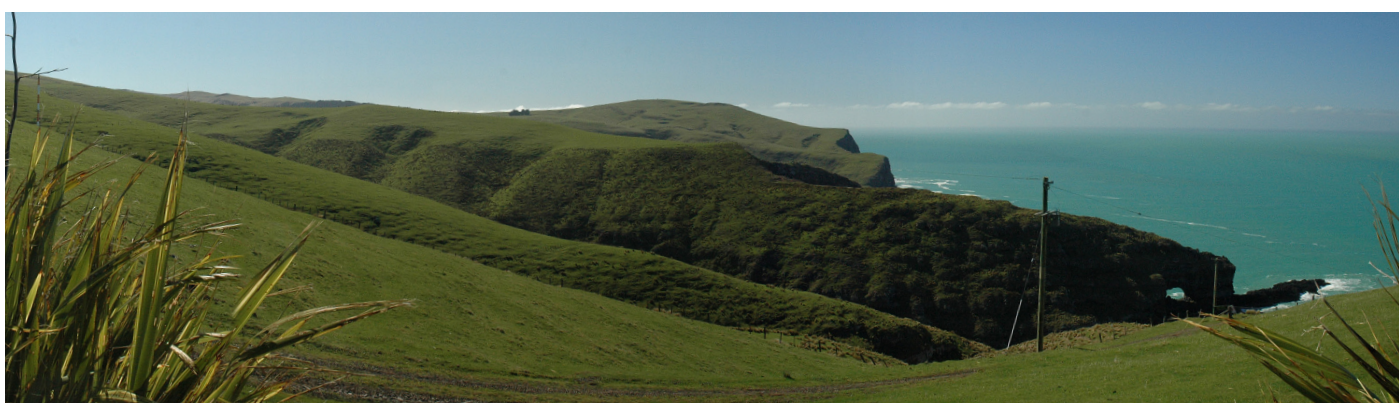


STAGE 3 - SECTION 32

CHAPTER 11

UTILITIES AND ENERGY

APPENDIX 2 - TECH REPORT: LANDSCAPE



Plan Change 63 Utilities

Advice on Landscape Related Effects of Utilities
for Christchurch City and Banks Peninsula



Plan Change 63 – Utilities

Advice on Landscape Related Effects of Utilities
for Christchurch City and Banks Peninsula



PREPARED FOR

Christchurch City Council

BY Boffa Miskell Ltd

August 2011

Executive Summary

Boffa Miskell Limited (BML) was engaged by Christchurch City Council (CCC) in June 2011 to provide technical advice regarding potential landscape effects arising from the installation of utilities particularly in relation to wind turbines and solar cells to assist with the preparation of Plan Change 63. Plan Change 63 is a review of the Christchurch City Plan and Banks Peninsula Plan in terms of provisions relating to electricity transmission and telecommunications. It is driven by the NPS Electricity Transmission. Landscape advice is required in relation to the effect of utilities on the landscape, particularly in relation to wind turbines and solar cells.

The scope of services outlined in the request for proposals (RFQ No 4500) requires the evidence on landscape effects from utilities, including wind turbines and solar cells, to cover the following issues:

- identify and comment on key landscape issues arising from installation and operation of utilities including wind turbines and solar cells.
- comment on the methods employed by the City Plan and Banks Plan to address these issues and their effectiveness.
- comment on any setback/buffer or other requirement which might be needed to address effects on sensitive areas (e.g. Outstanding Natural Landscapes) including in terms of views to ridgelines and the coast.
- comment on how domestic installations might impact on living areas, heritage items and protected trees, in terms of landscape.
- provide technical input into creation of new provisions if necessary and review draft provisions to ensure they would not lead to adverse effects on the landscape.
- review of submissions and attendance at the Hearing

CCC requires this report to inform the review of the Utilities chapters in the Christchurch City and Banks Peninsula Plans. This review is to be given effect through a Plan Change (PC 63) to the City Plan and Variation 12 to the Banks Peninsula Plan.

As part of this report research into potential landscape and visual effects that may arise from the installation and operation of utilities has been carried out and the findings are outlined in section 4. The key effects relate to visibility of structures, their effect on the landscape character and include construction effects, such as earthworks and vegetation removal. The magnitude of visual effects generally depends on the scale (size and bulk) and number of structures and their location in the landscape.

A limited number of landscape studies have been prepared within the Christchurch City and Banks Peninsula. The most relevant to inform this report was the Banks Peninsula Landscape Study (BML, 2006) and the Christchurch City Plan. In the Christchurch City and Banks Peninsula context several areas have been identified as particularly valuable landscapes that are sensitive to change (see sections 5 and 6). Generally Outstanding Natural Landscapes, Coastal Natural Character Landscapes, the Coastal Marine Area and the Main Ridgelines have a low ability to absorb large scale utility development due to their high value and importance in defining the landscape character. It has therefore been recommended in section 7 of this report that a higher level of control for utilities should be exercised by the council in these most sensitive areas.

Following the review of the proposed Utilities Chapters for the Christchurch and Banks Peninsula Plans, it has been concluded that the proposed changes to the utilities chapters of both Plans provide an appropriate level of control to manage potential landscape and visual effects. The choice of mechanisms is targeted to address specific landscape issues in an effective way.

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1 Introduction and Background

Boffa Miskell Limited (BML) was engaged by Christchurch City Council (CCC) in June 2011 to prepare a technical report on potential landscape effects arising from the installation of utilities, such as wind turbines, telecommunication masts and solar panels. CCC required this report to inform the review of the Utilities Chapters in the Christchurch City and Banks Peninsula Plans.

The Resource Management Act 1991 (RMA) requires Councils to recognise and provide for :

- preserving the natural character of the coastal environment (s 6a);
- the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development (s 6b);

And to have particular regard to:

- the maintenance and enhancement of amenity values (s. 7c);
- the quality of the environment (s 7f).

The Council is proposing to review the City Plan and the Banks Peninsula Plan and to prepare and process a Plan Change to amend those provisions relating to electricity transmission and telecommunications. This is proposed Plan Change 63 (PC63).

We understand that the need for a review is partially being driven by the National Policy Statement (NPS) on Electricity Transmission (2008) and the NPS for Renewable Electricity Generation (2011). Policy 8 of the NPS requires that

“In rural environments, planning and development of the transmission system should seek to avoid adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreation value and amenity and existing sensitive activities”

and the RMA requires district plans to give effect to the NPS. The RMA also requires councils to amend their District Plans to ensure that they are not inconsistent with any National Environmental Standards.

Accordingly, this report is concerned with landscape matters, and more specifically the effect of utilities on the landscape with a focus on wind turbines and solar cells. It is acknowledged that the Section 32 report and final provisions of PC63 will consider other matters in addition to landscape. The officer's report will address ecological issues, which are outside the scope of this landscape report. Separate reports have been prepared on glare and noise effects of utilities, which will also inform the content of the Plan Change.

This report will cover the potential landscape effects from wind turbines, telecommunication towers and masts, electricity transmission lines and solar panels. The description of potential effects (Section 4) is based on our experience from various assessments of effects prepared for utilities proposals across New Zealand and a review of extensive research published by various New Zealand and international authors (see Section 9 References). The scale of utilities and related effects are discussed in the context of both domestic and commercial schemes.

The information on landscape values available for Christchurch City and Banks Peninsula varies significantly. In 2006 the Council engaged BML to prepare the Banks Peninsula Landscape Study to help resolve appeals on the landscape provisions of the Proposed District Plan. The study contains detailed

information about landscape character and values of Banks Peninsula and served as a reference document for this report (Section 3).

No detailed landscape study has been undertaken to date for Christchurch City, but various sections of the City Plan provide short descriptions of landscape values present in areas that have been identified as Outstanding Natural Landscapes, such as the Port Hills and waterways/estuaries. The Christchurch Public Open Space Strategy, reviewed for the purposes of this report, contains information about the management goals for open space within the City and Banks Peninsula.

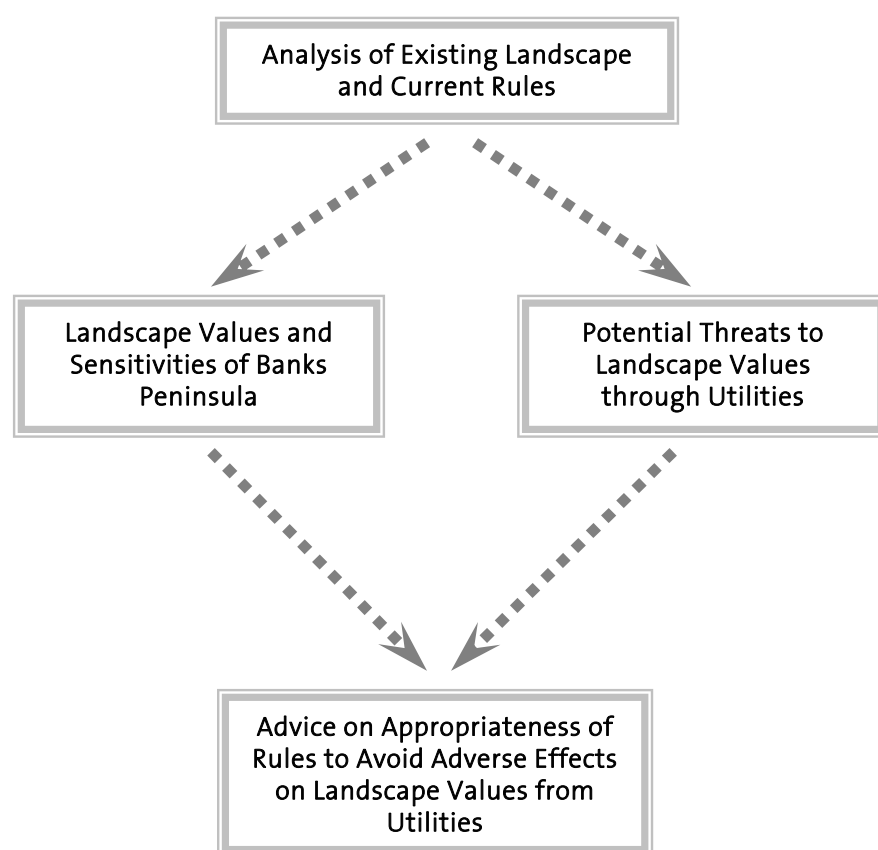
Following the identification of generic utilities effects and landscape values within Christchurch and Banks Peninsula, more specific landscape sensitivities are described in this report and recommendations for their protection from potential adverse effects related to the installation of utilities are made (Sections 6 and 7).

2 Methodology

The following methodology has formed the basis for this report. The methodology was agreed with the CCC Project Team at the start of the project. It was considered important to identify not only the key landscape issues that arise from the installation and operation of utilities, but to assess their potential effects against the existing values of the Christchurch City and Banks Peninsula Landscape.

All landscapes have values and their sensitivity to change is specific to the individual characteristics of a landscape, such as openness, naturalness, etc.

The key aspects of the methodology applied in this report can be summarised in the following diagram:



Assessment of existing landscape values and their sensitivity to change:

The first step involved a review of the City Plan, Christchurch Open Space Strategy and the Banks Peninsula Landscape Study (BML, 2006) to identify key landscape values that are sensitive to change through installation and operation of utilities. The key values and sensitivities relate to the identified Outstanding Natural Landscape and Coastal Natural Character Landscape areas, as well as the Main Ridgelines within Visual Amenity Landscapes (Rural Amenity Landscapes). In some cases landscape sensitivities may extend beyond these identified areas (eg other ridgelines and the remainder of the coastline within the Rural Amenity Landscape) and should also be given consideration.

Identification of key landscape issues arising from the installation and operation of utilities

Based on experience of previous assessments of various utility projects throughout New Zealand carried out by BML in the past, such as assessments of landscape and visual effects of proposals for windfarms, telecommunication towers and transmission lines, key landscape and visual issues relating to the

installation and operation of these and other utilities in the Christchurch City / Banks Peninsula landscape context have been identified. This includes an assessment of how domestic installations might impact on living areas, heritage items and protected trees, in terms of landscape.

Assessment of effectiveness of current methods employed by the City Plan and Banks Plan

Working with staff of the CCC Strategy and Planning Group, we have reviewed the existing methods currently employed by the City Plan and Banks Peninsula Plan. This task involved incorporating Council's knowledge relating to past consenting processes based on feedback from experienced Council staff.

Analysis of appropriateness of methods to avoid adverse landscape and visual effects

Following on from the information assessed within the previous tasks, advice was provided to Council on the appropriateness and robustness of the methods proposed in the Plan Change documents to address potential landscape and visual effects regarding utilities in Christchurch City and Banks Peninsula (written comments on Draft PC document dated 28/06/2011 were provided to A. Long/CCC). The findings were discussed with Council to identify the need for amendments to provisions. These revised provisions included commenting on requirements needed to address effects on sensitive areas (e.g. Outstanding Natural Landscapes, views to ridgelines and the coast).

3 Review of Existing Landscape Studies and Relevant Planning Documents

This section of the report provides a review of documents that contain relevant information in relation to landscapes within Christchurch City and Banks Peninsula District. An overview of 'special landscapes' identified in the Banks Peninsula Landscape Study, the City Plan and Public Open Space Strategy for Christchurch City is the key focus of this review.

3.1 Banks Peninsula Landscape Study (Boffa Miskell, 2007)

The landscape provisions in the Proposed Banks Peninsula District Plan had attracted considerable opposition over a period of ten years. In particular, the absence of a landscape study to identify the characteristics and values of the landscape was heavily criticised. The preparation of a robust landscape study was considered necessary by the Environment Court to resolve appeals. The study was completed in May 2007 and was used as a basis for mediation with the appellants and to inform the Environment Court hearing.

The scope and content of the Banks Peninsula Landscape Study was determined through a Court process and set out in detail. The preparation of the landscape study also involved wide-ranging consultation with appellants and the community, including an online preference survey and workshops.

The study was conducted in three stages including (1) landscape character analysis, (2) landscape value assessment and identification of Outstanding Natural, Coastal Natural Character, Visual Amenity and Heritage Landscapes. The third and final stage involved development of appropriate planning/management mechanisms to achieve desired outcomes. The planning mechanisms for managing future landscape change were developed as part of the study in collaboration with CCC planners. Mapping and landscape value identification for the study were based on site investigations and extensive use of GIS to incorporate physical, biological, cultural and land use data.

The methodology involved the following key phases:

1. Landscape characterisation: All the landscape character areas on the Peninsula were identified, mapped and described, using existing physical, biological, cultural and land use data and field work observation.
2. Assignment of values to the landscape¹: Four categories of landscape value were mapped: outstanding natural landscapes, coastal natural character landscapes, visual amenity landscapes and heritage landscapes. The categories reflected values assigned through extensive consultation with experts, stakeholders and the community.

¹ The attributes assessed during this phase of the study comprised the so called 'Amended Pigeon Bay' Criteria. Various Environment Court cases have reinforced the view that it is appropriate to consider this range of attributes/criteria in landscape assessments. These include:

- the natural science factors - the geological, topographical, ecological and dynamic components of the landscape;
- its aesthetic values including memorability and naturalness;
- its expressiveness (legibility): how obviously the landscape demonstrates the formative processes leading to it;
- transient values: occasional presence of wildlife; or its values at certain times of the day or of the year;
- whether the values are shared and recognised;
- its value to tangata whenua;
- its historical associations.

3. Identification of change scenarios and management mechanisms: Options, mechanisms and cost/benefit analyses for managing future landscape change were then considered, and recommendations made for achieving desired outcomes.

The first two phases of the landscape study have identified and described the features of the landscape that contribute to its high amenity and scenic values. Broadly these related to:

- the unique landform created by volcanoes with its resultant high legibility of its geological formation; and
- the mosaic and intimate character of land use which have evolved over time– the “consistent variety” in vegetation cover and land use; and
- the rugged and more isolated coastline of the outer bays back-dropped by wide open ridgelines.

A comprehensive consultation strategy linked to the assessment has given all interested parties opportunity for input to the study. Workshops with appellants and the community members and a public survey were carried out as part of the project. The landscape features emphasised as particularly important for the Banks Peninsula landscape in the public survey were:

- the coastline, particularly in the harbours;
- the prominent ridgelines that extend from summit to sea and which give uninterrupted views; and
- to a lesser extent, the bushed stream gullies that contribute to the landscape mosaic and small scale patterns on the peninsula.

Following the identification of landscape values throughout the Peninsula, various landscape categories were mapped as required in the brief (see section 5 of this report describing the landscape values in more detail).

Phase 3 of the Landscape Study was concerned with management of the landscape. The brief required that for each type of landscape identified (i.e., Outstanding, Coastal Natural Character, Heritage and Visual Amenity Landscapes), statutory and non-statutory management mechanisms are developed. These were required to be capable of being translated into District Plan provisions. In accordance with the brief the Study identified the types of mechanisms that would assist in achievement of desired landscape outcomes.

3.2 Christchurch City Plan

To date no comprehensive landscape study has been carried out for Christchurch City. The following summary gives an overview of relevant sections of the Christchurch City Plan, which provide protection for landscape and amenity values within the City. This includes important landscape elements of various scales, such as the Port Hills, waterways, Ecological Heritage Areas, and protected trees. This section contains summaries of relevant objectives and policies of the Plan and is structured to cover more general, large-scale landscape components first, followed by more specific features and areas, such as Protected Trees.

Natural values (6.3.5 Policy)

In recognition of the matters in Sections 6 and 7 of the Act, this policy seeks to discourage urban development which may adversely affect areas of outstanding landscape value, sites of ecological significance, or the margins of waterways or the coastline. While the urbanisation process is largely irreversible, it may be appropriate to recognise opportunities to set aside areas in public ownership for permanent protection where this is facilitated by the development process. Development which may create visual detraction, impede public access, result in the loss of ecological habitats, loss of vegetation, or a decline in water quality would not be favoured.

Rural Hills Zone (1.9 Objective)

The Rural Hills Zone extends from Godley Head in the east to Old Tai Tapu Road in the west and generally from the base to the crest of the Port Hills excluding existing urban development areas.

The topography of the Port Hills and its outstanding natural features, open landscape and rural characteristics, provide one of the most important visual amenities for the whole of the city, especially in terms of views of them from the city and views from them across the Canterbury Plains. Unique features that contrast these hills with the remainder of the plain on which the city is located, include large areas identified for their ecological heritage value comprising native flora and fauna, rock outcrops, tussock land, an imposing skyline, and upper spurs largely free of visible buildings. The zone recognises that the landscape values of the Port Hills are particularly important in much of the area east of Dyers Pass Road as these slopes form the back drop to the city.

Port Hills (2.7 Objective)

The Port Hills are an obvious landscape feature forming the backdrop to the City, and are also visible from beyond the district. The majority of the Port Hills consists of a rocky open tussock landscape which has a high proportion of indigenous plant species and which provides a remote experience in very close proximity to a major urban area. The Port Hills are considered an outstanding natural feature and landscape of national importance, and within the area are a number of internationally significant geological features, including prominent rock out crops and a number of volcanic dikes. It is acknowledged that the Port Hills are of significance to Tangata Whenua, and that it is important to consult with Tangata Whenua on issues regarding the Port Hills. The area is also important in terms of its scenic values for residents and visitors to Christchurch, with road access along the Summit Road, walkway networks and through the operation of the Mt Cavendish gondola.

The character of the Port Hills contributes to the visual amenity of Christchurch. Visually the hills are predominantly open tussock and grassland, particularly east of Dyers Road, and a mixture of exotic forestry and indigenous shrubland and bush west of Dyers Pass Road and in the gullies.

The open grassland contains features of considerable importance including rock outcrops, tussock land, native flora and fauna. The hills provide an imposing skyline and upper spurs which are largely free of visible buildings or structures, contrasting with the lower slopes which have become urbanised and dominated by housing and planting.

A major supporting statutory document is the Summit Road (Canterbury) Protection Act 2001, administered by the Summit Road Protection Authority consisting of representatives of the Council, the Banks Peninsula and Selwyn District Councils. This Act specifically controls structures, forestry and subdivision activities on upper slopes. The Council has a long term commitment to ensuring the majority of the Port Hills are publicly administered for both recreation and conservation purposes. The Council recognises that in large parts of the Port Hills the maintenance of environmental values is compatible with specific economic activity such as grazing or recreation.

The development of commercial forestry and use of the Port Hills for recreational pursuits will be provided for where they do not promote erosion, disturbance of the land or adversely impact upon the landscape characteristics. Areas of the Port Hills may develop over time to become forest and shrubland, particularly areas west of Dyers Pass Road.

Estuaries, waterways and wetlands (4.1.7 Policy)

The protection of the natural values of waterbodies and habitats is of prime importance and means these areas are generally less developed. Waterways, such as the Avon River, are significant natural features within urban Christchurch and this importance is emphasised by the relative scarcity of these environments in close proximity to the urban area. The City's rivers as shown on the Natural Environment Map (see Appendix Maps) are outstanding natural features².

Significant natural habitats and ecosystems contribute to the City's identity and origins in the landscape. Some development or change may be required where this enhances, conserves or restores those natural values as closely as possible to their natural state, for example, protection works along the margins of waterways. As their sphere of influence does not have a hard edge, recognition has been given to the need for buffer areas from adverse environmental effects of both land and water based activities.

Coastal Environment (2.6 Objective)

The coastal environment is defined as the area in which the coast is a significant element or part and includes the coastal marine area (which lies within the jurisdiction of the Canterbury Regional Council).

² In Volume 2 Section 2 of the City Plan, these are identified and mapped to include:

1. The Port Hills;
2. The coast;
3. The Avon/Heathcote Estuary;
4. The rivers;
5. Brooklands Lagoon; and
6. Grasslands.

The natural character of the coastal environment refers to the qualities and features which have been brought about by nature. The Avon-Heathcote Estuary, Brooklands Lagoon/Waimakariri River mouth and Scarborough Cliffs/Godley Head all contain important elements that constitute natural character for the City's coastline. Clear views along the beach frontages have been identified as a contributing factor of the natural character of the coastal environment. Particular reference has been made to the sand dune systems and their vulnerability to erosion and striking landscape qualities of the sea cliffs along the eastern coast. It is highlighted that sensitive management is required to ensure that this rugged coastal character is maintained and that is particularly important that the recreational value and visual quality of these cliffs is not compromised by inappropriate development. The recreational and wildlife habitat values of the coast and estuary are considered important attributes of Christchurch. The cultural significance to Tangata Whenua of the coastal environment and need for integrated management is also acknowledged in this section of the Plan.

Ecological Heritage Areas (2.4.1 Policy)

Colonisation and development has left the City with a landscape highly modified from its original natural state. Nature in Christchurch is now represented by still diminishing, small and often isolated fragments (with a few notable exceptions) of its former biological diversity.

Many of these remnants are unique to Christchurch and Canterbury. In some cases they are among the best remaining examples of their type on the Canterbury plains. The value of these natural remnants is not only scientific, educational and cultural but is also a guideline or measure of ecological sustainability within the City. The City's distinctive natural heritage is part of the unique character of Christchurch.

An ecological survey was carried out by the City and the conservation value of each area identified based on size, biodiversity, representativeness, rarity and naturalness of the sites and species occurring with them. Using these criteria the sites were given a ranking, with approximately 50 of these sites receiving the highest ranking. These sites are identified in the Plan as Ecological Heritage Areas and represent the majority of the pre-European nature of Christchurch. They are given protection under the City Plan in order that a representative sample of Christchurch nature is maintained for future generations and for their own intrinsic worth. Whilst the protection of these ecological heritage areas is sought, the Council is aware that a number of important sites are in private ownership with existing legitimate land use rights.

In broad terms, ecological heritage areas in the City include wetlands, woodlands, saline habitats, hill and plains forest, grassland and shrublands found within the Port Hills, low plains and the coastal environment. The Port Hills are the dominant landscape feature of the City and contain the City's largest remnants of predominantly native vegetation. The plains also contain some significant remnants of indigenous vegetation which are important to the natural character of the City. These unmodified dry grassland remnants are especially important as the great majority of the rural plains environment has been substantially modified by farming activities or urban activities. Of special significance are the McLeans Island grassland/shrubland and Kowhai woodland remnants which are among the best of the few remaining examples of their types on the Canterbury Plains. In contrast, the wetter alluvial flood plains and riparian areas of the City support wetlands and existing and regenerating native forest areas. Wetlands, such as Travis Wetland, Dickey's Road Wetland and Horseshoe Lake form vital links in the City's wetlands network important to the survival of native aquatic and wetland birdlife. Foremost among the forest remnants is the nationally important Riccarton Bush.

Surface waters of the City are a particularly important factor in its identity on an otherwise flat landscape, and the rivers, their margins and wetland areas are very important in defining the natural character of the City and providing potential links between natural area reserves. The coastal environment defines the eastern margin of the City and is a major recreational asset. The stability of the sand dune system along the eastern margin of the City is particularly important in terms of coastal hazards. In addition, the estuary, the rocky cliffs and the Brooklands Lagoon are vital components of the coastal environment, particularly their role as habitat for bird and aquatic life.

Protected Trees (Volume 3 : Part 10 Heritage and Amenities 2.5 Reasons for rules)

Protected trees are considered worthy of recognition on a number of criteria which may include:

- historic significance to the community;
- scientific or botanical significance;
- cultural or spiritual significance;
- recreational significance;
- landscape significance;
- functional value;
- size or age.

A tree may be protected for a combination of these factors, or because it is outstanding in one respect. The categories of protection contain two groups. These contain trees which are listed and categorised for protection on an assessment system and weighting based on the above criteria. Heritage trees have at least one or more factors which give them a metropolitan or wider significance and which makes them outstanding or unique. Notable trees are identified as important in the landscape of neighbourhoods, and while they may be a fairly common species, are large, old, have a high visual profile, or other character, which individually or in combination make them worthy of listing.

The last remnant of the lowland kahikatea forest once covering areas of the Canterbury Plains located within the Riccarton Bush reserve, is classified as a Notable trees area. The forest remnant contains a large number of mature kahikatea trees most of which are estimated to be between 300 to 500 years old, with the oldest up to 600 years old.

Special amenity areas (Volume 2 : Section 11 Living : 11.5 Objective External appearance :11.5.1 Policy)

While the previously described objectives and policies are aimed at protecting the City's natural landscapes and ecologically valuable assets, the following section addresses areas worthy or protection for their visual amenity values in an urban/ residential context.

A number of areas are identified in the Plan as Special Amenity Areas (SAMs). SAMs are areas in residential neighbourhoods that are distinctive from their surroundings and are considered to have a character worthy of retention. The reasons for identification, as such, will differ between areas. Special amenity areas have been identified for a number of reasons including any one or more of the following:

- consistent scale of dwellings;
- consistent age and style of dwellings;
- the lack of intrusions/infill, that is, the level of "intactness";

- the areas representative of a certain period of architecture or site layout;
- its contribution to the City's social history;
- the natural geographical topographical setting;
- the combinations of streetscape, tree planting and maturity of on-site vegetation; and
- the intimacy of the street scene.

Within the living environment are groups of buildings having a heritage value which are often representative of a particular architectural style and reflecting the social conditions of the period. These groups provide important pointers to the development of the City, in some cases contribute to the setting of listed heritage buildings and provide added value to the distinctiveness and variety of the street scene. These groups of buildings reflect a coherence, amenity and historic value that is worthy of recognition and preservation thereby protecting the diversity of the built form in the City, as well as contributing to its distinctiveness.

Since protecting the urban character of these areas is an important component in conserving the heritage of the City and enhancing amenity values generally, SAMs have modified, or additional, rules to the standard living rules in the City Plan.

3.3 Public Open Space Strategy (POSS)

The Public Open Space Strategy sets out a vision for public open space in Christchurch and Banks Peninsula over the next 30 years, the time span of the Urban Development Strategy. It provides a vision, goals, objectives and priorities to guide the efforts of the Council and its partners in the provision, development and maintenance of public open space.

Public open space is defined as any area that includes public parks and planted areas, waterways and streets that can be used for recreation or public health benefit, or to help protect the natural landscape. This can include green space (parks), blue space (waterways and coast) and grey space (streets, street malls or squares).

Christchurch City has a tradition of providing ample green open space, access to the outdoors and relative ease of access to rural areas and other desirable destinations. Public open space is provided by the Christchurch City Council (CCC), Environment Canterbury (ECan), the Department of Conservation (DoC) and charitable trusts.

Geographically, metropolitan Christchurch public open space is sited on an alluvial plain characterised by a patchwork of parks located at regularly spaced intervals linked by a grid and radial pattern of streets crossed by five main rivers. The metropolitan area is framed by the Waimakariri River to the north, the ocean to the east and the Port Hills to the south.

Banks Peninsula provides a vivid contrast to urban Christchurch. It is characterised by an eroded volcanic landscape centred on two caldera harbours, Akaroa and Lyttelton. The nature of the public open space on Banks Peninsula is also different. The publicly accessible park space in rural Banks Peninsula is widely scattered and in some cases access is difficult. The majority of publicly accessible land in the rural areas is contained within five large parks: Orton Bradley and Hinewai (managed by Private Trusts), Te Oka Farm and Misty Peaks (CCC) and Ellangowan (DoC). These areas cover more than 3500 hectares. Generally, most other parks are relatively small and concentrated in the main townships of Akaroa, Lyttelton and Diamond Harbour.

Outstanding attributes of Christchurch District public open space include:

- Hagley Park, the Botanic Gardens, Victoria, Cathedral, Latimer and Cranmer Squares, Worcester Boulevard, the City Mall and the Avon River provide an outstanding public open space framework for the central and western parts of the Central City with high natural and amenity and recreation values.
- Current provision of parks in suburban Christchurch is generally good with the majority of parks within easy walking distance of residential areas.
- Avon and Heathcote River environments provide two of the few natural corridors across urban Christchurch.
- The Port Hills parks network provides an almost continuous permanently protected landscape backdrop to the southern side of urban Christchurch.
- Summit Road between Evans and Gebbies Pass provides easy access to protected natural environments and views across urban Christchurch, while from Hilltop to above Akaroa permits panoramic views of Banks Peninsula.
- Banks Peninsula and rural fringes to the south and north of Metropolitan Christchurch contain significant areas of cultural and natural heritage and character as well as strong contemporary importance for Ngāi Tahu and their culture and traditions.
- Some of the best family swimming bays on Banks Peninsula, such as Wainui, Le Bons and Okains bays, are readily accessible and have public facilities.
- Large parks such as Hinewai, Misty Peaks, Te Oka Farm, Styx Mill Basin, Travis Wetland and McLeans Island provide core conservation havens for biodiversity and provide easy access to nature for urban residents.
- The Council's vision for the Styx River is to create a greenway across northern Christchurch.
- Development of a Waimakariri Regional Park by Environment Canterbury will provide enhanced public access to a potentially high quality natural environment for residents of northern Christchurch.

The Council has identified six concept plans, that provide an overview of how we plan to meet the goals and objectives. They include ideas of where future possible recreation routes may go (paths, tracks, walking and cycling routes), or locations and areas that may need an open space, i.e. a park, in the future.

3.4 Review of Effectiveness of Current District Plans in relation to Utilities

The Section 32 report prepared by the Council Planner for the proposed Plan Change 63 addresses the Statutory Framework in detail. The report also describes the implications of the NPS Electricity Transmission (NPSET), the National Environment Standards for Electricity Transmission (NESETA), NES Telecommunications (NESTF) and NPS for Renewable Energy Generation (NPSREG). This following section briefly outlines the key differences between the landscape relevant mechanisms in the current and proposed Utilities Chapters of both Plans, and evaluates their effectiveness.

Christchurch City Plan

The operative Christchurch City Plan provides for a range of utility structures. Except for lines and support structures for lines, these are generally required to meet performance standards and if they exceed the height and size standards defined for each zone will become a discretionary activity. In the rural zones of

Christchurch transmission lines are a discretionary activity, as long as they do not contain lattice towers. Transmission lines and support structures are treated as non-complying activities, except where replacing or maintaining existing facilities.

The NES Telecommunications links activity status for the installation and operation of a telecommunications facility in the road reserve with activity status in the district plan. It defers to district plans in relation to visual amenity, historic heritage, and protected trees.

While the current Utilities chapter addresses landscape effects to some extent, the proposed plan change emphasises the importance of ensuring that utilities are provided in a manner which takes account of potential adverse effects on the landscape, in particular in relation to Outstanding Natural Landscapes, Ecological Heritage Areas, the Coastal Marine Area, protected trees and historic heritage. The activity status in these landscape areas, which are particularly sensitive to change, has been elevated to non-complying for most utilities. This reflects the landscape advice provided in this document that it would be more difficult to absorb change associated with utility development in those parts of Christchurch which have particularly high landscape and natural character value and are identified under section 6 of the RMA.

Banks Peninsula District Plan

Currently, the District Plan rules in the Utilities Chapter (Chapter 36) of the Banks Peninsula District Plan allow utilities as permitted, restricted discretionary and discretionary activities where they comply with conditions, standards and terms aimed at avoiding, remedying or mitigating actual or potential adverse effects on the environment. While landscape effects have been addressed as an issue and through policies and objectives, the rules are relatively permissive. Any above ground utility, other than extensions to overhead lines, within Heritage Items, Recreational Reserves and Conservation Reserves Zones and the Outstanding Natural Landscapes, Coastal Natural Character Landscapes and Main Ridgelines as identified within the Rural Amenity Landscape are currently discretionary activities. Given the importance of these landscapes under s6 and 7 of the Act, non-complying activity status is considered more appropriate to ensure that adverse effects on the landscape can be fully assessed against the objectives of the Plan.

The proposed Plan Change (Variation12) provides a significantly higher level of detail regarding the types of utilities and their potential effects, including landscape and natural character effects. The Variation 12 proposes non-complying activity status for large-scale utilities, such as commercial energy generation, in the most sensitive parts of the Banks Peninsula landscape, including the ONLs, CNCLs, Main Ridgelines and the CMA. For the majority of the Banks Peninsula landscape, which has been identified as Visual (Rural) Amenity Landscape under s7c, small-scale utilities are permitted and large-scale utilities are discretionary activities. A buffer area around ONLs, CNCLs, Main Ridgelines and the CMA has been included in the proposed Utilities chapter to ensure that effects on the adjacent, most valuable parts of the landscape can be assessed for any proposal.

4 Overview of Potential Landscape Effects from Utilities

In this section of the report the potential landscape and visual amenity effects that could result from the installation of utilities, such as wind turbines, solar panels and telecommunication towers, are discussed in detail. The information has been collated from various resource consent applications prepared by BML for wind farms and cell phone towers, and additional research specifically undertaken for this project. A broad overview of effects will be given and general information derived from this research (see list of references in section 9) illustrated with examples of implemented utility projects in New Zealand and overseas.

4.1 Wind Turbines and Wind Farms

4.1.1 Visibility

Visual and aesthetic effects are often the most vocalised areas of concern expressed by the public about wind farm projects (National Academy of Sciences, 2007) because wind farms are highly visible due to their operational needs. Wind farms require elevation to capture wind, transmission lines for power entry and exit, access roads and large building platforms. For operational reasons wind farms can generally not be screened by surrounding planting or landform and the utilitarian appearance of commercial scheme often contrasts with a rural context. These factors combined make wind farms highly conspicuous to the public.

Viewing Distance

General visibility consists of what the human eye is capable of seeing at distance within a large scale landscape. The general overall visibility of wind farm turbines from distance is dependent on the size, orientation and surface of the turbines, atmospheric conditions and terrain in which they are positioned. Assuming optimum atmospheric conditions and no intervening landscape features, turbines are distinguishable to a viewer at a range of 15-20km from the turbine and clearly visible from 10-15km distance from the turbine (SNH 2002³). International literature refers to the Sinclair- Thomas matrix (see Appendix 1 for details) as a widely accepted guide for visibility of turbines. The Scottish Natural Heritage (2002) best practice guidelines provide the following guidance on general perception of a wind farm in an open landscape (p 10, table 3):

Distance	Perception
Up to 2km	Likely to be a prominent feature
2-5km	Relatively prominent
5-15km	Only prominent in clear visibility - seen as part of the wider landscape
15-30km	Only prominent in clear visibility - a minor element of the landscape

The Environment Court Decision (W031/2007) for West Wind windfarm in Makara near Wellington refers to a table with visibility effects with the following viewing distances (developed as part of assessment of visual effects for Te Apiti windfarm), para 111.

³ Publication Visual Assessment of Wind Farms, Best Practice for Scottish Natural Heritage by the University of Newcastle (2002)

Distance	Visual impact
<1km	Tend to dominate- potential for visual effect substantial
1-3km	Highly prominent- potential for visual effect substantial
3-6km	Still prominent - potential for visual effect moderate
Dominant: the feature has a defining impact on the view and is a focus of the view	
Prominent: the feature is clearly visible in the view and forms and important but not defining element	

Since the Sinclair- Thomas matrix is a widely accepted standard for visibility analysis, it is considered best practice to take the turbine height into consideration when determining the distances for visual impact. A 2km radius is widely accepted in international literature as a zone of visual dominance.

Turbine Height

It was found in various SNH publications that turbine heights greatly influenced the overall visual effects of a wind farm developments. A wind farm with fewer turbines of greater height generally has a more significant effect on the landscape than a wind farm with a greater quantity of turbines of much lesser height (SNH 2002). Consideration needs to be given to the heights, layout and numbers of turbines in a windfarm because the visual impact of a larger number of smaller turbines may be lower (as they are in a scale related to the landscape character) than a windfarm with a smaller number of larger turbines which may in turn be perceived as having a higher visual intrusion level owing to their lack of apparent size-similarity with the horizontal bands in the landscape into which they are to be inserted.

The selection of small scale turbines (for example reduced height of 15m to the top of the tower and 20m to blade tip) in a location where the landscape's topography can help to reduce visibility and the majority of key viewpoints is located at a distance of 5km or more, can help to minimise the effects of wind farms in the landscape (eg BML, Matakana, 2011).

Proportional Visibility

The position of wind turbines in relation to the horizon affects the visibility of the turbines. If the turbines are mostly positioned below the horizon only parts of the structure may be visible such as the moving rotor and blades, causing an unusual movement above the skyline. It has been found that visibility of the whole structure e.g. the tower and blades against the skyline has less impact and is more visually coherent to the viewer (SNH 2002) than just fragments of a turbine in view only. Useful photographs exemplifying poor placement of turbines are located in the United Kingdom Environment and Heritage Service (2008) Wind Energy Development in Northern Ireland's Landscapes. Draft Supplementary Planning Guidance to accompany Planning Policy Statement 1 'Renewable Energy' pages 52-54(UKEHS 2008)

Light Conditions

The 2002 SNH publication found that direct sunlight shining on the turbines for intermittent or consistent periods of time increases the prominence of the turbines when viewed from a range of distances and angles. Glinting of the blades in sunlight, backlighting of turbine structures and flickering shadows⁴ (known

⁴ Definitions:

as shadow flicker) from the movement of the blades were all identified as effects of light shining on the turbines (SNH 2002). Shadow flicker has been identified as an effect for people living in proximity to a wind farm, where it is identified as a distracting element in the overall landscape and in some cases a setback of 300m from public roadways is required (National Academy of Sciences, 2007).

Mounted lighting is required for each turbine to ensure aircraft avoidance of the general wind farm area. This may cause adverse effects to residents and other user groups by making the turbines a feature in the night time landscape (National Academy of Sciences, 2007).

Seasonal light conditions and the variation of viewing populations from winter to summer were also considered a factor when minimising the effects of light reception by Wind Farms in the 2002 Scottish Natural Heritage study.

Placement and Movement of Blades

Movement was detected at a distance of up to 15km in clear conditions or conditions of strong contrast between the turbine and its context in the 2002 SNH report. A lesser effect of movement was experienced at a 90 degree angle to the prevailing wind condition (SNH 2002).

Placement of turbine structures within a wind farm can affect the visual experience of a receptor. Turbines that are placed too far apart can have a scatter effect where the turbines appear to span a larger, more dominant area of the landscape and consequently the wind farm is no longer read as a coherent group (UKEHS 2008).

Colour and Contrast of Turbine Structures

Wind farms are generally elevated above the viewpoints they are seen from and therefore the turbines are often viewed against the skyline. To reduce visibility in these circumstances it is recommended that turbine colour should be off-white or pale grey tone as the majority of views of the turbine will be against a backdrop of a clear or cloudy sky (SNH 2002). The SNH 2002 publication found that the majority of turbines assessed in their Scottish study were dark grey and grey. The most common skyline views were of contrasting tones; Dark grey turbines seen against a lighter sky or vice versa (light turbines against a dark sky) and were apparent from middle to long range (5-15km) below the wind farm site (SNH 2002). Uncommon points of colour contrast were from backclothing where public viewpoints were at a higher elevation than the wind farm causing the turbines to be viewed against a background of hills, structures and vegetation (SNH 2002).

Landscape character and sensitivity greatly influences the actual and perceived visual effects of wind farms. Landscape character can be altered by the placement of a wind turbines, in particular for commercial wind farms with a high number of large turbines. This change can be minimised by the selection of a site where viewing populations are low, public viewpoints distant and the character of the existing landscape is already modified, containing other landscape and built features (BML, Matakana, 2011).

Viewer Perceptions

“The essence of aesthetics is that humans experience their surroundings with multiple senses. We often have a strong attachment to place and an inherent tendency to protect our “nest”. Concern over changes in

Glinting: Occurs when the sun is reflected directly into the eye of a viewer. Can occur over distances up to 12km.
Flickering: Occurs when the movement of the wind turbine blades casts a flickering shadow on the tower. Can be observed from 3km to 5km distance away from the turbine. (SNH 2002).

our personal landscapes is a universal phenomenon. Public perceptions of wind-energy projects vary widely. To some, wind turbines appear visually pleasing, while others view them as intrusive industrial machines” (National Academy of Sciences, 2007).

Viewer perceptions are formed and influenced by many subjective and unquantifiable factors including memory, familiarity, emotion, experience, visual capability and depth perception. Generally wind farm developments are supported by the public, however, new development within proximity to communities are often fiercely opposed by local people due to some of the factors outlined above (SNH 2002).

4.1.2 Construction Effects

Access roads to turbine site platforms require earthworks which will be visually apparent during the construction phase of a wind farm. In some instances these access roads are also required for ongoing maintenance of turbines and equipment. Earthworks can have a major impact on landscape character because of the high modification rate of large areas within the landscape. Due to the elevated nature of most wind farm sites access roads and turbine platforms often require large amounts of cut and fill, are highly visible and do not always follow the natural contour of the land. However, the following factors can help to minimise adverse construction effects on the landscape:

- Minimising the area needed for access roads
- Utilising existing tracks where possible reduces the need for earthworks
- Implementing mitigation planting over a progressive time period immediately following completion of earthworks limits the extent of site disturbance over any one time and accelerates rehabilitation.
- The placement of tracks on flatter terrain, following the natural contour of the land minimises significant cuts across the visible faces of slopes.
- Avoid construction of access roads in proximity of local waterways water to avoid effects on water quality related to vegetation clearance and earthworks
- During construction phases the use of productive land may be prohibited which may affect agricultural landuse. Generally grazing is possible once wind farms are operative.
- Temporary on-site facilities, such as concrete batching plants are less visually obtrusive if located in areas of low visibility. They are generally removed after the completion of construction.
- Increased traffic on local roads as a result of construction may occur (eg noise, dust effects, etc).

It is during the construction phase that ecosystem effects are at their greatest as large access roads, site offices, laydown areas, construction zones, excavation and other related construction activities are in place.

Effects on ecosystem structure are dependent on vegetation and landscape components that exist on a wind farm site prior to construction. As a result effects on ecosystems vary depending on landscape type i.e forest, ridgeline or coastal. Vegetation and forest clearance can lead to changes in microclimate around a turbine resulting in a modified ecosystem structure. Estimates of approximately 3 acres have been made regarding the area of potential surface disturbance for each turbine. If severe alteration of landcover occurs in numerous turbine locations throughout an area it can result in habitat fragmentation and overall reduction in the function and quality of the ecosystem (refer to National Academy of Sciences, 2007). These effects are generally covered as part of an ecological expert assessment but have some landscape implications.

4.2 Telecommunication Towers and Masts

Comprehensive design guidelines covering effects and potential design responses have been prepared by Earl Bennett Landscape Architects (2005) for Christchurch City Council and telecommunication providers. The report illustrates various structures in different landscape contexts. The following section provides a summary of the key findings.

The contrast between telecommunication structures and their settings creates visual impact, relating to the visibility of the structure and the contrast of the utilitarian character of the structure and its surroundings. These effects are dependent on the height, bulk and scale of the tower in relation to their location in the existing context. The contrast of a structure to its surroundings can also relate to its colour, form, and line. Viewing distance of the main receptors, the type of receptor, the landscape context, including existing landscape modification, amenity values and their sensitivity to change are external factors that influence the significance of effects. The perceived contrast is the result of a subjective evaluation, such as a modern element in an historic setting. While there are instances where large communication structures contrast dramatically with their settings, but are accepted as landscape elements in their own right, these instances are limited and in most instances visible harmony between the structure and the context is more desirable.

As summarised by Bennett (2005) the design responses to reduce adverse visual effects of structures can include (p.7):

- *place the structures in utilitarian settings*
- *reduce visual contrast by painting or colouring the structure so that it blends in with its environment*
- *develop fitting scale relationships between structures and context*
- *reduce visible contrast by reducing the size, bulk, complexity and density of the structure as much as possible*
- *remove the structures from view, reduce the frequency and duration of views, or reduce the number of viewers*
- *make the structure look like something else, ensuring that the 'something else' is fitting for that setting*
- *shaping, colouring, and placing structures which are on or near buildings so that they are integrated with those characteristics of the buildings*
- *arrange the elements of the structure to form a visually pleasing sculpture*
- *arrange groups of structures to form a unified visual composition*
- *buildings that are designed to better accommodate telecommunications structures*

The character of an area determines at a broader scale if contrast between utilitarian structures, like antennas, and the settings will occur and if they will be perceived as appropriate in their context. Bennett (2005) drew the following conclusions about the appropriateness of structures in a variety of contexts (p.8):

- *Open space, recreational areas, and historic precincts are places where the maintenance and enhancement of pedestrian and amenity values are considered important. The contrast in character between these places and antenna structures will usually be great. Locating them in these areas should generally be avoided, or special measures taken to camouflage or conceal them.*
- *Residential areas also have an expectation of amenity that can be adversely affected by the contrast in character between antenna structures and the setting. Any such structures in these*

areas should be as small and simple in design as possible and given great care in their location relative to existing dwellings.

- The contrast in character is less in most commercial and industrial areas, so antenna structures are encouraged to locate there. But they should generally be avoided in smaller scale neighbourhood commercial areas.*
- In the central city, antennas should be given specific design attention is to integrate them with the building forms.*
- Much of the rural zone can visually absorb antenna structures, if care is taken in design, location, and restoration. At a more detailed scale, antenna structures are to be sited so that they do not conflict in character with the immediate landscape surroundings. Examples of such contrast are when such a structure is placed within a precinct of historic dwellings or in an important public green space.*

Visual and landscape effects vary between types of structures, depending on their size, scale and way of mounting on the ground or on buildings.

Freestanding Antennas

Height is not the only important factor in determining the visual impact of these installations. Often the effects are determined by the materials, visual density, and diameter of the mast and the size and density of the antenna array and their colours relative to the background. In rural areas, the access track and power supply on hilltop installations can have an impact that is greater than that of the antenna. Panels mounted with single rather than double arms make for a simple structure that is more acceptable visually if seen from some distance. Guyed masts are of smaller diameter and therefore have less visual impact from a distance than larger diameter ones, but the need to be guyed increases their footprint and visual impact at close range. They are, therefore, better in rural contexts. Slimline masts with flush mounted antenna panels and single poles with whip antennas can have small visual impact, and the connection between the height of these structures and their visual impact is not as strong as for bulkier utilities.

Building mounted structures

The visual effect on the skyline and the detracting from the form of the building are important aspects of building mounted structures. Building mounted structures are frequently seen on the taller buildings in the centre of the city. The central city is intended to be a primary focus for community, business, tourism, and culture; it is also generally expected to have high architectural quality and buildings of appropriate external appearance. The installation of antenna structures in this area, therefore, requires special attention to their design and location and to building design to accommodate them. The effect of building mounted structures depends on the height of the building and its context. Where there are many tall buildings, the roof top installations are less apparent within the area and generally have little effect from street level, but the effects on the skyline and building form are apparent from outside the immediate vicinity of the installation. Where a tall building is in a more isolated position, or towers over its neighbours, the visual effects of the roof top installation may be greater.

Dishes and panels

Dishes and panels can be mounted on buildings, masts or directly on the ground. Freestanding dishes are more common in rural settings and have been rare to date in the urban environment where they are more frequently mounted on buildings. They can be up to several metres in diameter and their colour can vary. Density of the dishes varies from solid to visually permeable mesh. Relative scale between the dish and its setting is an important consideration in location and design. If mounted on buildings, dishes and panels

should be placed within the visual envelope of the building, wherever possible, avoiding placing them so that they are seen against the sky. The dish should be in scale with the building it is mounted on.

Equipment boxes and cabinets

These can vary from large boxes the size of shipping containers to very small cabinets at the side of the footpath. The visual impact of the larger boxes comes mainly from their form; colour can increase or diminish this effect. The forms of small cabinets are generally appropriate for their settings if they are appropriately located; the visual impact is mainly from their finish. Graffiti can call attention to them and increase adverse visual effects. In rural locations, they can usually be accommodated with care in their siting, and finishing them in a colour that is absorbed by the background.

Co-location of structures

Locating utilities together has been regarded as a way of reducing adverse effects by concentrating them at one location. This is effective for utilities at ground level, like equipment boxes and water tanks, but can have the reverse result when used for tall antenna structures. Where two or more tall antenna structures are close together, their contrast with the setting and their adverse effects can be more pronounced. Depending on the landscape, the spread of cell phone towers over numerous high points can have a greater visual effect than clustering of utilities in one location.

Masts and antennas are often located alongside roads, which means that these telecommunication utilities can often be found in highly visible public spaces. Cell phone and other utility towers are often clustered in elevated locations for economic purposes and to achieve maximum coverage. Whilst co-location can in some instances result in cumulative visual effects the operational benefits often outweigh the visual effects.

4.3 Electricity Transmission Lines

The types of transmission poles varies greatly in design, height and appearance. While local 33kv single circuit lines are visually unobtrusive with short (around 13m high) single poles, the larger 110kv and 220kv lines have more significant landscape effects. Some 110kv lines have single poles at a height of about 16m, but most higher voltage lines generally utilise lattice tower structures with an average height of 24m. The largest lattice towers for double circuit 220Kv lines are between 32 and 47 metres high, which significantly increases their visibility and effects on the landscape character of the surrounding area.

Existing transmission lines and corridors help pave the way for upgraded or new networks to be put into the landscape as they are already an accepted part of the local landscape. Elevation and proximity to private dwellings and public viewing areas, such as state highways and popular local roads, increase the visual effects of a transmission line. Generally, in assessments of transmission corridor/ route options, elevated land or areas in close proximity to existing dwellings and public viewpoints (e.g. roads) are the least preferred from a landscape and visual perspective. Conversely, areas with low elevation and with larger separation distances from existing dwellings and public viewpoints generally have greater visual absorption capability, reducing landscape and visual effects. In lower and more expansive landscapes taller towers and lines can be more easily visually integrated into the landscape with less prominent effects than in landscapes with topography changes. In landscape with topography contrasts, such as rolling hill country and valley landscapes, locally renowned landscape features are common and are usually visually interfered with by transmission lines. Generally, linear modifications, such as transmission lines, can be absorbed

more readily if located along the boundaries between landscape types, such as the base of a mountain range where the valley floor meets rising slopes. Spanning public roads at perpendicular angles helps minimise the potential extent of visibility on approach and when passing underneath and beyond the transmission lines (BML, 2010).

Interference with Outstanding Natural Landscapes and other areas of designated high value, such as high ecological or natural character value, should generally be avoided for route selection for transmission lines, as they have the potential to adversely affect the visual and environmental quality of such areas. Distinctive rural areas can also be sensitive to change, since the ability of such areas to visually accommodate a transmission line without compromising rural landscape values can be problematic especially where areas are viewed by large numbers of the public.

4.4 Photovoltaic Systems (Solar Panels)

Solar panel mounts fall into three primary categories: flush mounts, roof/ground (or universal) mounts, and pole mounts. Flush Mounts are typically used with small solar arrays on rooftops, because the structural design of a flush mount cannot support large solar panels. Flush mounts are simple and cheap to install and their visual effects are relatively low, since they blend in more readily with the roof structures they are mounted on. Roof-Ground mounts can be installed both on the ground and on rooftops. Roof-Ground mounts are typically constructed by a grid-like system of supports, and are typically bulky and unsightly, and in the United States many cities and neighbourhoods have passed ordinances against them for aesthetic reasons. Pole mounts are differentiated by how they are positioned on the pole, and their size and height can vary significantly. The visual impacts of these structures is determined by these design parameters.

Small scale domestic solar systems have potential to become more popular and to reduce the need for transmission lines crossing the landscape in the future. No extra land is required for energy generation for most domestic panels systems, which are generally incorporated into the existing building footprint. However, commercial, central systems are generally ground or pole mounted and can cover large areas of land. The landscape and visual effects are therefore very different and have to be addressed separately.

Domestic solar panels can be integrated into the facade or roof of a building to make them more aesthetically pleasing and less obvious. Solar panels have the potential to affect visual amenity values of buildings due to their elevation, reflectance qualities and contrast with the building materials surrounding them. The choice of colour and texture of the surrounding materials determine the visibility of the panels.

To generate large amounts of energy solar panels require a large surface area and can become visually intrusive because of their reflective glare and geometric pattern. Solar panels can have an 'artificial' 'high tech' appearance when viewed on mass. Visual impact is dependent on the size and type of solar panel and its support structure, as well as its location, i.e. in a highly receptive landscape or non receptive landscape. Their integration into a landscape depends on the sensitivity of that landscape.

The visual impact of solar systems can often be subjective and can rely on the individuals perception of solar energy and its appropriateness within the landscape. Similar to wind farms the visual effects of large scale, commercial solar systems are dependent on the distance of the receptor from the system, the elevation of the system and or the receptor, atmospheric conditions and the systems integration or lack of integration into the surrounding landscape.

Glint and glare⁵ can cause enlarged and temporary increases in brightness and visibility depending on the location of the viewer and atmospheric conditions; The nature and magnitude of potential glint and glare-related visual impacts for a given solar facility is highly dependent on viewer position, sun angle, the nature of the reflective surface and its orientation relative to the sun and the viewer, atmospheric conditions, and other variables. The determination of potential impacts from glint and glare from solar facilities within a landscape requires precise knowledge of these variables.

⁵ Glare: “The sensation produced by luminances within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility”

Glint: “A momentary flash of light resulting from a spatially localized reflection of sunlight” (Solar Energy Development Programmatic EIS, 2010, pp 13.1-175)

5 Identification of Landscape Values

5.1 Introduction

The RMA's references to landscape are both explicit and implicit. In "Landscape Planning Guide - For Peri-urban and Rural Areas", Raewyn Peart suggests that the Act ...*"enables the identification of four broad categories of landscapes which merit more dedicated focus in regional and district planning, each with slightly different management objectives: outstanding natural landscapes, landscapes which contribute to visual amenity and/or the quality of the environment, areas of the coastal environment with high natural character and areas with cultural or heritage significance. These categories are overlapping and interconnected and may not always have distinct boundaries."* She goes on to observe that *"Although landscape management, like any other environmental management exercise, is necessarily going to focus on some priority areas, there is a need to be concerned for the maintenance and enhancement of landscape quality everywhere. All landscapes arguably merit some management consideration under the 'sustainable management' purpose of the RMA and the requirement to avoid, remedy or mitigate adverse effects of activities on the environment."*

From a technical landscape perspective, the purpose of management may be characterised as:

- a) avoiding the inappropriate erosion of the intrinsic characteristics and qualities that have built up in the landscape over time through the interplay of natural and cultural processes; and
- b) enabling development and change to occur that avoids the loss of landscape coherence, diversity and cultural identity and meaning.

This landscape perspective is packaged within the RMA under a number of matters of national importance (RMA Section 6) and other matters to which the Council is required to have particular regard (Section 7). The RMA is concerned with the 'natural character of the coastal environment, wetlands, and lakes and rivers and their margins' (6(a)), 'outstanding natural features and landscapes' (6(b)), 'historic heritage' (6(f)) and 'landscapes which contribute to visual amenity and/or environmental quality' (7(c) and (f)).

'Protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna' (Section 6(c)) and 'the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga (Section 6(e)) are also linked to a broad understanding and valuing of landscape.

Natural features and landscapes that do not meet the criteria for being ranked as "outstanding" can be required to be "maintained and enhanced" either as "amenity values" or part of the quality of the wider "environment" under S.7(c) or S.7(f). Thus, for example, coastal landscapes or rivers or lakes that were not "outstanding landscapes" would still be required to have their "natural character" preserved under S.6(a), or areas of indigenous vegetation or habitats of indigenous fauna that were not considered "outstanding natural features" under S.6(b) will require protection under S.6(c).

The recent release of the New Zealand Coastal Policy Statement (NZCPS 2010) has highlighted the need for identification and mapping of special landscapes occurring within the coastal environment. Policies 13 and 14 of the NZCPS (2010) have been dedicated to the preservation and restoration of natural character.

This includes the identification and protection of coastal landscapes with high or very high (outstanding) natural character⁶.

The National Policy Statement on Electricity Transmission also highlights in its policy 8 that adverse effects from transmission systems on outstanding natural landscapes, areas of high natural character and areas of high amenity should be avoided. It is acknowledged that this is considered in the context of s5 of the RMA, which requires a balance with other aspects of sustainable management, such as social, economic and cultural well-being of communities.

In the Banks Peninsula Plan (see Figure 3 Appendix 1) Coastal Natural Character Landscapes (s6a), Outstanding Natural Features and Landscapes (s6b) and Visual Amenity Landscapes (s7c) have been outlined, while the Christchurch City Plan identifies areas of high natural character (s6a), Outstanding Natural Features and Landscapes and significant remnants of indigenous vegetation/ wetlands (s6c). As shown in Figure 1.

5.2 Identified Landscape Categories in Christchurch City and Banks Peninsula District

Outstanding Natural Features and Landscapes (ONF/L)

These are the landscapes with the most significant values as assessed in relation to the statutory requirements of Section 6(b) of the Resource Management Act. The Act imposes a duty upon the Christchurch City Council to ensure that these features and landscapes are protected and the intended outcome for Outstanding Natural Landscapes is to avoid further modification of these areas and the outstanding natural features within them. Activities and structures which may potentially modify, obscure or alter the particular values identified are therefore to be discouraged from occurring e.g., sky-lining an outstanding ridge line, or the planting of trees around an outstanding geological feature. It is therefore anticipated that higher or stricter levels of control would be imposed in the Outstanding Landscape (see Banks Peninsula Landscape Study).

These were the landscape features within Christchurch City and Banks Peninsula that were identified as highly legible and expressive of their formative processes:

- the legibility of the Akaroa and Lyttelton Crater Rims are exceptional;
- the volcanic layering of the Mt Bradley, Mt Herbert and Mt Evans summits and upper slopes are also exceptional;
- Kaitorete Spit is highly legible particularly where it is actively forming;
- there are several isolated landform features that are highly expressive of particular volcanic and erosive activity including selected dykes, domes and vents, and various rocky summits;
- the smooth slopes around the outer coast were considered to be expressive but arguably of lesser significance. However, the geologically recent Diamond Harbour slope below Mt Herbert is the most expressive of these volcanic slopes
- Port Hills with numerous rock outcrops and volcanic dykes

⁶ Policy 13 (c) assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character;

In terms of natural science aspects of Outstanding Natural Landscapes the following attributes and features were considered important in the Banks Peninsula Landscape Study (BPLS) and Christchurch City Plan (the Plan):

- geopreservation sites;
- selected domes, dykes and vents;
- indigenous forest remnants and regenerating indigenous vegetation, including indigenous shrubland and bush on Port Hills west of Dyers Pass Road and in the gullies
- current reserves and covenanted sites (including DoC, QEII, Council owned and Banks Peninsula Trust Reserves).
- open grassland on the Port Hills contains features of considerable importance including rock outcrops, tussock land, native flora and fauna
- significant natural habitats and ecosystems along the waterways, estuaries and wetland in Christchurch City
- Ecological Heritage Areas in the City include wetlands, woodlands, saline habitats, hill and plains forest, grassland and shrublands found within the Port Hills, low plains and the coastal environment (see section 3.2), including the Port Hills, Avon River, Coastline and Estuary, Riccarton Bush, Travis wetland, Dickey's Road Wetland, Horseshoe Lake, Brooklands Lagoon, McLeans Island grasslands and Kowhai woodlands which have been identified as particularly valuable.

Aesthetics were a central concern of the respondents to the public questionnaire undertaken as part of the Banks Peninsula Landscape Study. The key features that contribute to landscape quality, drawn from the questionnaire returns, were as follows:

- prominent ridgelines;
- absence of development;
- rugged landforms, especially exposed coastlines;
- a balance of farming and native vegetation;
- open ridges with uninterrupted views;
- natural (organic) vegetation patterns; and
- evidence of heritage or historic settlement.

These findings strongly support the view that much of the Peninsula is seen as displaying exceptional aesthetic quality. It is a picturesque or sublime landscape. In places this quality reflects the complex landforms, forested streams and gullies, a mosaic of land uses, unspoilt and convoluted harbour coastlines, and secluded settlements. In others, it is the wild and dramatic landscape of rugged peaks and outcrops, spectacular coastlines and panoramic views that are impressive. The proximity of these 'different' landscapes is a particular aesthetic quality of the Peninsula. However, the wild and natural landscapes are only one expression of the Peninsula's aesthetic quality and the settled Peninsula landscape is also highly attractive. These settled landscapes refer to the working landscapes which may be described as predominantly cultural rather than natural. The BPLS study team concluded that while these landscapes are highly attractive they are more accurately described as visual amenity landscapes rather than outstanding natural landscapes. Consequently, the mapping of outstanding landscapes was restricted to the wild Peninsula landscapes. The settled landscapes are addressed under Visual Amenity Landscapes (later referred to as Rural Amenity Landscapes).

The shared and recognised values within Banks Peninsula and Christchurch are highly varied. The following attributes have been included to define the shared and recognised aspects of outstanding landscapes on Banks Peninsula:

- Key viewpoints, which are predominantly found in elevated areas around the crater rim
- Reserves with walking tracks
- Favourite places identified by respondents in the public survey
- For Christchurch City the list of natural, cultural and recreational assets that are highly valued by the community and visitors alike would be long and varied and summarising them would extend beyond the purpose of this report.

As part of the BPLS consultation has taken place with Tangata whenua and a separate report was prepared. To Tangata whenua, the landscape values of the Peninsula are distinct from a western perspective. The consultation report highlighted that Ngai Tahu view Te Pataka a Te Rakaihautu in its entirety as being an outstanding significant landscape. The importance of the Port Hills to tangata whenua is also mentioned in the Plan.

Natural Character

Coastal Natural Character Landscapes (CNCL) under the Banks Peninsula Plan

As part of the BPLS the brief required the identification of Coastal Natural Character Landscapes (CNCLs). The study area for the BPLS was defined by the mean high water spring line around the Peninsula coast, excluding the Coastal Marine Area (CMA). The identified CNCLs are therefore all located on landward side of the mean high water spring line. While the CMA lies outside the district boundary, it is nevertheless considered a s6a matter. In accordance with Section 6(a) of the Act the Coastal Natural Character Areas are highly valued for their naturalness and lack of obvious modification. Similar to the Outstanding Natural Landscape the intended outcome is to retain an unmodified environment in the immediate vicinity of the coastal margin (land/water interface). This outcome is concerned with an absence of structures and exotic planting and avoidance of human induced change to the contour of the land, with a predominance of natural character. However, natural character is a dynamic quality.

The importance of coastal natural character has been addressed separately for:

- 1) the Peninsula's outer coastal environment; and
- 2) the harbours.

This contextual differentiation is justified by a shift of emphasis from natural processes in the wilder coastal environments (the actual dominance of nature) to natural patterns within the harbours (where the appearance of natural character provides a balance to more heavily developed areas). Much of the southern and eastern coastline of Banks Peninsula has been identified as having high natural character. Within the harbours and along the north coast less continuous areas of the coast are identified, but due to the greater pressures on these areas their importance may be elevated in the public's perception.

Natural Character under the Christchurch City Plan

Within Christchurch City no assessment of natural character has been undertaken to date. However, natural character issues may arise in relation to its coastline, lagoon, estuaries, rivers and wetlands, which are addressed in various sections of the Plan (see review section 3.2 of this report). The natural character

of these landscape features varies significantly throughout the City depending on the intactness of the natural elements, patterns and processes and the level of modification from human development.

The natural character of the coast and lagoon has been covered under policies for the coastal environment, while the estuary, waterway and wetlands are dealt with under a separate section of the Plan. Both refer to natural character and are relevant in this context. The assessment of Ecological Heritage Areas undertaken by CCC may also provide relevant information about the ecological aspects of natural character for these landscape features.

The wetlands and waterways within Christchurch contain important ecological and landscape values, which are briefly described in the Plan. This includes areas that have been identified in the Plan under s6a / b of the RMA (see Figure 1), in particular the Waimakariri, Styx, Avon and Heathcote Rivers. The important wetlands, such as Travis Wetland, Horseshoe Lake and Wilson's Swamp have been identified under s6c for their important remnants of indigenous vegetation. However, these ecological attributes also contribute to the natural character of these areas.

A large proportion of the landward area of the coastal environment is in public ownership, particularly around the margins of the Heathcote/ Avon River estuary, Brooklands Lagoon and along the coastal dunes system (along New Brighton Beach between the estuary and Waimakariri River mouth). A fairly large proportion of the coastal cliffs and bays between Mt Pleasant and Godley Head is also in public ownership, particularly east of Taylors Mistake. These parts of the City, together with the estuary have particularly high recreational value. The estuary also is important for recreation, particularly sailing activities which do not involve extensive use of powered craft, and it is also a major wildlife habitat. The sand dunes are identified as a vulnerable ecosystem with high susceptibility to erosion. The coastal cliffs to the east of the city (from Recliffs / Sumner to Godley Head) are a prominent geological and landscape feature.

The Plan highlights that the coastal environment has a high degree of sensitivity and vulnerability to modification which needs to be protected from inappropriate development. The importance of undertaking the management of the City's landward coastal environment in a manner consistent with that of the coastal marine area is acknowledged in the Plan. This should help to ensure that any activities do not compromise the natural values of these areas. It is also acknowledged that the coastal environment is of significance to Tangata Whenua and that it is important to consult with Tangata Whenua on coastal management issues.

Visual Amenity

Rural Amenity Landscapes/ RAL under the Banks Peninsula Plan

This landscape category applies to the balance of the Rural Zone on Banks Peninsula, all of which is considered to be of high aesthetic quality (see ONL/ aesthetic values). These qualities are a result of small scale development and land use creating a mixed pattern or mosaic of activities in a varied topographical landscape e.g., bush and pasture with housing dotted in-between. There is an absence of large scale and concentrated development and the desired outcome sought is to perpetuate this scale and variety of activity in the landscape and avoid the domination of particular activities and land use. However, in recognition of the working landscape character and existing level of modification the Council has a reduced level of control in these areas identified under s 7c of the RMA and development which is in scale and character with the existing environment, is to be expected in the RALs.

The landscape features emphasised in the public survey for the Rural Amenity Landscapes are:

- the coastline, particularly in the harbours;
- the prominent ridgelines that extend from summit to sea and which give uninterrupted views; and
- to a lesser extent, the bushed stream gullies that contribute to the landscape mosaic and small scale patterns on the peninsula.

Prominent ridgelines and spurs are key features that contribute significantly to the landscape character and amenity of Banks Peninsula. Often they are extensions of higher lying outstanding landscapes, but do not contain the same outstanding attributes or have a higher degree of modification than the ONLs. The major ridgelines, which often form the skyline from numerous viewpoints and contain visual catchments, have been mapped as part of the BPLS. While the Main Ridgelines identified within the RAL (s7c landscapes) may not have the same range of landscape values as ONLs identified under s6b of the RMA, their visual sensitivity is considered particularly high. This warrants a similar level of control, and therefore particular rules to avoid the introduction of structures on the ridge / skylines have been introduced in the Plan.

Rural Amenity under the Christchurch City Plan

Most of the urban area of the City is located on the plains, as is most of the rural area which has been subject to major modification. However, there are remnants of indigenous grassland, particularly in the western and north-western areas of the City, which retain a largely open character and although modified to some degree, still retain a number of characteristics typical of pre-European settlement. Recent work undertaken on behalf of the Council demonstrates that the indigenous plant associations remaining are significant in terms of Sections 6 and 7 of the Act and require recognition, particularly as they are the best remaining examples of dry native Canterbury grasslands, which are themselves unique in New Zealand. It is also acknowledged that the Plains are of significance to Tangata Whenua and that it is important to consult with Tangata Whenua on issues regarding the Canterbury grasslands or the plains. The area is also important in terms of being representative of an open landscape that would have been characteristic prior to settlement, and is again a rare landscape feature which is nevertheless close to the urban area of the City.

The rural area surrounding Christchurch has a distinctive character because of the generally low density of settlement and its relative predominance of open space. Within the rural area itself there are substantial variations in landscape character ranging from the highly visible and generally open landscape of the Port Hills, more intensively settled areas in the western and north-western parts of Christchurch, and large tracts of open plains such as in the area west of the International Airport. Large parts of the rural area are also adjacent to, or contain, important recreational facilities and river corridors.

Rural amenities includes a sense of open space, a low density (albeit variable) character, high levels of privacy, trees and forests, and a clear dominance of open space over the built environment. Rural amenities are valued not only by residents of the rural area itself, but are of wider benefit to the people of the City and beyond. Rural character is however of variable quality.

6 Potential Landscape Effects from Utilities in the Christchurch / Banks Peninsula Context

The landscape values and sensitivities of Christchurch and Banks Peninsula may be exposed to variable rates of landscape change in the future. Not all forms of future change can be anticipated, and with respect to utilities, the type, form, scale and significance of change may be influenced by new technologies.

In general threats arise where activities become larger in scale and therefore a more dominant feature of the landscape. On Banks Peninsula and sensitive parts of Christchurch, such as the Port Hills and along the estuary and coast, the development of housing and other man-made structures in locations that detract from open and natural characteristics or occur in more intensive clusters that contrast with the mosaic pattern or open coastal character that currently exists may have detrimental effects on the existing landscape. Effects are generally more significant if these structures obscure or alter the outline of natural landforms and if associated earthworks alter natural contours. The linear nature of some utilities, in particular transmission lines, creates unnatural lines in the landscape, which can lead to significant landscape effects along a long corridor of visual influence. Threats also arise through cumulative change i.e., landscape change arising over time from incremental development or “creep” where an existing modification in the landscape is used to justify further change.

Housing development in rural areas often causes an increased requirement for infrastructure and utilities. In these cases it would be preferable to plan for this landscape change through an integrated plan, which addresses these “follow-on effects” from rural residential development. As stated in the Banks Peninsula Landscape Study (BPLS) it is this potential for intensification and/or increase in scale of land use activities, along with inappropriate siting of buildings / structures which presents the greatest threat to the Banks Peninsula landscape. The visual sensitivity of the rural parts of Christchurch varies, with a lower capability to absorb change along the Port Hills and visually less sensitive areas on the northern and western edges. The urban expansion of Christchurch will be determined by PC1, developed by Environment Canterbury with Christchurch City, Selwyn and Waimakariri District Councils, and the NZ Transport Agency as a method of implementing the Urban Development Strategy (UDS), which covers an area known as the Greater Christchurch sub-region.

One of the key landscape effects associated with utility structures is their visual impact. The visibility and significance of the visual effect is generally dependent on the bulk and size of the structure and viewing distance. If structures appear on the skyline, in particular if they are situated on prominent ridgelines, their visual effect is in general more significant. Effects on the landscape character are dependent on the design and number of structures. In a small scale landscape with an intricate pattern of landscape elements, such as Banks Peninsula, large-scale structures, a high number of structures in close proximity to each other (eg wind farms), and strong linear elements (eg high voltage transmission lines), tend to adversely affect the landscape character. The flat rural plains with an existing linear pattern of modification, such as shelterbelts and roads, have the potential to absorb this kind of change more readily. In addition to the visual impact of a new structure, other effects related to the placement of utilities and structures include earthworks and the loss of significant indigenous vegetation, particularly in areas of outstanding landscape or natural character value.

As described in section 4, a variety of utility types cause landscape effects of a varying nature and scale. In general structures can modify or dominate a landscape depending on their location in relation to topography and vegetation, and their colour, material finish, height and size. When considering the effects

of utilities and structures and the types of management mechanisms that may be appropriate, consideration should be given to:

- different types of utilities; and
- their purpose (e.g. small scale domestic utilities are generally an anticipated feature of a rural environment);
- the variation offered by topography and vegetation for location of structures;
- cumulative effects;
- visibility (including considerations such as importance of public/ private viewpoints and sensitivity of the receptors);
- encroachment (physical and visual) on heritage and outstanding natural features and landscapes; as well as
- domination in areas of high natural character.

Earthworks can leave exposed and cut surfaces which contrast with surrounding vegetation and the natural contour. As a consequence they can be visually prominent and unsightly. Earthworks can potentially alter the shape and slope of the natural contour, particularly if straight/sharp lines are left which contrast with a more rounded topography. When considering effects created by earthworks and the types of management mechanisms that may be appropriate consideration should be given to the scale, volume, depth and location (visibility) of the area subject to the earthworks.

7 Recommendations

The Resource Management Act sets the statutory context for managing the use, development, and protection of natural and physical resources within Christchurch City and Banks Peninsula. The Act requires that this sustainable management regime enables “*people and communities to provide for their social, economic, and cultural wellbeing*”. In achieving this purpose, the Council is required to “*recognise and provide for*” as a “*matter of national importance*”:

- the preservation of the natural character of the coastal environment.....and the protection of them from inappropriate subdivision, use, and development;
- the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development.
- The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.
- The protection of historic heritage inappropriate subdivision, use, and development.

The Council is also required (under Section 7) to have particular regard to:

- The maintenance and enhancement of amenity values; and
- Maintenance and enhancement of the quality of the environment.

Considering Sections 5, 6 and 7 of the Act together reaffirms that the statutory context is requiring the planning mechanisms for utilities to provide for economic wellbeing as well as landscape values. Economic wellbeing may require land use change to occur within the landscape and this requires an overall judgement to set the thresholds for what change can occur as of right, and at what thresholds Council or wider community consideration of that change is necessary or appropriate.

In the light of the RMA provisions it is recommended that the Outstanding Natural Landscapes and Coastal Natural Character Landscapes (in Banks Peninsula) and the Coastal Marine Area should be treated as landscapes of the highest priority. In the context of Banks Peninsula the Main Ridgelines have also been identified as key landscape features with high visual importance and sensitivity to change. While they fall within the Rural Amenity Landscape (identified under s7c), they are considered of particular significance and should be included under the same level of control as the ONLs, CNCLs and CMA. The mechanisms selected should seek to protect their values from inappropriate change, including the landscape change induced by utility development. In most cases it would be preferable to minimise the installation of utilities and service corridors within or in the immediate vicinity of ONF/Ls, CNCLs and Main Ridgelines identified in the Christchurch City and Banks Peninsula Plans and the CMA.

There is an area of sensitivity where the higher valued Outstanding Natural and Coastal Natural Character Landscapes adjoin the Visual Amenity Landscapes (on Banks Peninsula) or residential areas (in Christchurch City). Concerns may arise that activities and structures, including utilities, within the Visual Amenity Landscape which are located close to the boundary with an Outstanding or Coastal Natural Character Landscape may adversely impact upon the higher valued areas. For larger scale utility developments, particularly wind turbines, it would therefore be appropriate to include more stringent mechanisms within a buffer of 50m in elevation or 150m horizontally (whichever is the lesser), a distance which corresponds to a similar rule for buildings in the buffer area.

The most prominent ridgelines descending from the elevated crater rims, in particular those identified as Main Ridgelines within the Rural Amenity Landscape in the Banks Peninsula Plan, are visually sensitive to

change. Since structures often appear on the skyline without a visual backdrop from a wide range of viewpoints, new development on these ridgelines is generally more difficult to integrate into the existing landscape. As these landscape features often have an open character and skyline that is highly sensitive to the placement of prominent new development, it is recommended that the Council exercises a tighter level of control than within the remainder of the Rural Amenity Landscape of Banks Peninsula (identified under RMA S7c). Policy 8 of the Transmission NPS is concerned with ONFLs and also areas of high amenity and recreation value. Accordingly, the policies in the Banks Peninsula Plan should reflect these high amenity concerns associated with the Main Ridgelines. It is important that any rule for ridgeline protection is very explicit and clear about how it is to be measured. Such a rule can result in arbitrary lines which may become a noticeable demarcation in the landscape. Where a rule can be developed which is clear and certain with respect to measurement (vertically and horizontally) then ridgeline protection can be effective. A rule for identified Main Ridgelines has been included in the Banks Peninsula Plan to avoid the appearance of dwellings on the skyline (building platform at an elevation at least 20 vertical metres below that of the adjacent main ridgeline if not located within an existing building cluster). It is recommended that this existing rule is adopted and amended to apply to large scale⁷ utility development as part of this Plan Change. Another method would be to include a requirement that structures should not be seen against the sky when viewed from a road/public place, but a downside of this method is that it is not clear over what distance this rule applies and if unformed legal roads need to be included in the visibility assessment.

A reduced level of control would be anticipated in Rural Amenity Landscapes on Banks Peninsula and Rural Zones in Christchurch not identified as ONLs and accordingly, some provision should be made for utilities and structures which meet performance standards to be a permitted activity. These development standards should generally be set at a level where any significant land use change (e.g. from commercial power generation) would be required to be assessed having regard to the values and features of a particular site. This enables the land use to better reflect the mosaic nature of the landscape and respond to the opportunities provided by the variety in topography, vegetation and character. This flexibility also retains the ability to control cumulative effects over a number of sites or utility developments. The rural amenity of Banks Peninsula is considered to be of higher value and sensitivity to large-scale change than the rural plains in the north and west of Christchurch, which should be reflected in the rules.

In parts of Banks Peninsula and Christchurch, it is the vegetation that contributes strongly to an area's natural character and landscape values. The loss of this vegetation may have significant ecological, landscape and visual effects. When considering the effects of vegetation removal and the types of management mechanisms that may be appropriate to control the removal, consideration should be given to the types and value of vegetation. Controls, such as those limiting removal under other sections of the Plan, should apply to indigenous vegetation in general and not be limited to Ecological Heritage Areas (Section 6c sites). Consideration should also be given to the operation of those controls e.g., area, volume, time/spatial control i.e., limited removal over a defined time span.

Regarding the protection of heritage values another matter of concern, which the Council should have a level of control over, is the installation of domestic utilities, including masts, turbines, antennas and solar panels on and in the vicinity of heritage buildings and protected trees. While the presence of such facilities is generally expected, the visual impact of these utilities has the potential to detract from the heritage and amenity values of a listed/ protected item.

Developed areas within Christchurch City and settlements on Banks Peninsula, in particular those in commercial and industrial zones, have a significantly higher potential to absorb change from utility

⁷ relating to height, size and number of structures

development. It is therefore recommended to provide for utilities in these areas as a permitted activity if they meet appropriate performance standards. It is also recommended to include a rule which enables existing structures to be maintained or replaced with another of the same or similar, height, size or scale, within the same or similar position and for the same or similar purpose.

For discretionary activities the landscape matters the Councils should consider could include:

- location of earthworks
- extent or volume of earthworks
- depth and length of cuts
- siting, design and methods for implementing earthworks
- impact on natural contours and alteration of the natural form of the land
- impact on any geological features
- impact on the legibility of the landscape
- visibility of the area subject to earthworks from public viewing points and recreation areas
- loss of native vegetation
- impact on amenity and aesthetic values of the locality
- impact on known cultural sites
- rehabilitation – staging, earth shaping, the type of vegetation to be reinstated, number of plants if non-pastoral, maintenance of planting
- location and shaping of any fill
- any impacts on riparian margins
- any impacts on indigenous habitat
- control of run-off during excavation and prior to implementation of rehabilitation
- requirement for an accidental discovery protocol and/or monitoring of earthworks within identified cultural and heritage landscapes.

8 Conclusions

The main landscape and visual effects that may arise from the installation and operation of utilities have been identified in this report (see section 4). They relate to visibility of structures, their effect on the landscape character and include construction effects, such as earthworks and vegetation removal. The magnitude of visual effects generally depends on the scale (size and bulk) and number of structures and their location in the landscape. Generally visibility of structures is higher if they are located on ridgelines without a visual backdrop.

In the Christchurch City and Banks Peninsula context several areas have been identified as particularly valuable landscapes that are sensitive to change (see sections 5 and 6). Generally Outstanding Natural Landscapes, Coastal Natural Character Landscapes, the Coastal Marine Area and the Main Ridgelines have a low ability to absorb structures and large scale utility development is considered to be out of character in these parts of the landscape with a high risk of compromising the landscape values of these areas. It has therefore been recommended in this report (see section 7) that a higher level of control for utilities should be exercised by the Council in these most sensitive areas to provide the opportunity to fully assess large-scale utilities development proposals against the objectives in the Plans. Smaller scale, domestic utilities are likely to be absorbed into the rural working landscape without compromising its amenity values. Therefore, a lower level of control is considered appropriate for small, individual structures in these areas.

Following the review of the proposed Utilities Chapters for the Christchurch and Banks Peninsula Plans, the following conclusions have been drawn regarding their effectiveness to address potential landscape effects from utility structures:

The level of control in the most sensitive landscape areas has been increased to non-complying activity status in both districts, which reflects the values of these parts of Christchurch and Banks Peninsula. A buffer has been proposed around these areas to ensure that effects on adjacent landscape values can be assessed appropriately. Important individual landscape features, such as heritage items and protected trees have also been considered in the assessment of landscape effects, albeit with less stringent controls. While the Plan Change has to balance the economic and social wellbeing of the community, the protection of important landscape values from utilities effects and requirements of relevant NPSs and NESs are key considerations.

It is considered that the proposed changes to the Utilities chapters of both Plans provide an appropriate level of control to manage potential landscape and visual effects. The choice of mechanisms is tailored to specific landscape issues and addresses them in an effective way.

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Appendix 1 - Potential Visual Impact of Wind Turbines in Relation to Distance

Information derived from : <http://www.cprw.org.uk/wind/Hlords/hlapp1.htm>

The Sinclair-Thomas Matrix

In September 1996 an attempt was made by Mr Gareth Thomasto define the potential visual impact of wind turbines by descriptors which could be assessed in the field, and which, with repeated observation, should produce a degree of observer consistency. The approach assumes good normal visibility, and is intended only to be a general guide, especially at the margins of each band, recognising the importance of local conditions, viewing direction, turbine angle and the scale and nature of the landscape context. The Matrix incorporates the following nine bands of visual impact ranging from "dominant" to "negligible", identified as 'A' to 'I' in the Table below.

The Thomas approach was later extended to viewpoints around other wind power stations which used larger turbines in order to establish the extent to which distances for each visibility band (and thus the appropriate ZVI radius) needed to be extended in relation to the increase in turbine size. In practice, the larger turbines used in most installations constructed since the 41-45m '1st generation' have tended to cluster around 52-55m, and the results for these are shown in the first column of what may now be called the 'Sinclair-Thomas Matrix'. Provisional results from larger turbines subsequently built have also been used to construct a further tentative set of distances.

THE 'THOMAS' AND 'SINCLAIR-THOMAS' MATRICES to estimate the potential visual impact of different sizes of wind turbines

	Overall turbine height	41-45	41-45	52-55	70	95 ** (projected)
Descriptors	Band	Thomas Matrix		Sinclair-Thomas Matrix		
		Original	Revised			
	Approximate Distance Range (km)					
Dominant impact due to large scale, movement, proximity and number	A	0-2	0-2	0-2.5	0-3	0-4
Major impact due to proximity: capable of dominating landscape	B	2-3	2-4	2.5-5	3-6	4-7.5
Clearly visible with moderate impact: potentially intrusive	C	3-4	4-6	5-8	6-10	7.5-12
Clearly visible with moderate impact: becoming less distinct	D	4-6	6-9	8-11	10-	12-17
Less distinct: size much reduced but movement still discernible	E	6-10	9- 13	11-	14-	17-22
Low impact, movement noticeable in good light: becoming components in overall landscape	F	10-12	13-16	15-19	19-23	22-27
Becoming indistinct with negligible impact on the wider landscape	G	12-18	16-21	19-	23-	27-35
Noticeable in good light but negligible impact	H	18-20	21-25	25-	30-	35-40
Negligible or no impact	I	20	25	30	35	40
Suggested radius for ZVI analysis		15	18	20	25	30

Appendix 2–Maps

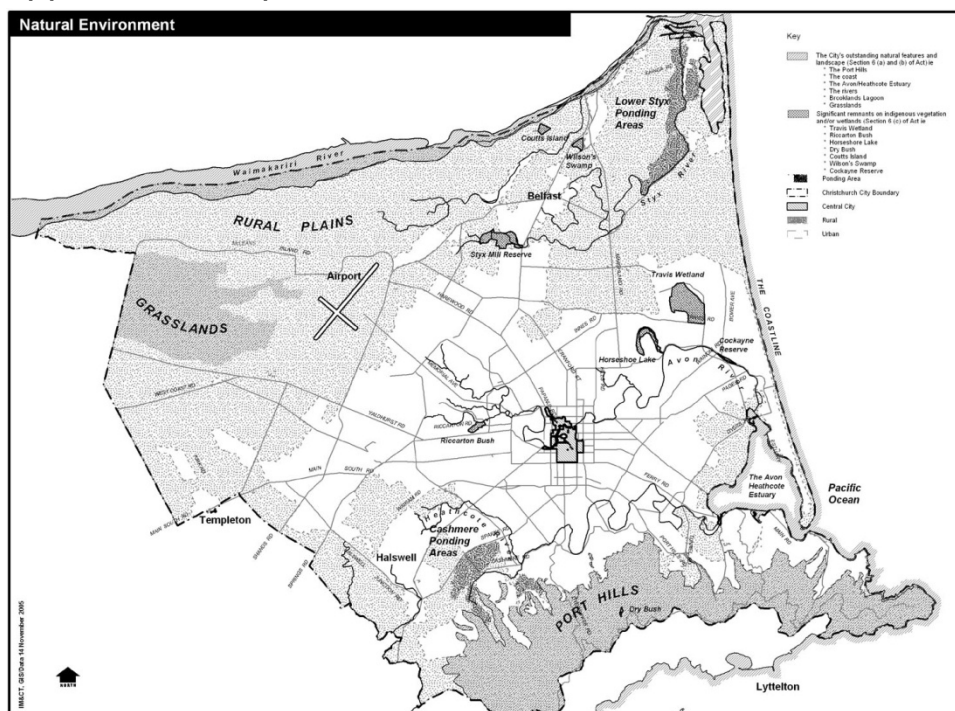


Fig 1: Map derived from Christchurch City Plan showing areas of the natural environment that have been identified under RMA sections 6a (Natural Character), 6b (Outstanding Natural Landscapes) and 6c (Significant Remnants of Indigenous Vegetation and / or Wetlands).

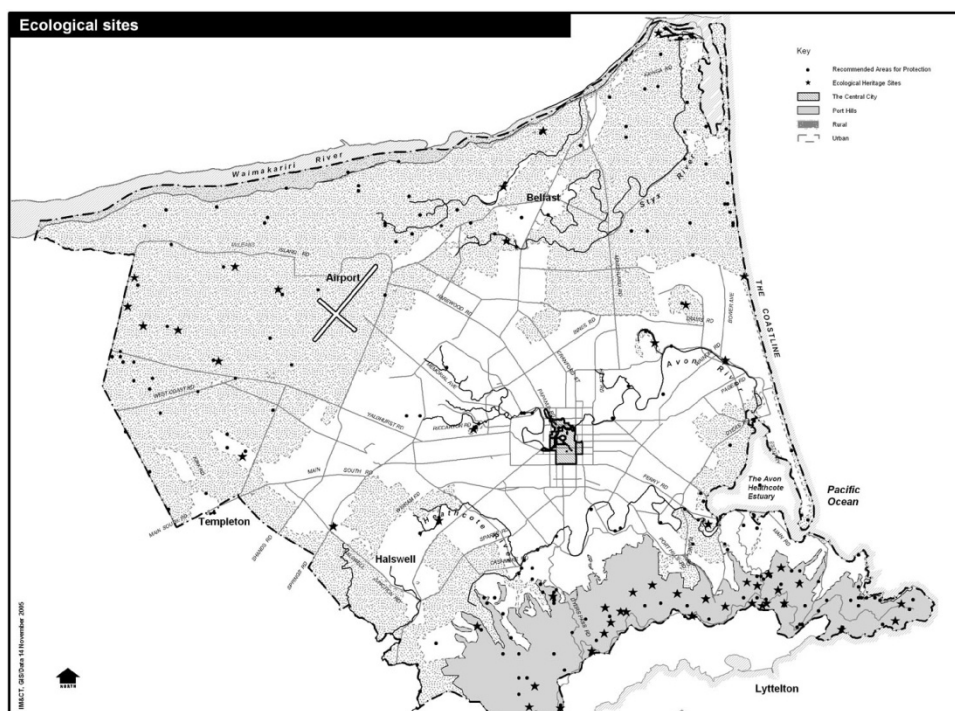


Fig 2: Map derived from Christchurch City Plan showing Recommended Areas for Protection and Ecological Heritage Sites.

Appendix 3—Graphic Supplement



The location of wind farms determines the visibility of turbines. If only parts of the turbines are visible, the movement of blades attracts the viewer's attention.



The scale of turbines is hard to interpret unless viewpoints are in close proximity to familiar objects.



Access roads to turbine platforms require earthworks which can be visually apparent during and shortly after construction phases.



Wind farms are often located on elevated ridgelines and therefore appear on the skyline when viewed from lower lying viewpoints. This lack of a backdrop generally increases their visibility and they can be a prominent feature in the landscape for a distance of up to 2-5km, depending on the height of turbines and light conditions.



The scale and prominence of transmission towers can be reduced by locating them close to landscape area boundaries, such as the base of a mountain range where a valley floor meets rising slopes. Elevated locations are generally more prominent.



When situated on ridge lines and hilltops, transmission towers can become prominent visual features of the skyline.



Due to their industrial appearance and bulk, lattice towers often have a higher magnitude of visual effects in comparison to single pole towers.



Transmission towers create strong unnatural lines in the landscape. These linear features can be more readily absorbed in a modified landscape context, such as in rural areas with shelterbelts and boundary fences.



A local example of flush mounted solar panels in domestic use.
Image Source: Boffa Miskell Limited



Flush mounted solar panels are generally visually less obtrusive as they blend in with the structures they are mounted on.
Image Source: <http://www.solardave.com/>



A large collection of roof/ground (universal) mounted solar panels in domestic use. These panels tend to cause more significant visual effects.
Image Source: <http://www.solardave.com/>



A small commercial solar farm with pole mounted solar panels .
Image Source: Copyright U.S. Department of Agriculture 2011. This photo was taken on April 20, 2011 using a Nikon D7000. POLE



Clustering of cell phone towers and integration with existing structures is often preferable.



There are various ways to integrate telecommunication structures with existing structures.



Telecommunication towers and masts placed in existing industrial areas can generally be absorbed in the landscape context, as they are in character with their surroundings.



Telecommunication towers and masts can be moved out of direct view by setting them back from public roads and placing them behind existing buildings. This often helps to reduce the visual effects from public viewpoints.



Telecommunication towers can be integrated into the landscape disguised as other structures such as this clock tower in Elmwood. This camouflage method is only appropriate in selected cases.