Eco town houses in the CBD

Two couples work their way through the red tape to build a sustainable small-scale development in the inner-city of Perth.

In late 2011 construction started on a small sustainable development close to the Perth CBD. Two town houses and two apartments will be built using different construction methods, including reverse brick veneer, straw bale and insulated cavity double brick. The use of solar passive design principles resulted in 8–10 star energy ratings. It has been a two-year journey so far for the two couples behind the project. From idea to building approval, the main hurdles were tackling government policies, such as streetscape policies, town planning policies and their application to mixed town house and apartment developments, and the use of rain water and grey water.

BY EUGENIE STOCKMANN
DIAGRAMS COURTESY OF RIGHT HOMES

Our goal

Early on we dedicated ourselves to forming a clear vision and goals to help guide the decision-making process ahead. We wanted to create a small-scale inner-city living environment in Perth that was sustainable, promotes a community feel and encourages creativity. We wanted the project to become a showcase for future increased density sustainable development, to generate interest and inspire real change.

Finding land

The dream started to become reality in January 2010, when we purchased a block of land: 96 Rutland Avenue in Lathlain, Perth. A mere 839m², zoned for medium density, which allows for construction of up to three town houses and a single bedroom apartment.

How it all started

As a reader of The Owner Builder magazine, you probably identify with the dream of designing and building your own home. My husband and I dreamt about that too, of building our own straw bale house. While many people move to rural areas and country towns to make this dream a reality, we wanted to build our home in an inner-city location, close to the Perth CBD. We thought of a medium density town house development to showcase how such developments can be more sustainable.

When do you decide it is time to take the first step towards making your dream a reality? For us a sabbatical in 2009 gave us the energy and courage to sell our comfortable home in the outer suburbs and move into an old and neglected rental property closer to the CBD. While we closed one door behind us, another opened: we found a second couple that shared our vision and we joined forces. The close cooperation and sharing of ideas, skills, workload and financial investment between two couples made it possible to launch the project.

Below left: Modelling of site and sun angles. Below right: Beginnings – the slabs go down.
railway line, about 400 metres from a train station, and within walking and cycling distance to shops and other community facilities. It provides us with transport options other than driving for the majority of our trips.

The design

Owning a block of land meant we could start with the design. You can imagine that it takes good design to fit three houses on an 839m² block. While we enjoyed doing our own initial sketches, we needed help to get the solar passive design right and ensure compliance with a whole range of government planning policies. We knew we would be pushing boundaries and wanted to engage someone with experience to guide us through the process of planning approval. It had to be someone who believed in our project and was willing to work with two couples. After some time searching, we chose Griff Morris from Solar Dwellings.

The key principles that guided the design were:

- **Passive solar design:** Our aim was to build dwellings that would not need energy (or at least as little as possible) for heating or cooling. Applying solar passive design principles, including northern orientation, positioning of windows, ventilation and shading, combined with choice of building materials (including insulation and double glazed windows), has resulted in 8 to 10 star energy ratings.

- **Think small:** We wanted to build houses with a small footprint. This not only means reducing the amount of materials required and thus our footprint and cost, but most importantly increases the amount of open space. Australia builds the biggest houses on the planet with an average of 243m² for a free-standing house. Our dwellings (all double storey) have a footprint of around 60–75m² with a total living space of around 120 to 150m² for each town house and 65 to 75m² for each apartment. We believe we have used space cleverly to offer amenity without waste.

- **Reduce the impact of the car:** Driveways and garages dominate most town house developments. A typical development provides a double garage per dwelling and a driveway takes up most of the open space. In our development each dwelling has access to one single garage. Also, we wanted to use the open space for productive and water wise gardens. We were able to do that by keeping car parking at the front of the property. This design decision was also crucial to apply passive solar design principles. Overall, the measures ensured that 60% of our development will be open space.

- **Green space:** Both ‘thinking small’ and ‘reducing the impact of the car’ resulted in an increased amount of green, open space. Too many town houses only have access to a small, brick-paved courtyard. For us, green space is important as it provides natural cooling in summer, an opportunity to grow some fruit and vegetables, habitat for the critters that we share the planet with and space to recharge our batteries.

- **Community:** We decided to split what would be the third town house into two apartments: one downstairs and one upstairs. The idea is to make it affordable for people to move to the area, as well as to increase the diversity of residents. While universal access principles were applied to the whole development, the bottom apartment, in particular, will be ideal for wheelchair access or the elderly. We also strived to design an environment that enables chance encounters between neighbours – for instance, from the parking area residents will have to walk to their front doors, all of which face a common courtyard. In addition, most of the garden space is shared, there are no fences and there is also a common outdoor kitchen and a bike store.

Planning approval

The above design features made sense to us but they diverge radically from the typical Australian development and we had to overcome some obstacles to get planning approval.

First, there was uncertainty about combining town houses and apartments in the same development – it seemed nobody had done that before. The difficulty was that, according to state planning policies, a town house needs to have a certain amount of square metres ‘for the exclusive use.’ However, in our design all open space is common. The Department for Planning advised that all we needed to do was to provide a minimum 20m² courtyard for each town house and 10m² for each apartment – and we did as directed. Still, council planning officers wanted to see lines on a map showing which bits of land belonged to whom. As we finally drew lines on a map, the box was ticked and we could move on.

But the red flag was raised again. While our block was large enough to build three town houses plus a single bedroom apartment under the planning policies, we did not have enough land for two town houses and two apartments unless the two apartments were both single bedroom and were each less than 60m². This was not ideal, but we had no choice. The issue has been addressed in an update
of planning policies in late 2010, but we could not afford to put the project on hold waiting for the change to come through.

**Streetscape problems**

The biggest hurdle, however, was that our design was not in line with the council’s streetscape policies. As I mentioned before, keeping parking at the front of the block was crucial to optimise the passive solar design and increase the amount of quality green space. But it meant that the garages (instead of front doors) face the street and the garages protrude more than one metre past the front facade of the building and this was not allowed.

Under Western Australian planning regulations, our development needs to provide a total of six parking bays: two for each town house and one for each apartment. Such requirement stood even after some small concessions for proximity to a train station (400 metres); there were also no concessions for the communal bike store.

We decided that instead of building six garages, we would provide four single garages, one for each dwelling and two additional visitor parking bays. Under strict conditions – we were not allowed to use the verge or the road for visitor bays and were obliged to have only one driveway as well as a setback of 4.5 metres. The traditional developments would have used a long driveway into the block leading to double garages incorporated into each building. However, if we were to maintain useable open space and a community feel, there was not much choice other than to design two double garages at the front of the block thus dominating the streetscape. However, by ensuring that the garages face each other rather than the street, we were able to reduce the visual impact.

We have been fortunate that the elected councillors saw the sustainability merits of the project and voted in favour of our plans. We got planning approval in December 2010.

**Building approval**

During building approval, the choice to split one town house into two apartments came back to bite us. While for planning approval the apartments were regarded as a two storey building under the Building Code of Australia (BCA), they were classed as a three storey building because of loft space, which will be used for storage.

This had huge implications from a fire safety perspective. We were even told that we could not have large windows on the north – crucial for the passive solar performance – due to fire issues. With persistence and the help of a fire engineer, who performed calculations and wrote a report, we were able to settle all issues and preserve the design.

The other big challenge has been our aim to be water wise. Sharing rainwater tanks among dwellings in a small development makes sense, but the current WA Department of Health legislation considers it as high risk and sets very onerous monitoring and reporting requirements.

The legislation also does not allow the use of grey water on common land. The alternative would be a grey water treatment system but that comes at a high monetary cost, as well as more monitoring and reporting requirements.

After engaging the assistance of Josh Byrne from JBA, we secured an exemption from the Department of Health from the monitoring and reporting requirements for rainwater, as well as support for the connection of one of the town houses to a grey water diversion system. Dual plumbing systems will be installed in all other dwellings in anticipation of future legislative changes.

**The journey continues**

The building licence came through in early October 2011; construction started late 2011. We entertained the idea of owner building, but this project is too complex and simply does not lend itself to it. The requirements around construction of apartments in combination with restriction on sale of the properties were the main reasons for our decision to engage a builder.

We count ourselves lucky to have found Right Homes, a company that shares our vision of building sustainable and affordable homes and has been enthusiastic from the start about our project. There are not many builders that will take on straw bale construction, let alone the challenge of combining three construction methods and two different classes of buildings in one and the same development.

Fortunately, Right Homes do provide us with the opportunity to still be very hands on, in particular when it comes to construction of the straw bale dwelling. The raising and rendering of the walls have been outsourced to us, the owners. We will also supply and construct some of the building materials, including door frames, doors, solar awnings and treads for the stairs.◆

Follow the progress of this unique development on www.thegreenswing.net

**Links & resources**

◆ Josh Byrne & Associates
Integrating the fields of environmental science, landscape design, sustainability policy, community development and environmental communications.

www.joshbyrne.com.au

◆ Right Homes
Solar passive designs and sustainable extras, constructing everything from individual homes to unit developments.

08 9355 0374, www.righthomes.com.au

◆ Solar Dwellings
Design and construction services creating passive solar homes in Perth and regional Western Australia.

08 9444 4400, www.solardwellings.com.au
North elevation (Unit 3 left, Unit 2 right) and common space

South-west elevation

Unit 1 – north west elevation

Unit 2 – south east elevation

Unit 3 – north west elevation