# The design process

**Every design process is unique, and this generic step-by-step guide to the design process is indicative only. The number of steps varies depending on the complexity of the project and whether you're building a new home, renovating or simply making a few small home improvements.**

For an overview of the entire process of building or renovating a home, read this article in conjunction with *Preliminary research* and *The construction process*.

*Your Home* is immediately relevant to anyone designing and building a new home, and it can guide renovations and additions. (see *Planning home improvements; Renovations and additions; Repairs and maintenance*)

If a plan house is your preference, *Buying a home off the plan* shows which design features to look for. You can usually customise your design to some extent.

If you're buying an apartment, *Buying and renovating an apartment* indicates the features to look for and how to renovate or make small improvements.

## Step 1: Preliminary research

This first step is explained in detail in *Preliminary research*, which covers:

- examining your current home and lifestyle
- developing your design brief
- deciding your baseline budget
- exploring sources of professional advice for each stage of decision
- familiarising yourself with the advice in this guide to inform your brief.

## Step 2: Choose your designer

*Choosing the right designer for your project is arguably your most important step on the path to your new home.*

Engage a designer based on their experience, qualifications and demonstrated capacity to deliver the type and style of home described in your brief and for your climate zone. Make sure you sight their professional indemnity insurance. Seek references from previous clients and, where possible, visit homes that the designer has completed.

### Architects and building designers

Designers fit into one of two main categories: architect or building designer.

In Australia, architects are state-registered and regulated, and the legislation governing them varies from state to state. To gain registration under the Architects Accreditation Council of Australia, a person must hold a recognised degree in architecture or demonstrate equivalent qualifications, undertake a period of experiential training and pass a practice examination. To remain registered, architects must hold appropriate professional indemnity insurance and undertake regular continuing professional development.

Regulation and registration of building designers also varies between states. Building designers are state-registered in Tasmania, Queensland and Victoria. They are moving toward national accreditation in other states and territories through Building Designers Australia. NSW and South Australian chapter members are accredited through an internal process. Registered or accredited building designers in all states are required to carry professional indemnity and undertake and report continuing professional development to remain accredited. The range of services offered by building designers varies significantly. Many hold architecture or other specialist design degrees; others are qualified drafting professionals who establish their own practices after many years of experiential learning.


Steve Wray and DSWEPaC

# Before you begin
## The design process

Designing for sustainable outcomes remains an underdeveloped skill in many design practices. Some designers claim that they don't apply the principles in *Your Home* because there is no consumer demand, but this is changing rapidly. Many architects and building designers now specialise in sustainable practice. Seek out a designer with specialist skills in this field to achieve high quality, cost-effective outcomes.

Designers usually coordinate a team of specialist consultants (e.g. geotechnical engineer, structural engineer, building sustainability assessor, sustainability consultant, interior designer and landscape designer). Obtain references for any nominated consultants to ensure they have the capacity to deliver consistent, professional results in your climate, region and local government area.

You may want to delegate all of the design decisions for your home to the designer and consultants; you may want to be fully involved throughout the process. In either case, discuss your level of involvement with designers before appointing one. Levels of client involvement in the design process are a common source of disagreement between the parties. Choose a designer who is prepared to work the way you want to.

Your working relationship with your designer is critical. Over-involvement can limit the designer's ability to deliver the best solutions. Under-involvement can give you a home that doesn't satisfactorily meet your brief. Make sure you, the client, are comfortable with each stage and check it against your brief before moving on to the next stage.

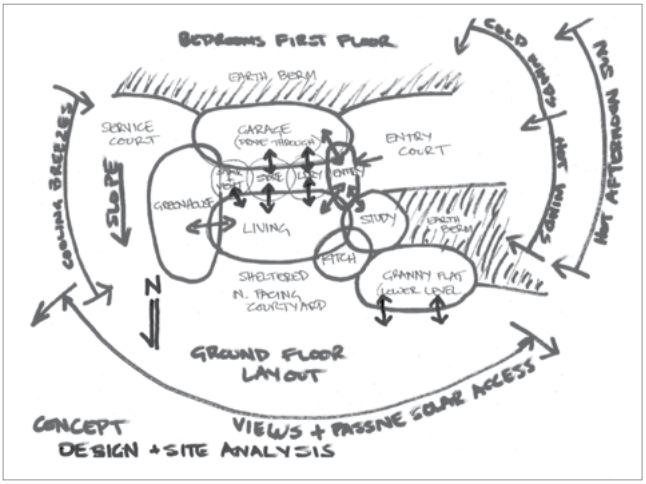
The complex planning controls of many local governments can have far reaching impacts on your design solution and must be negotiated. Your designer should have a sound knowledge of these planning controls and a good working relationship with the local government authority. Otherwise, they should nominate an appropriately qualified consultant to negotiate council approval on your behalf.

## Step 3: Site analysis

Visit the site with your designer to do a 'SWOT' analysis (strengths, weaknesses, opportunities and threats). This is your first opportunity to work with your designer to see if your objectives align. It can take the form of a paid consultation or can be part of the design contract outlined in the next step.

On the site, consider:

- climate responsive design and site specific variables
- orientation
- cool breeze access
- solar access




Source: Suntech Design

The designer can make a concept plan and site analysis after the first site visit.

- views
- overshadowing by landforms, trees and buildings (site survey)
- slope (site survey)
- soil type (geotechnical report)
- bushfires risks
- stormwater drainage
- access and transport
- services (power, gas, phone, water, sewer).

*Choosing a site* has more information.

On completion of this initial consultation/site visit, have your designer value-add to your brief by identifying possible design solutions that capitalise on the site's strengths and opportunities, and overcome its weaknesses (e.g. poor solar access) and threats (e.g. slipping soils, fire risk or flooding).

Analysis at this early stage of climatic influences can identify how your site's microclimate might vary from the generic climate zones outlined in *Your Home*. (see *Design for climate*)

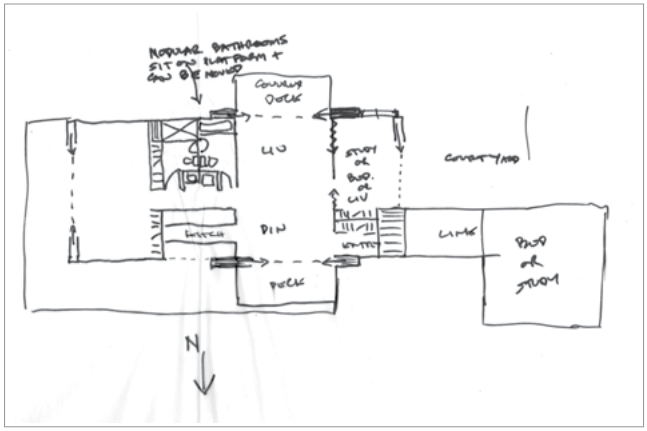
Compare your designer's recommendations to those in *Orientation*, *Passive heating* and *Passive cooling*, and ask for clarification if you're unsure.

### Tip

Your designer's advice is likely to be limited if they aren't paid for it. Negotiate a set fee for this initial advice to gain a more comprehensive preliminary analysis and a detailed fee proposal for your project.

As a rule of thumb, expect the cost of full sustainable design and working drawing documentation for a new home to be 3–6% of the total budget, and more if project supervision is included. A good designer who produces a space efficient and climate-responsive home can save you at least as much as the cost of their fees, by helping you reduce upfront construction costs (through efficient use of space and materials) and ongoing energy costs (through climate-appropriate design). Good design is a smart investment.

*Good design is a smart investment.*




Source: Suntech Design

The first plan of your new home may emerge on the 'back of an envelope'.

## Step 4: Brief development, fee proposal and design contract

If your design contract was not signed earlier, it is usually signed at this step. If you are unable to proceed to contract confidently after discussing the designer's site analysis and fee proposal, consider seeking an alternative opinion from another designer.

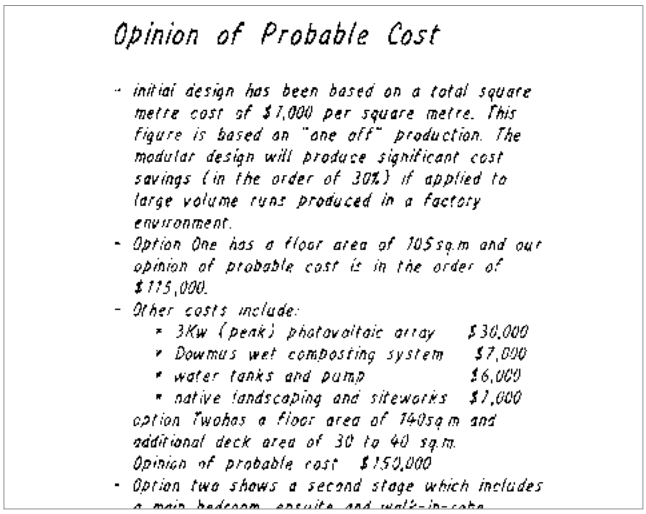
The brief you began in the preliminary research stage remains a 'living document' that is frequently updated throughout the design process as a record of your agreed decisions. It should also form the basis of the designer's fee proposal. Annex both to your contract with the designer.

Beyond providing an 'opinion of probable cost' that typically includes a range of likely costs, designers generally don't accept responsibility for the final cost of your project due to the enormous range of variables beyond their control. Buying off the plan can increase budget certainty but reduce design flexibility.

*Review your preliminary budget and your brief with your designer.*

Ask your designer to review your preliminary budget in light of your brief to identify potential problems and suggest strategies to deal with them. Designers generally work within a range of costs per square metre. Size is the major determinant of cost but other variables include preliminaries (e.g. council, geotechnical and engineers fees), site difficulty (e.g. slope, access, fire hazard, wind exposure), the construction system used, number and size of wet areas (bathrooms, laundry and kitchen), services (cost of water, sewer and energy supply) and access (e.g. drive construction, materials transport distances, travel times for trades).

Your designer should provide indicative costs for each sustainable feature in your brief and recommend additional ones that may be relevant for your site or climate. Apply life cycle costing to each item. In many cases, savings on utility bills exceed the additional costs, and often mortgage repayments, for these features. You will be saving money from the day you move in. 'Quarantine' these costings in your budget from the outset to ensure delivery at the end. (see *Affordability*)



Opinion of Probable Cost

- initial design has been based on a total square metre cost of $1,000 per square metre. This figure is based on "one off" production. The modular design will produce significant cost savings (in the order of 30%) if applied to large volume runs produced in a factory environment.
- Option One has a floor area of 105sq.m and our opinion of probable cost is in the order of $115,000.
- Other costs include:
  - 3Kw (peak) photovoltaic array $30,000
  - Dowmus wet composting system $7,000
  - water tanks and pump $6,000
  - native landscaping and siteworks $1,000

option Twohas a floor area of 140sq.m and additional deck area of 30 to 40 sq.m.
Opinion of probable cost $150,000

- Option two shows a second stage which includes

Source: Suntech Design

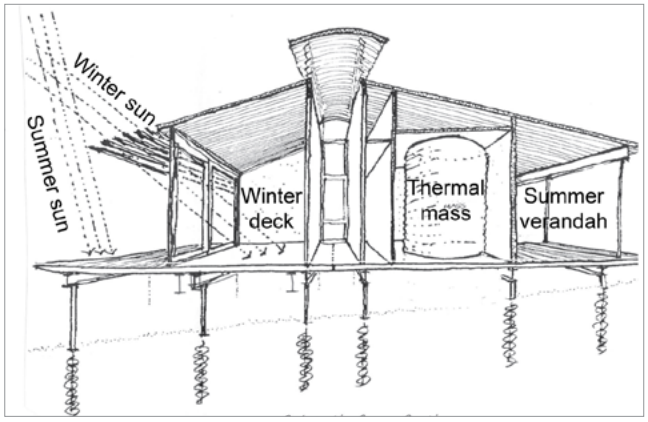
The designer can estimate the probable cost of the concept.

Each subsequent update to the brief should be agreed to and signed off by both parties as a variation to the contract.

## Step 5: Concept designs

Designers often prepare several concept designs to communicate their thinking and allow you to assess them against your brief. They can range from a simple bubble diagram sketch on the back of an envelope, through to hand drawn concepts of form and spatial arrangements. Analyse them in light of the information in the *Passive design* articles that apply to your climate

zone and raise any questions with your designer. (see *Design for climate*)




Source: Suntech Design

Concept designs can help make initial sustainability choices.

Concept designs should consider construction systems but not lock them in unless they are a fundamental component of your brief. The choice of high or low mass materials and the amount of mass required in floor, walls or roof to achieve thermal comfort varies depending on other design decisions including glass to mass ratios and heating and cooling systems. (see *Thermal mass*)

Input from a building sustainability consultant or assessor can be very useful at this stage to ensure that every opportunity to achieve high level thermal performance is locked in while the design is still very flexible.

## Step 6: Design development

Through discussion with your designer, choose the concept design that best suits your needs. The designer then develops the concept into a preliminary layout. More than one concept can be developed in this way but each additional concept developed may increase design fees.

This important stage usually includes preliminary room arrangements, window opening sizes and orientation, indication of indoor–outdoor flow, furniture layouts and preliminary choice of construction systems. Spend time visualising your household living in the design at this stage. Revisit your analysis of your current home. Have problems been overcome? Have new ones been created?

The decision-making process for materials selection also progresses during this step as external and internal finishes are considered. Take this opportunity to identify sustainably sourced materials with low life cycle environmental impact. (see the section *Materials*)

### Tip

To help with visualisation of views, breeze and sunlight entry, consider making a simple cardboard model of the design with cut-out windows and place it on your site at different times of day and season. Make it yourself by gluing your designer's plans and elevations onto cardboard, or ask them to make a model for you.

Construction costing is based on a rate per square metre, as is the cost of heating and cooling your home. The larger the home, the more it costs to build and operate. Reducing the size and reallocating that budget to sustainable features is an important focus during this stage of design. Trimming just a few square metres from each room can pay for double glazing or a photovoltaic array.

*The larger the home, the more it costs to build and operate.*

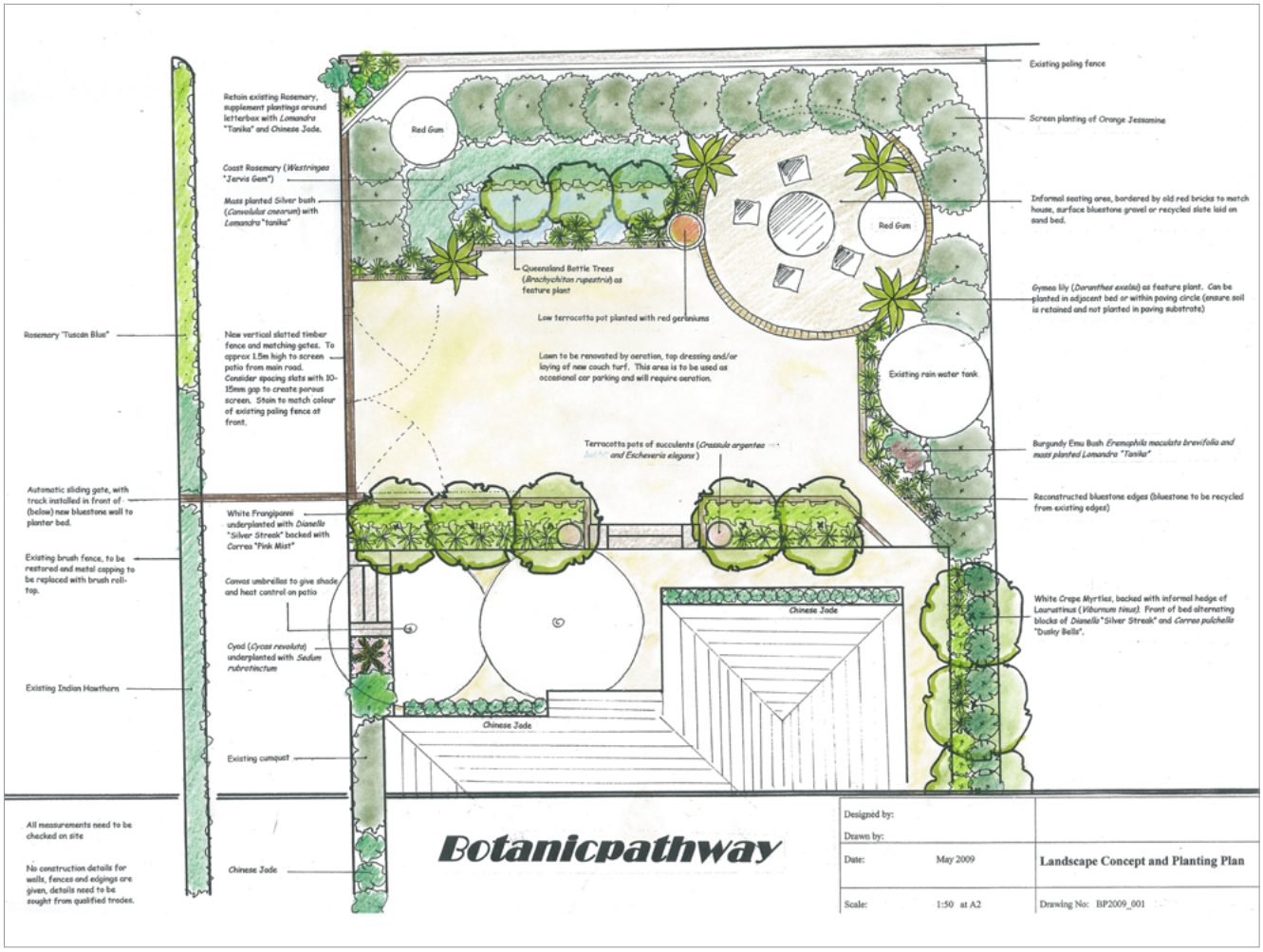

Size does matter — a smaller house saves in many ways

Measure each piece of furniture (new or existing) you intend using in your home and ask your designer to draw and print them at scale so you can cut them out and experiment with various layouts on the concept plans. You can visualise how your family might live in the house and identify any problems — particularly oversized spaces. Make a detailed list of your storage requirements. Add each list to the brief and check each one off before signing off on the final design.

Computer-based building design and modelling tools, such as house energy rating tools like AccuRate, BERS Pro and FirstRate5, can predict environmental performance and model the thermal performance benefits of window numbers, size, placement and orientation as well as various mass levels in different construction systems (see www.nathers.gov.au). Complete this analysis before finalising your design and choice of construction system. Later solutions or changes may be expensive.

Prepare your landscape design at this stage. Landscaping makes many critical contributions including shading the building or windows, diverting breezes, ensuring privacy, creating delight and saving water. (see the appendix *Landscaping and garden design*; the section *Water*)

It is common for designers to discuss the proposal with council planners and inspectors at this stage to identify any issues requiring resolution.




Source: Botanicpathway

A landscape designer can add shade, character and delight to your home.

## Step 7: Final design

Make your final design and selection decisions of the following matters in light of advice from the relevant *Your Home* article:

- floor plan and building form (see the section *Passive design*; the appendix *Streetscape; The livable and adaptable house*)
- construction systems (see *Construction systems*)
- window type, size and orientation (see *Glazing*)
- shading solutions (see *Shading*)
- external finishes (see *Construction systems; Cladding*)
- heating/cooling system (see *Heating and cooling*)
- major appliances (see *Hot water system; Renewable energy*)
- water systems, e.g. rainwater tanks and water recycling (see the section *Water*)
- landscape design (see the section *Water;* the appendix *Landscaping and garden design*)
- interior design and finishes (see the appendix *The healthy home; Lighting*).

> *This stage is often the greatest test of commitment, for both you and your designer, to achieving an environmentally sustainable home.*

Final design is often when budget overruns become apparent and cost reductions are then made. This point is usually the single greatest threat to the environmental sustainability of your home because sustainability features are often considered 'optional' and eliminated in the trade-off process even though they may have relatively low cost.

These trade-offs are best managed by dividing your project into stages. Features you don't need right away can be built or added later. Include the sustainability features at the start and reduce your bills from the day you move in. These features are usually less expensive to incorporate in the initial build than to add later. Additional spaces or rooms designed into a total concept at the outset can be added cost effectively when future finances allow.

> *Changes made after this stage has been signed off will likely add to design costs.*

When both parties are satisfied with the design, submit the final design drawing to council for planning approval before design detailing, if a staged approval process is desirable. This approach can accommodate design changes required by council more cost effectively. The alternative approach (combined planning and construction approval) is more expensive if council requires design changes, which need to be made to both sets of drawings.

## Step 8: Council approval — Planning and/or construction certification

Straightforward designs on sites that are not subject to stringent planning controls are commonly submitted to council for simultaneous planning and construction approval. One set of plans can address both planning and construction detailing. For more complex designs that challenge the standard approval process, separate submissions can be advantageous. These challenges are often associated with oversized developments that impact on neighbouring views or amenity, or are out of character with the surrounding neighbourhood. (see the appendix *Streetscape*)

A statement of environmental effect is commonly required at planning approval stage. This generally seeks an undertaking that your development will have no adverse impact on the local environment and often has a detailed checklist of items to be addressed.

Many of these items are addressed in *Your Home* articles, which contain links to further reading that helps complete your statement of environmental effect. (see the sections *Energy* and *Water*; the appendices *Streetscape; Landscaping and garden design; Sediment control* and *Noise control; Transport; Wastewater reuse; Waste minimisation*).

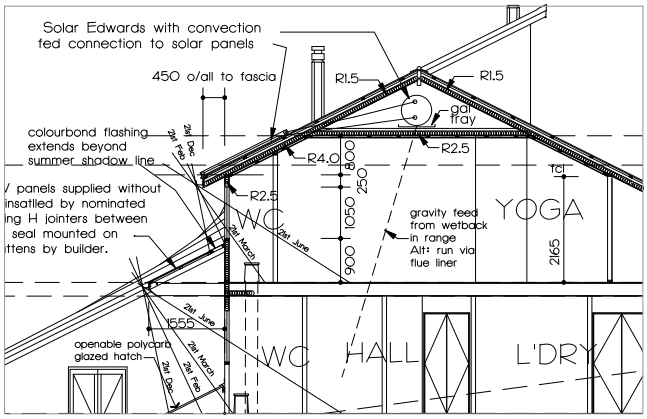
## Step 9: Design detailing

In this stage, design and construction details are finalised and documented. These documents typically include:

- working drawings (details of how the design is to be built)
- a specification of the materials, standards, finishes and products to be used
- NatHERS (or BASIX in NSW) rating
- engineering design and certification.

They (or more detailed versions) are also given to builders when they are invited to tender for the work and form the basis of your contract with your builder.

Final schedules of materials and quality of finishes are documented in the specification by reference to Australian Standards, industry definitions of practice and desired outcomes that are not noted on the plans. Specifications are critical to achieving sustainable outcomes because it is here that sustainable inclusions, practices and finishes are spelled out and linked to the contract.




Source: Suntech Design

Working drawings are used by the builders to tender for the job.

**Specification**

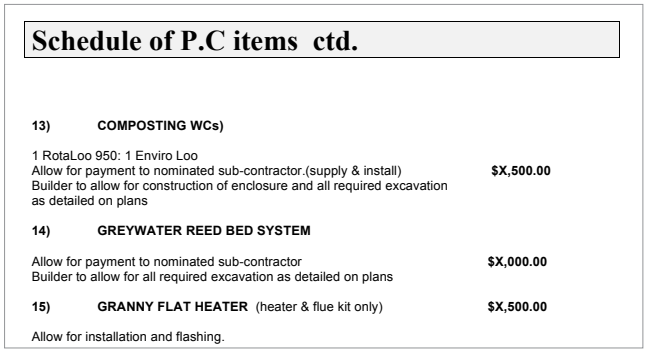
**Proposed new home for:**

**Client**
**Address**

Plans and specifications prepared by:

**XXXX Design**

**Contact details**
**ABN**



**Schedule of P.C items ctd.**

**13) COMPOSTING WCs)**

1 RotaLoo 950: 1 Enviro Loo
Allow for payment to nominated sub-contractor.(supply & install) **$X,500.00**
Builder to allow for construction of enclosure and all required excavation as detailed on plans

**14) GREYWATER REED BED SYSTEM**

Allow for payment to nominated sub-contractor **$X,000.00**
Builder to allow for all required excavation as detailed on plans

**15) GRANNY FLAT HEATER** (heater & flue kit only) **$X,500.00**

Allow for installation and flashing.

Source: Suntech Design

Specifications support the working drawings.

Specification writing for sustainability is a relatively new skill, and many designers fail to adequately address important items, practices and standards. Builders often claim that they don't use environmentally preferred materials and practices because their competitors underquote them by using inferior, unsustainable products or by talking consumers out of features such as double glazing, solar hot water and best practice thermal comfort inclusions.

To level the playing field, specify sustainable practices, clearly and unambiguously, in tender documents and draw these (currently) atypical clauses to the attention of tendering builders.

The next stage is the tendering process with builders. (see *The construction process*)

## References and additional reading

ACT Planning and Land Authority. Design and build. www.actpla.act.gov.au

Association of Building Sustainability Assessors. www.absa.net.au

Australian Institute of Architects. www.architecture.com.au

Australian Institute of Building Surveyors. www.aibs.com.au

Australian Local Government Association. www.alga.asn.au

Building Commission Victoria. www.buildingcommission.com.au

Building Designers Association of Victoria. www.bdav.org.au

Building Designers Australia. www.bdaa.com.au/ (follow links to relevant state chapter)

HIA GreenSmart professionals listed by postcode: http://tradebuild.com.au

Home Design Directory. Construction cost calculator. www.homedesigndirectory.com.au

Master Builders Australia. www.masterbuilders.com.au

MyDesigner. www.mydesigner.net.au

New building cost guides. www.cordellestimating.com.au/costguides

Northern Territory Department of Lands, Planning and the Environment. www.dlpe.nt.gov.au

NSW Department of Planning and Infrastructure. www.planning.nsw.gov.au

Queensland Department of State Development, Infrastructure and Planning. www.dsdip.qld.gov.au

South Australian Department of Planning, Transport and Infrastructure. www.dpti.sa.gov.au

Sustainability Victoria. www.sustainability.vic.gov.au

Tasmanian Infrastructure and Resource Information Service (IRIS), Planning and Development. http://irisp.dot.tas.gov.au

Victorian Department of Planning and Community Development. www.dpcd.vic.gov.au/planning

West Australian Planning Commission. www.planning.wa.gov.au

## Author

Chris Reardon, 2013