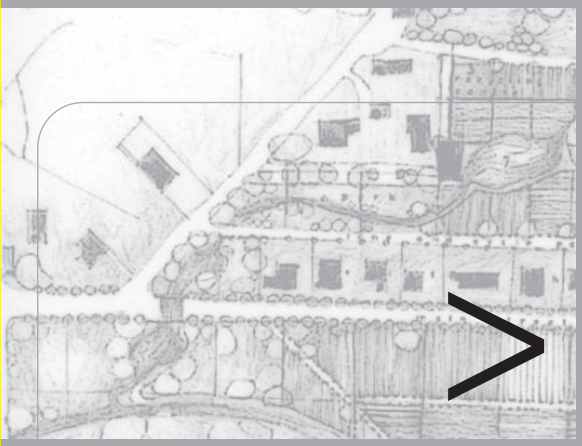


designguide

SITE

Housing New Zealand
Housing New Zealand Corporation

INTRODUCTION

HNZC is a long-term property owner, and is interested in the long-term utilisation of a site to its optimum capacity. This does not always translate into developing at maximum density. HNZC supports sustainable development.

The Site Design Guide aims to support development that optimises site potential through sympathetic site planning, and consideration of associated risks and benefits, resulting in a higher standard of housing for HNZC occupants.

The Site Design Guide is split into four sections.

- **Land**
- **Access**
- **Aspect**
- **Amenity.**

These sections contain references to topics that are:

Essential
These items are required by HNZC.

Highly Desirable
These items should be included.

Desirable
HNZC considers these items advantageous.

OVERVIEW OF THIS GUIDE

IN THIS GUIDE…

SECTION 1 LAND

The land section analyses the quality of the site as a potential building platform. It examines suitability of the site for development, and the risk of natural disaster (earthquake, slippage, flooding). It may be necessary to engage professional consultants (eg. geotechnical engineers) depending on the perceived risks and the scale of the development.

IN THIS SECTION ON LAND…

TOPOGRAPHY

The existing condition of the land is critical to the success of a proposed development. Land must be stable, and if the site is low-lying, or near a waterway, risk analysis must be undertaken to establish the likelihood of flooding. The following pages provide a guide to land use issues.

Due to increased pressure on the capacity of our cities it is necessary to develop sloping sites. The gradient of a site will affect the occupant groups that are able to be housed. However with careful design many of the difficulties of sloping sites can be overcome, resulting in a good housing solution.

- Safe access to the site and house must be provided.
- Cost of building on a steep slope must be reasonable (while almost any site can be built on, the expense of retaining and piling may be prohibitive).
- The requirements of the proposed occupant group must match the profile of the site.

Difficult site access and costly building platform construction.

SECTION 1 LAND

STABILITY

Due to the effects of deforestation and rainfall there has been significant slip damage on New Zealand land. Earthquakes have also caused devastation to New Zealand buildings. Prior to building, the risk of slippage and earthquakes needs to be evaluated.

Historical records and local or professional knowledge must be researched at a level appropriate to the perceived risk of land instability for a given project.

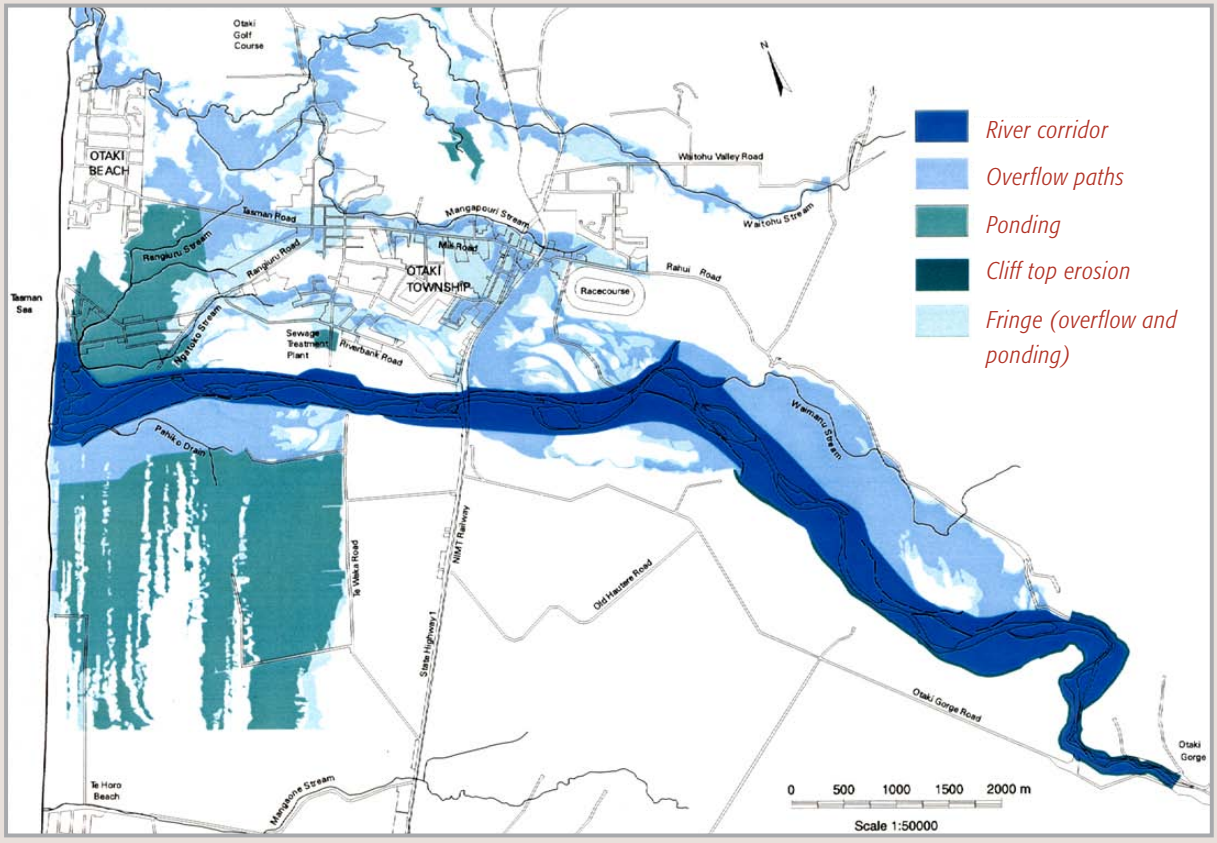
- If there is to be significant vegetation removal on a site the effects of this with respect to slippage must be established. Local rainfall as a contributing factor needs to be considered.
- Where fault lines exist close to the site, their current status must be identified, and their risk of movement and the associated consequence of building failure must be assessed within the parameters of the design lifetime of the project.

FLOODING

Topography and proximity to waterways are contributing factors to flooding. Historical data and local knowledge will offer valuable insight into the likelihood of flooding, and must be considered in accordance with the scale of the project.

- If an area is low-lying and near a water source, or has flooded in the past, a flooding risk assessment will be needed.
- This must consider the design lifetime of the project and the consequences of failure.

Floodplain map - Kapiti Coast.



SECTION 1 LAND

HISTORICAL USE

There can be significant hidden problems associated with the historical use of a site, including differential settlement, contamination or buried structures. While it is important to make checks on the site for potential risks, the amount of research required is dependent on the scale of the project being undertaken, and the likelihood of there being significant past use (eg. industrial use).

ALTERED LAND FORMS

Altered landforms sometimes contain fill, which may result in some of the problems identified above. Physical cues to these problems are indicated below.

- Obvious interventions, eg. a sudden change in topography.
- Sunken land, eg. a flat site that has a dish in it.
- Remnants of buildings.

There are also other checks on the site that may yield useful information. These are listed below.

- Check TLA records and request a Land Information Memorandum (LIM).
- Check the historical Certificate of Title records for past owners. These could give a clue as to past uses of the land.
- Make local enquiries – consult utilities providers, or longtime local residents.
- Where the site is in an area with past industrial use, or where there have been problems with fill or buried structures on sites nearby, a physical check and research of records should be completed.
- It is likely an expert consultant (eg. a geotechnical engineer or soil scientist) will be required to perform tests for factors such as safety for residential use, bearing capacity and stability.

Sunken areas in existing landform indicating past earthworks or uneven settlement.

CONTAMINATION

There are a number of forms of land contamination that may be discovered on a site. Examples include organic material giving off gas, heavy metal deposits from prior industrial use, or an asbestos dump.

The source of contamination may be able to be removed or avoided. However where a building platform does not lie over contamination, the site must still be safe for all activities that may occur on it.

- The presence of contamination on a site must always be referred to a professional for examination, assessment, and advice on a preferred course of action.

SECTION 1 LAND

EARTHWORKS

Earthworks refers to the moving of earth on a site. This can be done to enhance amenity of the site, or to make it more accessible or more easily built upon. Generally the cost of bulk earthworks is less than the cost of retaining walls and construction that may be necessary to make a site usable, but there are a number of implications that require careful consideration.

Under most District Plans a Resource Consent is required for almost all earthworks. This has a time implication for a project. Added to this is the time required to complete the earthworks (which is weather dependent, and may not be feasible in summer because of dust or in winter because of mud). Undertaking earthworks is a major exercise and impacts on the environment and the timeframe of the project.

Earthworks requiring a Resource Consent need the input of a skilled consultant such as a civil engineer to support the Resource Consent application.

- The effects the earthworks will have on the existing site features must be assessed, and hazards identified.
- A plan for the earthworks must be completed including scope, timeframe, and costs. This needs to be weighed up against alternative options for siteworks design.
- The quantity of the cut and fill required, and the scale of the earthworks should be kept to the minimum needed to produce a satisfactory design.
- Where fill is imported to the site, it must be clean and free draining.
- Transporting of fill affects local roading networks and neighbourhoods. These effects should be pre-planned to cause as little effect as possible.

Significant earthworks have a large impact on the environment. Need for them must be carefully assessed.

SECTION 2 ACCESS

Site access relates to the design of the entrance to the site. It incorporates issues of security, off-street parking provision, fencing and steps, ramps and paths. The requirements of the occupant group are very important and access needs to be suitable for the expected occupant group.

IN THIS SECTION ON ACCESS…

PATHS, STEPS AND RAMPS

Level access to a site prevents few problems when providing housing. However, as flat land becomes more scarce it is realistic to expect that sloping sites will become more common.

Note: all paths, steps and ramps must be provided to meet the requirements of the NZBC. Further to those requirements HNZC highlights the following points.

- There are some user groups for which level access is required. When providing housing to such a user group, comply with the requirements of NZS 4121: Code of Practice for Design for Access and Use of Buildings and Facilities by Disabled Persons, 2001.
- For other housing stock that is at ground level and has the potential for providing an accessible journey. Check with HNZC regarding the proportion of housing requiring access to meet NZS 4121.

A well-integrated ramped access to a community building.

Level site access is a requirement for accessible housing.

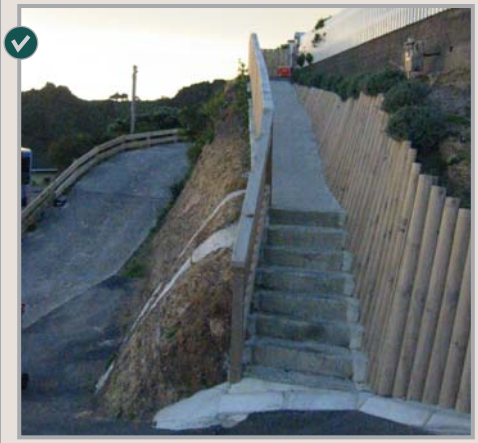
SECTION 2 ACCESS

PATHS, STEPS AND RAMPS

The following issues are further considerations of site access.

- A path must have a hard, even surface and must be provided from the footpath edge to the front door of the dwelling in an efficient configuration.
- All materials used to provide walking surfaces must be non-slip.
- All changes in level must be clearly marked.
- Adequate lighting must be provided to all paths, steps and ramps.
- Sufficient distance from the end of steps or ramps to the front door must be provided to ensure that shopping bags, prams, or items being carried are able to be set down safely while the door is opened.
- Paths and landings must be generous enough to comfortably manoeuvre a pram around a change in direction. They also must accommodate furniture removal.
- Where modernisation of an existing property is undertaken, site access should be upgraded to provide disabled access only where it is possible to provide an accessible journey (ie. if it is not possible to provide disabled access through a home then it is not worth spending money on making the site accessible).
- Retrofitting of existing properties with disabled access provision should be done sympathetically so as not to detract from the property or the streetscape.

Although steep, the steps and ramp are well built with smooth surfaces and a solid balustrade.



Although the dwelling overlooks the approach the balustrade is insufficient and the drop to the road dangerous.

A well-constructed ramp with visually permeable balustrades and entry provided from the same point as stepped access.

SECURITY

To enhance security in a property the best approach is to allow a visual connection between the street and the house. Houses are most secure when their front face is clearly visible from the road.

At site design level the following need to be addressed for security.

- The building platform (and ultimately the building) must be visible from the road and vice versa.
- The approach to the house from the street must be overlooked from within the house, and it must be well lit - refer to the Architecture Design Guide.
- The number of rear sections should be minimised. Optimally in new developments there should be no rear sections.
- Fences to a street frontage should be visually permeable, or low enough to see over.
- Side and rear fences may need to be higher than front fences to provide security and/or privacy.
- Gates of an appropriate size and location should be provided in fences.

Note: it is important that this information be combined with that in the Urban and Architecture Design Guides.

Good visual connection between the street and the housing results in a safe site and neighbourhood.

Poor road-dwelling visual connection reduces site and neighbourhood security.

SECTION 2 ACCESS

FENCING

Not all properties will need to have their boundaries fenced. In some cases the best solution will be a planted edge. However there are also situations where fencing is required.

Fencing provides a number of amenities to a site. It acts as a demarcation of ownership, encouraging occupants to think of the site as their own and to treat it accordingly. It also acts as a barrier to keep unwanted people or dogs out, or children in, and it adds legibility and definition to both a site and a neighbourhood. This section should be read in conjunction with the Urban Design Guide.

REAR YARDS

- Fencing should add to the security and privacy of the rear yard.
- Where private outdoor space is provided in a rear yard, fencing should contribute to the outdoor space. This can be done through adding to privacy, contributing to microclimate, or by blocking an unpleasant view.
- In high wind zones some air flow through the fence is desirable.

Low planting in place of a fence to give boundary definition where outdoor space is provided to the rear of the dwelling.

FRONT YARDS

- Where fences are required along a street boundary they must not obstruct the view from the house to the street and vice versa - refer to Security in the Site Design Guide.
- Gates should open inwards onto hard surface paths at appropriate points.
- Where children will play in front yards appropriate fencing must be provided. It is important to note the need for careful division between vehicle access and child play areas to avoid accidents.
- It is desirable to provide visually interesting fences, or planting around fencing to prevent the edge of the site from appearing barren.
- In housing with private outdoor space behind the house, the front wall of the house may sometimes become the secure edge to a site. In this situation the site boundary should be marked with planting or a low wall to demarcate the public/private edge.

Clear visual connection between front entry and street with a low wall to mark the boundary.

Variation provides visual interest.

SECTION 2 ACCESS

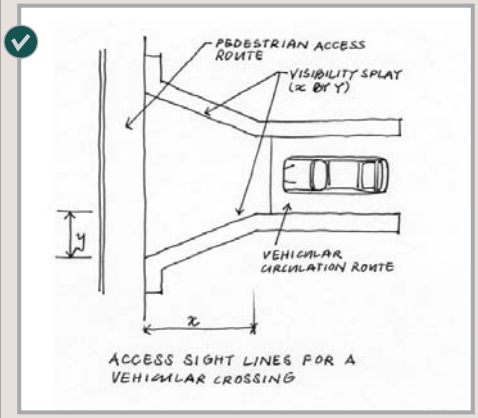
OFF-STREET PARKING

Off-street parking provisions, and limitations on vehicle crossings are subject to District Plan requirements. Many District Plans require provision of at least one off-street park. This should be integrated into site design to provide an amenable entry to the site.

Note: there may be ramifications of not providing an off-street car park. Where there is no provision for off-street parking it may be necessary to use hard landscaping to prevent cars from being parked on a front yard.

- Vehicle crossings must comply with TLA District Plan requirements, and have safe sight lines and clear visibility to and from the site.
- Where a dwelling is on a rear site or a long way from the road, vehicle access is required (eg. some rural situations).
- Adequate separation and clear vision between vehicle access and children's play areas must be provided for reasons of safety.
- Driveway access may be integrated with pedestrian access to provide a safe entry to the site and dwelling. This can cut down on the required area of hard standing.
- Off-street parking should not compromise other aspects of the site planning, such as sunny outdoor space.
- The distance from the car to the house entry should be minimised.
- Lengths of driveway should be efficient.
- The car is often the most valuable asset a tenant will own. The value of this asset should be recognised and addressed in providing off-street parking (ie. the car should be located close to the house, and communal parking areas are often not an appropriate response to parking provision).

Vehicle access splay.



Driveway access with a clear splay and good visibility.

Well planned off-street parking that doesn't compromise visual connection with the street.

SECTION 3 ASPECT

Aspect groups a number of site conditions. They are physical influences generally external to the built form and require attention at the inception of a project as they are not controlled from within the site. These conditions affect the design responses with respect to private outdoor space, indoor-outdoor connection, site planting and organisation of the built form.

Use this part of the Site Design Guide with reference to the Urban Design Guide for contextual response and with reference to the Architecture Design Guide for consideration of internal layout.

IN THIS SECTION ON ASPECT…

CLIMATE

New Zealand has a range of climate zones. Climatic conditions vary markedly longitudinally and from east to west. These conditions must be identified early as they require different site planning responses.

The microclimate is the experience of the weather patterns on a particular site. Before determining a suitable design response to the microclimate, the following elements need to be identified.

- Sunlight hours and the movement of the sun across a site, including shading and reflection from surrounding buildings.
- Prevailing winds, eddies and lee zones. This should include observations of wind chill and strength.
- Rainfall and pattern of rainfall (ie. which months of the year experience heaviest rainfall and which periods are dry).
- Rainwater runoff across the site.
- Existing significant vegetation that offers shading or wind protection should be noted.

This information will also be useful to test and evaluate the likely effects of building and landscape interventions on the microclimate of the site.

SECTION 3 ASPECT

SUNLIGHT

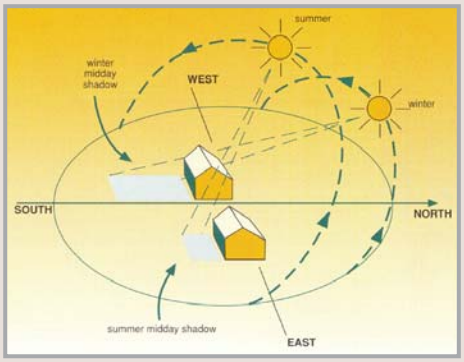
It is established that sunlight has far-reaching effects on a person's health, well-being and state of mind. New Zealand generally has an abundance of sunlight and it is important that our houses respond to this condition.

With the benefits of abundant sunlight come the negative effects such as overheating, and the damaging effects of UV light on skin and on furnishings. These can be mitigated through site design.

- Private outdoor space must be sited to receive good sun through much of the day. Where possible this should be provided to the rear of the site - refer to the Urban Design Guide.
- Site planting, fences and buildings must be positioned to offer sufficient shade for people to be outside while being protected from the sun.
- Plan orientation on a site should optimise opportunity for North facing glazing. It is easier to control solar gain to North facing glass as the sun is higher in the middle of the day, making eaves and shading devices more effective - refer to the Winter/Summer sun path diagram on this page.
- Plan orientation should allow for an adequate area of roof to be North facing on an appropriate gradient to allow for the use of a solar powered hot water booster system.

Sunny rear yard with shading provided to deck by adjacent tree.

Winter/Summer sun path diagram. Seasonal paths of the sun and the cast of shadows.

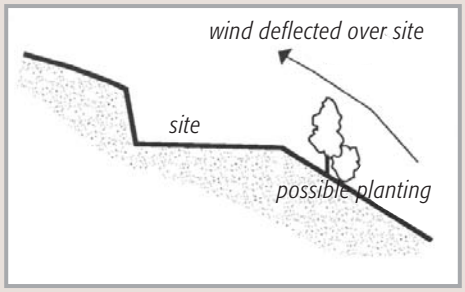


WIND

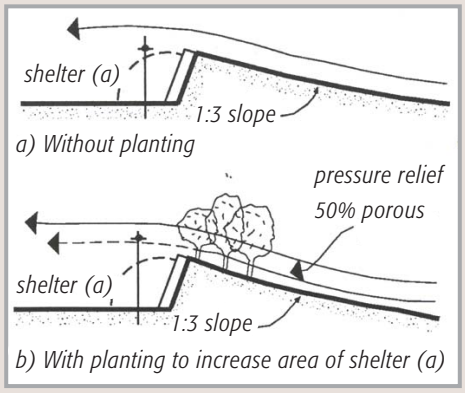
It is important to identify and respond to wind conditions on a site to utilise their benefits and to mitigate their negative effects.

- Private outdoor space must be protected from strong prevailing winds.
- Access points to the dwelling must be sited to be protected from strong prevailing winds.
- Washing lines should be positioned to receive good drying air movement.
- Windows should be protected by built form and site features from exposure to prevailing winds, especially where the wind is often accompanied by rain.
- Fence types should respond to wind direction and strength. Perforated fence types are usually better to reduce the effects of strong wind as solid fences often worsen the effects of wind.

Sheltering effects of vegetation.



Sheltering building platform through site protection and planting.



SECTION 3 ASPECT

PRIVACY

Privacy in a domestic environment is essential. TLAs District Plans contain specific requirements for the provision of private outdoor space and noise privacy between neighbouring properties. A number of the influencing factors in the provision of privacy operate predominantly across neighbouring boundaries and therefore must be addressed in the site design.

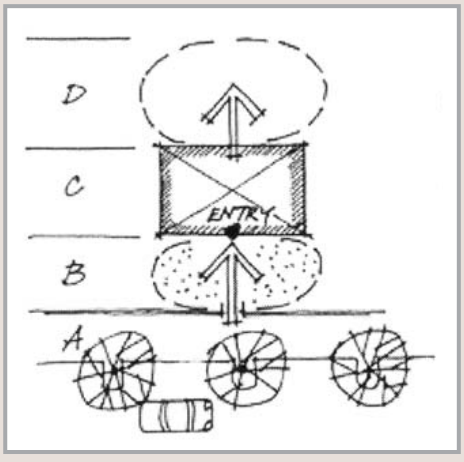
PRIVATE OUTDOOR SPACE

Additional to District Plan requirements are the following site design considerations.

- Private outdoor space must be of a usable size (this will relate to dwelling size). It must be big enough for outdoor furniture and to provide a children's play area.
- It should not be directly overlooked by neighbouring properties.
- Planting can be used to add to, or create privacy in private outdoor space.

Private outdoor space of a usable size in morning sun.

In single level dwellings space B represents the front garden, space D the back-yard, while in a medium density situation space B may represent shared paths and space D the private courtyard.



Key:

D Private external space
C Private dwelling
B Privately controlled but publicly visible space OR semi-private shared space
A The public realm eg. the street.

WINDOWS OVERLOOKING NEIGHBOURING PROPERTIES

- Windows from one dwelling must not directly face windows of a neighbouring dwelling.
- Windows must not directly overlook neighbouring private outdoor space.
- It is desirable that windows are positioned to overlook the street and the approach to a neighbouring property. This adds to the security of a neighbourhood and the overlooked site. Where private outdoor space is provided to the front of a property, it is not desirable that the neighbouring properties directly overlook the private outdoor space.

NOISE PRIVACY

- Appropriate acoustic separation between sites should be achieved through positioning the dwelling and the use of planting and walls. The level of separation will vary depending on other site conditions such as existing background noise, and relationships to neighbouring buildings.

Small dark rear yards, directly overlooked by neighbours.

SECTION 3 ASPECT

NOISE

There will always be an amount of noise on a site. Some noise is acceptable while excessive noise causes interruption to daily life and requires mitigation through design.

Damage to hearing is caused with short term exposure to noise of over 85dBA. However noise becomes a nuisance at far lower levels. It is not possible to establish a precise level where noise is unacceptable as it is dependent on other environmental factors which are specific to different sites.

When carrying out site analysis the following is a guide.

- Identify levels of noise.
- Identify whether they are a long-term source (eg. motorway) or short-term (eg. construction site).
- Identify type of noise. It is generally accepted that sharp and unpredictable or intermittent noises are more disruptive than constant noise (dependent on level).
- Ensure noise levels are within acceptable levels. TLAs and Transit New Zealand have noise guidelines.

It is not acceptable that occupant use of outdoor space is constantly disrupted by noise. Once the analysis has been completed, it may be necessary to engage professional advice to address on-site noise reduction.

Airport or other transport noise is a long term noise and must be mitigated against in site and building design.

Construction sites in residential areas are generally a short term nuisance that will pass.

SECTION 4 AMENITY

Site Amenity is provided by a combination of building, landscape and community level interventions. These include District Plan regulations governing scale of development, regional influences such as appropriate planting and the accommodation of community facilities. All of these combine to contribute to the general utility of the site.

IN THIS SECTION ON AMENITY…

SITE COVERAGE AND SETBACK

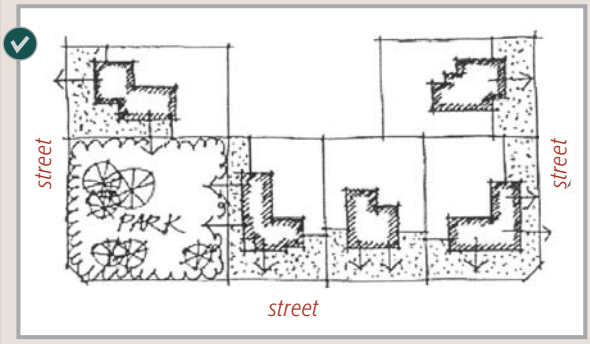
In determining site coverage, it is important to refer to the Urban or Rural Design Guides. Appropriate site coverage is usually influenced by the scale of surrounding urban or rural fabric, modified by proposed development in the area. District Plan regulations usually limit maximum site coverage, and may also define setback off the boundary through yard requirements.

Note: where intensification of a site is appropriate, it may be necessary to apply for a Resource Consent (if high site coverage means the development falls outside of the permitted activities in the District Plan).

- Site coverage must not compromise the provision of private outdoor space. The scale of the development will be influenced by the surrounding urban fabric - refer to the Urban Design Guide.
- The setback from the front boundary of the dwelling should respond to the surrounding environment. Refer to the Urban Design Guide.
- The setback should be appropriately sized for the type of development. For medium density housing, it is likely to be less than for low density housing.
- In determining setback, the size of private outdoor space should be an influencing factor.
- Dwellings should be sited to overlook the street and any neighbouring public space. This will add to the security of an urban environment - refer to the Urban Design Guide.

District Plan may influence setback off the boundary through yard requirements.

Housing must always present well visually to the public realm and overlook it. On a corner site, the housing must present well to both street frontages.



SECTION 4 AMENITY

LANDSCAPE

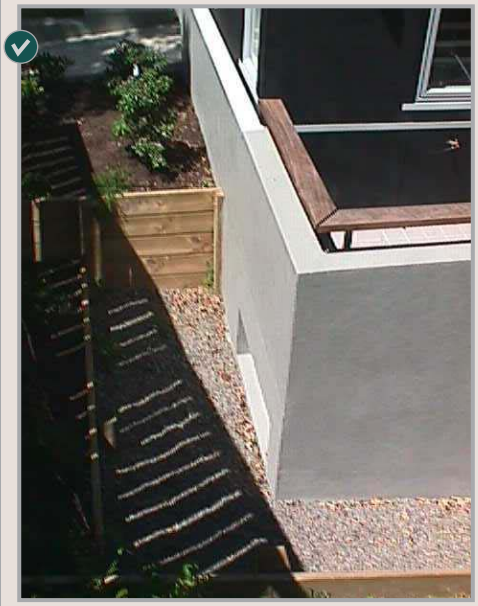
Landscape is an important part of any residential property. It is divisible into two types of intervention. One is hard landscape, made up of fences and walls, steps, ramps and paths and the other is planting. The balance of the two forms is integral to achieving a strong landscape scheme.

HARD LANDSCAPE

- A hard surface outdoor living area must be provided (eg. a paved area or an area of decking).
- The outdoor hard area must be partially covered and protected from prevailing weather.
- The outdoor area must be big enough to accommodate an amount of outdoor furniture appropriate to the size of the dwelling.
- The areas of hard landscaping provided should be appropriate for the size of the dwelling and the site. It is not recommended that a site be predominantly covered by hard surface.
- Hard landscaping should be used to add definition and legibility to a site. This can be done through low walls, provision of clearly defined off-street parking, paths and fencing.
- Areas of loose gravel can add to site security, as the noise of footsteps can indicate an intruder.

The outdoor living area must accommodate outdoor furniture and include hard paving.

Gravel paths to the rear of a property add security to a dwelling.



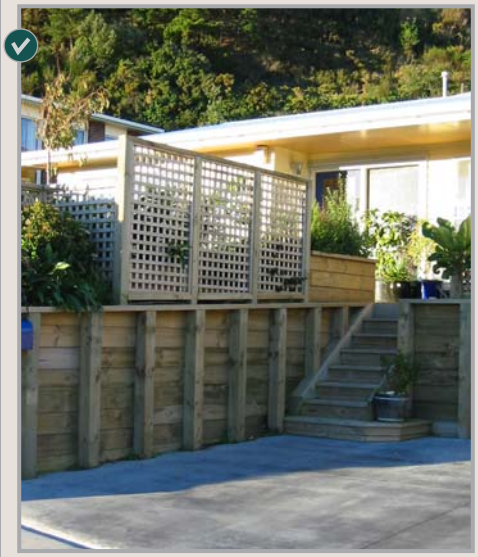
PLANTING

Planting can add a great deal of amenity to a site, but it must also be considered from a maintenance viewpoint. Many sites have existing vegetation that can be retained. Trees can provide low maintenance planting.

The following items are an approach to site planting. Refer also to the climate and privacy sections of this guide.

- Confirm that all plant species to be used on site grow well locally.
- Preserve existing mature trees. If they can be relocated this should be a second option.
- In sites where there is no existing planting, a variety of plants that grow at different rates should be used to establish a site.
- Reintroduction of native species into their natural habitats should be considered.
- As planting can have a significant impact on the appearance of a neighbourhood, the cultural mapping of an area may recommend the planting of particular species.

Definition of site is aided by the use of retaining walls, fences and planting around this off-street car park.



Low growing flower and shrub gardens with well-kept lawns add significantly to the attractiveness of a new development.

SECTION 4 AMENITY

COMMUNITY FACILITIES

Postal delivery, rubbish collection and recycling are services provided to most residential properties. All of these have space requirements and impact on site design.

RUBBISH AND RECYCLING

It is important to be able to accommodate local requirements for rubbish collection, which may vary between different service providers. Flexibility is recommended as the type of provision is likely to change during the life of the dwelling.

- When bins are not out for collection they must have a suitable storage area on site outside of the dwelling that is readily accessible. This area must be reasonably protected from cats, dogs and vermin.
- An area for collection on the road frontage of the site must be provided. This must be accessible and should not interrupt car parking provisions.
- Where communal rubbish areas are provided they must be well screened from nearby tenancies and reasonably protected from cats, dogs and vermin.
- Where communal rubbish collection areas are provided they must be easily cleaned (ie. smooth wash-down surfaces, preferably with a tap nearby).
- In multi-unit development, provision of a communal rubbish area is preferable. Where the collection area would need to be very large it is appropriate to use a number of smaller collection areas.

No provision for rubbish or recycling creates an eyesore and potential public nuisance.

POSTAL DELIVERY

- Letterboxes must be securely fixed.
- A letterbox must not be attached to the house; a mail slot in a door is not acceptable due to possible security breach.
- Generally individual letterboxes are preferable to letterbox banks. (This is dependent on the situation and in some cases a well positioned letterbox bank is desirable.)
- Letterboxes should be positioned so they can be accessed from a hard-surface path.
- An occupant should not need to step outside their site to access mail.

Individual letterbox adjacent to entry in medium density housing is preferred.

Letterbox banks must only be used where they are appropriate to the user group.