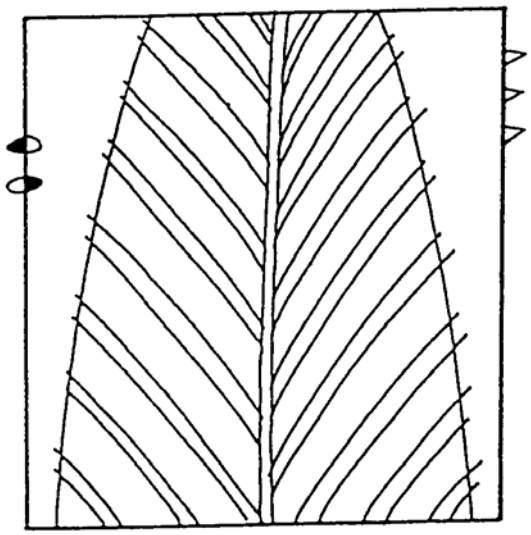
BUILDING IN THE BUSH





Waitakere City Council
Te Taiao o Waitakere

Contents

Guidelines for building in the bush 3

How much bush can I clear on my section? 4

Good communication = good management 5

General methods of tree protection 5

Site stability 6

Design features to maximise benefits of bush-living 6

What about services? 7

Maintaining the natural character of your bush site once the house is built 10

Further work on your property 10

Controlling weeds 10

Looking after the bush on your property 11

Resource consents 12

Further information 13

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

Guidelines for building in the bush

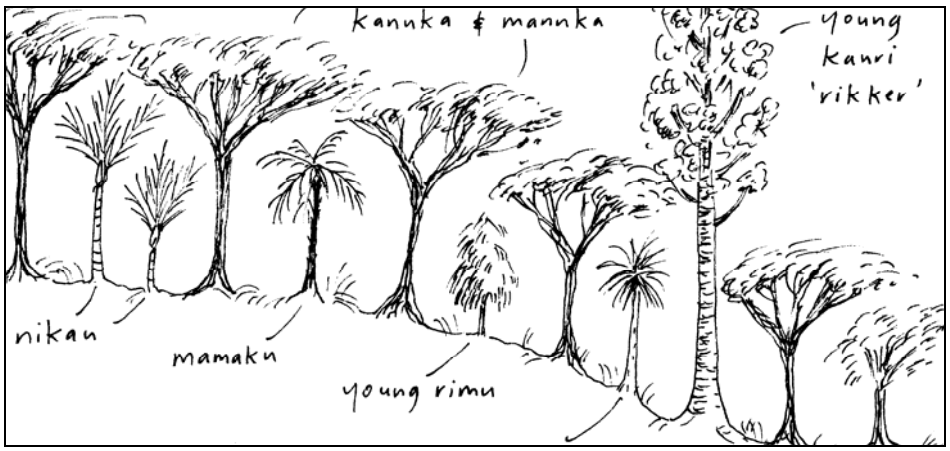
Living in the bush has many benefits which you've already recognised if you're choosing to live there. In New Zealand there are not many places like Waitakere where you can live among spectacular bush-covered hills yet be so close to a city.

While there are some constraints to living in the bush, it's important to realise that these need to be accepted to a certain degree. Imposing a typically "urban" lifestyle on a bush environment is not appropriate. However, many bush-living constraints can be minimised, especially if a little thought goes into planning.

The Waitakere Ranges are home to a wide variety of animal and plant species. Two-thirds of all the native fern species of New Zealand are found in the Waitakeres, as are one-quarter of all native flowering plants. Many of these are rare.

Extensive logging occurred in the Ranges during the 19th and 20th centuries. Kauri, rimu, kahikatea and many other species were milled for timber, leaving very little of the original vegetation.

Even though vegetation is re-establishing throughout some 80% of the Ranges, the forest will take a long time to reach its pre-1800's condition. It is slowly recovering, however, and this can only continue if we minimise our impact.



All natives need to be protected. This means not only large kauri and rimu trees, but also all the small seedlings and other plants, often termed 'scrub'.

Species such as manuka, kanuka and many coprosmas provide vital shelter to enable the seeds of larger trees to germinate and grow. Without the fast-growing understorey plants, species such as kauri and rimu would have a hard time establishing themselves.

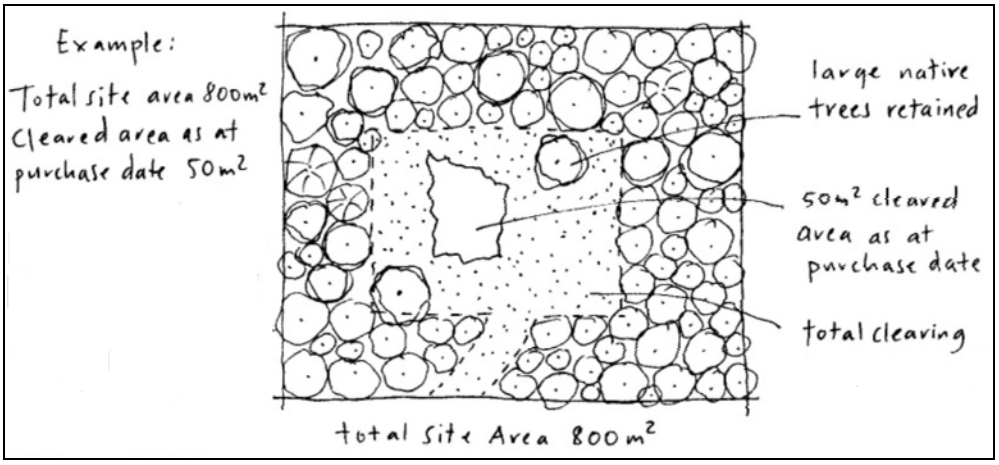
The Waitakere City Council and the local community are keen to protect the special character of the Ranges. This is why the District Plan has rules on vegetation removal. These rules and this chapter will help you minimise the impact of your development on the bush.

How much bush can I clear on my section?

If you're intending to build on a bush site, or any site with affected vegetation, you'll probably need a resource consent to remove it.

Aim to remove only as much as you need to build a house and driveway. Decks are often more appropriate than lawns for outdoor living space in the bush.

The District Plan has rules on the amount of bush you can clear on any site, and generally requires that any already cleared areas are used as part of the development.



When choosing a house site on a bush-clad section:

- Use any already-cleared areas on the site (for the house, driveway etc).
- Completely avoid significant trees.
- Consider building close to the road to minimise the extent of clearance.
- Consider multi-level development to reduce the building footprint and provide elevated living areas for better daylight and sun access.
- Plan for wastewater disposal fields and water tank locations.
- Design the house site to be well clear of significant trees (structures should be well clear of drip-lines).
- Make allowance for the growth of trees, especially those close to the house. Contact with vegetation causes damage to buildings, through reduced ventilation, blocked spouting, prolonged dampness, and abrasion of coatings.
- Site the house so that you won't have to continually prune to retain solar access and keep spouting unblocked.

- Make provision for underground services such as wastewater irrigation fields, power, water, and phone lines. To minimise disturbance to root zones it's often best to locate these along the driveway access.

- Think about the impact building foundations will have on the environment. Consider not using a concrete floor slab unless it's needed for passive solar design (see the *Design for the sun* chapter). Timber pile foundations or pole houses might be more suited to bush sites, especially steep ones, because they need smaller earthworks.

- Before construction, think about minimising disturbance from material storage areas and machinery access.

Good communication = good management

A well-managed site is a successful site. There must be a good flow of information between property owners, architects, project managers, and contractors. Contractors need to know the conditions of a resource consent and be warned to take care when working near protected vegetation. Before work starts, it's a good idea to organise a pre-commencement meeting where all parties get together to discuss the project and in particular the protection of the vegetation to be retained.

General methods of tree protection

Whether you live in the bush or an urban site, if your property has significant trees there are a number of ways to protect them and some general rules for working near them. It is good practice to obtain an arborist's report, and this is often a consent requirement.

Protection of the root zone

Roots are a vital part of the tree, providing anchorage and stability, absorbing water and mineral nutrients, transporting essential substances and storing food reserves. Root systems tend to assume a spreading, pancake shape rather than extending deep into the earth. About 85% of the more important roots are found in the top 600mm of the earth where nutrients are most highly concentrated. A small change in the root zone can cause a tree to lose vigour or die.

Temporary protective fencing

The council usually requires a robust temporary protective fence around all vegetation being retained for the duration of construction. The fencing should create a clear boundary between the construction zone and protected vegetation. There should be no works or storage of materials within the protection zone. Roots are easily smothered and can be damaged by chemicals leaching out from materials discarded on top of them. Machinery – and even regular foot traffic – can compact the soil around roots and cause plants to decline. The position of protective fences can usually be established at the pre-commencement meeting.

Site stability

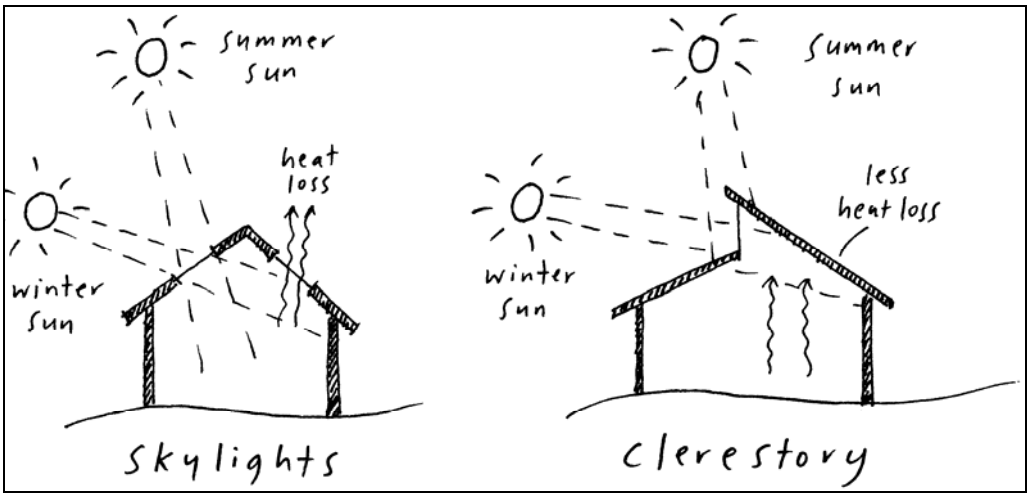
Much of the land in the Waitakere Ranges is stability-sensitive. A geotechnical assessment is often required when developing a bush site. You can find out whether your site has stability issues by getting a Project Information Memorandum report (PIM) or a Land Information Memorandum report (LIM) from the council.

Building foundations with minimal earthworks are preferable in the bush, and keeping as much vegetation as possible on the site also aids stability.

Design features to maximise benefits of bush-living

There are many design options for houses in the bush to maximise light, sun and warmth and minimise dampness. (For a detailed discussion on technical aspects of design features, see the *Design for the Sun* and *Heating* chapters.)

Orienting the building to the sun is fundamentally important, to maximise sunlight penetration. Designing living areas (both indoor and outdoor) in the northern facing parts of the house, for instance, can be the best way to take full advantage of the sun.



Clerestory windows and, to a lesser extent, skylights can help allow more light into the house if it is surrounded by trees. Skylights leak a lot of heat, so they need to be double-glazed and as small as possible. They can also lead to overheating if they're oversized or there are no overhanging trees.

Insulation is very important in helping to reduce heat loss and preventing dampness, especially in houses with reduced thermal mass (pole or pile foundations, for example, rather than concrete foundations – see the *Design for the sun* chapter*).* Insulate walls, roofs and under floors. Fit close-fitting drapes.

Dampness can also be minimised in other ways. A dehumidifier may be useful as a last resort, but you need to identify the causes of dampness and address these first. For instance, using extractor fans vented to the outside in bathrooms and above stoves is important, as considerable moisture is generated in these areas. Clothes dryers should be vented to the outside rather than the roof space. Gas heaters should have flues. Window and door frames with inbuilt vents and thermal breaks will reduce condensation and heat-loss. Double-glazing will also help, especially on south-facing windows. This is more expensive initially but if properly used will pay for itself in the long run. Designers, or your Eco Design Advisor, can use thermal modelling software to help you decide where double glazing will be worthwhile.

What about services?

Trenching across the roots for underground services (sewage, telephone, power, gas etc) can seriously harm trees. Where possible put underground services in cleared or proposed cleared areas such as along the driveway access. Where this is not possible thrusting or careful hand digging are less harmful. A qualified arborist will be able to help with this aspect of the planning.

Driveways

When planning a driveway, try to position it as far away as possible from protected vegetation. Keep construction works outside the drip-line (canopy spread) of trees. On totally bush-clad sites keep the driveway short and put it where only less-significant vegetation will be removed. On steep sites consider a parking platform at the road. Consult a qualified arborist.

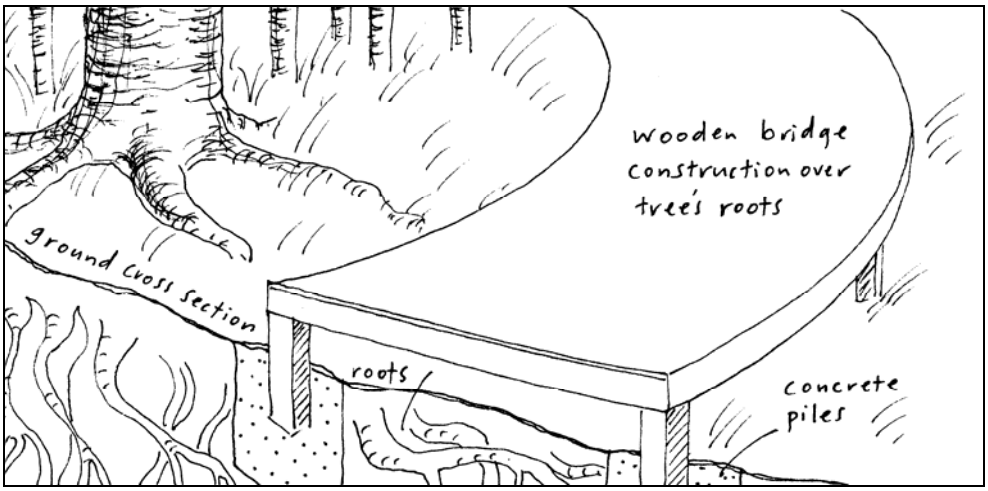
Driveways that curve in from the road are visually and ecologically preferable – they assist with screening the house from the road and also help stop funnelling of wind. This reduces damage to the bush along the edge of the driveway.

Driveway construction

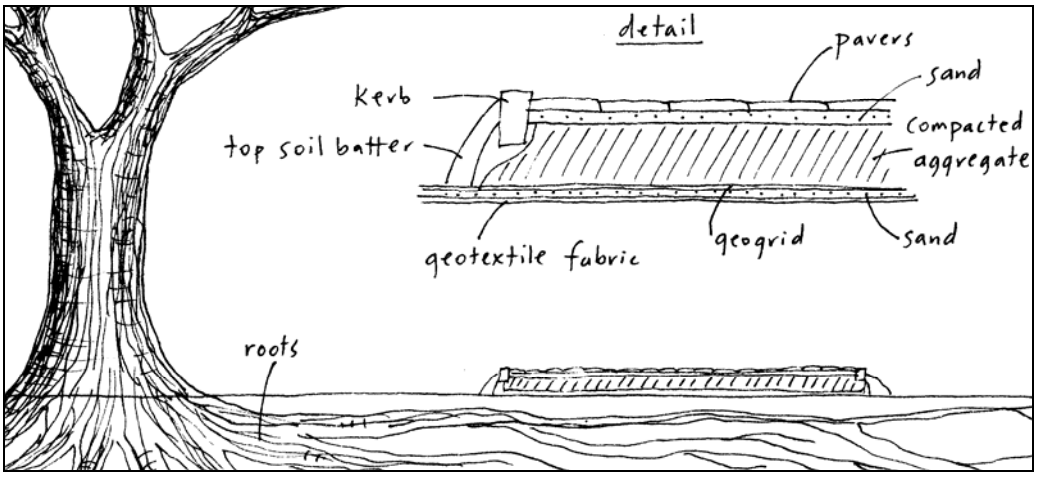
If you can't avoid laying a driveway beneath the drip-line of trees, protect the roots by carefully choosing the method and materials.

Concrete slabs, cobblestones and paving laid straight on the top of roots, excavating or raising the ground level beneath the drip-line, or cutting roots will all cause damage.

The least damaging kind of driveway is a bridge construction: a platform elevated on isolated load-bearing poles or piles above the root zone. While they can be an expensive option, bridge structures allow an uninterrupted supply of oxygen, nutrients and moisture, and allow the roots to grow and avoid compaction.



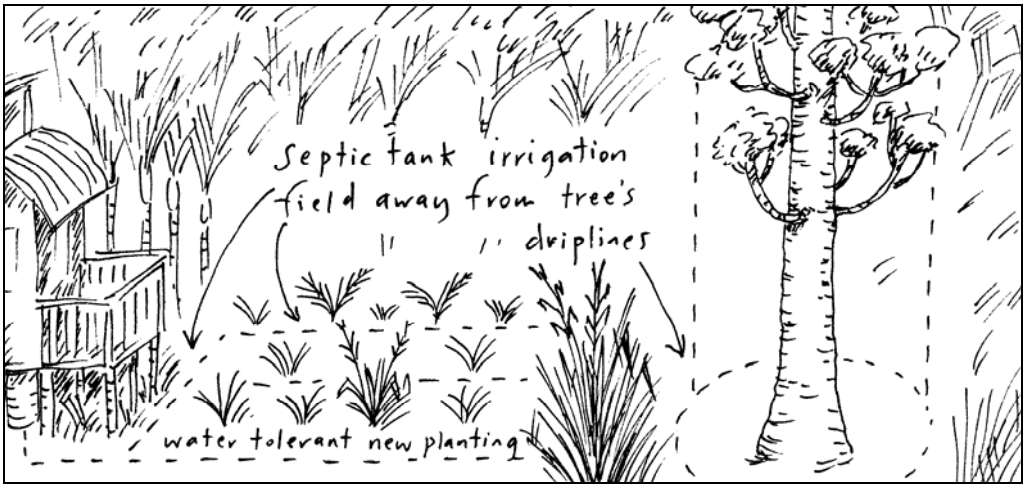
Other acceptable methods would include laying gravel on a geotextile membrane, or permeable paving on a sand base. A qualified arborist will be able to advise the best methods and materials. An arboricultural report may be required as part of a consent application for site development (see the *Resource consent* section).



Septic tanks and wastewater irrigation fields

If your site is not connected to the public sewer system, you will need your own system to treat wastewater. There are a number of ways to treat blackwater (water from toilets) and greywater (laundry, shower, bathroom etc) – refer to the *Wastewater* chapter.

A common method of treating wastewater is with evapotranspiration systems or dripper lines. Irrigation fields for wastewater systems need to be carefully sited. Installing the lines should require little or no excavation or removal of vegetation. However, the increased level of moisture and nutrients can be a shock to the roots of established trees. Try to avoid placing treatment systems within the drip-lines of established trees, especially species which prefer dry feet.



Many plants will do well, however, with increased irrigation. If you're putting additional plants over irrigation fields, use eco-sourced (native to the local ecosystem) species suited for the purpose and which will blend in with the character of the bush. The council can provide advice on which plants to use.

Power, phone and gas

The council will usually require you to underground all services. Be careful to minimise damage to roots during undergrounding, as discussed above.

Maintaining the natural character of your bush site once the house is built

Once your house is built, there are a number of ways you can ensure the health of the natural environment around your home.

Further work on your property

If you plan any further work once your house is built, such as retaining walls, decks, or extensions to the house, this may require another resource consent, even if no trees are removed. It will pay to check with the council beforehand.

Controlling weeds

Weeds are a huge problem in the city and in the Waitakere Ranges in particular. Many of the weeds are garden 'escapees': species planted as attractive garden plants. Unfortunately their potential as weeds was not realised and the plants seeded or dispersed in the bush to become environmental pests, suppressing and strangling native growth. Around 130 species of troublesome exotic plants are now causing problems in the Ranges. For more information refer to the 'Environmentally damaging plants' Appendix in the District Plan or your regional council's publications.



There are several ways to keep weeds from becoming a problem on your property:

- Remove existing weeds. Guides are available from the Waitakere City Council and the Auckland Regional Council (ARC).

- Avoid planting any species that have the potential to damage the environment. There are lists of these available from the Waitakere City Council, as well as other information on weeds. If you need more information phone the biosecurity officers at Auckland Regional Council.

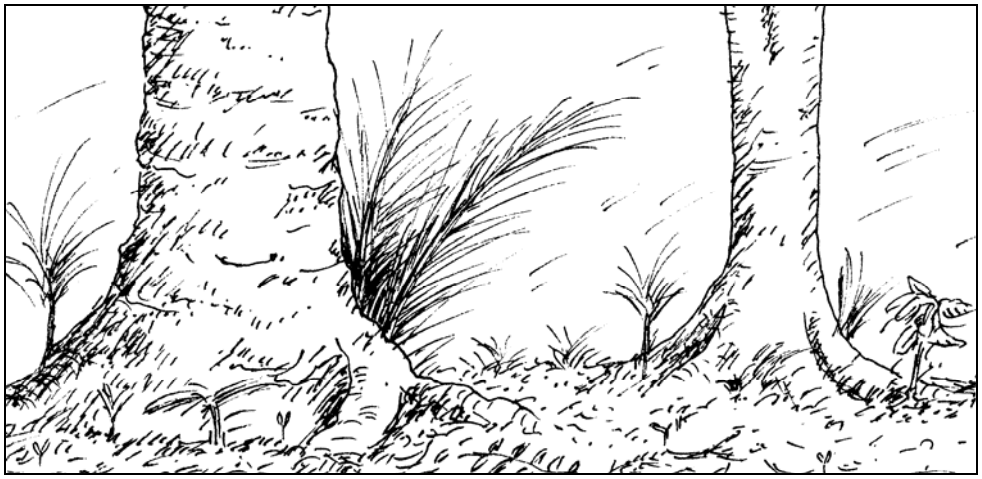
- If you plan to plant more trees it's better to choose natives. The council has brochures to assist with this.

- Take care with compost. It is often best not to compost weeds because they may start to grow again when the compost is used.

Looking after the bush on your property

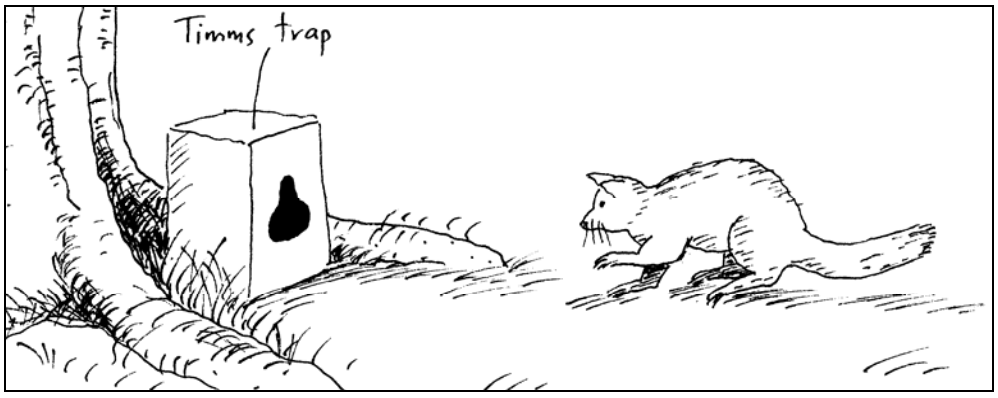
The preservation of bush in private ownership is an important and vital step to safeguarding the Ranges as a whole, and something you can be actively responsible for. There are many ways to protect the significant vegetation on your property.

Remember that all native trees should be protected in the Ranges. Take care not to remove the understorey or bottom layer – this includes fallen branches and leaf debris. The bush floor is one of the most important parts of the forest: it supplies nutrients to growing vegetation and provides a nursery for germinating seeds and small seedlings. Removing the understorey is detrimental to the health of the forest.



Dying or diseased trees on your property can be removed, but the council requires you to seek the advice of a professional arborist first because the tree may be able to be saved. A qualified person can advise how to prevent disease spreading to other trees.

You can help control animal pests on your property by trapping possums. Timms traps are available from the council or from the ARC and are an effective, humane method of control.



They must be used correctly to be safe and humane. The trap needs to be firmly pinned to the ground. Using them on hard surfaces or in trees can lead to animals being partially caught and damaged but not killed. The correct bait must be used, or non-target species, such as blackbirds or hedgehogs, may be attracted to the trap. Use jam, carrot, or pumpkin (not apple) mixed with curry powder or cinnamon. Never use meat in the trap.

Resource consents

When developing a bush section, you will need a resource consent. Even if your chosen building platform had been previously cleared of vegetation, you may still require consent, so check with the council's planners first.



Further Information

Advice at the Waitakere City Council:

Phone the call centre (09) 839 0400
Ask for: Duty Planner (Resource Consents)
Eco Design Advisor

On the web

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.

If there are questions you can't find answers to on Smarterhomes, www.level.org.nz goes into more depth and is aimed at the design and building industries, with drawings and links to Building Code compliance documents.

This chapter was last reviewed in September 2008.

Printed on recycled paper.