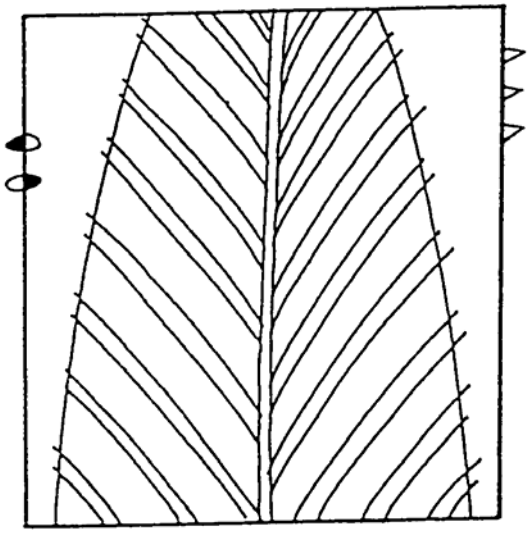
AVOIDING CONSTRUCTION WASTE



Waitakere City Council
Te Taiao o Waitakere

Contents

This chapter is part of the Waitakere City Council's Sustainable Home Guidelines. The complete set can be obtained through most libraries or from the Waitakere City Council, Private Bag 93109, Henderson, Waitakere City 0650, New Zealand, phone (09) 839 0400, email: info@waitakere.govt.nz.

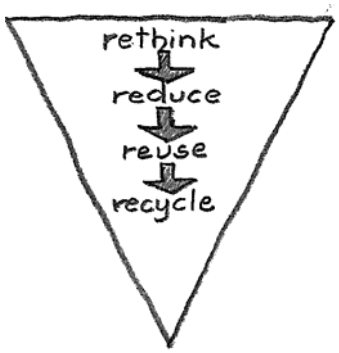
The guidelines are also available on the council's web site: http://www.waitakere.govt.nz

What is waste minimisation?

You can save yourself money and reduce your impact on the environment by considering resource use and waste generation during the design phase of a building project. The cost of waste is not just the disposal cost of getting the waste skip collected, it is the cost of the original raw material, plus the labour time wasted on it, plus the disposal cost. Additionally the lifecycle of the building should be considered: what happens at the end of the building's life? Future uses, flexibility of design and deconstruction also have a solid waste impact on the environment. In New Zealand waste generated from the construction and demolition sector accounts for around 26% of waste to landfill, and is estimated at around 50% of waste generated overall when volumes to cleanfill are taken into consideration.

Waste minimisation is about commonsense and a change of attitude, rather than new technologies. Often waste minimisation options cost nothing to implement and give benefits straightaway with little or no effort. This chapter offers tips that can help designers, builders and home owners reduce resource waste and cost. For more detailed tools and resources for reducing construction waste, including templates for waste management plans, suggestions for contract clauses and waste transfer forms, visit www.rebri.org.nz (REBRI stands for Resource Efficiency in the Building and Related Industries).

It is important to understand the principles of waste minimisation. The waste hierarchy shown here demonstrates that recycling is actually the last option after rethinking to eliminate the waste altogether, reducing the amount of waste produced, and reusing waste that is produced.



Before you start designing

Study the site

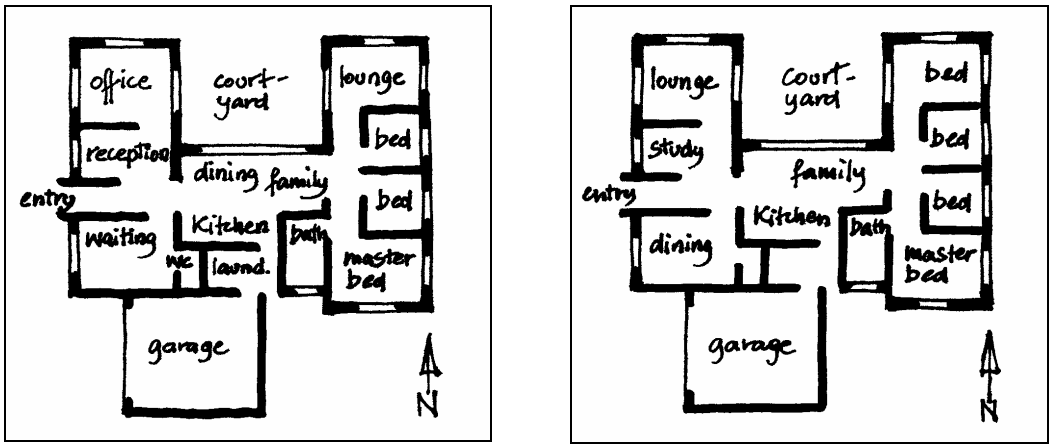
When designing a resource-efficient home, you should first understand the features and limitations of the building site. Record microclimates, wind directions, sun angles, slopes, vegetation and soil types. Also study the wider surroundings, taking note of neighbouring buildings, roads and trees. Make sure the architect or designer visits the site, ideally more than once. Study the site at different times of the day. Think what will change at different seasons.

Question the size of the building

How large do rooms really have to be? How many rooms are needed? Can rooms be used for more than one purpose, such as office and guest-room, or garage and workshop? Smaller buildings use fewer resources and cost less to build. A reduction in floor space gives you the opportunity for greater quality.

Picture the building in 10, 20 or even 50 years' time

How will the use change? With the help of technology, for example, many more people could work from home in the future – you could plan for a home office. Will the materials you have chosen last that long? Will they stay in fashion? By building a flexible home with durable materials, you will not face the costs of future repairs, alterations or even demolition. Allow your home to grow and develop as your household and your needs change.



The Eco-friendly Home – two possible uses

Consult your project team

Involve the entire project team in the design: the owner, the architect/designer, the builder and sub-contractors. Are the things you want practical? How can you tune the design to minimise waste? What works and what does not? By involving everyone, problems can be solved early. The more innovative your design, the more important it is that everyone is empowered to contribute, to understand the objectives, and to avoid misunderstandings. Communication is the key to a successful development.

Research

Talk to many people, read books and trade magazines, and have a look on the internet. Find out about new practices and materials which may reduce wastage. Visit your local demolition yard – second-hand materials and components might offer better quality and character than new ones. Consult third parties, such as the Waitakere City Council. You need to keep up with the constant new developments to make the best informed decisions.

REBRI guidelines and tools

Spend some time researching the REBRI guidelines and tools that are available at www.rebri.org.nz and how they could be incorporated into your project.

During the design

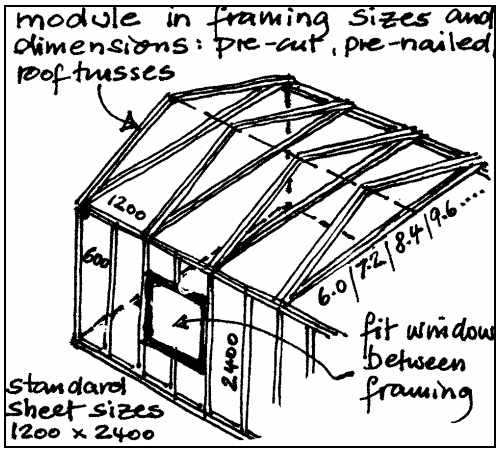
Design buildings in harmony with their surroundings

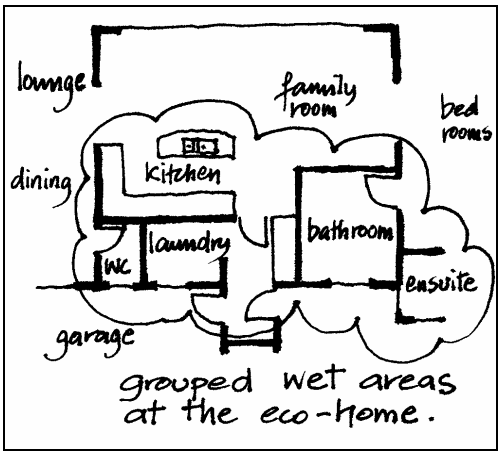
Plan the building to reduce vegetation clearing and earthworks. Reduce driveway length and paved surfaces. Consider piles or poles – especially on sloping sites - to avoid excessive excavations. Reduced disturbance to the land reduces waste and resource use. It also reduces environmental damage and the cost of clearing - usually with expensive machinery.

Consider module sizes in the design

Design room-sizes to co-ordinate with the standard sizes of floor, roof and external cladding materials. In New Zealand many materials are sized as multiples of 600mm, because this is the maximum stud width – standard wall panels, for instance, are 1200mm wide by 2400 or 3000mm high. So if you design to a module of 300 or 600mm, fewer panels need to be cut, they're easier to fit, and there's less waste – the overall cost of a house can be reduced

significantly. You can also arrange window and door spaces to co-ordinate with the layout of studs to eliminate the need for extra studs.





Service efficiency

Group wet areas, such as kitchens, laundries and bathrooms close together and place the hot water cylinder, solar collector, or hot water heat pump centrally in this group. Reduced pipework lengths and sharing of gulley traps, etc, result in major savings. You can also work out efficient circuits for electrical and telephone cabling.

Use pre-fabricated and pre-cut components

Wall framing and roof trusses can be pre-cut, pre-nailed, and delivered as a correctly sized unit ready to be installed. Construction is faster, no waste is generated on site, and resource use is more efficient at the factory compared with a building site, where off-cuts are often dumped or burnt.

Less is more

Design for simplicity and user-friendliness. Find low-technology solutions. Options which require certain occupant behaviour or even training should be avoided. **Why?** These solutions are much less likely to break down or require maintenance; and will be simpler to use. They also cost less and use fewer resources. People might not behave how you expect them to and the occupants will change over time.

Use fewer finishes

Use materials which do not need finishes applied to them. Examples are natural wood ceilings, bricks and tiles, pigmented and densified concrete or plaster, or roofing steel with the colour baked on at the mill. Fewer materials are used and less work is required finishing. Materials that don't require finishes don't require maintenance later on either. Reducing finishes can also mean fewer health and environmental risks.

Consult and plan well

Take all the time you need to plan the project carefully. Talk the design through with your project team and ask them to find ways that use fewer materials and produce less waste. Estimate what wastes will be produced for your project and develop a Construction Waste Management Plan (templates are available at www.rebri.org.nz).

The conventional separation of design and construction is the biggest barrier to waste reduction. A good way to avoid this is to have an intensive brain-storming meeting with all parties involved. Eco-friendly building takes time. Time invested in the planning stage will be paid back during the construction and lifetime of the building. Making changes during or after construction can be very costly.

Document your design

Keep records of the design, including all details. This needs to continue throughout the building process. Where are the water pipes, studs, electrical cables? How much insulation is there, and what type was installed? By whom? When? This "house-book" should stay with the house when ownership changes to make future repairs and maintenance easier and should contain all the appliance guarantees. Less waste is created trying to locate leaking pipes or faulty cables, your consumer guarantee is more enforceable if defects can be identified accurately, and alterations and extensions can be planned more cost effectively. It also means that potential buyers know what they are buying. The asking price can be increased if extra features, such as good insulation, were fitted and well documented.

Design for the future

Use durable, low maintenance materials. Design houses to make alterations and repairs easy through good access. Choose materials and components that can be re-used and install them in a way that allows disassembly – use screws instead of nails. People's needs change, but buildings which can adapt and are durable will be valued for a long time.

Design for green living

Design homes in a way that will make 'green' living easy. Allow space in the kitchen for the separation of recyclables, paper, compostable material, and refuse, and provide room for a compost pile or a worm farm. The way buildings are designed influences the lives of their occupants.

Dealing with contractors

Finding the right people

Negotiate waste minimisation issues before contracts are signed - re-negotiation of contracts later often results in additional costs. If you don't feel that the person understands what you are talking about, find someone who does. One session of briefing all interested bidders can save you time and ensures that all parties have understood the issues. Ask contractors to supply a construction waste management plan with their bid. Use the REBRI tools to assist this process and let prospective contractors know that these tools are available.

Getting them to help you

Ask your contractors for advice about the maintenance of the building. This information should go into the "house-book" with their information and guarantees on the work undertaken. Good contractors have the expertise to provide this information and take pride in their work. Their maintenance advice will help to increase the life-span of the building and assist financial planning for replacement. Guarantees and documentation of their work will assist you and future owners.

The costs and benefits

It is important to cost out waste minimisation options to ensure you are gaining maximum benefit for your efforts. There might be additional costs because of more time spent on the project. Who will carry these? There will also be benefits from the reduction in material waste. Who will benefit, and can these savings be accounted for? These issues should be sorted out before contracts are signed. However, some flexibility is needed because it is a complex, collaborative process and miscalculations may occur.

Why? Unless you know what the costs and benefits are, you will never know if the new methods are viable and who gains the benefits.

The building site

Keep it tidy

Make sure that the building site is kept tidy. There should be a suitable area to store materials – covered if possible. Waste should be separated and recycled or, better still, reused. You could ask suppliers to take packaging back – it is preferable to avoid waste in the first place rather than have to recycle it. Think about your contractors: your site will be their workplace. Could you set up composting/a worm farm for their lunch scraps? Order a kerbside recycling bin for their drink bottles to be there when construction starts and let them know which day to put it out. A tidy site is good for a builder's image – it also means that materials are less likely to be damaged or lost. It's also safer, because workers are less likely to trip over things.

Central cutting areas

If possible, materials should be cut and their off-cuts stored at a central location. It is much easier to re-use off-cuts if you don't have to hunt for them all over the site. This simple technique can reduce waste by 15%.

Reuse temporary works

Temporary works, such as formwork for concrete or scaffolding, should be reused. By selecting more durable materials, such as metal, waste can be avoided. This is particularly useful when building several identical houses. This also includes reusing packaging. Reusable crates are better than plastic or cardboard wrapping.

Ordering materials

Estimate materials correctly and arrange for them to arrive just in time. Materials are often wasted because they are damaged during storage. Do not plan for 10% wastage – if you over-order there is no incentive for the contractor to use resources efficiently. Tell your suppliers that you are keen to reduce waste and ask them not to over-package materials. If you ask suppliers to provide less packaging they will eventually do it through customer demand.

Waste management

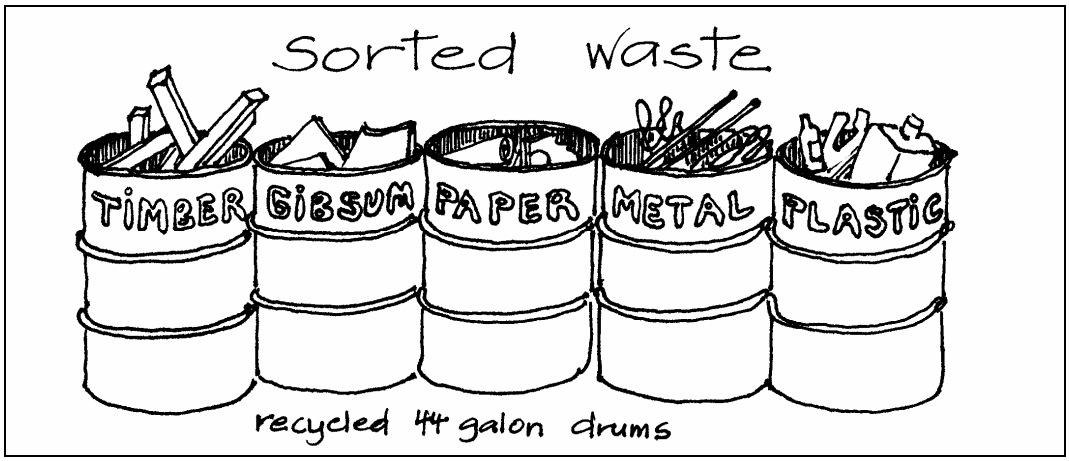
Ask your waste contractor if they will provide a discount if waste materials are pre-sorted for individual collection. Some contractors may supply several small bins to make sorting easier. Another option may be to use a company that sorts waste after collection and on sells recyclable and re-usable materials.

Documentation

It is important that work is documented 'as built' in the 'house-book', with special attention to those details changed from the original plans. Ask contractors to complete the REBRI waste transfer forms and take photos of the site.

Learn from the experience

Visit the building site and ask contractors how they are getting on. Find out what worked well and what didn't. Have a look in the skip to see what materials are being wasted and why. You could do a waste audit, either by separating all wastes into different categories and weighing them, or doing a visual estimate of the percentages of different categories in the skip, to show exactly what is being thrown away. How much money have you saved by reducing waste? Was it worth it? What did you learn? Can you pass on the experience to others?



Further information

Advice at the Waitakere City Council:

Phone the call centre Ph (09) 839 0400	Ask for:	Cleaner Production Eco Design Advisor

On the web

www.rebri.org.nz is the site of Resource Efficiency in the Building and Related Industries. It provides links to waste exchange sites, forms for waste tracking and a complete set of tools and guidelines for construction waste reduction.

www.smarterhomes.org.nz/construction/construction-site-practice/on-site-waste-minimisation/

www.smarterhomes.org.nz is a mine of up-to-date and independent information. Designed for the general public, it's easy to use, has case studies, and includes features such as Homesmarts, a calculator you can use to find information relevant to your needs or simply to run a home-health check.

This chapter was last reviewed in September 2008.

Photocopied on 100% recycled paper.