Boffa Miskell

Balmoral Solar Array

Assessment of Landscape Effects
Prepared for Infratec New Zealand Ltd

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Graphic Supplement (bound separately)

1.0 Introduction

1.1 Scope of the report

1.1.1 Boffa Miskell Limited (BML) has been engaged by Infratec New Zealand Ltd (Infratec) in March 2021 to undertake an Assessment of Landscape Effects[1] for a proposed solar array at Balmoral Station, Braemar Road, Tekapo (otherwise referred to as The Site in this report). The Site is zoned Rural and lies within the MacKenzie Basin sub-zone within the MacKenzie District Plan, but also falls within an Area of High Visual Vulnerability.

1.1.2 The following report assesses the landscape and visual effects of the proposed solar array and ancillary development on the immediate and surrounding environment character.

1.2 Project background

1.2.1 In August 2020, BML was commissioned by Infratec to prepare a feasibility report to understand the process and potential barriers in developing a large-scale solar array on land at Balmoral Station in the Mackenzie Basin. At this time, the site being considered was approximately 72ha of land to the north of SH8 and west of Braemar Road, now known as Site A.

1.2.2 In December 2020, Boffa Miskell were commissioned to undertake a detailed survey of the ecological values at Site A, undertake a brief desktop research exercise to obtain information about the possible effects of the solar farm structures on the vegetation at the site, and to provide preliminary advice regarding impact management measures that may be required as part of a consenting process for the solar farm. The report identified that the ecological values of the solar farm Site A are very high, and the area is ecologically significant in terms of the Resource Management Act and Canterbury Regional Policy Statement (CRPS).

1.2.3 On 5th May 2021, a meeting was held with Lake Tekapo Enterprises (LTE), Infratec, Boffa Miskell, and representatives for MacKenzie District Council (planner (Nick Boyes), Ecologist (Mike Harding) and landscape planner (Graham Densem)) to discuss the proposed solar array at Site A. During the meeting, potential effects on the values of the outstanding natural landscape were of concern due to the site's prominence within the outwash plain, along with the ecological concerns outlined above.

1.2.4 As such, the Applicant concluded that it would be preferable from an ecological and landscape perspective to consider alternative sites. However, the number of suitable sites on Balmoral Station is limited due to several factors including, but not limited to:

- Many areas support significant indigenous vegetation (as defined in accordance with the criteria in the CRPS).
- There are extensive areas where less than 20% of the original Indigenous vegetation cover remains.

- The high visibility of many areas from public viewing points including Mt John.
- The high likelihood of significant adverse effects on the values of the outstanding natural landscape of the Mackenzie Basin.
- The need to connect, with relative ease, to existing electricity transmission infrastructure.
- The retention of land that is suitable for primary production including irrigation and stock finishing.

1.2.5 Therefore, careful thought and consideration was given to choosing another site for the proposed solar array, having regard to the factors identified above. Consequently, only two sites were identified: Sites B and C.

1.2.6

1.2.7 Site C (the Site) was selected as the preferred site because it was initially perceived to have the following qualities:

- The Site adjoins Braemar Road along its northern boundary, so has good access for construction and maintenance vehicles.
- A 33kV line (part of the local line network) runs down the opposite site of Braemar Road, meaning the Site has excellent proximity to a grid connection point.
- The Site is relatively flat, meaning that earthworks are likely to be limited in scale and extent.
- The Site is bordered by a mature shelterbelt (15-20m in height) which may limit views of the Site from Braemar Road, and its position behind Old Man Range means that it is unlikely to be visible from public viewing points such as Mt John and State Highway 8 (SH8).
- Due to the historic use of the Site and activities on it (cultivation, application of fertiliser, sowing of seed and planting of a shelter belt) there may be a dominance of exotic/pasture species.

1.3 Other Technical Relevant Reports

1.3.1 Boffa Miskell has prepared an Ecological Impact Assessment (EcIA) report to accompany the necessary resource consent applications for the proposed solar farm.

1.3.2 The assessment finds that existing ecological values (in terms of vegetation) across the area that would be developed are moderate, due to the presence of indigenous plant species and despite the overall dominance of exotic pasture species.

1.3.3 The ecological effects of the solar farm to vegetation include direct vegetation clearance amounting to approx. 2.3 ha in total; and may include indirect effects on vegetation composition across a larger area. Effects to vegetation especially beneath panels would be mitigated to a degree by changes to site grazing management (exclusion of cattle); and overall this would amount to a Low magnitude of effect to indigenous vegetation; all species and habitats present at the site are extremely widespread and frequently far more intact across the surrounding area. Following construction, weed spread and establishment is possible, and post-construction monitoring and control is recommended to control this.

1.3.4 The report also finds that the solar farm development has the potential to cause a slight loss of an already marginal habitat for some bird species, and construction disturbance to feeding and nesting is possible. Adverse effects of the proposal are considered to be very low. Effects to lizards (southern grass skink) that occupy a small portion are not of ecological concern in the context of this proposal, due to the minimal requirement for site preparation and clearance and retention of the core lizard habitat in a wetland and setback area.

1.4 Consultation and Engagement

1.4.1 The Assessment of Environmental Effects (AEE) contains a full project description and a full description of the consultation and iwi engagement undertaken to date.

1.4.2 The Applicant has actively engaged with MDC and its experts on this proposal to ensure that it is a feasible proposition, and the potential and adverse effects are being addressed in an appropriate manner.

1.4.3 Meetings have been held with MDC and Aoraki Environmental Consultancy Limited (AECL) on 28th July 2021 and 26th January 2022.

1.4.4 There have also been other numerous conversations with MDC's technical experts regarding assessment methodologies, potential adverse effects and effective mitigation measures.

1.5 Assessment Process

1.5.1 This assessment considers the natural character, landscape and visual effects of the Proposed Development and has been undertaken with reference to the Quality Planning Landscape Guidance Note (Boffa Miskell Limited)[2] and its signposts to examples of best practice, including: the UK guidelines for landscape and visual impact assessment[3], the New Zealand Landscape Institute Guidelines for Landscape Assessment[4] and the Draft Aotearoa Landscape Assessment Guidelines Te Tangi a te Manu[5]. 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 assessment provides separate chapters to discuss landscape, visual and natural character effects, but is referred to throughout as an Assessment of Landscape Effects in accordance with the Guidelines.

1.5.2 A full methodology is outlined in **Appendix 1** of this report, identified effects are rated using a seven-point scale which ranges from 'very low' to 'very high'.

1.5.3 A visit to the site and its surroundings was undertaken on 4-5th May 2021, with a subsequent site visit to the site and its surroundings on 9th November 2021. Weather conditions on both days were fine and clear.

[2] https://www.qualityplanning.org.nz/index.php/node/805

[3] Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, 2013

[4] Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

[5] Te Tangi a te Manu Aotearoa New Zealand Landscape Assessment Guidelines [Final Draft], NZILA

2.0 Existing Environment

2.1.1 The site lies within the Mackenzie Basin, to the northwest of the town of Tekapo, within an area of tussock grasslands, enclosed by mountain ranges. The basin includes the large lakes and canals of the Upper Waitaki Power Development and the towns of Twizel, Mt Cook and Tekapo. The District Plan describes the landscape as "vast and spacious with subtle colourings and vegetation patterns, dominated by natural features and extended views. Development in the high country has also been generally unobtrusive, with isolated contained settlement and a lack of prominent artificial structures and patterns."

2.1.2 The site lies within the Mackenzie Basin Subzone and Outstanding Natural Landscape, as defined under Plan Change 13 of the Mackenzie District Plan, and is defined as an Outstanding Natural Feature and Landscape in the Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010).

2.1.3 The landscape of the Mackenzie Basin is described in the Landscape Study as follows:

> *This landscape contains areas of exceptional legibility, aesthetic, transient, shared and recognised, very high natural science and high tangata whenua and historic landscape values. It is acknowledged that landscape qualities vary across an area of this size, which contains areas of human modification. Lake Benmore, while a man-made feature, has high aesthetic, shared and recognised and tangata whenua values, which warrant its identification as 'outstanding'.*
>
> *The lakes and their basin setting are highly expressive of their formative processes and have high aesthetic values. The glacial origins of the basin landscape are expressed in many legible landscape features including moraines, rôches moutonnées, hanging valleys and terraces. The openness of the vast basin landscape and expansive views of the encompassing mountain ranges are spectacular and are widely celebrated.*
>
> *The entire basin is of great importance to tangata whenua who used the lakes for mahinga kai. The basin was a part of a wider network of trails which linked the coast to the Alps. The basin is widely recognised throughout New Zealand for its high tourism and recreational values. It is a landscape which has provided inspiration for writers and artists for generations.*
>
> *The Mackenzie Basin has an important place in high country history. Early pioneers established large remote stations, and traces of this history remain in the landscape today.*

2.2 Landscape Context

2.2.1 Within the Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010) the Site is located within the Intermontane Basins and Ranges landscape type, and within this forms a part of the Glacial and Fluvial Basin Flood Land Type. The underlying geology of the site is that of an outwash plain, formed of glacial deposits due to meltwater outwash at the terminus of a former glacier. The outwash plain within which the site is located is situated on the high plain between lakes Takapō and Pūkaki which includes the New Zealand Defence Force land (formerly Braemar station), Balmoral and Irishman Creek. Old Man Range lies to the south of the site, beyond the wetland of the same name, see **Figure 1**.

2.2.2 Directly to the north and southeast of the site lies the New Zealand Defence Force training area, while Lake Alexandrina with its hut settlement located at its southern tip lies to the northeast. Further to the east lies the distinctive feature of Mt John with its internationally renowned observatory, and Lake Tekapo beyond. Mount John is a roche mountonnée, a rock formation created by the passing of a glacier and displays a distinctive long sloping edge on the upside of the glacier and a shorter steeper edge on the downside. To the distant west of the site Lake Pukaki forms the north-western extent of the Mackenzie Basin.

2.2.3 Lakes Tekapo, Pukaki and Alexandrina are all shaped by the basin's glacial past, also being formed by glacial retreat. Landcover of the area is generally herbfield and grassland with areas of bare soil and rocks. Some areas of pine plantation and shelterbelts also form a feature in the area, including at the Tekapo Military Camp, around Balmoral Station and surrounding the site itself, and their darker colour and verticality is noticeably incongruent with the low profile and expansive nature of the basin landscape.

2.2.4 The land in the vicinity of the site is undeveloped and in either pastoral or defence use. The township of Tekapo is located approximately 8.5km to the southeast, at the southern end of Lake Tekapo. An Alpine Energy transmission line (33kV) runs to the north of the site that terminates at Mt Cook. State Highway 8, which connects Tekapo to Twizel is the main road in the area, lying around 4.8km to the southeast of the site at its nearest point. Views from State Highway 8 towards Glenmore, Braemar, and Mt Cook Stations are recognised with the provision of Scenic Viewing Area 2 in the District Plan, see **Figure 4**. The site lies outside of this viewing area.

2.3 Mana Whenua Values

2.3.1 The Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010), identifies the following Tangata Whenua Values in relation to the Mackenzie Basin:

- Lakes Tekapo, Pukaki, Benmore and Ohau are acknowledged in the Ngai Tahu Claims Settlement Act (1998).
- The Mackenzie Basin lakes (Tekapo, Pukaki and Ohau) are all referred to in the legend of "Nga Puna Wai Karikari o Rakaihautu" which describes how the principal lakes of Te Wai Pounamu were dug by the rangatira (chief) Rakaihautu.
- Maori used the lakes in this area for mahinga kai (waterfowl).

- These lakes are part of a wider mahinga kai trail that ran from Lake Pukaki down the original path of Waitaki River to the coast.

2.3.2 Te Rununga o Arowhenua and Te Rununga o Waihao both hold mana whenua over the Site.

2.3.3 Initially the Applicant engaged with both Te Rununga o Arowhenua and Te Rununga o Waihao but was advised that Aoraki Environmental Consultancy Limited (AECL) would take the lead on this project and that no reply would be provided on behalf of Te Rununga o Waihao.

2.3.4 A copy of the draft application and technical reports were provided to AECL on 22nd March 2022, so they could digest these prior to a hui on 30th March 2022. Engagement with iwi has been a key part of the process and the hui provided an opportunity to discuss the proposal and for iwi to provide comments and/or recommendations on the application.

2.4 Site Description

2.4.1 Site C (the Site) is located on Braemar Road, Tekapo, approximately 9km to the northwest of the Tekapo township. The Site is known as 'Irishman Paddock', approximately 120ha in area and there is an established shelterbelt growing along all its boundaries, with small gaps for vehicle access and where waterways flow across and out of the Site, see **Figure 5 Site Photographs**. The shelterbelt provides visual and physical separation of the site from the wider basin landscape.

2.4.2 The topography is gently undulating with hummocks and low-lying areas where water is retained after heavy rainfall events. There is one central wetland area which divides the Site into two parts. This wetland connects to the Old Man Wetland located to the south of the site. A further wetland area is located in the southwest corner of the site.

2.4.3 The site itself is currently used for grazing and has a cover of oversown and fertilised short tussock grassland which meets the definition of improved pasture. The area has been used for grazing by sheep and cattle. Braemar Road forms the northern site boundary.

2.4.4 To the immediate north of Braemar Road, the land is used by the NZ Defence Force and is designated for this purpose. Land to the south of the site falls away to become lower lying with the Old Man wetland to the south, before the land rises steeply to the Old Man Range, a distinctive rounded feature in the immediate area. To the east of the site, the Braemar Road rock glacier is recognised as a site of Geological Significance in the MacKenzie District Plan. Balmoral Station lies to the southeast of this, also accessible from Braemar Rd.

2.4.5 The Ecological Impact Assessment (EcIA) prepared by Boffa Miskell identifies that the site is actively farmed, and that the original (pre-European) vegetation of the area has been modified for pastoral improvement, but the site has not fully cleared of indigenous vegetation. Hence, indigenous plant species (particularly fescue tussock, copper tussock, and a range of other locally common and widespread inter-tussock species) remain prevalent across the 'main paddock area' of the site where solar panel arrays and other infrastructure would be constructed. This main paddock contains three main indigenous vegetation types including grasslands with fescue tussock and copper tussock, and herbfields on dry raised areas dominated by exotic mouse-ear hawkweed. A limited range of fauna currently uses the main paddock area, with a small number of indigenous bird, lizard and invertebrate species likely to occupy the site in low numbers.

2.5 Visual Catchment

2.5.1 The Site Context Plan (**Figure 1**) identifies locations where potential views of the proposed development would be available. Views from these locations are provided in **Figures 6A to 6E** and discussed in Section 5.4 below.

2.5.2 As part of understanding the potential level of visibility, a ZTV (Zone of Theoretical Visibility) map was prepared, see **Figure 3**. The ZTV prepared has been based on contour information only and does not consider the location and height of vegetation or structures. It provides a starting point and a useful tool to guide where field investigations should be undertaken. ZTVs need to be supported with ground - truthing and other analysis.

2.5.3 The ZTV illustrates that the visual catchment of the site is extremely limited, with views towards the Site are contained by the undulating moraine and outwash landform of the surrounding area, in particular by the Old Man Range to the south of the site. Further, the pine shelterbelt surrounding the site boundary prevents views into the site. Publicly accessible views are limited to small sections of Braemar Road near the site boundary, where gaps in the shelterbelt vegetation allow glimpsed views into the site. One area of higher land to the west of the site also provides an elevated view into the site.

2.5.4 There are few residential dwellings in close proximity to the Site and publicly accessible views from the north and east are extremely limited due to the Ministry of Defence land in this direction. Balmoral Station is the nearest residential dwelling to the site, lying approximately 1.85km to the east, and views from here towards the site are screened by the landform of the Old Man Range. There are no other private residences with views towards the site.

2.5.5 Public views are limited to users of the minor road of Braemar Road (part of which runs through Defence Land) and elevated views to the west from an area of elevated moraine landform. Views from state Highway 8 towards the site are screened by the undulating glacial landform to the south of the site. The site is not visible from the Mt John observatory due to containment by the landform of Old Man Range.

3.0 Relevant Statutory Provisions

3.1.1 As part of this assessment, there are a number of planning provisions that are relevant to this project. Specifically, they include:

- The Resource Management Act, notably Section 6 matters (Outstanding Natural Landscapes).
- Canterbury Regional Policy Statement
- MacKenzie District Plan

3.2 Resource Management Act

3.2.1 The RMA provisions relevant to landscape and visual effects addressed in this report will be in respect of the relevant planning provisions of the RPS, and the District Plan, which are each deemed to have given effect to the relevant provisions of Part 2 of the Resource Management Act 1991, namely:

- **Section 6(b)** - the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development
- **Section 7(c)** - the maintenance and enhancement of amenity values
- **Section 7(f)** - the maintenance and enhancement of the quality of the environment

3.2.2 Schedule 4 Section 7 (1b) requires any physical effect of the locality to be addressed as part of the assessment of environmental effects including any landscape and visual effects.

3.2.3 Under Section 6 matters, the Site lies within the within the Mackenzie Basin Subzone and Outstanding Natural Landscape, as defined under Plan Change 13 of the Mackenzie District Plan, and is defined as an Outstanding Natural Feature and Landscape in the Canterbury Regional Landscape Study Review 2010.

3.2.4 Schedule 4 Section 7 (1b) of the RMA also requires any physical effect of the locality to be addressed as part of the assessment of environmental effects including landscape and visual effects.

3.3 Canterbury Regional Policy Statement

3.3.1 The Canterbury Regional Policy Statement (RPS) (Environment Canterbury, 2013), was republished in October 2020 and provides the current framework for the sustainable management of the Region's natural and physical resources.

3.3.2 Within the RPS, Objective 12.2.1 is relevant to the Region's outstanding natural features and landscapes. Under this objective, Policies 12.3.1, 12.3.2, and 12.3.4 require the identification, protection and management of outstanding natural features and landscapes.

3.3.3 The site forms a part of the Mackenzie Basin Outstanding Natural Landscape. The landscape Description for the basin as described in the RPS is as follows:

> *The Waitaki and Mackenzie basins are vast, open landscapes surrounded by mountain ranges which include Aoraki/Mount Cook, Mt Sefton, Mt Tasman and the Southern Alps/Ranges Kä Tiritiri o te Moana. The braided Tekapo, Pukaki, Ohau and Ahuriri Rivers and their associated river terraces pass through these basins.*
>
> *The lakes are dominant features of the open grassland landscape of the basin. These lakes and their basin setting are highly expressive of their formative processes. Many legible landscape features including moraines, roches, mountonnees, hanging valleys and terraces are found in the basin. The openness of the vast basin landscape and expansive views of the encompassing mountains ranges are spectacular and are widely celebrated. Landscape qualities vary across an area of this size, which contains land use modification and man- made features. The Waitaki Hydro Electric Power Scheme with its long standing history and distinctive features, including lakes, dams and canals, forms part of this large-scale landscape. The hydro lakes including Lake Tekapo and Pukaki are subject to active management to facilitate hydroelectricity generation as part of the Waitaki Hydro Electric Power Scheme.*

3.3.4 The landscape evaluation describes the Mackenzie Basin as having “Areas of exceptional legibility, aesthetic, transient, shared and recognised, very high natural science and high tāngata whenua and historic landscape values.”

3.3.5 A full description of the values of the MacKenzie Basin from which the RPS description is based is provided in the Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010). An extract of this is provided in **Appendix 2.**

3.4 MacKenzie District Plan

3.4.1 The Operative Mackenzie District Plan 2004 (the Plan) controls land use in the part of the Mackenzie Basin covered by Mackenzie District Council.

3.4.2 This part of the Basin is identified as the “Mackenzie Basin Subzone” in the operative District Plan. The relevant objectives, policies and rules are contained in the Rural Chapter (Chapter 7) of the Plan.

3.4.3 Stage 1 of the District Plan Review has begun (incorporating plan changes 18 and 19). These plan changes focus on indigenous biodiversity and activities on and within waterbodies. They are at various stages of review. Significant changes have been made to objectives, policies and rules for the Mackenzie Subzone as result of Plan Change 13. The Plan Change 13 process started in 2007 and focused on landscape within the Mackenzie Basin subzone. It resulted in several Environment and High Court hearings and decisions. The last decision was released in December 2018.

3.4.4 Plan Change 13 resulted in the Mackenzie Basin subzone being identified as an outstanding natural landscape, due to:

- the openness and vastness of the landscape
- the tussock grasslands
- the lack of houses and other structures
- residential development limited to small areas in clusters
- the form of the mountains, hills and moraines, encircling and/or located in, the Mackenzie Basin
- the undeveloped lakesides and State Highway 8 roadside.

3.4.5 The Plan uses a range of different planning tools to protect and enhance the outstanding natural values of the Mackenzie Basin. Different objectives, policies and rules apply depending on if they fall within a particular area or site. Within the plan the site is identified as falling within an area of High Visual Vulnerability. Visual Vulnerability is a measure of the capacity of the landscape to absorb development.

3.4.6 Mackenzie District Council (MDC) have confirmed that the solar array is defined as a Utility. The proposed roading, earthworks, permanent office, permanent switchgear containers and temporary shipping containers are included in the definition as 'facilities, structures and works necessary for the generation and transmission of energy.' Therefore, the Rules in Section 16 of the MacKenzie District Plan take precedence over the Rules in Section 7, Rural Zone.

3.4.7 Planning provisions of relevance to the project are therefore:

- **Objective 1:** Utilities whose functioning and operation avoid, remedy or mitigate adverse effects on their surrounding environment.
- **Policy 1:** To avoid, remedy or mitigate adverse environmental effects created by the operation of utilities through the application of performance standards to separate incompatible activities, maintain visual amenities, safety, and the quality of the environment
- **Policy 4:** To protect areas identified as possessing important natural features, significant indigenous vegetation or significant habitats of indigenous fauna from utilities which are visually and environmentally incompatible.
- **Policy 8:** To provide for the establishment, operation, maintenance, enhancement, upgrading and development of electricity generating utilities in the District while ensuring that adverse effects on the environment are avoided, remedied or mitigated.

3.4.8 The site is also identified as being located in an area of High Visual Vulnerability in the Mackenzie District Plan. It is noted that the identified areas of visual vulnerability a guide to areas where development may be more (or less) appropriate based solely on visual vulnerability which is one of the relevant factors. Overall landscape sensitivity will be assessed on a case by case basis in accordance with Policy 3B(1).

3.4.9 Policy 3B (1) relates to activities in the MacKenzie Basin's Outstanding Natural Landscape and aims:

- …to protect and enhance the outstanding natural landscape of the Mackenzie Basin subzone in particular the following characteristics and/or values: (a) the openness and vastness of the landscape; (b) the tussock grasslands; (c) the lack of houses and other structures; (d) residential development limited to small areas in clusters; (e) the form of the mountains, hills and moraines, encircling and/or located in, the Mackenzie Basin; (f) undeveloped lakesides and State Highway 8 roadside.

3.5 Background studies

3.5.1 The Mackenzie Basin Landscape: Character and Capacities (Graham Densem Landscape Architects, 2007) provides the background for Plan Change 13.

3.5.2 The site lies within the Tekapo Landscape Area, described in the assessment as:

3.5.3 "the watershed of Lake Tekapo, from its headwaters in the north to the moraines behind Tekapo village in the south, and from the Two Thumb Range summit in the east to the Gammack Range in the West. It also extends to the Fork Stream area near Balmoral Military Camp and the Balmoral Station."

3.5.4 The Study identifies areas of visual vulnerability within the Mackenzie Basin, which form the basis for Appendix V (Visual Vulnerability Areas in the Mackenzie District Plan, see **Figure 4** for locations). These are identified as follows:

- High vulnerability: areas with little capacity for change – that is, the existing values are 'vulnerable'.
- Medium vulnerability: areas with some capacity for change under strict controls
- Low vulnerability: areas with freer capacity to absorb change without damaging the landscape values

4.0 Proposal Description

4.1.1 It is proposed to construct a solar array with a maximum generation capacity of approximately 88MW at Braemar Road, Tekapo. The proposed solar array will be developed in two phases:

Phase	Megawatt-peak capacity	Area (approx.)	Length of construction period	Date when construction commences
1	12MWp	13.5ha	6 months	2023.
2	76MW	86ha	18 months	Subject to the cost, time and planning considerations of network upgrades to both Transpower and Alpine Energy infrastructure.

4.1.2 Phase 1 will cover that part of the Site shown in pink on the Site Plan in **Appendix 3**. In real terms, over the course of a year this will produce enough electricity to power 2,800 households, equivalent to around 70% of the Tekapo township.

4.1.3 Phase 2 will cover the balance of the Site as shown on the Site Plan in **Appendix 3** but will be constructed in 3 blocks, hereafter referred to as Block 1, Block 2 and Block 3.

4.1.4 This application seeks consent for the entirety of Phase 1 and Phase 2.

4.1.5 The Solar Array will comprise:

- PV array modules – Phase 1 will contain approximately 20,000 bifacial PV modules and Phase 2 will contain approximately 114,940 bifacial PV modules. In total, there will be 134,940 modules. These modules generate electricity on both sides, allowing for direct and reflected light to be captured and harnessed.
- Perimeter security fencing.
- 2 new underground lines connecting the Site to the transmission network.
- 17 Central Inverter Skid Units.
- Two MV Export Switchgear and storage areas.
- Internal tracks, parking and laydown area.

4.1.6 However, until such time as Alpine Energy Limited (the local network owner) upgrades the Tekapo B substation capacity to accept electricity from the site is limited. Accordingly, and to properly test the project, the Applicant is proposing to carry out the development in two phases.

PV Modules

4.1.7 Each bifacial PV module will be approximately 2.4m by 1.3m and will be mounted on framing that will be typically supported by a single line of C-section galvanised steel piles. The piles will be driven approximately 1.6m into the ground (depending on geotechnical conditions). The modules will be angled to achieve maximum efficiency, whilst also recognising the need to manage effects on landscape values and will generally be at least 1m above ground level. However, irregular changes in ground levels may mean this is slightly encroached in certain spots however this will be the exception to the rule. A concept elevation depicting typical mounted PV modules can be found in Appendix 4 of the AEE.

4.1.8 The modules will be erected in rows to form arrays. Whilst the modules may appear to form a continuous area, actual ground coverage will be approximately 40% (48ha) by area. The proposed layout will provide approximately 4.9m between each array to provide access for maintenance and replacement (if required) and 4 access tracks of approximately 4m in width that will enable vehicle access as shown on the Site Plan in **Appendix 3**. The modules will be setback approximately 10m from the shelterbelts and at least 24m from the edge of the wetlands, which includes a 4m strip for light vehicles i.e. quad bikes to access the modules.

4.1.9 The PV modules will likely have a 20-year life and then need to be replaced at that time or earlier if there are significant advancements in technology. However, it is intended that the solar array will operate on the Site in perpetuity.

Operation of the Array

4.1.10 The electricity will be collected from each module, passing through cables. The voltage at this point is typically around 1500V. The power will then be routed to MV inverters which convert the direct current generated by the solar modules into alternating current which can be fed into the electricity grid. The inverters will also manage the amount of electricity entering the grid to ensure the system does not get overloaded. A further series of high voltage AC cables will then carry the electricity to the MV export switchgear unit comprised of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment. The switchgear is used to both de-energize equipment to allow maintenance or replacement work, and to disconnect the solar array from the electrical network if there is a fault.

4.1.11 To connect the part of Phase 2 west of the central wetland to the switchgear unit in the northeast corner of the Site, it is proposed to run an underground cable out of the Site and along Braemar Road to avoid the central wetland. It is acknowledged that this will require approval from MDC'S Roading Department.

Buildings

Permanent

4.1.12 It is proposed to install inverters in weather resistant housings on a single ISO 20' or 40' container skid (2.5m wide x 2-3m in height x 7-8m in length) sitting on a reinforced concrete slab.

4.1.13 The inverter's main job will be to convert DC power produced by the solar array into usable AC power. However, they will also enable monitoring from afar, so Infratec can see how the system is performing and can provide diagnostic information to help operation and maintenance crews identify and fix system issues. These important components are also increasingly taking on decision-making and control functions to help improve grid stability and efficiency as well as responsibility for battery management.

4.1.14 It is expected that in Phase 1 there will be approximately 2 of these, with a further 15 (approximately) being required for Phase 2.

Figure 4: Photograph of HEMK MV skid gen 3

4.1.15 The MV Export switchgear and storage facility is typically a prefabricated building the size of a two 40' containers side-by-side, so approx. 5m in width x 12m in length, which sit on a reinforced concrete slab. This will be located near the connection points to the local network, as shown on the Site Plan attached in **Appendix 3**.

Figure 5: Photograph of MV Export switchgear and storage facility

4.1.16 A permanent site storage facility comprising a 20ft or 40ft container or kit set building may also be installed on-site to provide simple office facilities, storage and welfare facilities.

4.1.17 Overall, permanent site coverage will be approximately 41% (48.5ha).

Temporary structures

4.1.18 During the construction of Phase 1, a temporary site office will be established in a converted shipping container or similar, as well as temporary amenities for staff such as self-contained toilets and a break area. These will be located in a temporary laydown area that will be located close to the entrance to the Site as identified in light blue on the Site Plan in **Appendix 3**.

4.1.19 During construction there will 15-20 40' shipping containers in the site temporary laydown area, for receiving stock of piles, framing, PV modules and cable.

4.1.20 These buildings/containers will be removed after the completion of Phase 1 and solar modules erected within the laydown area.

4.1.21 This process will be repeated for Phase 2, with laydown area being identified on the Site Plan in **Appendix 3**.

Fencing

4.1.22 Phase 1 will be surrounded by a 2.4m tall chain-link, fence throughout its construction and operation. This will be extended around the entire Site when Phase 2 is constructed. The fence will be located within the Site and screened by the existing shelterbelts.

4.1.23 All the wetland areas will be fenced as shown on the Site Plan in **Appendix 3** as part of Phase 1 with a stock and rabbit-proof fence, which will be setback at least 20m from the edge of the wetlands. An initial rabbit and hare knock-down (and follow-up surveillance / control) will be employed following site establishment, to eliminate and exclude rabbits and hares from the wetland and setback areas.

Three Waters

4.1.24 It is intended to truck potable water to the Site to meet drinking water demands for construction workers and staff as required. An above ground water tank, with a capacity of up to 5,000L will be situated on the site adjacent to the Site Office, to be constructed during Phase 1, to provide drinking water and service the ablutions. The water tank will be filled with potable water offsite and trucked to the site as required.

4.1.25 The temporary site office and staffroom will be self-contained having a surface effluent tank (2,700L capacity) that will be emptied as required, via a truck that will take sewerage offsite to be disposed of appropriately at an authorised facility.

4.1.26 Stormwater runoff from the proposed buildings and structures will be discharged to ground as there is no reticulated stormwater system in this area. The proposed internal tracks will be constructed using shingle only and there will be central drainage swales that will be permeable allowing stormwater drainage from the tracks direct to ground.

Earthworks

4.1.27 The proposal (Phase 1 and 2) will require a total volume of 13,074m^3 over a total area of 27,372m^2 (2.74ha or 2.4% of the Site) of earthworks to:

- provide a flat platform for structures, parking for 9 cars and the laydown areas of approximately 25m x 50m, and
- create internal roads; and
- minor levelling works within the array area; and
- create trenches or reticulation of DC and AC cables between modules, inverters, transformers and to the grid connection. These will be backfilled once work is complete and allowed to revegetate.

4.1.28 The piles for the modules will be driven and therefore there are no 'earthworks' required as there will be no cutting, filling or displacement of earth.

4.1.29 The volumes and area per phase are set out below:

Phase	Volume	Area
1	3,096m^3	6,298m^2
2	Block 1: 3,903.96m^3 Block 2: 2,777.28m^3 Block 3: 3,296.76m^3 Total = 9,978m^3	Block 1: 7,961.65m^2 Block 2: 6,046.05m^2 Block 3: 7,066.30m^2 Total: 21,074m^2
Total	**13,074m^3**	**27,372m^2**

4.1.30 The minimum depth of cut will be 0.2m and the maximum depth of cut will be 1m, associated with the digging of trenches. It is understood that depth to groundwater is approximately 6m, however the highest groundwater level for the Site is unknown given the lack of bores and groundwater monitoring in this area. That said, it is highly likely that the earthworks will remain above the known level of groundwater for the Site.

4.1.31 Earthworks will be setback at least 20m from the wetlands on the Site. A swale drain will also be created along each of the access tracks to channel surface water run-off and keep it away from the works/array area. Given this, a sediment and control plan will be prepared to manage the effects of earthworks and construction phase stormwater during the construction phases.

4.1.32 It is proposed to implement an Erosion and Sediment Control Plan (ESCP) as a mitigation measure to ensure these effects are mitigated as much as practicable. The general principles that will be adopted during the earthworks activities and incorporated in the ESCP and the dust management plan reflect the scale of the works and are as follows:

- Minimise the disturbance area due to earthwork activities as far as practicable, noting that Phase 1 and Phase 2 will be undertaken years apart, while satisfying all requirements for construction of the Site.
- Progressively stabilise exposed areas following completion.
- Divert all clean water runoff away from exposed earthworks areas, to minimise the risk of sediment entering the wetlands.
- Intercept sediment-laden runoff (as required) from exposed areas with sediment retention ponds to provide filtration and retention of sediment prior to discharging to land.
- Regularly inspect the erosion and sediment control measures and undertake any maintenance necessary to maximise the potential retention of sediment on the site.
- If necessary, earthwork activities may be limited in specific areas during periods of high wind and rainfall.
- Ongoing assessment of the erosion and sediment control measures and, if required, adjustments as the work progresses.
- Ensure site staff are aware of the requirements of the ESCP and the relevant resource consent conditions prior to the works commencing.
- Ensure that after hours contact details are available.

4.1.33 These principles are generally in accordance with the Environment Canterbury (ECan) Erosion and Sediment Control Online Toolbox for erosion and sediment control.

4.1.34 Furthermore, the earthworks contract developed for the Site will place specific responsibilities on the contractor for the environmental management of the Site. As part of this management, the contractor will be responsible for providing and maintaining adequate erosion and sediment control measures to protect the wetlands. Dust will be controlled through the use of water trucks, if required, to ensure no offensive or objectionable effects beyond the site boundary.

Vegetation clearance

4.1.35 It is understood that the area of vegetation that will need to be cleared is 2.7ha given that the modules will sit above the ground.

4.1.36 In summary, the proposal will result in the following loss of vegetation clearance:

Phase	Permanent Loss	Temporary Loss
1	3,746m^2	2,553m^2
2	9,671m^2	11,404m^2
Total	**13,416m^2**	**13,956m^2**

4.1.37 However, adopting the precautionary principle, it has been assumed that the shading of vegetation, especially indigenous vegetation, may lead to a loss of species and diversity. Conversely, there is evidence that exotic/pasture species will benefit from shading, which will enable the Site to be used for pastoral activities. It is therefore difficult to quantify the exact extent of vegetation loss, but permanent vegetation clearance associated with construction activities such as earthworks (not shading) will be approximately 13,416m^2 (1.2% of the Site). However, all vegetation clearance, loss and potential changes to species and diversity have been assessed.

4.1.38 It is not proposed to undertake vegetation clearance, earthworks or construct modules within 20m of the wetlands on the Site. However, it is proposed to remove several existing crack willow trees and surveillance for (and elimination of) several key weed species will occur within wetland / setback areas (Russell lupin, scotch broom, gorse, lotus, sweet briar, and all exotic trees e.g., willow, conifer, poplar and birch species).

Vehicle Crossings, tracks and hardstanding

4.1.39 There are two vehicle crossings to the Site that will be retained as shown on the Site Plan in **Appendix 3**. It is proposed to establish a further 4 vehicle crossings that will provide direct access from Braemar Road to four internal tracks thus minimising the need for tracks and associated vegetation clearance and earthworks within the Site. The vehicle accesses will be formed to MDC standards.

4.1.40 Four permanent gravel tracks will be constructed in a north/south direction across the Site to provide for the construction of the array and access by staff for on-going maintenance. Aggregate will also be needed to create hardstanding in the laydown areas, and concrete may be required to create foundations for the inverters and fencing.

Traffic Generation

4.1.41 During construction of each stage, approximately twenty light vehicle trips will be required to and from the Site each day with staff entering and leaving the site.

4.1.42 Delivery of materials (including aggregate for tracks, inverters and containers, and the construction materials for the solar arrays) will be made using heavy goods vehicles. Other equipment will be required at times e.g. pile driving machinery. The numbers and scale of vehicles will range depending on the deliveries and will require up to 8 heavy vehicle movements per day at times during the construction period.

4.1.43 The majority of vehicle movements will be associated with the construction of the solar array as the Site is generally passive and operates without permanent staff. However, there will be the occasional need for maintenance or repair engineers to visit the Site to undertake routine or emergency works. It is anticipated that only 1 - 2 staff will need to visit the Site approximately once a month. This will equate to around four vehicle trips per month when staff visit the site to check the solar array is operating as it should and carry out any maintenance.

Storage and Use of Hazardous Substances

4.1.44 Some fuel storage for machinery will be required during construction but will comply with all HSNO requirements including bunding storage areas and having spillage kits on Site. No fuel or chemicals will be stored on the Site once construction is complete.

4.1.45 Oil-filled Transformers remaining on the Site will be fully bunded as per AS NZS standards and good industry practice.

33kV underground power lines

4.1.46 The project will require two new connections to the existing 33kV electricity network. Two underground lines, cumulatively 350m in length, are proposed to connect the Site to the existing Alpine Energy 33kV network at Braemar Road. One will be associated with Phase 1 and located at the southern end of the Site and the other with Phase 2 and located at northern end of the Site.

Primary Production

4.1.47 The Site will continue to be used for pastoral activities, likely grazing sheep, as they can walk under and amongst the modules without damaging them, but all cattle grazing will cease. All grazing will be fully excluded from a 10.5 ha 'central wetland' area (which includes a ≥20 m setback of existing dry pasture / short tussockland and from two other 'southwest wetlands' (4.0 ha in total) in the southwest corner of the Site (including dryland setback as above), by means of an internal stock and rabbit-proof fence. This means 14.5 ha of the c.113 ha site that is currently grazed by cattle will no longer be grazed at all. Aerial over sowing and top-dressing will also cease in the wetlands and setback areas but may continue in other areas of the Site. This will occur as part of Phase 1.

4.1.48 Once Phase 2 construction commences, the Site may be fertilised, with machinery being able to access between the rows of modules, although a hand or more manual approach may be required to fertiliser under the modules. However, fertiliser may not be required at all, depending on the rate of growth achieved when the land is sheltered from the worst of the Mackenzie weather.

5.0 Assessment of Effects

5.1.1 Landscape and visual impacts result from natural or induced change in the components, character or quality of the landscape. Usually, these are the result of landform or vegetation modification or the introduction of new structures, facilities or activities. All these impacts are assessed to determine their effects on character and quality, amenity as well as on public and private views.

5.1.2 In this study, the assessment of potential effects is based on a combination of the landscape's sensitivity and visibility together with the nature and scale of the development proposal.

5.1.3 Particular effects considered relate to the following:

- Landscape character effects
- Visual amenity effects from public and private locations; and
- Effects in relation to statutory provisions.

5.1.4 The principal elements of the proposal that will give rise to landscape and visual effects are:

- The installation and operation of PV array modules – Phase 1 will contain approximately 20,000 bifacial PV panels. These panels generate electricity on both sides, allowing for direct and reflected light to be captured and harnessed. A diagram showing a potential layout at the site under a two-phase arrangement (Phases 1 and 2) is attached as **Appendix 3**.
- Perimeter security fencing.
- 2 new underground lines connecting the Site to the transmission network.
- 17 Central Inverter Skid Units.
- Two MV Export Switchgear and storage areas.
- Internal tracks, parking and laydown area.

5.2 Natural Character Effects

5.2.1 The term ‘natural character’ occurs within the first of eight matters of national importance under Section 6 of the Resource Management Act (RMA). Within the RMA, sustainable management of natural and physical resources requires the preservation of natural character of wetlands, rivers and their margins.

5.2.2 In terms of natural character, the highest degree of naturalness occurs where there is the least amount of human induced modification. Structures, such as those required for a solar farm can adversely change and alter the natural character of an area. The significance of this effect is dictated by the size, location and sensitivity of the receiving environment.

5.2.3 The Site has been modified through its current land use for sheep and beef grazing, and by the planting of a pine shelterbelt around the site boundary. Due to this, experiential values associated with natural character values are **moderate**. The site contains three main indigenous vegetation types including grasslands with fescue tussock and copper tussock, and herbfields on dry raised areas dominated by exotic mouse-ear hawkweed; it is of moderate ecological value despite the overall dominance of exotic pasture species. Abiotic values are therefore considered to be **moderate**. Abiotic values of the wetland areas within the site are considered to be **moderate**, due to access of these areas by stock, which has resulted in substantial pugging to many areas. Overall, the natural character value of the wetland areas within the site is **moderate**.

5.2.4 When considering the Sites’ existing nature, along with the removal of grazing form wetland areas, the biotic and abiotic attributes (particularly of existing wetland areas) of the Site are expected to improve and regenerate over time. The existing wetland areas, along with a >20m setback of dryland (‘main paddock’) vegetation will be fenced off from grazing animals and left to enhance habitat for indigenous flora species. In time, the wetland habitats across the Site will increase in naturalness.

5.2.5 Experiential attributes associated with the rural environment of the Mackenzie will reduce due to the presence of numerous structures that cover the landscape and hide the natural undulation of the landforms. However, this is limited to the area within the site which is well contained by the surrounding shelterbelt. The wetland margins will be met with structures rather than open, expanses of space. However, these margins will flourish in time with the removal of grazing.

5.2.6 Overall, the proposal is considered to have a **neutral to low beneficial** effect on the natural characteristics and qualities of the Site. As the wetlands on the Site regenerate, the level of natural character on the Site is expected to increase, essentially creating positive benefits for both the Site and surrounding landscape.

5.3 Landscape Effects

Direct Landscape Effects (or Biophysical effects)

5.3.1 The assessment of biophysical effects considered the nature and significance of modifications to landform, the wetlands at the Site, and vegetation.

5.3.2 Landform within the Site would remain unchanged as the proposed Site is gently sloping. Earthworks will be required for the construction of gravel access tracks and for cable trenching, as illustrated on the plan in Appendix 3. The layout of these tracks and cable trenches has been carefully designed to minimise their length and therefore earthworks requirements. The area of earthworks totals around 2.3ha of the 117ha site.

5.3.3 There will be minor disturbance to the soil associated with the construction of the solar panels, ancillary structures, cable trenching, laydown and access and the fencing around the Site. Proposed panel foundations will be via screw link or driven pile in the ground. This will entail minimal additional earthworks for the installation of the support structures (screw anchor or driven pile and frame site on top). Overall, there will be **low** (neutral) effects on the topography or landform of the development Site.

5.3.4 Four 4 metre wide sections of the pine shelterbelt will be removed to allow for site access. The Site will be accessed by existing entrances along Braemar Road. The Site will remain productive, the ground at each site will remain grassed and will be utilised for grazing. The physical effects on vegetation associated with accommodating the proposed Solar Farm will be limited to the removal of small areas of tussock / pasture to allow for trenching, pile driven foundations and the installation of the ancillary equipment for the solar panels. Effects on vegetation would be **negligible**.

5.3.5 A central wetland area runs through the centre of the Site, with a further wetland area located in the southwestern corner of the site. The proposed solar arrays will not be located in the vicinity of the of these areas (a 20m minimum setback has been allowed for) and no earthworks will be carried out within these setbacks. It is proposed to fence the wetland areas off from the remainder of the solar farm to prevent stock access. There would be no changes to these features as a result of the proposed development, and over time the quality of these wetland areas may improve (see Section 5.2).

Landscape Character Effects

5.3.6 Landscape character is derived from the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, vegetation, land use and features of human settlement. It creates the unique sense of place defining different areas of the landscape.

5.3.7 The Mackenzie Basin is a unique and special landscape, characterised by its vast open nature with striking milky-blue coloured lakes, wide river basins and golden tussock laden slopes providing the setting for expansive views towards the encompassing mountain ranges, as encapsulated by **Viewpoint Photograph 1 on Figure 6A** from Scenic Viewing Area 2 **and Viewpoint Photograph 9 on Figure 6E** from the summit of Mt John. The Canterbury Regional Landscape Study recognises that the landscape contains areas of exceptional legibility, aesthetic, transient, shared and recognised, very high natural science and high tangata whenua and historic landscape values.

5.3.8 The Study also acknowledges that landscape qualities vary across an area of this size, which contains areas of human modification. The site is one such area of the Mackenzie Basin where human influence, in the form of the planting of a pine shelterbelt, and fertilising of the land to obtain improved pasture, has modified the character of the basin landscape.

5.3.9 Effects on landscape character include:

- The temporary disruption to existing landscape characteristics and values during construction; and
- The modification of the existing landscape values and wider long-term impacts on the landscape character and amenity of the area.

During Construction

5.3.10 During the construction period there will be disturbance to the soil associated with the construction of the solar panels, ancillary structures, cabling (trenching), laydown and access areas and the fencing around the Site. The impact on the landscape character during construction would arise from the exposure of bare earth and the movement of construction vehicles, as each stage of the solar farm is constructed. These activities will be largely contained by the existing pine shelterbelt around the site boundary.

5.3.11 The effects on landscape character are anticipated to increase incrementally as construction progresses and more solar panels are erected. Stage 1 of the development is smaller, with Stage 2 of the development having the greatest area of change during the construction period.

During Operation

5.3.12 The Site will transition from a rural productive landscape to that of a landscape containing energy infrastructure. The large expanse of open space within the pine shelterbelt boundaries will be reduced to areas between solar panels. Grazing sheep will continue to manage the pasture underneath the panels and frames. The sheep will be excluded from the wetland areas by fencing. The presence of farm animals will maintain a sense of the existing rural character of the Site.

5.3.13 The Site forms a part of the Mackenzie Basin ONFL but maintains a different character to that of the surrounding outwash plain, being separated from this area by the existing pine shelterbelt which surrounds the site. This shelterbelt screens the ground surface of the site from view in the wider landscape, in all but a few small areas. The Site's location tucked near the base of Old Man Range also means that it is contained from the wider basin landscape and this also fits in with the recommendations outlined in the Landscape Guidelines (Appendix K) of the Mackenzie District Plan, which recommends buildings and structures are located near a change in landform, such as at the base of the hill, avoiding central locations. Guidance for the siting of buildings and structures also states that landform as a backdrop to buildings has a unifying effect, and that existing vegetation should also be used to form a background. This is the case for all views of the proposed solar farm in the wider landscape, as illustrated in **Viewpoint Photographs 5, 6 and 8**.

5.3.14 The pine shelterbelt forms a part of the existing modified character of this part of the Mackenzie Basin and it is proposed to maintain this for the life of the solar farm. The proposed solar panels will have a low profile in the context of the existing landform and the surrounding shelterbelt, and any effects on landscape character would be very localised.

5.3.15 To further limit the landscape effects of the proposed development it is recommended that the following measures are undertaken:

- The materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape, as outlined in Appendix K of the Mackenzie District Plan;
- Where practical, proposed new buildings will be non-reflective and in coloured in a natural range of browns, greens and greys to complement the tones found in the rural surroundings, as outlined in Appendix K of the Mackenzie District Plan;
- Visible foundations shall be avoided where possible, keeping the floor of buildings/structures close to ground level;
- Fencing shall follow the inside of the shelterbelt boundary and be in accordance with the recommendations outlined for fencing in Appendix K of the Mackenzie District Plan; and
- Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.

5.3.16 Post-construction monitoring and weed control measures should be implemented post construction to control weed establishment.

5.3.17 With these measures in place, overall, a **low** adverse effect on the landscape character values of the Mackenzie Basin is expected due to the introduction of solar panel structures and associated infrastructure.

5.4 Visual Effects

5.4.1 Visual amenity effects are influenced by several factors including the nature of the proposal, the landscape absorption capability and the character of the site and the surrounding area. Visual amenity effects are also dependent on distance between the viewer and the proposal, the complexity of the intervening landscape and the nature of the view.

Effects from public vantage points

Viewpoint 1 – State Highway 8

5.4.2 The view from State Highway 8 looks north-east towards the site. The view illustrates a view from State Highway 8 across Scenic Viewing Area 2 as defined in the Mackenzie District Plan. Tekapo Military Camp is visible in the far left of the image with Old Man Range beyond, framing the left of the view. Mt John forms the right-hand side of the view. The existing power lines crossing the basin are visible in the middle ground of the view, with distant views towards the mountains beyond. The site is screened from view beyond Old Man Range. Visual effects from this viewpoint would be **none**.

Viewpoint 2 – Braemar Road, near Balmoral Station

5.4.3 The view near Balmoral Station looks west towards the site. The pine shelterbelt surrounding the site is visible in the distance in the centre left of the view. Braemar Rd forms the centre of the view, with a view out towards the Gammack and Hall Ranges beyond. The existing 33Kv transmission line is visible in the right of the view. Visual effects from this viewpoint would be **none**.

Viewpoint 3 - Braemar Road East

5.4.4 In the view from Braemar Road approaching the site from the east, the pine shelterbelt around the site boundary stands out starkly against the mountainous backdrop. The ground surface of the site is screened from view by the shelterbelt and by the outwash landform that rises away from the view. The distinctive landform of Old Man Range frames the left-hand side of the view. The existing power line can be seen crossing the centre of the view. Visual effects from this viewpoint would be **none**.

Viewpoint 4 – Braemar Road, approaching site boundary from the East

5.4.5 Braemar Road and the distant Gammack Ranges from the right-hand side of the image, with the pine shelterbelt forming the site boundary visible across the centre of the view. The existing 33kv power line crosses in front of the shelterbelt in the middleground of the view. The landform of Old Man Range rises to frame the left-hand side of the image. A very small part of the interior of the site can be glimpsed through a gap in the shelterbelt. This gap looks towards the site of the export switchgear and storage facility for the project, and a very small part of this, together with the export line to the grid would be visible from this viewpoint, resulting in a **very low adverse** visual effect.

Viewpoint 5 – Braemar Road West

5.4.6 In this view, approximately 1.7km from the site boundary, approaching the site on Braemar Road from the west, the site is visible in distant centre of image, with the Old Man Range forming the backdrop and the Two Thumb Range forming the distant horizon in the view. The pine shelterbelt is visible, and due to the elevation of the viewpoint, much of the ground surface of the site is also visible. Further small gaps in the shelterbelt will be created by the construction of the access tracks. This view is representative of a view from a short section of road (approximately 900m in length) where due to the elevation of the landform, it is possible to gain a view into the Site. Road users would experience this view as a transient view as they travel east along this section of Braemar Road towards the site. Visual effects from this viewpoint would be **low adverse**, and would gradually reduce as road users move closer to the site, as described in Viewpoint 6 below.

Viewpoint 6 – Braemar Road west

5.4.7 In this view, approximately 1.2km from the site boundary, a similar view to the above is acquired, but the elevation of the road has lowered, allowing most of the ground surface of the site to be screened by the surrounding shelterbelt. Further small gaps in the shelterbelt will be created by the construction of the access tracks. Visual effects would be **very low adverse**.

Viewpoint 7 – Braemar Road West near site boundary

5.4.8 In this view approaching the site boundary from the west on Braemar Road, two gaps in the shelterbelt can be seen, which provide narrowly framed views into the site.. The landform of Old Man Range forms the horizon in the left-hand side of the image beyond the shelterbelt, with the Two Thumb Range forming the distant horizon in the centre of the view. The existing 33kv transmission line can be seen crossing the basin in the left-hand side of the view. From this location a transient framed view into the site of the site's fencing and solar panels would be visible, resulting in **very low adverse** visual effects.

Viewpoint 8 – View South from Site Boundary

5.4.9 This view south from Braemar Road looks directly into the other gaps present in the boundary shelterbelt. Further small gaps in the shelterbelt, similar to this but only 4m in width, will be created by the construction of the access tracks. Braemar Road is in the foreground of the view, with the ground surface of the site is visible in the centre of the view, with the southern side of the shelterbelt and the Old Man Range beyond. This view would be experienced as an oblique glimpsed view by users of Braemar Road. Solar panels, inverter units and surrounding security fencing would be visible. No panels would occupy the immediate foreground of this view, as the gap in the shelterbelt coincides with the wetland exclusion area in this location. Visual effects for road users at this particular point would be **moderate-low adverse**.

Viewpoint 9 – Mt John

5.4.10 The panoramic view from Mt John looks west towards the site, which is screened from view beyond Old Man Range and Tekapo Military Camp, visible in the left of the image. The dark colour of the pine plantation surrounding the camp stands out starkly against the mountainous grassland backdrop. Shelterbelt planting is also visible in the distance beyond he ranges Lake Alexandrina is visible in the right of the view, with landform rising towards the mountain ranges beyond. The form of the Mackenzie Basin is clearly visible, flanked by the higher mountain ranges to the north and west. Visual effects from this viewpoint would be **none**.

Private Effects from private vantage points

5.4.11 As discussed above, there are few residential dwellings in close proximity to the Site and publicly accessible views from the north and east are extremely limited due to the Ministry of Defence land in this direction. Balmoral Station is the nearest residential dwelling to the site, and views from here towards the site are screened by the landform of the Old Man Range. There are no other private residences with views towards the site, therefore visual effects for local residents are **none**.

5.5 Summary of Visual Effects

5.5.1 Overall, adverse visual effects resulting from the proposal are limited due to the Site's secluded location behind the landform of the Old Man Range. As described earlier, the Site has been selected due to its contained nature within the wider landscape and the surrounding mature shelterbelt (15-20m in height) which limits views to the site from Braemar Road, and the Site is also not visible from main viewpoints in the district (such as Mt St John and SH8).

5.5.2 Where visual effects are possible these range from **moderate-low adverse** for one view located at a gap in the site boundary, reducing to **very low adverse** for views where most of the site is screened by the shelterbelt. There is an area of visibility to the west of the site on Braemar Road, where the road elevation allows views into the ground surface of the site. This occurs along a stretch of road approximately 900m in length, and the views would be transient and glimpsed views as road users move along the route. Visual effects for these road users are **low adverse**. There are no private residences with views towards the site, therefore visual effects for local residents are **none**.

5.6 Effects in relation to Statutory Provisions

5.6.1 In terms of Section 6(b) of the Resource Management Act relating to the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development, the Site lies within the within the Mackenzie Basin Subzone and Outstanding Natural Landscape, as defined under Plan Change 13 of the Mackenzie District Plan, and is defined as an Outstanding Natural Feature and Landscape in the Canterbury Regional Landscape Study Review 2010. The Study acknowledges that landscape qualities vary across an area of this size, which contains areas of human modification.

5.6.2 The Site is one such area of the Mackenzie Basin where human influence, in the form of the planting of a pine shelterbelt, and fertilising of the land to obtain improved pasture, has modified the character of the basin landscape. The shelterbelt screens the ground surface of the site from view in the wider basin landscape, in all but a few small areas. Given the containment of the site from the wider basin landscape, and the low level of disruption to the landscape fabric of the outwash plain, overall, a **low** adverse effect on the landscape character values of the Mackenzie Basin is expected.

5.6.3 Mackenzie District Council (MDC) have confirmed that the solar array is defined as a Utility. The proposed roading, earthworks, permanent office, permanent switchgear containers and temporary shipping containers are included in the definition as 'facilities, structures and works necessary for the generation and transmission of energy.' Therefore, the Rules in Section 16 of the Mackenzie District Plan take precedence over the Rules in Section 7, Rural Zone.

5.6.4 Policy for Utilities aims to protect areas identified as possessing important natural features, significant indigenous vegetation or significant habitats of indigenous fauna from utilities which are visually and environmentally incompatible, as well as to provide for the establishment, operation, maintenance, enhancement, upgrading and development of electricity generating utilities in the District while ensuring that adverse effects on the environment are avoided, remedied or mitigated. The site's well contained nature and the nature of the works, with limited earthworks help to achieve the desired outcome of these policies.

5.6.5 The site is identified as being located in an area of High Visual Vulnerability in the Mackenzie District Plan. It is noted that the identified areas of visual vulnerability a guide to areas where development may be more (or less) appropriate based solely on visual vulnerability which is one of the relevant factors.

5.6.6 Although identified as a being a part of this vulnerable area, the site is visually well contained. The proposed location of the solar farm within an existing shelterbelt, screening it from the wider landscape maintains the openness and vastness of the Mackenzie landscape. Located near the base of the Old Man Range, the solar panels would meet the guidelines for siting structures as outlined in the District Plan Appendix K - Landscape Guidelines. The form of the development has a low profile and would not disrupt the vistas of the wider mountains, hills and moraines The site is also not visible from the key viewing area of SH8.

5.6.7 Further recommendations have been outlined for the proposal below, based upon the Guidance provided in Appendix K.

6.0 Recommendations

6.1.1 The following recommendations are made to reduce the landscape and visual impact of the proposal:

- The materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape, as outlined in Appendix K of the Mackenzie District Plan;
- Where practical proposed new single story buildings will be non-reflective and in coloured in a natural range of browns, greens and greys to complement the tones found in the rural surroundings, as outlined in Appendix K of the Mackenzie District Plan;
- Visible foundations shall be avoided where possible, keeping the floor of buildings/structures close to ground level;

- Fencing shall follow the inside of the shelterbelt boundary and be in accordance with the recommendations outlined for fencing in Appendix K of the Mackenzie District Plan; and
- Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.

7.0 Conclusions

7.1.1 The proposed solar panels and ancillary development have been located within an area of the Mackenzie Basin where human influence, in the form an existing mature pine shelterbelt, and the fertilising of the land to obtain improved pasture, has modified the character of the basin landscape. The well contained nature of the site limits the potential for adverse effects on the ONFL, creating only localised low-level effects.

7.1.2 In landscape terms, the implementation of the solar farm will represent a localised temporary disruption of an existing modified area. The proposed solar farm layout has been designed to avoid any disruption of the existing wetland areas and maintains the existing pine shelterbelt which forms a part of the existing landscape context.

7.1.3 Any views will remain very localised, being limited to the corridor of Braemar Road which provides transient views and generates only low level effects, with the exception of the location of the access tracks at the site boundary which offer near views into the Site. There are no private views towards the proposed development, and the proposal is not visible from the key scenic viewing areas of State Highway 8 and Mt John.

8.0 References

Boffa Miskell Ltd. (2010). *Canterbury regional landscape study review: Final report* (Report No. C08016). Prepared by Boffa Miskell Ltd for Environment Canterbury.

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Appendix 1: Assessment Methodology

11 February 2019

Natural Character, Landscape and Visual Effects Methodology

Introduction

The landscape assessment 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, changes in the existing character or condition of the landscape and the associated experiences of such change. In addition, the landscape assessment method includes an iterative design development processes, which seeks to avoid, remedy or mitigate adverse effects (see **Figure 1**).

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to the **Draft Te Tangi A Te Manu: Aotearoa New Zealand Landscape Assessment Guidelines** and its signposts to examples of best practice, which include the **Quality Planning Landscape Guidance Note**[6] and the **UK guidelines for landscape and visual impact assessment**[7]**.**

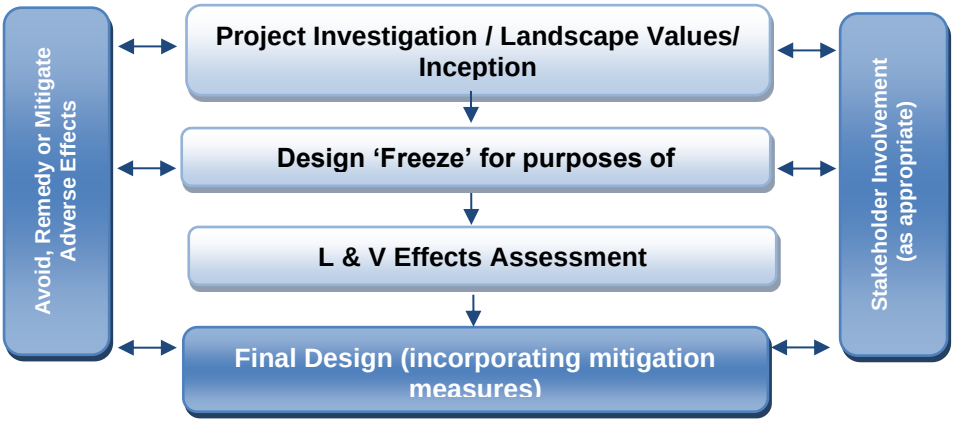


Figure 1: Design feedback loop

When undertaking any landscape assessment, 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 natural character, landscape and visual effects assessments are closely related, they form separate procedures. Natural character effects consider the characteristics and qualities and associated degree of modification relating specifically to waterbodies and their margins, including the coastal environment. The assessment of the potential effects on landscape considers effects on landscape character and values. 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:

Natural Character effects: *Change in the characteristics or qualities including the level of*

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

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

[6] http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape
[7] 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 first step requires identification of the landscape's **character** and **values** including the **attributes** on which such values depend. This requires that the landscape is first **described**, including an understanding of relevant physical, sensory and associative landscape dimensions. 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.

Natural Character Effects

In terms of the RMA, natural character specifically relates to the coastal environment as well as freshwater bodies and their margins. The RMA provides no definition of natural character. RMA, section 6(a) considers natural character as a matter of national importance:

> *…the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development.*

Natural character comprises the natural elements, patterns and processes of the coastal environment, waterbodies and their margins, and how they are perceived and experienced. This assessment interprets natural character as being the degree of naturalness consistent with the following definition:

> *Natural character is a term used to describe the naturalness of waterbodies and their margins. The degree or level of natural character depends on:*
>
> - *The extent to which natural elements, patterns and processes occur;*
> - *The nature and extent of modifications to the ecosystems and landscape/seascape;*
> - *The highest degree of natural character (greatest naturalness) occurs where there is least modification; and*
> - *The effect of different types of modification upon the natural character of an area varies with the context and may be perceived differently by different parts of the community.*

The process to assess natural character involves an understanding of the many systems and attributes that contribute to waterbodies and their margins, including biophysical and experiential factors. This can be supported through the input of technical disciplines such as marine, aquatic and terrestrial ecology, and landscape architecture.

Defining the level of natural character

The level of natural character is assessed in relation to a seven-point scale. The diagram below illustrates the relationship between the degree of naturalness and degree of modification. A high level of natural character means the waterbody is less modified and vice versa.

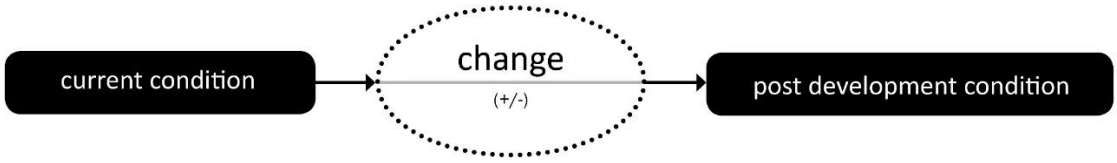
Very High	High	Moderate - High	Moderate	Moderate - Low	Low	Very Low

Scale of assessment

When defining levels of natural character, it is important to clearly identify the spatial scale considered. The scale at which natural character is assessed will typically depend on the study area or likely impacts and nature of a proposed development. Within a district or region-wide study, assessment scales may be divided into broader areas which consider an overall section of coastline or river with similar characteristics, and finer more detailed 'component' scales considering separate more local parts, such as specific bays, reaches or escarpments. The assessment of natural character effects has therefore considered the change to attributes which indicate levels of natural character at a defined scale.

Effects on Natural Character

An assessment of the effects on natural character of an activity involves consideration of the proposed changes to the current condition compared to the existing. This can be negative or positive.



The natural character effects assessment involves the following steps;

- assessing the existing level of natural character;
- assessing the level of natural character anticipated (post construction); and
- considering the significance of the change

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 physical, sensory 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)	**Ability to absorb change**	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.
	The value of the landscape	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	**Size or scale**	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.
	Geographical extent	Wider landscape scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 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.

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: Seven points as illustrated on Figure 3

Nature of target points: 3.5m above existing 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 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.

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 guide books 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[8].

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 4** has been prepared to help guide this process:

Contributing Factors		Higher	Lower	Examples
The Viewing Audience (sensitivity)	**Ability to absorb change**	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
	Value attached to views	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	**Size or scale**	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)
	Geographical extent	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
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).	- Permanent (fixed), Transitory (moving)

Table 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.

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 2** set out below:

Nature of effect	Use and Definition
Adverse (negative):	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
Neutral (benign):	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

[8] Best Practice Guide: Visual Simulations BPG 10.2, NZILA

Beneficial (positive):	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 1: Determining the Nature of Effects

Cumulative Effects

This can include effects of the same type of development (e.g. bridges) or the combined effect of all past, present and approved future development[9] 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 conclude 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:

Figure 2: Assessment process

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in **Table 3** below. This table which can be used to guide the level of natural character, landscape and visual effects uses an adapted seven-point scale derived from Te Tangi A Te Manu.

Effect Rating	Use and Definition
Very High:	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character and in views.
High:	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains and a major change in views. *Concise Oxford English Dictionary Definition* *High: adjective- Great in amount, value, size, or intensity.*
Moderate- High:	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed and prominent in views.

[9] The life of the statutory planning document or unimplemented resource consents.

Moderate:	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent in views but not necessarily uncharacteristic within the receiving landscape. *Concise Oxford English Dictionary Definition* *Moderate: adjective- average in amount, intensity, quality or degree*
Moderate - Low:	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.
Low:	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. *Concise Oxford English Dictionary Definition* *Low: adjective- **1.** Below average in amount, extent, or intensity.*
Very Low:	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 3: Determining the overall level of landscape and visual effects

Determination of "minor"

Decision makers determining whether a resource consent application should be notified must also assess whether the effect on a person is less than minor[10] or an adverse effect on the environment is no more than minor[11]. Likewise, when assessing a non-complying activity, consent can only be granted if the s104D 'gateway test' is satisfied. This test requires the decision maker to be assured that the adverse effects of the activity on the environment will be 'minor' or not be contrary to the objectives and policies of the relevant planning documents.

These assessments will generally involve a broader consideration of the effects of the activity, beyond the landscape and visual effects. Through this broader consideration, guidance may be sought on whether the likely effects on the landscape or effects on a person are considered in relation to 'minor'. It must also be stressed that more than minor effects on individual elements or viewpoints does not necessarily equate to more than minor landscape effects. In relation to this assessment, moderate-low level effects would generally equate to 'minor' (see **Table 4**).

The third row highlights the word 'significant' which has particular reference to the NZCPS and Policy 13 and Policy 15 and where on the effects-spectrum 'a significant' effect would be placed.

Less than Minor		**Minor**	**More than Minor**			
Very Low	**Low**	**Moderate – Low**	**Moderate**	**Moderate-High**	**High**	**Very High**
					Significant[12]	

Table 4: Determining adverse effects for notification determination, non-complying activities and significance

[10] RMA, Section 95E

[11] RMA Section 95D

[12] To be used only about Policy 13(1)(b) and Policy 15(b) of the New Zealand Coastal Policy Statement (NZCPS), where the test is 'to avoid significant adverse effects'.

Appendix 2: Canterbury Regional Landscape Study Extract

app

Appendix 3: Solar Array Concept Layout

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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