Process and principles of renovation

by Jeremy Spencer

A renovation, even more than a new build, takes a consideration of ESD principles, structure, and costs, applied thoughtfully and imaginatively to the client brief to make the most of what an existing home has to offer. It can be thought of as a puzzle where the pieces connect on a myriad of considerations: layout, materials, energy, cost, function, health, beauty, legislative compliance. Unless the piece under consideration fits many of the principles it is unlikely to be the right answer. Designing a sustainable renovation is an artful game, and like a picture puzzle there is an overwhelming satisfaction when you find the piece that just fits beautifully.

So how is the puzzle solved? There is not a one-size-fits-all approach, as each job has different constraints. Over time I have refined the following strategy:

- Following a process for cost effective design performance
- Being informed in our design responses by principles of environmental design

The process

It is important to be objective in seeking cost effective design performance.

1) Understand the brief

Design is about improving the human condition, and poor responses inevitably lead to churn of housing stock and waste of resources. The designer must get inside the heads of the occupants to understand what they are after, and why they are after it. Understanding motives gives much more flexibility when considering a design response, and flexibility is what you need most when working with the constraints of an existing structure.

2) Understand existing conditions

The great advantage of renovation is that the existing house has a history - find out all you can. Owners can have a wealth of information so mine their knowledge! Which rooms are too cold or too hot? What direction do the summer breezes blow from? What materials are in good condition and can be re-used? What do they love about the existing house? Where are the important memories located? What renovations have been done over time?

3) Understand the structure

How is the roof constructed? Where are the loads supported? Is the subfloor sound? Are there cracks and why? What parts of the existing building can be relied upon and what will need demolition or TLC if retained? Where do the services run? Lack of knowledge when doing renovations leads to budget blowouts.

The principles

Creation is always a fluid process. There are no fixed 'rules', just the principles to be followed and to be weighed as appropriate to the needs of the job and the client. The following principles should be considered during the design process. Not every principle can be applied in every job, and the designer will set priorities according to the job. If multiple principles aren't ticked by a decision or selection, think again, as it is unlikely to be the optimal solution.

- **Create beauty –** An ugly building will not last long. Take time to make your solution artful - if not a work of art. Be imaginative.
- **Retain existing structure –** Remove as little of the existing structure as necessary to fulfil the brief.
- **Re-use and recycle –** There is nothing better than parts of the house that carry a story. Reused materials not only tick numerous environmental boxes, but importantly bring a history, and hold memories that can give a house soul and grounding, locking it in to a human narrative of time and place.
- **Use new to complement old –** Does the existing building get too cold, or too hot? New additions can be designed to compensate for the shortcomings of the existing. For instance, a warm air transfer duct can move heat from new warm rooms to cold existing rooms, and vice-a-versa.
- **Be cost effective –** The Pareto Principle holds that 80% of the effects come from 20% of the causes. This rule holds well in sustainable design – especially during renovation. We are after best bang for the green buck. For example while Passiv Haus air tightness may be a valid aim, it is usually not cost effective for a renovation. Instead spend ¼ the amount, gap seal and insulate the major culprits, reap 80% of the benefits and spend the savings on other areas.
- **Insulate new and old –** Insulating new sections is a no brainer. Whilst a reliable rule of thumb for a cost effective renovation is to focus on the area of structural works and touch other areas as little as possible, insulation of the existing building should not be neglected, including gap sealing

and weather-stripping. They are almost always the most cost effective way to make significant improvements to existing structures.

- **Infuse with winter sun –** The secret to high passive performance in cool to mild climates is infusing winter sunlight to as many rooms as possible. An added benefit is brighter, healthier homes with more connection to the outdoors!

- **Mass up –** Mass almost always improves temperature stability and performance, except in the Top End. Choose low embodied energy mass options, or performance gains may be negated by high embodied energy. Demolition often liberates bricks which can be re-used, or external brick walls that can often be internalised when extra rooms are added.

- **Invite cool summer breezes –** Make breeze paths in line with prevailing summer sea breezes or cool winds. It's free cooling, enough said.

- **Keep air clean –** While there can be dangerous materials in existing homes such as asbestos and lead paint, these are usually only dangerous when disturbed. Existing materials will have off-gassed most of their VOC's in the first decade of their life, so retaining existing materials may be better for indoor air quality.

- **Specify 'green' –** Choosing more low impact and healthy materials not only maintains the integrity of the project, it sends important market signals influencing broader societal change, beyond the boundaries of the project

- **Use House Energy Rating software as a design tool –** Once a design response has been created through the principles above, submit it to an energy rating expert while the design is still fluid. It is at this stage in the process that the rating tools have their greatest leverage. Improvement strategies and material choices can be costed for effectiveness, and the design tweaked to make the most of the renovation, turning a good passive design into a high performing home.

The decision to renovate or knock down and rebuild is a very important one, as extending the life of a core structure can have so many sustainability and societal benefits. Using the knowledge of these two highly experienced practitioners will assist in getting it right. (Refer to their showcase in Part 6).

ABOVE / Intelligent use of recycled, renewable and low VOC materials - recycled Karri handrail, bamboo stair threads, formaldehyde-free strawboard & low VOC paint comes together in this stairwell. *Credit/ Simon Black*