58 Stevens Street

A carbon positive project.

EARTHCARE DEVELOPMENTS

58 Stevens Street Fremantle

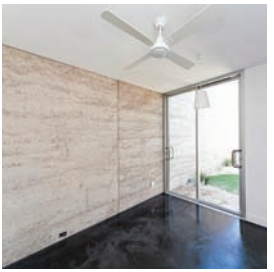
This rare development is a unique combination of many factors:

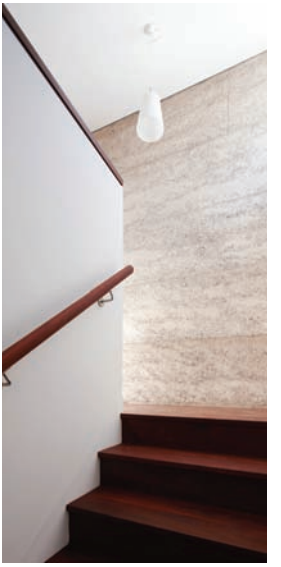
- the owners' strong interest and commitment to design and sustainability and their different business interests in recycling and landscape
- the vision of local architects' firm, Officer Woods
- the builder, Peter Hobbs, who has a distinguished architectural career

Other important contributions are from well known artist and sculptor Mark Grey-Smith and many talented tradespeople as well as Earthcare Landscapes staff.

Great projects are the sum of many parts, and we believe this shows at Stevens Street, where many contributions and ideas come together in a stunning project.

No. sculpture: Mark Grey-Smith
Photo: Robert Firth





Photos: Robert Firth
and Aperture 22.

The development was conceived to demonstrate a number of ideas that the owners believe are scarce in Fremantle, but are simple to use in most homes. These include: contemporary design, high level environmental features (carbon positive), courtyard living, flexible living arrangements (such as 2 entries and the ability to easily convert rooms as needs change) all within walking distance into Fremantle. The design also reflects the Knutsford precinct both past and future – industrial, modern, creative, walkable.

The brief to the architects was to design a housing project that enables the potential for multiple uses in the future and can be both energy and water efficient.

The houses were built on land owned and lived in by the developers for over 10 years. Many of the existing trees were all planted some years ago and the large flame tree that currently stands at the front was relocated from the rear garden before construction started.

The previous house – a 2 bedroom cottage - was demolished and the materials recycled where possible. This included crushing the old concrete blocks and roof tiles and these were re-used as part of the rammed earth walls. The old timber floorboards were saved and re-used upstairs.

Virtual tour

We would like to invite you on a virtual tour around the Stevens Street project to highlight, educate and inspire!

Please note numbers on this brochure reference materials and items identified in house A.

See pages 8 and 9 (centre spread) for floor plan.

External features

01 Solar panels are connected back to the grid. The 2KW system has been independently tested to provide excess energy requirements for each house on an annual basis. These assist in making the homes carbon positive!

02 Robust and low maintenance external cladding - no painting required for both steel and cement sheet cladding.

03 Verandahs to shade summer heat gain. Unit A has a retractable shade device being installed.

04 Small windows in the west side of the houses to reduce summer heat load. Broad northern aspect to maximise winter solar heating internally.

05 All rainwater tanks are dual plumbed to all internal toilets and washing machine – they each hold over 3000L and excess water flows into a large underground storm-water soak, replenishing ground water supplies.

06 100% recycled material includes crushed concrete blocks and roof tiles from the previous house and other demolition and construction materials. These have been cleverly re-used in the rammed earth walls. All that was added was water and cement!

07 Grass trees were recovered from another site that was due for clearing.

08 Recycled timber used as decking within the landscaped areas.

09 Local recycled sand was used for site fill. This is sand normally going to landfill, except it has been separated at a recycling processor for re-use elsewhere.

10 Gabions used limestone from excavation work. All limestone rock came from the original site and the building site next door. This significantly reduced the amount of travel involved, thereby reducing CO^2 emissions.

11 Sandstone paving – off-cuts of Kimberley quartz – were used. This produces a much lower carbon impact than using virgin material.

12 Termite reticulation system installed to reduce use of toxic chemicals.

Internal features

13 Concrete slabs installed with black oxide and thickened to 200mm along the northern edge of living areas to retain and release winter solar heat.

14 Use of R2.5 and R3.0 local Albany wool insulation in walls and ceilings, and R2.5 air cell roof insulation. Wool insulation has thermal advantage when compared to other insulating non-natural fibre materials. This reduces the carbon footprint because it is naturally grown and also the health risks associated with fibreglass insulation.

15 Skylights for cross ventilation and to naturally light up bathroom areas to reduce power costs.

16 Cross ventilation opportunities have been maximized to reduce power costs.

17 Timber framing is local plantation pine.

18 Use of lightweight concrete sheeting – 50mm thick (V Panel) in upper floor substrate to improve acoustics and insulation.

19 High performance low emissivity glass (Low-E) provided to all windows to reduce heat gain in summer and heat loss in winter.

20 Fans installed in bedrooms for low energy night time cooling.

21 Use of Low VOC paints throughout, which reduces off-gassing, giving better internal air quality.

22 All cabinets have a low VOC E-Zero chipboard sub-straits, giving better internal air quality.

23 Natural stone was used for bench tops.

24 Use of natural timber veneer finishes using local jarrah.

25 Increased livability using universal light switches for ease of turning on switches, universal easy use tap fittings, and wheelchair accessible toilets on the ground floor.

26 Large commercial grade sliding doors and windows to full 2.7m ceiling height allowing for improved indoor outdoor enjoyment. Commercial grade is designed to withstand more use and is therefore more robust.

27 Full floor to ceiling high internal doors.

28 Quality European appliances for longer life with high water and energy savings when compared to standard products.

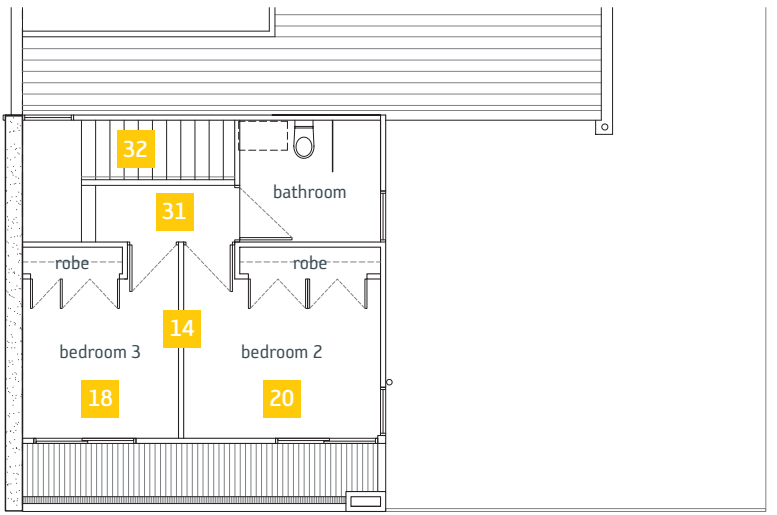
29 Use of LED lights throughout to considerably reduce power consumption.

30 Hidden picture railing along full length of internal rammed earth wall, allowing for the enjoyment of pictures without damaging the rammed earth wall.

31 Use of recycled floorboards from previous house for upper floor.

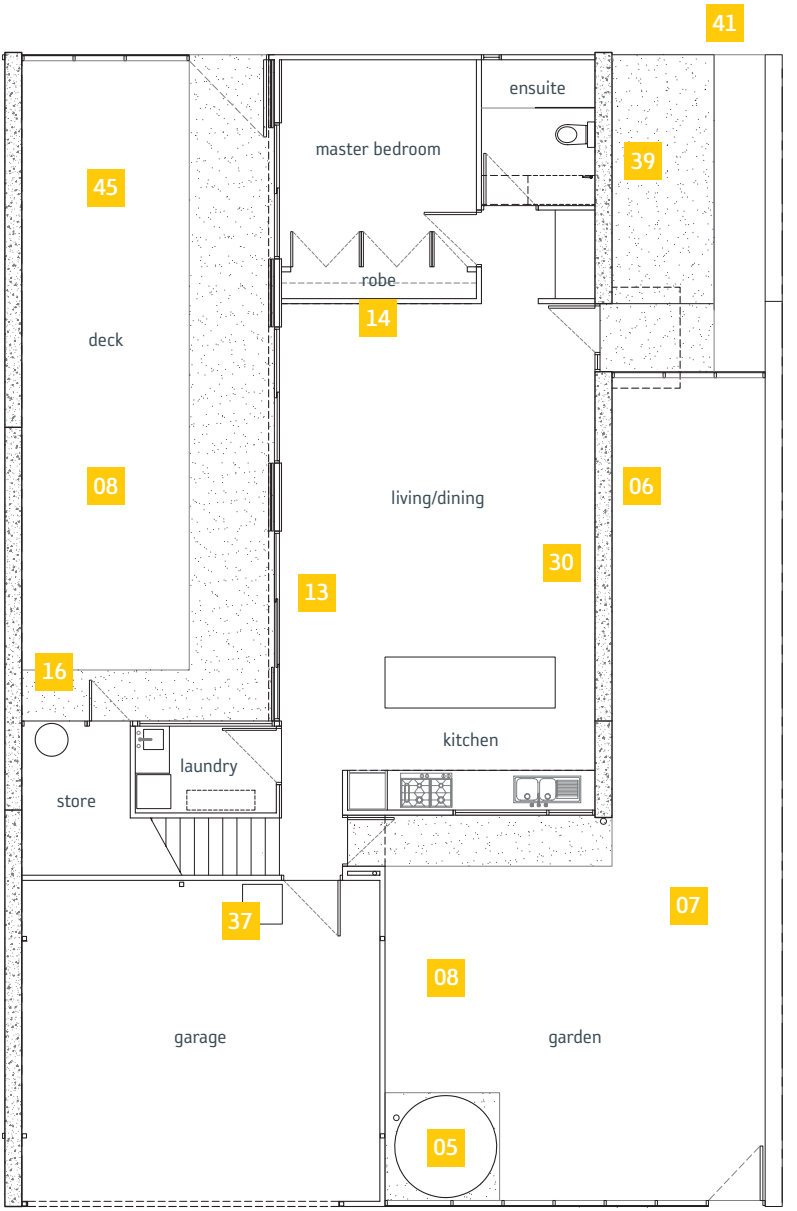
32 Use of recycled jarrah from Perry Lakes stadium for staircase.

House A
58 Stevens Street Fremantle



Upper floor

N



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Ground floor

Water

33 Double plumbed sewerage to allow for grey water retro-fitting.

34 All showers have a 4 star water efficiency rating.

35 All dual flush toilets include rainwater harvest and re-use to all toilets.

36 Low water use landscape, use of drippers and local low water usage plants.

NOTE: Dual plumbed pipe work for grey water system has been installed. Awaiting change in legislation – currently not enough garden due to proposed occupancy.

Other features

37 Each house has a wine/food cellar installed in the carport – 2400mm deep by 1800mm wide. Access is by ladder and the cellar is lit. Wine racks included.

38 Productive garden beds and communal fruit trees/herbs on the driveway.

39 Renowned artist Mark Grey-Smith designed aluminium gates and the number 58 artwork.

40 Security lighting for driveway and walkway.

41 Separate guest entrance with intercom.

42 Honed and finished black concrete floor to garages as future home office.

43 Relocated Dracena draco in Unit D was saved from the previous garden on site.

44 Zero water verges established with local heathland/coastal plants for habitat and year round green. This includes local Fremantle mallee – Eucalyptus foecunda.

45 Deciduous trees in courtyards for summer shade and winter sun.

46 Homes have been planned for multi-generational and potential home office use.

47 Ground floor bathrooms have been planned to accommodate universal facilities upgrade.

Re-use and recycling

A two-bedroom cottage previously occupied this site. As part of a re-use and recycling strategy, the following materials were incorporated into the new houses:

- Original concrete blocks and roof tiles were re-used in the rammed earth walls
- Original timber floor boards were re-used in the new upstairs areas
- The remaining parts of the old house were separated at demolition and sent for processing; include copper pipe, tiles, remaining timber and so forth. Over 95% of house material can be recycled.

In addition, locally sourced recycled timber has been used as decking within the landscaped areas and off-cuts of Kimberley quartz were used rather than using virgin materials. Recycling these materials has significantly reduced the amount of materials that would usually go to landfill. Re-using and recycling materials originally on-site has also reduced transportation which produces CO^2 and other particulates.

Re-use of limestone from site

A large amount of limestone was excavated from the site when the original building was removed for recycling and re-use. The limestone at Stevens Street, and also from the house being built next door, was taken a short distance off-site and then returned for use in the outdoor areas during landscaping. The limestone that wasn't put back onto the site was used in other local Earthcare Landscaping projects. Typically most limestone from similar sites is sent to landfill so the re-use of materials represents a large saving in transportation and CO^2 emissions.

Sand fill recycled

Fill sand was used for earthworks to raise up levels as required for construction. This was sourced from a reputable, local recycling processor. This sand was generated from the recovery process of construction and demolition material that is normally sent to landfill.

Builder's waste material recycled

By using Earthcare Recycling's unique builder's waste disposal system, up to 80% of builder waste was recycled rather than going to landfill. The system involves the use of specific purpose 1.5 and 3 m^3 bins (see photo below) and provides for a cleaner, safer development site. Additionally, over-ordering of construction materials is currently a problem in Western Australia and the builders at Stevens Street were under instructions to be extremely conscious of this, thereby reducing waste in the first instance. Using the Earthcare Recycling system the off-cuts of metal, timber, cardboard and gyprock were all sent to local recycling companies rather than to landfill.

Photos: Earthcare recycling bins at use at Stevens Street

It is estimated that approximately 35 tonnes of waste is produced from each typical (brick and tile) house built in Western Australia. Business as usual would equate to 4 x 35 tonnes of waste = 140 tonnes of waste from a project of this size. For every tonne of waste that Stevens Street diverted from landfill, 0.4 tonnes of greenhouse gas (GHG) was saved. **This equates to 140 tonnes x 0.4 tonnes GHG = 56 tonnes of greenhouse gas saved in this project.**

The recycling and re-use strategies used at Stevens Street have contributed to impressive CO^2 savings!

This unique recycling system is gaining greater market acceptance as developers, builders and the consumer seek more assurance that what is said to be recycled actually is!

Life cycle assessment

A Life Cycle Assessment has been carried out on the proposed design, calculating the carbon emissions due to materials manufacture, materials transport, building construction, building maintenance and building operations. The boundary of the assessment includes the building foundations, floors, walls, roof, internal finish, external finish, services and basic fittings. The results measured against a benchmark are summarised below:

Building Materials:
134 kgCO^2e per occupant per year.
Saving of 73%

Transport, Assembly and Maintenance:
144 kgCO^2e per occupant per year.
Saving of 34%

Building Operations:
-286 kgCO^2e per occupant per year.
Saving of 112%

Total Building:
Zero kgCO^2e per occupant per year.
Saving of 100%

EARTHCARE
DEVELOPMENTS

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