

# Appendix 1: Landscape Effects Assessment Method

## Introduction

The Landscape and Visual Effects Assessment (LEA) process provides a framework for assessing and identifying the nature and level of likely effects that may result from a proposed development. Such effects can occur in relation to changes to physical elements, the existing character of the landscape and the experience of it. In addition, the landscape assessment method may include an iterative design development processes, which includes stakeholder involvement. The outcome of any assessment approach should seek to avoid, remedy or mitigate adverse effects (see **Figure 1**). A separate assessment is required to assess changes in natural character in coastal areas and other waterbodies.

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines<sup>11</sup> and its signposts to examples of best practice, which include the Quality Planning Landscape Guidance Note<sup>12</sup> and the UK guidelines for landscape and visual impact assessment<sup>13</sup>. Te Tangi a te Manu recognises the term 'landscape effects' as all-encompassing, and that visual effects and natural character effects are a subset of landscape effects. This methodology provides separate sections to discuss landscape, visual and natural character effects.

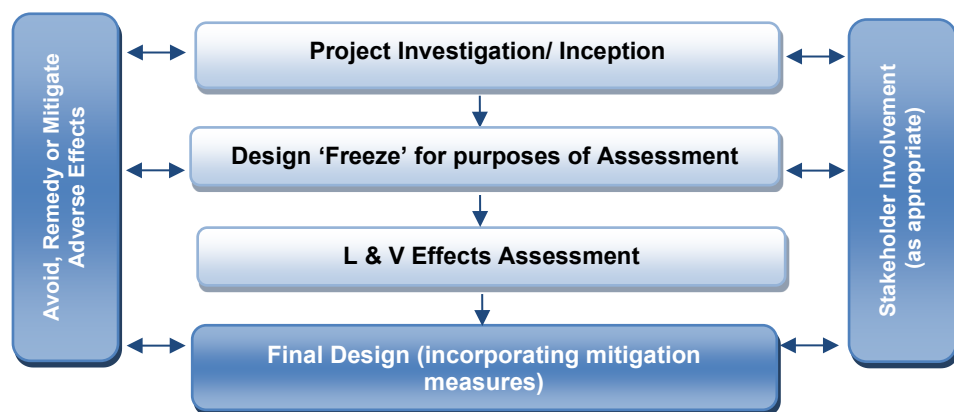


Figure 1: Design feedback loop

When undertaking a LEA, it is important that a **structured and consistent approach** is used to ensure that **findings are clear and objective**. Judgement should be based on skills and experience and be supported by explicit evidence and reasoned argument.

While landscape and visual effects assessments are closely related, they form separate procedures. The assessment of the potential effect on the landscape forms the first step in this process and is carried out as an effect on landscape elements, features and on landscape character. The assessment of visual effects considers how changes to the physical landscape affect the viewing audience. The types of effects can be summarised as follows:

**Landscape effects:** *Change in the physical landscape, which may affect its characteristics or qualities.*

**Visual effects:** *Change to views which may affect the visual amenity experienced by people.*

<sup>11</sup> NZILA (2022) Te Tangi a te Manu Aotearoa New Zealand Landscape Assessment Guidelines

<sup>12</sup> <https://www.qualityplanning.org.nz/node/802>

<sup>13</sup> Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

The policy context, existing landscape resource and locations from which a development or change is visible, all inform the 'baseline' for landscape and visual effects assessments. To assess effects, the landscape must first be **described**, including an understanding of the **key landscape characteristics and qualities**. This process, known as landscape characterisation, is the basic tool for understanding landscape character and may involve subdividing the landscape into character areas or types. The condition of the landscape (i.e. the state of an individual area of landscape or landscape feature) should also be described together with, a judgement made on the value or importance of the potentially affected landscape.

## **Landscape Effects**

Assessing landscape effects requires an understanding of the landscape resource and the magnitude of change which results from a proposed activity to determine the overall level of landscape effects.

### **Landscape Resource**

Assessing the sensitivity of the landscape resource considers the key characteristics and qualities. This involves an understanding of both the ability of an area of landscape to absorb change and the value of the landscape.

#### ***Ability of an area to absorb change***

This will vary upon the following factors:

- Physical elements such as topography / hydrology / soils / vegetation;
- Existing land use;
- The pattern and scale of the landscape;
- Visual enclosure / openness of views and distribution of the viewing audience;
- The zoning of the land and its associated anticipated level of development;
- The scope for mitigation, appropriate to the existing landscape.

The ability of an area of landscape to absorb change takes account of both the attributes of the receiving environment and the characteristics of the proposed development. It considers the ability of a specific type of change occurring without generating adverse effects and/or achievement of landscape planning policies and strategies.

#### ***The value of the Landscape***

Landscape value derives from the importance that people and communities, including tangata whenua, attach to particular landscapes and landscape attributes. This may include the classification of Outstanding Natural Feature or Landscape (ONFL) (RMA s.6(b)) based on important biophysical, sensory/ aesthetic and associative landscape attributes, which have potential to be affected by a proposed development. A landscape can have value even if it is not recognised as being an ONFL.

### **Magnitude of Landscape Change**

The magnitude of landscape change judges the amount of change that is likely to occur to areas of landscape, landscape features, or key landscape attributes. In undertaking this assessment, it is important that the size or scale of the change is considered within the geographical extent of the area influenced and the duration of change, including whether the change is reversible. In some situations, the loss /change or enhancement to existing landscape elements such as vegetation or earthworks should also be quantified.

When assessing the level of landscape effects, it is important to be clear about what factors have been considered when making professional judgements. This can include consideration of any benefits which result from a proposed development. **Table 1** below helps to explain this process. The tabulating of effects is only intended to inform overall judgements.

Contributing Factors		Higher	Lower
Landscape (sensitivity)	<b>Ability to absorb change</b>	The landscape context has limited existing landscape detractors which make it highly vulnerable to the type of change resulting from the proposed development.	The landscape context has many detractors and can easily accommodate the proposed development without undue consequences to landscape character.
	<b>The value of the landscape</b>	The landscape includes important biophysical, sensory and shared and recognised attributes. The landscape requires protection as a matter of national importance (ONF/L).	The landscape lacks any important biophysical, sensory or shared and recognised attributes. The landscape is of low or local importance.
Magnitude of Change	<b>Size or scale</b>	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	The majority of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetic or perceptual change apparent.
	<b>Geographical extent</b>	Wider landscape scale.	Site scale, immediate setting.
	<b>Duration and reversibility</b>	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 9-1: Determining the level of landscape effects

## Visual Effects

To assess the visual effects of a proposed development on a landscape, a visual baseline must first be defined. The visual 'baseline' forms a technical exercise which identifies the area where the development may be visible, the potential viewing audience, and the key representative public viewpoints from which visual effects are assessed.

The viewing audience comprises the individuals or groups of people occupying or using the properties, roads, footpaths and public open spaces that lie within the visual envelope or 'zone of theoretical visibility (ZTV)' of the site and proposal. Where possible, computer modelling can assist to determine the theoretical extent of visibility together with field work to confirm this. Where appropriate, key representative viewpoints should be agreed with the relevant local authority.

### Zone of Theoretical Visibility

As an initial step in the visual analysis, a Zone of Theoretical Visibility (ZTV) mapping exercise was undertaken of the site in its context to determine the likely extent of visibility in the wider landscape. ZTV mapping represents the area that a development may theoretically be seen – that is, it may not actually be visible in reality due to localised screening from intervening vegetation, buildings or other structures. In addition, TV mapping does not convey the nature or magnitude of visual impacts, for example whether visibility will result in positive or negative effects and whether these will be significant

'Zone of Theoretical Visibility' (ZTV) is based on a Digital Terrain Model (DTM) overlaid on a map base. It is also known as a Zone of Visual Influence (ZVI), Visual Envelope Map (VEM) or Viewshed Map. The term ZTV is preferred for its emphasis of two key factors that are often misunderstood:

- Visibility maps represent where a development may be seen theoretically – that is, it may not actually be visible in reality, for example due to localised screening from intervening vegetation, buildings or other structures which is not represented by the DTM; and
- the maps indicate potential visibility only – that is, the areas within which there may be a line of sight. They do not convey the nature or magnitude of visual impacts, for example whether visibility will result in positive or negative effects and whether these will be significant or not.

ZTVs are calculated by computer, using any one of a number of available software packages and based upon a DTM that represents topography. The resulting ZTV is usually produced as an overlay upon a base map, representing theoretical visibility within a defined study area.

As the ZTV mapping is based entirely on 'bare ground' topographic data, it does not take into account the screening, unless LIDAR based vegetation data is used to generate the DTM. In addition, the level of reliability of the contour information will influence the accuracy of the mapping. ZTV mapping does however take into account factors relating to the curvature of the earth and light refraction. ZTV is helpful where to focus field work but it should be remembered that while ZTV is a useful assessment tool, is important to recognise its limitations.

For this project, the following parameters were used:

Location of target points: Tip height of proposed turbines at 160m above ground level

Observer Eye Height: 2.0m

Coefficient of Earth Curvature and Refraction: 0.07

Base Spheroid used for computation: WGS 84

Following the ZTV analysis, field work is used to determine the actual extent of visibility of the site, including the selection of representative viewpoints from public areas. This stage is also used to identify the potential 'viewing audience' e.g. residential, visitors, recreation users, and other groups of viewers who can see the site. During fieldwork, photographs are taken to represent views from available viewing audiences.

### **The Sensitivity of the viewing audience**

The sensitivity of the viewing audience is assessed in terms of assessing the likely response of the viewing audience to change and understanding the value attached to views.

#### ***Likely response of the viewing audience to change***

Appraising the likely response of the viewing audience to change is determined by assessing the occupation or activity of people experiencing the view at particular locations and the extent to which their interest or activity may be focussed on views of the surrounding landscape. This relies on a landscape architect's judgement in respect of visual amenity and the reaction of people who may be affected by a proposal. This should also recognise that people more susceptible to change generally include: residents at home, people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views; visitors to heritage assets or other important visitor attractions; and communities where views contribute to the wider landscape setting.

#### ***Value attached to views***

The value or importance attached to particular views may be determined with respect to its popularity or numbers of people affected or reference to planning instruments such as viewshafts or view corridors. Important viewpoints are also likely to appear in guidebooks or tourist maps and may include facilities provided for its enjoyment. There may also be references to this in literature or art, which also acknowledge a level of recognition and importance.

#### ***Magnitude of Visual Change***

The assessment of visual effects also considers the potential magnitude of change which will result from views of a proposed development. This takes account of the size or scale of the effect, the geographical extent of views and the duration of visual change, which may distinguish between temporary (often associated with construction) and permanent effects

where relevant. Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA<sup>14</sup>.

#### Visual Simulations

As part of the assessment process, visual simulations have been prepared in accordance with NZILA Best Practice Guide: Visual Simulations BPG 10.2<sup>15</sup>. This has entailed taking digital photographs from each of the identified viewpoints and recording their GPS locations. Preparation of visual simulations required the preparation of a 3D model of the proposed turbine locations and associated earthworks supplied by Meridian. The GPS coordinates for each viewpoint were also added to the model and using the same focal length parameters as that of the camera, an image of the 3D wire frame of the proposed landform was then generated for each viewpoint. This was then registered over the actual photograph, using known reference points to bring the two together. The surface of the proposed landform was then rendered to approximate the likely appearance of the Site.

When determining the overall level of visual effect, the nature of the viewing audience is considered together with the magnitude of change resulting from the proposed development. **Table 2** has been prepared to help guide this process:

Contributing Factors		Higher	Lower	Examples
The Viewing Audience (sensitivity)	<b>Ability to absorb change</b>	Views from dwellings and recreation areas where attention is typically focussed on the landscape.	Views from places of employment and other places where the focus is typically incidental to its landscape context. Views from transport corridors.	Dwellings, places of work, transport corridors, public tracks
	<b>Value attached to views</b>	Viewpoint is recognised by the community such as an important view shaft, identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers.	Acknowledged viewshafts, Lookouts
Magnitude of Change	<b>Size or scale</b>	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development.	Most key features of views retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Glimpse / no view of the proposed development.	- Higher contrast/ Lower contrast. - Open views, Partial views, Glimpse views (or filtered); No views (or obscured)
	<b>Geographical extent</b>	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.	- Front or Oblique views. - Near distant, Middle distant and Long distant views
	<b>Duration and reversibility</b>	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).	- Permanent (fixed), Transitory (moving)

Table 9-2: Determining the level of visual effects

## Nature of Effects

In combination with assessing the level of effects, the landscape and visual effects assessment also considers the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign.

<sup>14</sup> Best Practice Guide: Visual Simulations BPG 10.2, NZILA

<sup>15</sup> Best Practice Guide: Visual Simulations BPG 10.2, NZILA

It should also be noted that a change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways; these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes.

This assessment of the nature effects can be further guided by **Table 3** set out below:

Nature of effect	Use and Definition
<b>Adverse (negative):</b>	The activity would be out of scale with the landscape or at odds with the local pattern and landform which results in a reduction in landscape and / or visual amenity values
<b>Neutral (benign):</b>	The activity would be consistent with (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and / or visual amenity values
<b>Beneficial (positive):</b>	The activity would enhance the landscape and / or visual amenity through removal or restoration of existing degraded landscape activities and / or addition of positive elements or features

Table 9-3: Determining the Nature of Effects

## Cumulative Effects

During the scoping of an assessment, where appropriate, agreement should be reached with the relevant local authority as to the nature of cumulative effects to be assessed. This can include effects of the same type of development (e.g. wind farms) or the combined effect of all past, present and approved future development<sup>16</sup> of varying types, taking account of both the permitted baseline and receiving environment. Cumulative effects can also be positive, negative or benign.

### Cumulative Landscape Effects

Cumulative landscape effects can include additional or combined changes in components of the landscape and changes in the overall landscape character. The extent within which cumulative landscape effects are assessed can cover the entire landscape character area within which the proposal is located, or alternatively, the zone of visual influence from which the proposal can be observed.

### Cumulative Visual Effects

Cumulative visual effects can occur in combination (seen together in the same view), in succession (where the observer needs to turn their head) or sequentially (with a time lapse between instances where proposals are visible when moving through a landscape). Further visualisations may be required to indicate the change in view compared with the appearance of the project on its own.

Determining the nature and level of cumulative landscape and visual effects should adopt the same approach as the project assessment in describing both the nature of the viewing audience and magnitude of change leading to a final judgement. Mitigation may require broader consideration which may extend beyond the geographical extent of the project being assessed.

## Determining the Overall Level of Effects

The landscape and visual effects assessment concludes with an overall assessment of the likely level of landscape and visual effects. This step also takes account of the nature of effects and the effectiveness of any proposed mitigation. The process can be illustrated in Figure 2:

<sup>16</sup> The life of the statutory planning document or unimplemented resource consents.



Figure 2: Assessment process

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in **Table 4** below. This table which can be used to guide the level of landscape and visual effects uses an adapted seven-point scale derived from NZILA's Best Practice Note.

Effect Rating	Use and Definition
<b>Very High:</b>	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character and in views. Turbines would appear dominant and overbearing in primary views.
<b>High:</b>	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains and/or result in a major change in primary views. Turbines would appear prominent, but not necessarily dominant. <i>Concise Oxford English Dictionary Definition</i> <i>High: adjective- Great in amount, value, size, or intensity.</i>
<b>Moderate- High:</b>	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed and may appear prominent in views
<b>Moderate:</b>	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent in secondary views but not necessarily uncharacteristic within the receiving landscape. <i>Concise Oxford English Dictionary Definition</i> <i>Moderate: adjective- average in amount, intensity, quality or degree</i>
<b>Low - Moderate:</b>	Minor loss of or modification to one or more key elements / features / characteristics, i.e. new elements are not prominent within views or uncharacteristic within the receiving landscape.
<b>Low:</b>	Little material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic or prominent in views and absorbed within the receiving landscape. <i>Concise Oxford English Dictionary Definition</i> <i>Low: adjective- 1. Below average in amount, extent, or intensity.</i>
<b>Very Low:</b>	Negligible loss of or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a 'no change' situation and a negligible change in views.

Table 9-4: Determining the overall level of landscape and visual effects