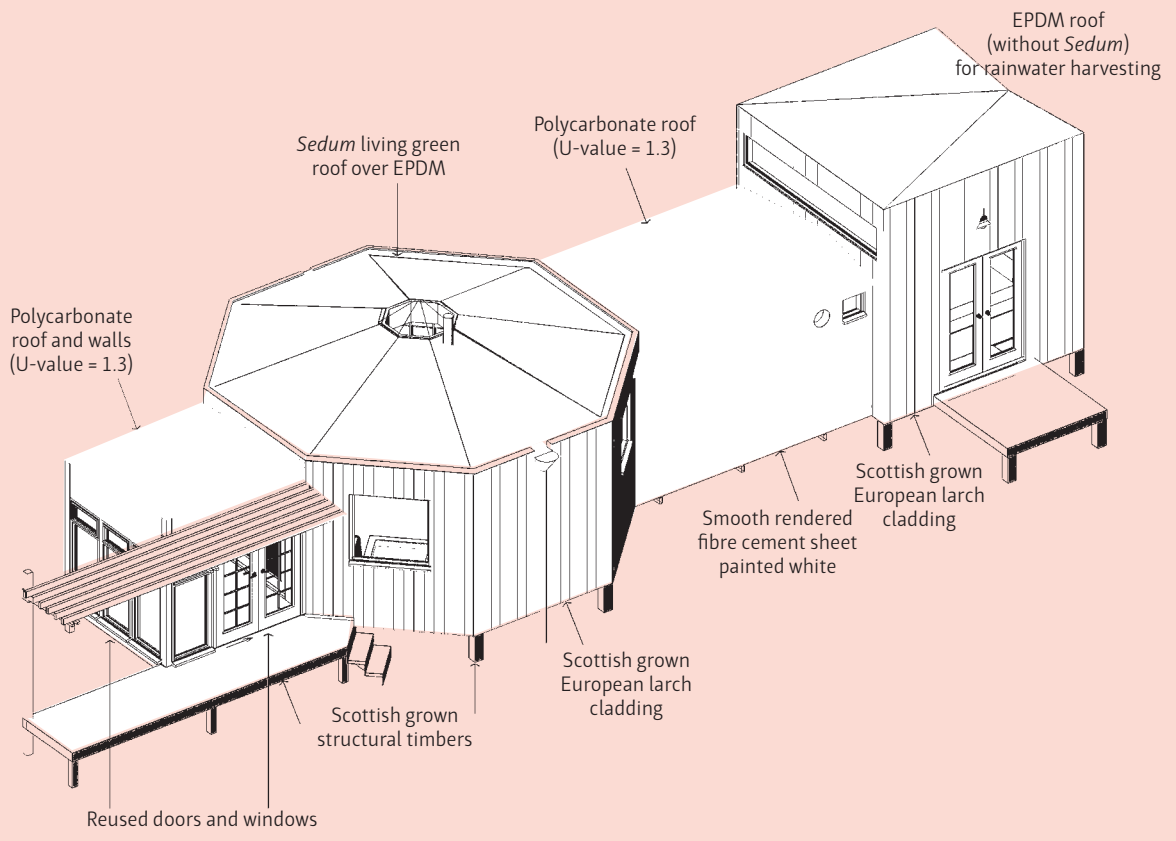
The main space has an octagonal floor plan, 6m across. The corners are 'softer' and easier on the eye than conventional ones. Within the space, the kitchen, dining and living areas centre around a wood stove. They 'borrow' space and amenity from each other, enabling a smaller combined footprint. A central skylight delivers natural light.

The link area is flooded with daylight entering through its translucent roof and ceiling; both roof and ceiling are of 35mm, 7-walled polycarbonate with U-value 1.3. The corridor, with full-length storage on one side, doubles as a dressing room.

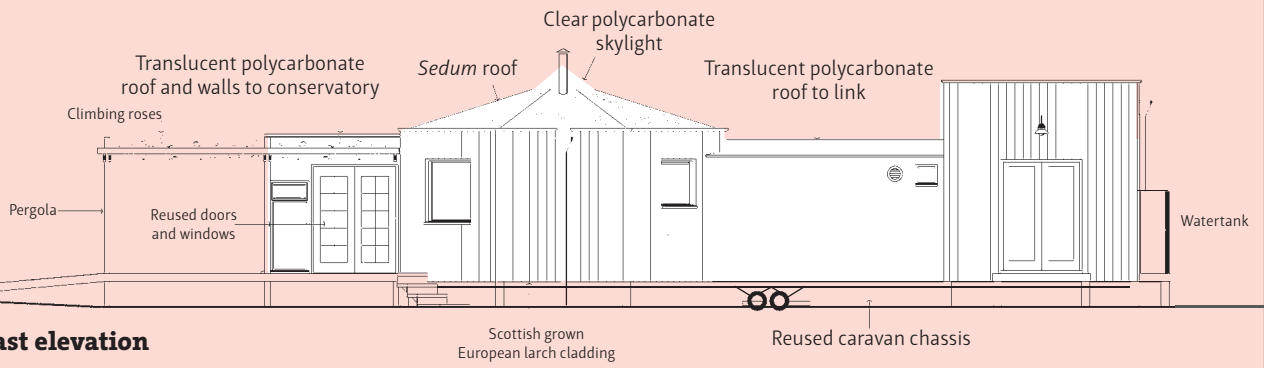
A well-appointed compact bathroom incorporates a toilet, basin and full sized shower cubicle.







**Floor plan**



**East elevation**

PLANS: GRAHAM MELTZER (FINDHORN FOUNDATION ASSET DEVELOPMENT GROUP)



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Because clothes are stored elsewhere, the bedroom is minimally furnished with just a bed. Its cubic form, high ceiling and minimalist décor induce something of the qualities of a 'sacred' space. A full-width south-facing clerestory invites views of the stars and full moon while a narrow full-height window to the west offers views of nearby trees. An east-facing deck, incorporating a hammock and hot tub for two, opens off the bedroom.

The exterior of the two habitable 'pods' are clad with tactile, warm-hued timber while the link containing the services is sheathed in smooth fibre cement panels painted white. The main space will soon have a living 'green' roof planted with *Sedum* (a hardy succulent used for green roofs) while the flat bedroom roof will be used to harvest rainwater.

The building is approached across a bridge and under a pergola that will eventually carry climbing roses. An entry porch, constructed of reclaimed doors and windows and lit at night with colour-changing LEDs, provides a space to gently arrive and deposit coats and shoes. The progression from street to interior is designed as a series of experiences that encourage a subtle energy and mood shift from that of the outside world to a more relaxed and tranquil state.



## Sustainable construction

The Ecomobile is a lightweight timber-framed building, with the structural timber being mostly recycled. The sub-floor structure comprises a reused caravan chassis supported at the perimeter by loadbearing columns on pad footings. The 200mm thick 'breathing' walls and 300mm deep roof are insulated with *Rockwool* (stone wool insulation), with the 150mm deep floor containing *Warmcel*, granulated insulation made from recycled newspaper.

The 'breathing' walls in the Ecomobile comprise seven layers (two are permeable membranes) that, together, convey water moisture from the interior to the exterior. This ensures indoor air quality and prevents bacteria and mould accumulating in the wall cavity.

The exterior cladding is untreated locally grown larch, an extremely durable and beautiful plantation timber. Interior walls and ceilings are of plasterboard, finished with odourless, solvent-free, organic paint. The flooring, kitchen worktop and windowsills are of bamboo. The building has no carpet or curtains in order to minimise house dust.

## Owner builder savings

The Ecomobile cost approximately £40,000 (\$66,000) to construct. At £800 (\$1300) per m<sup>2</sup>, this is about half the construction cost of newly-built, architecturally designed and detailed homes in the region.

The biggest cost saving was achieved through owner building. The Ecomobile was built with the help of FF staff using FF resources; volunteer labour from the wider community was also used from time to time. The labour component of the overall cost was approximately 20% – considerably less than with conventional building procurement. I both designed and constructed the building, which reduced the amount of documentation necessary and eliminated any need for conventional architectural supervision. Further savings were made through online shopping for materials, fixtures and fittings, resulting in many fewer trips off site and saving time, money and carbon emissions.

The Ecomobile is, in truth, poorly oriented for passive solar gain. Site constraints dictated that it be elongated

in a north-south direction, counter to passive solar design principles. However, the south facing conservatory and large openings on south-facing walls provide considerable passive solar gain.

The main source of space heating is a log stove burning locally cut firewood. In the absence of central heating, oil-filled electric wall panels provide backup heating to each room although these are seldom used. The boiler is also electric. The cooktop is a low-energy induction hob. There is no television, washing machine, clothes dryer (the occupants use a shared community laundry), dishwasher or microwave. Because the Ecomobile creates no carbon emissions in its day to day running, it can be considered a 'zero-carbon' building.

In striving to reduce carbon emissions, the Foundation is gradually phasing out its oil and gas fuelled boilers, replacing them with biomass or electric units. A community-owned wind farm, one of only two in Scotland, currently provides more than enough renewable electricity for the community's needs. In 2007, the wind park (comprising four turbines) exported an excess of 40% of its total output to the national grid.

The Ecomobile is a vehicle for sustainable living. Designed for a couple, it offers high levels of comfort and amenity while enabling the occupants

to minimise their environmental footprint. Small dwellings require fewer materials to construct, less energy to heat and can be filled with less material 'stuff'; at 25m<sup>2</sup> per person, Ecomobile is about half the size of the average UK dwelling. Beyond material considerations, however, the Ecomobile offers a supportive setting for 'voluntary simplicity' – a less consumerist, more environmentally benign lifestyle characterised by thoughtfulness, ease and beauty. A place where the soul may find peace! ♦

*Graham Meltzer grew up in New Zealand before living in Australia for 30 years. His first owner builder project was at Tuntable Falls, Nimbin in the '70s and early '80s, before studying architecture. He has been at Findhorn for 11 years. He can be contacted via email [graham.meltzer@findhorn.org](mailto:graham.meltzer@findhorn.org)*



## Links & resources

### ♦ Findhorn Foundation

An international centre for holistic learning.  
[www.findhorn.org](http://www.findhorn.org)

### ♦ Findhorn Ecovillage

An ecologically respectful built environment.  
[www.ecovillagefindhorn.com](http://www.ecovillagefindhorn.com)

