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Landscape Assessment Report

Proposed Solar Farm
Nova Energy Ltd, Mackenzie Basin

5 March 2025

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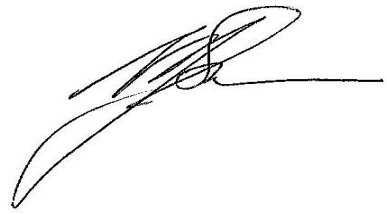

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Use and Reliance

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1 Introduction

1.1 Purpose and Scope

Rough Milne Mitchell Landscape Architects (**RMM**) has been engaged by Nova Energy Ltd (**the Applicant**) to assess the actual and potential landscape and visual effects of a proposed 500ha solar farm, located within Lot 3 DP422901, State Highway 8 (**SH8**), Twizel (**the site**), which is approximately 868ha in area.

The site is accessed from SH8, 830m south of Ostler Road, Twizel, via the existing Sol Quarry accessway. The site is approximately 9km long and on average 1.2km wide, narrowing to its southeast point. It is situated between the Twizel River to the north, the Ōhau River to the south, the confluence of these two rivers to the southeast and SH8 to the west, refer to **Figure 1** below.

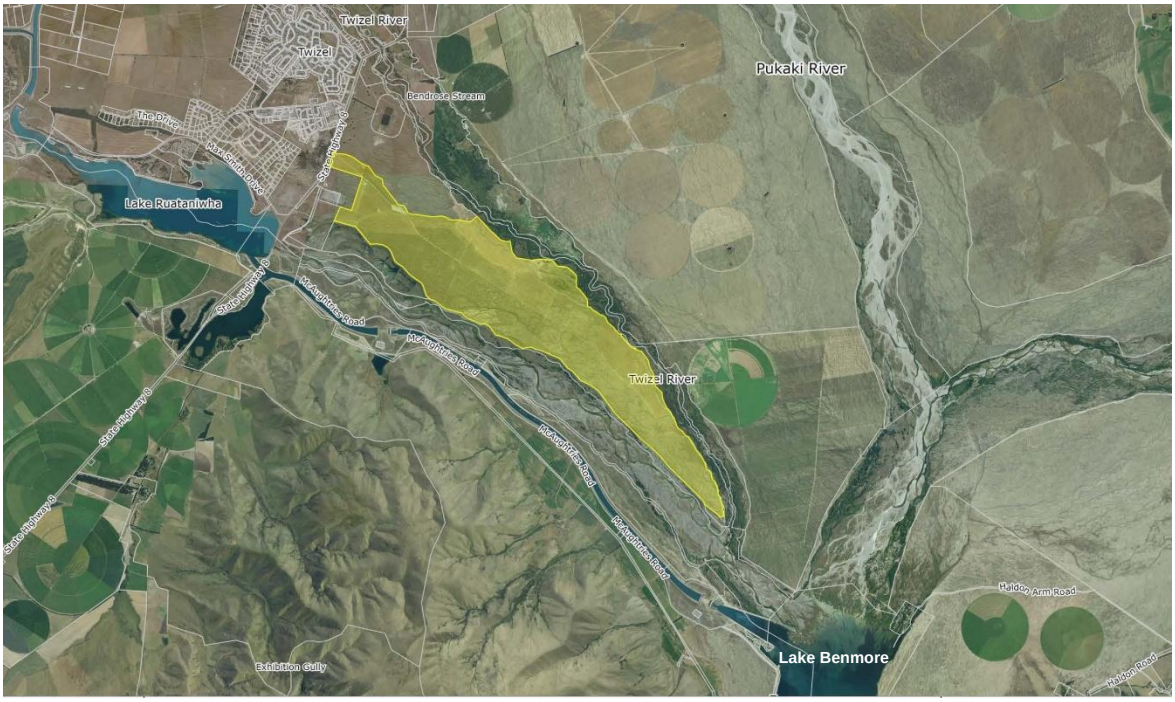


Figure 1. The site locations, immediately east of Twizel township situated between Twizel River and Ōhau River, within the Mackenzie Basin, as highlighted in yellow.

Under the Operative Mackenzie District Plan (**OMDP**) the site is zoned Rural and is within the Mackenzie Basin Subzone which is identified as an Outstanding Natural Landscape (**ONL**) and is within an area of high visual vulnerability. Refer to **GA Sheets 18 and 19**. Section 16 of the OMDP contains the utility rules, which take precedence over the Rural Zone rules. Subsequently, under Section 16 - Rule 1.5e resource consent is required as a *discretionary activity* because solar panels as part of a renewable generation facility are not specifically listed as permitted or discretionary activities. Additionally, resource consent is required as a discretionary activity under Rule 1.5d because the capacity of the new overhead lines will exceed 100 Megavolt Ampere (**MVA**).

The Mackenzie District Council (**Council**) have proposed a new Mackenzie District Plan (**PMDP**) through a rolling District Plan Review and each chapter is being reviewed under a separate plan change.

Proposed Plan Change 23 relates to the General Rural Zone (**GRUZ**), and Plan Change 26 relates to Renewable Electricity Generation and Infrastructure (**REG**) Chapter. Under the PMDP, the site is within the GRUZ and is within the Mackenzie Basin's ONL and a high visual vulnerability area. Refer to **GA Sheet 23**.

Similar to the OMDP, the REG chapter takes precedence in the PMDP when assessing renewable electricity generation activities, refer to REG - Table 1. Subsequently, under REG-R7 resource consent is required as a *discretionary activity* because the proposed solar farm is not a small-scale renewable electricity generation activity, is not otherwise listed and will be located within an ONL.

Other consent requirements apply to the proposal, which are identified within the Resource Consent Application and Assessment of Environmental Effects (**AEE**) Report.

The landscape assessment report is formatted as per the following:

- A description of the proposal.
- An outline of the relevant policy provisions within the Mackenzie District Plan.
- The identification and description of the receiving environment. The receiving environment is described in terms of the landform, land cover and land use and how those landscape attributes contribute to the receiving environment's existing physical, perceptual and associative landscape values.
- An assessment of the actual and potential landscape, natural character and visual effects, including cumulative effects.
- An assessment against the relevant statutory provisions.
- Recommendations.
- Conclusion.

This report is accompanied by:

- **Appendix 1 -** The Relevant OMDP and PMDP Policy Provisions
- **Appendix 2 -** Graphic Attachment (**GA**). The GA contains plans of the proposed solar farm, solar panels and ancillary structures, exemplar images of similar solar farms in Aotearoa New Zealand and Australia, maps and aerial images of the site location, the identification of the receiving environment, the relevant OMDP and PMDP planning maps and photographs of the site taken from the surrounding public places.
- **Appendix 3 -** Visual Simulations prepared by Virtual View Ltd, a company that specialises in preparing 3D visualisations. Ten visual simulations have been prepared which directly correspond the viewpoint location photographs in Appendix 1.

1.2 Methodology

The methodology and terminology used in this report has been informed by the Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines[1].

[1] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022.

The landscape assessment report assesses the proposed solar farm without any landscape mitigation and is to recommend landscape mitigation measures (if any) if such measures are appropriate within the Mackenzie Basin and can mitigate the potential adverse effects of the proposal.

The site and its surrounds were visited on 25 June 2024. This site visit was undertaken to assist in understanding the landscape character and values within the receiving environment and assessing the proposal's actual and potential landscape and visual effects.

This report is tailored to suit the nature of the proposed solar farm and its context, including the framework of the governing legislation. The statutory documents containing provisions relevant to the proposed solar farm are found in the Resource Management Act 1991 (**RMA**), the National Policy Statement for Renewable Electricity Generation (**NPS-REG**), and the OMDP and PMDP. The OMDP and PMDP give effect to the RMA and NPS-REG and therefore provide the policy framework against which this landscape assessment has been evaluated.

The Applicant commissioned a peer review of this report by Patch Landscape Architects, that will form part of the Application. RMM reviewed the Patch Peer Review and met on 3 March 2024 to discuss the two reports, as part of preparing this report. There were some minor differences in opinion between the two reports however, this only resulted in one change to the recommendations at the end of this report. This is the removal of Matagouri as a recommended plant species, as it is too slow growing.

The table included in **Figure 2** outlines the rating scales that are referred to in this report. The table included in **Figure 3** is a comparative scale between the seven-point scale, and the RMA s95 notification determination test and the RMA s104D non-complying gateway test (the latter not being relevant).

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

Figure 2. The seven-point landscape and visual effects rating scale.[2]

Very Low	Low	Low - Moderate	Moderate	Moderate - High	High	Very High
Less than Minor	Minor		More than Minor		Significant	

Figure 3. The comparative scale of degree of effects.[3]

[2] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 140.

[3] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 151.

2 The Proposal

2.1 Description of the Proposal

Resource consent is sought for a solar farm development within the 868ha site located east of Twizel township between the Twizel River, Ōhau River, SH8 and Lake Benmore. The overall extent of the solar farm is approximately 500ha. It will generate approximately 310.8 megawatts peak (MWp), which is approximately the equivalent to the powering of 50,000 homes.

2.1.1 Site Selection

In terms of Aotearoa New Zealand's transition to sustainable energy, the proposed solar farm, being located alongside the Mackenzie / Waitaki hydro lakes / canals, poses a unique opportunity to generate power during the day, thereby providing the opportunity for the hydro lakes to store water during the day, increasing the capacity and flexibility of the network to provide additional power at night to meet periods of high demand. Given the global warming crises, as the climate changes and droughts become more common, there is a high risk that the nearby hydro lakes will not be able to provide continuous power and power outages throughout Aotearoa New Zealand will become more likely / increasingly frequent.[4] Therefore, the proposed solar farm's co-location with the hydro power scheme will assist in providing a more resilient power generation system for Aotearoa New Zealand.

This site has been chosen as a suitable location for a solar farm due its operational requirements. Primarily this is because the site is immediately southeast of the Twizel Substation that can accommodate the large amount of power that will be generated from the solar farm.

In addition, the site and the Mackenzie Basin receives above average sunlight hours / irradiance within Aotearoa New Zealand[5] at 2,500 hours (as recognised in the PMDP REG Chapter[6]) and is co-located with the extensive Hydro Power Scheme within the Mackenzie Basin, which contributes to its character. Also, the site is relatively flat and accessible, therefore minimal land disturbance / earthworks is required to install the panels and associated development.

2.1.2 Solar Farm - Extent

The overall extent of the solar farm has been limited to 500ha within the 868ha site for the following reasons, and as illustrated on **GA Sheets 3 - 4**:

- The solar farm is contained to the northwest by an approximate 4-5m tall escarpment face, located approximately 1km east of SH8. The escarpment descends northwest to southeast, away from SH8. This escarpment assists with visually screening the solar farm when viewed from SH8.
- The solar farm is excluded from a large portion of the northern section of the site. This is because the solar farm avoids the identified wetlands and areas of indigenous vegetation.
- The solar farm is excluded from areas along the southern side of the site as they contain indigenous vegetation and sites of natural significance.

[4] https://www.ecan.govt.nz/get-involved/news-and-events/2024/record-low-water-levels-across-waitaha-canterbury/

[5] https://niwa.co.nz/climate-and-weather/mean-monthly-sunshine-hours

[6] PC26 - REG Chapter, Decision Version. Page 21.

2.1.3 Solar Panels

A One Panel (**1P**) Single Axis Tracking system is proposed, refer to **GA Sheet 5**. A 1P system comprises of a solar table one panel wide (2.4m x 1.3m), up to 87 panels long, that run north - south across the site. There will be an approximately 4.4m wide gap between each row of panels, measured when the panels are parallel with the ground's surface. Overall, there will be 495,465 solar panels situated on 5,750 solar tables within the site.

When multiplying the size and number of solar panels (excluding operation and management buildings, inverters, and transmissions lines) the proposal will result in a site coverage of 154.6ha or 18% of the 868ha site. Refer to **GA Sheet 3**.

The solar tables are steel structures, and each table is attached to the ground by 11 steel poles, centralised along its length. Each table structure is designed to move so the solar panels pivot east to west towards the sun's rays as the sun moves through the sky. In the early morning the solar panels will face east, for the majority of the day the solar panels will be more or less horizontal / parallel to the grounds surface and at the end of the day the solar panels will face west.

The solar panels when parallel with the grounds surface stand approximately 1.85m above ground level. When the solar tables are tilted as far east or west as possible, on a 60-degree angle, the top of the solar panel will stand approximately 2.8m tall with the bottom approximately 0.8m above ground level. Refer to **GA Sheet 5.**

The solar tables are designed to avoid internal shading, which means the pivot is restricted to prevent the solar panels facing as far east or west as possible. Instead, each table will 'back track' so they start and finish their daily cycle in a semi-tilted position rather than full tilt to prevent shading. Full tilt being a position they do not spend much time in.

2.1.4 Power Conversion Unit - Integrated Inverter/Transformer/Control Gear

Seventy-four central inverters will be located within the site, as illustrated on **GA Sheet 3**. The purpose of the inverters is to convert the direct current (**DC**) from the solar panels to an alternating current (**AC**) so the solar power can be transferred into the grid.

Each inverter is situated within a 20-foot shipping container frame, which is approximately 6.0m long, 2.4m wide and 2.9m high. The container frames and all parts of the inverter that can be painted will be finished in black, sandstone grey, gull grey, or similar colours with a low reflectance value (**LRV**).

Inverters have been located within specific parts of the site, so they are as efficient as possible. Also, they have been situated within the central part of the site where the solar tables assist in visually screening them from view. In particular, when potentially seen from the west.

2.1.5 Transmission Line

Two 33kV overhead transmission line will extend through the site's central spine, alongside the main accessway to Transpower's Twizel Substation. The transmission line will, for the most part be 10.6m tall, comprising of a 3m wide horizontal rail and three power cables. Two approximately 250m long stretches of transmission line will be 15.2m tall. These are located immediately east of the Twizel Substation and where the line traverses the escarpment face. Refer to **GA Sheets 3 and 6**. The transmission line will provide the necessary connection to transport the power sourced from the solar farm to the main grid connection.

2.1.6 Access

The existing accessway off SH8 will be upgraded, so the entry point is immediately south of the exiting gravel track, includes turning bays along SH8 and is sealed for approximately the first 40m. The upgraded accessway has been formed to Waka Kotahi standards.

The alignment of the accessway within the site will vary from its current alignment, so people accessing the solar farm do not need to travel near the existing quarry. The new alignment ascends / descends the escarpment face 220m west of the quarry, where an existing 1,200m^2 area of exposed earth is located. Refer to **GA Sheet 3**.

Upgrades to the existing roughly formed farm tracks within the site may occur if the current tracks will be inaccessible in inclement weather. Upgrades to the tracks will likely consist of a compacted gravel surface.

2.1.7 Temporary Site Office

Temporary site offices, including toilets / washrooms will be located within the 500ha solar farm area, on the lower terrace alongside the main accessway during the construction phase of the solar farm. These buildings will be removed once the solar farm is operational.

2.1.8 Fencing

A 1.2m tall rabbit-proof fence will be situated around the perimeter of the proposed landscaping.

The existing 1.2m tall post-and-wire fence will be maintained around the perimeter of the site. Where necessary, this fence will be upgraded to a rabbit-proof fence to assist with the long-term maintenance of all areas of existing and proposed vegetation.

2.1.9 Earthworks

Earthworks will consist of:

- Constructing the accessway tracks throughout the site.
- Trenching for the cables associated with the solar panels and inverters. All excavated material will remain on site. For reference, the solar tables will be attached to poles that are driven into the earth, therefore no earthworks are required for the poles.
- Levelling areas within the site where the existing undulations require minor corrections, so the landform does not interfere within the tilting solar panels.

2.1.10 Water Tanks

Four 20,000L water tanks will be located in strategic firefighting locations throughout the site. The water tanks will be finished in a dark recessive colour, so they do not stand out amongst the solar farm development.

2.1.11 Land Management

The Wildlands Ecological Report[7] concluded that to reduce the potential adverse effects of the solar farm on the biodiversity and ecological values of the site the solar farm development is recommended to achieve the following, which it does:

[7] Wildlands Consultants - Additional lizard, vegetation, and invertebrate surveys of a proposed Twizel solar farm. Contract Report No. 6986. Prepared for Nova Energy. April 2024.

- Exclude identified areas of significant indigenous vegetation, wetland habitats, Threatened or At-Risk plant populations, and areas of high-quality lizard habitat. Ideally, the solar farm design would avoid areas where grasshopper populations were detected.
- These areas could be set aside as protected areas and habitat enhancement and restoration, such as indigenous vegetation plantings and the creation of additional rock piles, could be undertaken, along with connective planting between habitats.

Subsequently, the Applicant is proposing a condition of consent to prepare and administer a Lizard Management Plan, Terrestrial Invertebrate Management Plan, Avifauna Management Plan and Biosecurity Management Plan. The implementation of these management plans will result in the enhancement of the ecological habits and biodiversity values within the site, in particular within the areas that have been identified as having indigenous values, refer to **GA Sheet 9**.

Also, for reference the land under the panels will continue to be intermittently grazed.

3 Relevant Policy Provisions

3.1 National Policy Statement for Renewable Electricity Generation.

The NPS-REG sets out one objective and eight policies to enable the sustainable management of renewable electricity generation under the RMA. The NPS-REG objective, as included below is relevant to the proposed solar farm (underlined for emphasis).

Objective

"*To recognise the national significance of renewable electricity generation activities by providing for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities, such that the proportion of New Zealand's electricity generated from renewable energy sources increases to a level that meets or exceeds the New Zealand Government's national target for renewable electricity generation.*"

For reference, the New Zealand Government's target for electricity generated from renewable energy sources is 90 per cent by 2025[8] and 100 per cent by 2035[9].

3.2 Operative Mackenzie District Plan

As outlined on Planning Map 38 and 61 the site is zoned Rural and is within the Mackenzie Basin ONL which extends across most of the basin, refer to **GA Sheets 21 and 22**.

The Rural Zone objectives and policies, which are included in Appendix 1 of this report seek the protection of the outstanding landscape values and the protection of the natural processes and elements which contribute to the district's overall character and amenity. To protect these values, proposals are to be designed and located where they avoid or mitigate their potential adverse effects which may otherwise modify or detract from areas with a high degree of naturalness, visibility, and aesthetic value.

Regarding the proposal, RMM has been advised that the proposed solar farm will be a *discretionary activity*. This is because Section 16 of the OMDP contains the utility rules, which take precedence over the Rural Zone rules. Subsequently, resource consent is required under the OMDP as a *discretionary activity* under Section 16 - Rule 1.5e because solar panels as part of a renewable generation facility are not specifically listed as permitted or discretionary activities.

The OMDP objectives and policies that are relevant to the proposed solar farm is included in Appendix 1. The assessment of landscape and visual effects in Section 6 take these objectives and policies into consideration.

[8] https://environment.govt.nz/acts-and-regulations/national-policy-statements/national-policy-statement-for-renewable-electricity-generation/#:~:text=The%20NPS%20recognises%20the%20importance,from%20renewable%20sources%20by%202025.

[9] https://www.nzte.govt.nz/page/renewable-energy

3.3 Proposed Mackenzie District Plan

Council is currently preparing the PMDP through a rolling District Plan Review process. Currently Stage 1 – Strategic Chapters and Stage 2 – Spatial Plans Implementation and Light are fully operative.

Part 2 – Strategic Direction for the Natural Environment recognises that "*The District contains many natural resources of importance. These include (but are not limited to): resources valued by mana whenua for mahika kai; the Aoraki Mackenzie International Dark Sky Reserve; outstanding natural features and landscapes; indigenous biodiversity; renewable energy resources and the District's wetlands, lakes and rivers and their margins."*

Regarding this, the PMDP recognises the importance of protecting these values as they contribute to the "*District character and identity and its desirability as a place to live in and visit* as they contribute *to the community's environmental, social, cultural and economic well-being*." This is achieved through the Natural Environment Objective, as included below (underlined for emphasis).

Chapter: NE – Natural Environment

NE-O1 Natural Environment

The values of the natural environment, including those that make the District unique, contribute to its character, identity and well-being, or have significant or outstanding intrinsic values, are recognised and provided for, and where appropriate protected and enhanced. This includes, but is not limited to, values associated with the following important natural resources:

1. *mahika kai resources;*
2. *night sky darkness;*
3. *outstanding natural features and landscapes;*
4. *significant indigenous biodiversity; and*
5. *water bodies and their margins.*

Chapter: REG – Renewable Electricity Generation

The introduction of the REG Chapter recognises the renewable energy development pressure on the Mackenzie Basin stating that "…*There is also increasing interest in solar power generation in the District, due to the high amount of irradiance, particularly in Te Manahuna / the Mackenzie Basin.*

The NPS-REG directs that the development, operation, maintenance and upgrading of both new and existing renewable electricity generation activities is provided for, in order to increase the proportion of electricity generated from renewable energy sources, thereby displacing use of non-renewable energy sources and reducing carbon emissions. These activities often have a functional need or operational need to be in a particular location, but can have adverse effects on the environment, particularly in areas which have important natural values or mana whenua values. This chapter provides direction on how renewable electricity generation activities are to be provided for, while appropriately managing the potential adverse effects of these activities." (Underlined for emphasis).

RMM has been advised that under PC26, the REG chapter takes precedence when assessing renewable electricity generation activities, and under REG – Table 1, the NFL objectives and policies are not applicable / do not need to be considered when assessing REG activities. Rather, the focus of an assessment is on REG-O2 and REG-P6.

REG-O2** - **Adverse Effects

The adverse effects of renewable electricity generation activities are managed in a way that recognises and provides for the national significance of renewable electricity generation activities.

REG-P6** - **Other Renewable Electricity Generation Activities – Within areas of significant indigenous vegetation and significant habitats of indigenous fauna, ONLs, ONFs, riparian areas and SASM or on highly productive land

Provide for renewable electricity generation activities (not otherwise specified in REG-P3 and REG-P4) within areas of significant indigenous vegetation and significant habitats of indigenous fauna, Outstanding Natural Landscapes, Outstanding Natural Features, Sites and Areas of Significance to Māori, riparian areas, or within area of Highly Productive Land, where:

1. *there is a functional need or operational need for the activity to be in that location;*
2. *adverse effects on the values of the area are avoided as far as practicable, including through site, route or method selection, design measures and other management methods;*
3. *adverse effects on the values of the area that cannot be avoided are remedied or mitigated, where practicable;*
4. *other adverse effects (that do not affect the values of the area) are avoided, remedied or mitigated as far as practicable;*
5. *regard is had to any proposed offsetting measures or environmental compensation, where there are significant residual adverse effects that cannot be avoided, remedied or mitigated; and*
6. *particular regard is had to the practical constraints associated with renewable electricity generation activities, including the:*
   a. location and efficient use of existing electricity generation, transmission and distribution infrastructure; and
   b. the need to locate the renewable electricity generation activity where the renewable energy resource is located.

The direction in REG-P6 does not apply in relation to managing adverse effects on the outstanding natural landscape and features of Te Manahuna / the Mackenzie Basin where REG-P2 applies.

(Underlined for emphasis)

Under REG chapter, the proposed solar farm requires resource consent as a *discretionary activity* under REG-R7 because it is not a small-scale renewable electricity generation activity, is not otherwise listed and will be located within an ONL. As a *discretionary activity* and the NFL objectives and policies not being relevant, this assessment, assesses the actual and potential landscape and visual effects of the proposed solar farm on the outstanding landscape values of the Mackenzie Basin.

The PMDP objectives and policies that are relevant to the proposed solar farm are included in Appendix 1. The assessment of landscape and visual effects in Section 6 take these objectives and policies into consideration.

4 Landscape Description

4.1 Extent of the Receiving Environment

The site and the receiving environment are situated within and form part of the Mackenzie Basin, the largest intermontane basin in Aotearoa New Zealand. The receiving environment takes in the southern part of the Mackenzie Basin, including and between the southern end of Lake Pukaki, the eastern face of the Ben Ōhau Range, Ōhau River, Lake Ruataniwha, the eastern face of the Benmore Range, the northern end of Lake Benmore, and Grays Hill and the Mary Range that are east of Lake Pukaki and the Pukaki River, as illustrated on **GA Sheet 18**.

With reference to Mr Graham Densem's Landscape Character Maps, the receiving environment is comprised of the 'South Basin', 'Twizel', and 'Rhoborough', the southern end of 'Pukaki' and the western half of 'Benmore', as illustrated on **GA Sheet 20**.

4.2 Description of the Receiving Environment

The Mackenzie Basin is a glacially derived landscape composed of fluvioglacial outwash deposits of the Otira glaciation. Google earth and Canterbury Maps aerial imagery illustrates that the underlying outwash plain landform remains relatively intact. The soils within this wider area vary between moderately deep to shallow with varied thicknesses of loess over alluvial gravels on the outwash terraces.

Remnant vegetation on the outwash plains within the South Basin would have included short tussock and matagouri scrub.[10] Land use is predominantly in the form of grazing and traditional farming practices including topdressing and pivot irrigation. The increase in exotic pasture and reduction in dryland vegetation over the past 30 years has been identified as impacting on the landscape character of the outwash plain.[11]

The site is located on the outwash plain between the Ben Ōhau Range and Lake Pukaki to the north, and the Benmore Range and Lake Benmore to the south. At a broad scale, this outwash plain is a recognisable, very large and relatively flat area of land, despite the large-scale modifications to the basin created by the Upper Waitaki hydro-electric power scheme. The Tekapo, Pukaki, Twizel and Ōhau Rivers[12] traverse the outwash plain flowing south to feed into Lake Benmore and then into the Waitaki River.

At a smaller scale, the site is situated on the outwash plain that is bounded by the incised Twizel and Ōhau Rivers, and their confluence prior to Ōhau River converging on Lake Benmore. These braided rivers are located some 10 – 20m below the outwash plain that the site is situated on, separated by steep escarpment faces or small terraces stepping down to the rivers. The Twizel River, Ōhau River,

[10] Graham Densem Landscape Architects Ltd. November 2007. The Mackenzie Basin Landscape Study: Character and Capacities.

[11] Graham Densem Landscape Architects Ltd. November 2007. The Mackenzie Basin Landscape Study: Character and Capacities.

[12] The District Plan has identified the Tekapo / Pukaki Rivers and the Ōhau River as Sites of Natural Significance. The District Plan has not identified the Twizel River as a Site of Natural Significance.

Pukaki River and Lake Benmore are classified as Sites of Natural Significance and Sites and Areas of Significance to Māori - Waterbodies and Ancient Trails.

The water flow of these four braided rivers is relatively low, as it is controlled by spillways at Lake Tekapo, Pukaki and Ruataniwha, with most water being diverted along the Ōhau and Pukaki Canals.

The ecological context of the receiving environment and site is described in detail in the Wildlands Report[13]. In brief, the Wildlands Report outlines that:

- Pasture now occupies much of the Pukaki Ecological District.
- The adjacent braided riverbeds have been identified as a historically rare ecosystem type and are naturally uncommon on a national basis, the rivers provide important habitat to a number of bird species and rare insects and are under active restoration as part of a 'Project River Recovery'.
- The Lake Ruataniwha Conservation Area surrounds much of the proposed solar farm site, made up of several discrete areas of land. One area lies along most of the Twizel River side of the proposed solar farm site, with another area on the Ōhau River.[14]
- An area along the Ōhau River is identified as a Site of Natural Significance in the Mackenzie District Plan, primarily for its avifauna habitat values, as well as areas of wetland. It extends along the Ōhau river from Lake Benmore into, and including, parts of Lake Ruataniwha and its margins. There are two locations where this area overlaps with the boundary of the proposed solar farm property.[15]

The Ōhau and Pukaki Canals, which form part of the wider Upper Waitaki hydro-electrical scheme, flow from Lake Pukaki and Lake Ōhau into Lake Ruataniwha and then extend south along the toe of the Benmore Range into Lake Benmore, the largest man-made lake in Aotearoa New Zealand.

The Twizel Substation is located at the top end of the Ōhau Canal, just off SH8, southeast of Twizel and within close proximity to the site. The Ōhau B and Ōhau C Power Stations, consisting of the large dams, buildings and substations are located along this canal. Several 220kv National Grid transmission lines are located throughout this southern part of the Mackenzie Basin, south of Lake Tekapo connecting the Benmore Dam, and the Ōhau A, B and C Power Stations with the Twizel Substation and substations throughout the South Island. The hydro power scheme contributes to the character of the Mackenzie Basin landscape and is an identifiable element within this ONL.

Twizel township, which was created to house the workers constructing the hydro-electrical scheme is situated on the outwash plain immediately north of Lake Ruataniwha. Twizel is accessed from SH8 and since the construction of the hydro-electrical scheme, Twizel township has become a service and tourist town. It is the largest town within the Mackenzie District and has a growing population and growing footprint as per the updated residential zoning in the PMDP, including an extension of residential zoning near the SH8 and Max Smith Drive intersection and an approximate 12ha Industrial Zone adjacent to the oxidation ponds and east of SH8. Overall, Twizel township and its surrounds is, and is anticipated to be the most developed area within the Mackenzie Basin.

[13] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023.

[14] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023. Page 5 and Figure 2, Page 7.

[15] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023. Figure 2, Page 7 and Page 8.

The Mackenzie Basin is experienced primarily from SH8, which traverses the basin past the hydro lakes and townships at Tekapo and Twizel. It is an important scenic tourist route affording extensive views across the basin.

Twizel and the numerous campgrounds (Lake Benmore – Ōhau C, Benmore Views, Falstone, and Haldon Arm) within the receiving environment are well situated as a base for the large number of the recreational opportunities in its vicinity.

Recreational activities include camping / caravanning, rowing and water skiing on Lake Ruataniwha and Lake Benmore, salmon fishing in the lakes, rivers and canals, skiing at Ōhau and Round Hill Ski fields, and mountain biking on the Alps to Ocean Trail and numerous other local trails.

The clean, dry and dark sky is a recognised feature of the basin and consequently the Mackenzie Basin has been designated as a Dark Sky Reserve.

As previously mentioned, between 1991 and 2020 the Mackenzie Basin received approximately 2,500 hours of sunshine annually[16] and in 2022 it received 2,464 hours of sunshine[17]. It was the fifth sunniest place in Aotearoa New Zealand in 2022 and is commonly thought of as one of the sunniest places in the South Island, along with Blenheim and Nelson.

4.3 Description of the Site

The site includes the majority of the long and narrow outwash plain bounded by the incised Twizel River to the northeast, Ōhau River to the southwest, the confluence of these rivers to the southeast and SH8 to the northwest. The site is accessed from SH8, 830m south of Ostler Road, Twizel, via the existing Sol Quarry accessway.

The landform within the site is generally flat, with the topography gradually descending northwest to southeast, with an approximate 40m elevation difference across the site. An approximate 5m tall escarpment face extends east to west through the sites northwestern end, with the very western end of the escarpment situated 200m south of Transpower's Substation. The scarp face descends northwest to southeast with most of the site (and the proposed solar farm) being situated on a separate, lower terrace to the one SH8 is situated on.

Sol Quarry's consented quarry (RM180173) which allows for the extraction of 100,000m^3 of material and a small extraction pit are located along the scarp face within the northwestern side of the site.

This accessway within the site has been formed to accommodate quarrying vehicles and truck and trailer units between SH8 and the Sol Quarry. The accessway descends the scarp face immediately east of the quarry. The formation changes to a rough farm access track and extends northwest to southeast through the approximate centre of the site, to the site's southeast corner / point.

The site's landcover is described in detail in the Wildlands Report[18]. In brief, the Wildlands Report outlines that:

- *"The site has been cultivated by direct-drilling, and this has led to a widespread distribution of improved pasture species across the site. Not all of the direct-drilled area comprises improved*

[16] https://niwa.co.nz/climate-and-weather/mean-monthly-sunshine-hours

[17] https://niwa.co.nz/sites/niwa.co.nz/files/2022_Annual_Climate_Summary_FINAL_v3.pdf

[18] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023.

pasture however, probably where shallower soils meant the directly-drilled pasture species did not establish so well."[19]

- The 5m tall scarp face within the northwest part of the site is a "*critical habitats for indigenous biodiversity values including populations of Threatened and At-Risk plants, lizards, and invertebrates*."[20] The exception to this is the quarry and small extraction pit.
- The important biodiversity values within the site include the following, all of which are located on the margins of the site.
  - *"Five plant species classified as At Risk or Threatened.*
  - *Eight Threatened and nine At Risk avifauna species may be present at the site.*
  - *Three lizard species have been confirmed at the site. Three additional At Risk and one Threatened lizard species may also occur at the site.*
  - *One Threatened terrestrial invertebrate has been identified at the site, and up to five additional notable terrestrial invertebrate species may occur at the site."*[21]
  - *An ephemeral wetland is present in the northern part of the site, that meets the criteria for rarity. Ephemeral wetlands are considered to be rare ecosystem types, and all wetland habitats are ecologically significant due to widespread reduction and modification throughout Canterbury."*[22]
  - The site is classified entirely as a 'critically under protected' land environment, with more than 30% indigenous vegetation left and less than 10% indigenous vegetation protected.[23]

Overall, the ecological values on-site vary considerably. Most of the site has a cover of exotic pasture with these areas having low value, and the less developed margins and scarp face within the site are important habitat for indigenous plants, avifauna, lizards, and invertebrates.

The National Grid Transmission Line between the Twizel and Islington (Christchurch) Substation extend east to west through the northwestern end of the site, on the upper terrace.

Regarding the above, the site forms part of the expansive views over the Mackenzie Basin floor. As the site is predominantly devoid of built form, it contributes to the Mackenzie Basin's unspoiled openness and vastness and the long open views to the Southern Alps and other mountains encircling the basin.

From a desktop analysis and on-site investigations, the site is visible from the below mentioned public places, refer to **GA Sheets 19, 25 and 26**.

- State Highway 8.

[19] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023. Page 9.

[20] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. June 2023. Page 4.

[21] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. (June 2023). Page 4.

[22] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. (June 2023). Page 36.

[23] Wildlands Consultants – Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm near Twizel Contract Report No. 6620. Prepared for Nova Energy. (June 2023), page 8.

- Old Iron Bridge Road.
- McAughtries Road.
- Falston Road.
- The Twizel River Trail.
- Twizel and Ōhau Rivers
- Lake Benmore and the Lake Benmore – Ōhau C Campground
- Ben Ōhau – Greta Track.
- The Benmore Range Easement Track.

Additionally, it may be seen from Glencairn Station, a high-country station accessed off McAughtries Road, west of the Ōhau Canal and the site.

Regarding the above list, as the site is relatively flat and has a very limited amount of verticality (built form or trees) it is evident that the site is not overly prominent from these locations. In other words, the viewer focus is drawn to the distant mountains, rivers, lakes, or areas of visual interest i.e., the power stations.

The amenity values experienced when travelling along the public roads and within these private places are described below in Section 6 of this report.

4.4 Landscape Values of the Receiving Environment

The landscape values of the receiving environment (physical, perceptual and associative) form the baseline, along with the OMDP and PMDP policy provisions, for an assessment of landscape and visual effects. The landscape values of the receiving environment (including the site) stem from its past and present landscape attributes (landform, landcover and land use). The landscape values that are relevant to an assessment of the proposed solar farm are listed below.

The receiving environment, which forms part of the southern extent of the Mackenzie Basin subzone in which the site is situated has been identified as an ONL. Its distinct landscape character stems from its geological uniqueness as an intermontane basin, wildness, seasonal colouring, openness of the vast basin landscape enclosed by the encompassing mountain ranges, and glacial erratic / evidence of glaciation. These physical attributes, contribute to the landscape values being:

- Its distinctive Mackenzie Country landscape character with its unique, natural, and visual qualities of the high-mountain basin environment.
- Its unspoiled openness and vastness and the long open views to the Southern Alps and other mountains encircling the basin. This stems from the vast landform scale of the basin, lack of trees and houses and other structures throughout the rural environment, with development limited and clustered in small areas and the undeveloped lakesides and SH8 roadside**.**
- The highly legible landscape features throughout the basin, including the moraines, roche moutonnée, valleys, terraces, fans, glacial erratic and outwash plains.
- The high degree of aesthetic and experiential values afforded by the highly legible, glacially derived basin and expansive sky, large scale of the landforms including the river valleys and enclosing mountains, the scenic outlook over Lake Pukaki and Lake Tekapo to the distant mountains including Aoraki Mt Cook, the vivid turquoise blue water colour of the glacial lakes, the golden tussock-laden slopes which surround the basin and transient values contributed by the strong seasonal changes and seasonal vegetation colour.

- The high degree of shared and recognised values that are evident through works by artists and writers inspired by the landscape, being nationally important for tourism, astronomy and the plentiful recreational opportunities that are provided.

At a local scale, the site adds to most of above-mentioned landscape values. However, the outwash plain that the site is situated on is not unspoiled. This is because the land cover has been modified / cultivated for agricultural cropping and grazing stock e.g. the greening effect has occurred on site. Also, it contains a gravel quarry operation and a small part of the National Grid transmission line. Positively, this existing development within the site is sparse, low lying or somewhat transparent (transmission towers) and continues to provide for long open views over the basin to the enclosing mountain ranges.

4.5 Mackenzie District Plan – Landscape Values

In addition to the above, OMDP Appendix I[24], J[25] and V[26] and the PMDP planning maps[27] outline the Sites of Natural Significance, Scenic Viewing Areas and Scenic Grassland Schedules and areas Visual Vulnerability. The relevant parts of these Appendices to the District Plans are included below and are illustrated on **GA Sheets 21 - 24**

4.5.1 Sites of Natural Significance

Although the site is not identified as a site of Natural Significance, it lies immediately adjacent to the Ōhau River Sites of Natural Significance. Small areas extend into the site along its southwestern side.

The adjacent Ōhau River, and nearby Tekapo / Pukaki Rivers and Lake Benmore have been identified as Sites of Natural Significance. The below inserts describing these Sites of Natural Significance are from the District Plan.

"11 - Ōhau River (Tekapo, Pukaki, Ōhau riverbeds); SSWI (Lake Ruataniwha), (Ruataniwha Springs), (Ōhau River); WERI: Ruataniwha area includes an artificial lake with shallow margins planted with shrubs for common bird species and a spring fed stream. Parts of lake heavily used for recreation. Both areas used for cross-fostering of black stilt chicks. Springs provide excellent waterfowl habitat, with Australasian bittern, black stilt and other waders breeding. The Ōhau is a braided river of gravel flats and islands. Wrybill breeding area and black stilt feeding and wintering area."[28]

"*45 - Tekapo/Pukaki Rivers (Tekapo/Pukaki and Ōhau Riverbeds); SSWI (Tekapo River); (Pukaki River Ponds); WERI: Wide, braided alluvial riverbeds providing important habitat for waterfowl, waders, passerines and aquatic and terrestrial insect fauna. Breeding areas for black stilts, banded dotterels, black fronted terns, black backed gulls and wrybills. Native and introduced fish species occur in high numbers. A series of artificial ponds on margin of Pukaki River also provide a habitat for waterfowl and waders.*

[24] Mackenzie District Plan. Appendix I – Sites of Natural Significance: Mackenzie District.

[25] Mackenzie District Plan. Appendix J - Scenic Viewing Areas and Scenic Grassland Schedules.

[26] Graham Densem Landscape Architects Ltd. November 2007. The Mackenzie Basin Landscape Study: Character and Capacities.

[27] https://mackenzie.isoplan.co.nz/review/property/8523219/0/99?_t=property

[28] Mackenzie District Plan. Appendix I – Sites of Natural Significance: Mackenzie District. Page 3.

46 - Lake Benmore - Largest artificial lake in New Zealand. Deltas of Ōhau, Twizel, Pukaki and Tekapo Rivers provide important wildlife habitat. The shallow margins, mudflats and willows are also important to waterbirds. The area is important as an overwintering and feeding area for black stilt and heavily utilised by many other waterbird species. Some islands are habitats for threatened lizards and plants."[29]

4.5.2 Areas of Significance to Māori - Waterbodies and Ancient Trails

The Ōhau River (SASM 46) and Twizel River (SASM 35) are identified as Areas of Significance to Māori - Waterbodies and Ancient Trails. The below inserts describing these Areas of Significance to Māori are from the PMDP.

"The Ōhau River flows from Lake Ōhau into Lake Benmore in Te Manahuna/Mackenzie District. Prior to the creation of Lake Benmore in the 1960s as part of the Waitaki River hydroelectricity development, the Ōhau River flowed directly into the Waitaki River. It was part of the extensive network of traditional travel routes through Te Manahuna/Mackenzie District. In particular, the Ōhau River provided direct access from the Waitaki Valley to Lake Ōhau, which was an important kāinga mahika kai."

"Whakatipu is the Māori name for the Twizel River, which flows into the Ōhau River in Te Manahuna/Mackenzie District. Water is central to all Māori life. It is a taoka left by ancestors to provide and sustain life. Water plays a unique role in the traditional economy and cultural of Kāi Tahu. Without water no living thing, plant, fish, or animal can survive. Waterbodies such as the Whakatipu/Twizel River represent the blood vessels that supply nourishment to all living things. Waterbodies and the resources they support, determines the siting of kāika, identity and the rhythm of lives. The traditional values and controls regarding water are included in the spiritual and practices (tikaka) of Ngā Rūnaka."

4.5.3 Scenic Viewing Areas and Scenic Grassland Schedules

Appendix J of the OMDP and the PMDP planning maps identify the location, extent and describe the Scenic Viewing Areas and Scenic Grassland within the district.

The site is not located adjacent to or in proximity of a Scenic Viewing Area, therefore it does not interfere with the views gained from these identified areas. Also, the site is not within a Scenic Grassland Area.

4.5.4 Visual Vulnerability

The site forms part of the South Basin which has been identified as having a high degree of visual vulnerability.

High Visual Vulnerability:

Areas of high visual vulnerability can be summarised as:

- *the wide basins;*
- *lakes and lakesides, including shorelines and lakeside hill and mountain flanks;*
- *raised mountain ranges, hills and isolated mountains;*
- *river corridors;*
- *extensive areas and intact sequences of native plant communities particularly areas of continuous natural grassland, low development levels and visual vividness.*

[29] Mackenzie District Plan. Appendix I – Sites of Natural Significance: Mackenzie District. Page 7.

The visual vulnerability mapping dates back to Mr Graham Densem's 2007 Landscape Study. Through Plan Change 13, Mr Densem prepared the "Intensification and Outstanding Natural Landscape: Landscape Management of the Mackenzie Basin in Light of Court Decisions"[30] Report that provides further assistance in understanding the areas and values of identified as having high visual vulnerability and how to maintain the ONL values of these areas.

The 2015 Report focused on pastoral intensification, subdivision and rural residential development at a Plan Change level to assist in understanding where such activities would be more appropriate to maintain the ONL values of the Mackenzie Basin. Noting that the site is already predominantly used for farming activities, an activity that is "*likely to erode ONL natural science and aesthetic values*." [31]

[30] Mackenzie District Plan Change 13. In Intensification and Outstanding Natural Landscape: Landscape Management of the Mackenzie Basin in Light of Court Decisions. Mr Graham Densem. November 2015 (updated).

[31] Graham Densem Landscape Architects Ltd. November 2007. The Mackenzie Basin Landscape Study: Character and Capacities. Page13.

5 Potential Issues

The proposed solar farm will result in an approximate 500ha solar farm, which is slightly smaller in area when compared with the existing development within Twizel township, which is approximately 730ha in area.

It will consist of long low-lying lines of solar panels running north to south through the site and their associated inverters, water tanks, accessway and 33kv powerline within the Mackenzie Basin ONL, located between the Twizel and Ōhau Rivers, immediately northwest of Lake Benmore, Aotearoa New Zealand's largest manmade lake.

The potential adverse landscape and visual effects arising from the proposed solar farm may include the following:

- Effects on the distinctive Mackenzie Country landscape character with its unique, natural and visual qualities of the high mountain environment.
- Effects on the openness and vastness of the Mackenzie Basin, including the long open views.
- Effects on the legibility of the outwash plain and the sense of landform continuity.
- Effects on the degree of naturalness.
- Effects on the high degree of aesthetic and experiential values, visual coherence – seasonal vegetation colour, dramatic views that reflect transient values (snow cover, vegetation colour, weather, low light, wildflowers/lupins, lake colours), in particular the scenic outlook from SH8.
- Effects on the shared and recognised (associative) values of the Mackenzie Basin.

6 Assessment of Landscape and Visual Effects

6.1 Assessment of Visibility and Visual Effects

Whether the proposal is considered appropriate is determined by the visual effects on the receiving environment and whether the landscape values attributed to this setting are retained or whether, if adversely affected, effects can be satisfactorily avoided, remedied or mitigated. In general, landscape values experienced visually include a scenic outlook (views over a rural landscape), the high legibility, visual coherence of the broader landscape and the views to the distant mountains.

"A visual effect is a kind of landscape effect. It is a consequence for landscape values as experienced in views. Visual effects are a subset of landscape effects. A visual assessment is one method to help understand landscape effects." [32]

The significance of the visual effect is influenced by the visibility, distance, duration of the view, the scale, nature and duration of the proposal, its overall visual prominence, the context in which it is seen, and the size of the viewing audience.

As mentioned above, a desktop analysis and on-site investigations found that the proposed solar farm is potentially visible from the below public places or publicly accessible places.

- State Highway 8
- Old Iron Bridge Road
- McAughtries Road
- Falston Road
- Lake Benmore and the Lake Benmore – Ōhau C Campground
- The Twizel River Trail
- Ōhau River Four-Wheel
- Ben Ōhau – Greta Track
- The Benmore Range Easement Track

Also, it may be seen from Glencairn Station, a high-country station accessed off McAughtries Road, immediately west of the Ōhau Canal and the site.

Twenty-three panorama photographs representing the views towards the site from the surrounding public places are included in the **GA**. Additionally, ten visual simulations have been prepared by Virtual View Ltd to illustrate what the proposed solar farm will look like, when seen from these representative viewpoints.

A Glint and Glare Analysis Study[33] has been prepared by ITP Renewables that has assessed the actual and potential glare on road users and other receptors that may result from the solar farm. This report is attached to the Resource Consent and Assessment of Environmental Effects Report. The

[32] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 135.

[33] ITP Renewables. Glint and Glare Study – Final Report. Revision 3. November 2024.

Glint and Glare Analysis Study assessed the proposed solar panels having a rest angle 0 degrees (parallel to ground) and a rest angle of 5 degrees.

The report concluded that with a rest angle of 0 degrees, "*8 observation points and 4 routes received green glare, while 3 road routes received yellow glare. Yellow glare has the potential to cause after image to observers, while green glare has low potential to cause after image.*" [34] Then with a rest angle of 5 degrees, the report concluded that "*This analysis did not identify any green or yellow glare effects, indicating that this approach provides effective mitigation*" [35].

Subsequently, the Applicant are proposing a condition of consent which will stipulate that the solar panels, at the start and end of the day will not sit at 0 degrees, which causes the glint or glare. Rather the minimum angle will be 5 degrees so no glare will be experienced from the surrounding public places.

6.1.1 State Highway 8 – Viewpoints 1 - 7

Viewpoint Location Photographs 1 – 7 on **GA Sheets 27 – 30** represent the views over the Mackenzie Basin towards the site and the proposed solar farm that are gained from SH8. Visual simulation from Viewpoint 3, 5 and 7 have been prepared to assist in understanding how visible the proposed solar farm will be from SH8.

These seven viewpoint locations representing the view from SH8 are from:

- Viewpoint 1 – Ruataniwha Road – 2.4kms from the solar farm.
- Viewpoint 2 - Ostler Road – 2.0kms from the solar farm.
- Viewpoint 3 – South of the entry into the site – 1.4kms from the solar farm
- Viewpoint 4 – Twizel Substation – 1.0kms from the solar farm
- Viewpoint 5 – Max Smith Drive – 1.3kms from the solar farm
- Viewpoint 6 – Lake Ruataniwha – 1.4kms from the solar farm
- Viewpoint 7 - Pukaki Canal Bridge – 1.5kms from the solar farm

A high degree of amenity is experienced when travelling north and south, through the Mackenzie Basin along SH8. This is due to the broad, open, and relatively uninterrupted sweeping views over the glacially fed lakes, including their memorable turquoise blue colour, the seasonal presence of flowering lupins, and the predominately dryland grass clad outwash plains contained by the distant ring of steep often snow-capped mountains. Whilst NFL-P6 is not relevant to this assessment, it does recognise the importance of the amenity experienced from State Highway 8.

When travelling along the highway between Lake Ruataniwha and Tekapo, the townships of Tekapo and Twizel, the Pukaki Airport, the hydro canals, dam infrastructure and substations, and the National Grid power lines reduce the naturalness of the Mackenzie Basin as perceived by a road user. Despite this, these elements remain subservient to the vastness and openness of the basin that is experienced.

[34] ITP Renewables. Glint and Glare Study – Final Report. Revision 3. November 2024. Page 5.

[35] ITP Renewables. Glint and Glare Study – Final Report. Revision 3. November 2024. Page 5.

Extent of Visibility and Visual Effects

The more distant half to two thirds of the solar farm is potentially seen when road users are travelling north and facing east from the 650m stretch of SH8 between Old Iron Bridge Road and the entry to the site, represented by Viewpoint 3. Also, the majority of the solar farm is potentially seen when road users are travelling north and facing east from the 500m stretch of SH8 between the Lake Ruataniwha Dam and Max Smith Drive, represented by Viewpoints 5 and 7. The solar farm is not seen from these two stretches of road by south bound road users because it will be outside their field of view.

Apart from these two short stretches of SH8, the proposed solar farm will not be seen from the remainder of SH8 due to intervening topography, development, and / or vegetation.

When travelling north at 100km/h, equivalent to 28m/second along the state highway the solar farm will be briefly seen for a total of approximately 30 seconds, noting the view is terminated early as the solar farm is outside road users primary and peripheral fields of view the further north they travel.

When seen the solar farm will draw the eye as it is dark in colour and siting just above the outwash plain, being somewhat of a juxtaposition to the outwash plains lighter brown / green ground cover. This level of development will also reduce the perceived sense of naturalness over this outwash plain.

These potential adverse visual effects will be reduced by the low-lying nature of the solar farm as the views over the outwash plain will not be reduced, with the willow trees along the Twizel River, the distant outwash plains and enclosing mountains still being seen. It will also be seen in the context of large scale power generating infrastructure including the Twizel Substation, Lake Ruataniwha, the Ōhau Canal and the dam that road users cross to divert water into the canal, and the National Grid transmission lines, all of which assists with absorbing the proposal into the site.

Also, the views towards Lake Ruataniwha and Ben Ōhau are photo worthy, and the entry to Twizel township also draws the eye. Therefore, whilst the solar farm is potentially seen from these two short stretches of road, there are a number of other impressive and visually interesting views that draw the eye. Therefore, it is likely that there will be a sizable number of road users that don't notice the proposal.

Due to the above, the proposed solar farm will have a **moderate degree** of adverse visual effects when seen from these two stretches of SH8.

Recommendation 1

As illustrated on the Visual Simulations for Viewpoints 5 and 7, the southern edge of solar farm appears as a hard edge sitting just above and detracting from the visual coherence of the escarpment and more natural, vegetated and unkempt Ōhau River. It is considered / recommended that native, grey shrubland vegetation maturing to 2 – 3m tall located along the southern edge of the site would visually screen the solar farms hard edge, slightly reducing the amount of visible built form and assist with visually separating it from the Ōhau River. This landscape mitigation would reduce the adverse visual effects of the proposed solar farm to a **low-moderate degree**.

For reference, if the recommended landscaping is adopted, the degree of adverse visual effects without any landscape mitigation can be interpreted as being the temporary adverse visual effects prior to the landscaping maturing. Subsequently, the long-term adverse visual effects can be interpreted as the adverse visual effects that take into consideration the landscape mitigation.

6.1.2 Old Iron Bridge Road – Viewpoints 8 - 9

Old Iron Bridge Road is accessed from SH8 and provides access to the Twizel Substation and descends to a DOC facility dedicated to protecting and managing bird life, Ōhau River, and a small unnamed lake within the Ōhau River confines, popular for swimming, paddle boarding etc.

The two viewpoint locations representing the view from Old Iron Bridge Road are from:

- Viewpoint 8 – Twizel Substation – 1.5kms from the solar farm
- Viewpoint 9 - Ōhau River – 1.5kms from the solar farm

A moderate-high degree of amenity is experienced when travelling along Old Iron Bridge Road. Unlike most areas, the views from this road, in particular over the outwash plains are regularly interrupted by the substation and mature stands of exotics, and from the lower portion of road, they are confined to the Ōhau River and distant mountains. However, the overall sense of vastness and openness is still experienced, and the power generation infrastructure remains subservient to the overall grandeur of the basin.

Extent of Visibility and Visual Effects – Upper Terrace

When travelling north or south along the elevated stretch of Old Iron Bridge Road, a fleeting view towards the distant half of the solar farm will be gained within the periphery of the view from a short 400m stretch of road between the substation and the terrace edge.

When briefly seen, the solar farm and overhead powerlines will not appear out of place being seen in close proximity of the Twizel Substation, National Grid transmission lines and the Ōhau Canal. Notably, the powerlines will be visually lost behind and amongst the substation infrastructure. Also, it will not interfere with views over the outwash plain to the surrounding mountains. The most noticeable visual difference will be the change to the landcover and its colouring as the darker colouring of the panels will be noticeable amongst the brown / green grass cover. Whilst visually different, the solar farm's sinuous ribbon appearance following the terraces natural landform pattern visually mitigates what could otherwise be a rectangular grid like appearance. Overall, the proposed solar farm will have a **low degree** of adverse visual effects when experienced from this stretch of road.

The land on the terrace alongside Old Iron Bridge Road is not within the site. Therefore, there isn't an opportunity for landscape mitigation to screen the distant half of the solar farm.

Extent of Visibility and Visual Effects – Lower Terrace

When travelling along the lower stretch of Old Iron Bridge Road (not including the gravel track alongside the Ōhau River), the southern edge of the proposed solar farm will be seen above the terrace edge. Similar to what is illustrated on Viewpoint 14 – Visual Simulation. When seen, the panels will draw the eye as an additional piece of energy infrastructure within the landscape and they will interfere with the cohesive appearance of the escarpment. However, they will be seen behind three National Grid and three local grid power lines, alongside the Transpower Substation and in close proximity of the Lake Ruataniwha Dam. All of which provide visual context of this landscape containing large scale power generating infrastructure, which assists with absorbing the proposal into the site. Also, whilst the southern edge of the solar farm is seen, its low-profile design being 1.85m tall and horizontal nature means that it will not interfere with views of the adjacent river or to the surrounding mountains. Therefore, the proposal will have a **low to low-moderate degree** of adverse effect on the amenity experienced from this stretch of road.

The recommended mitigation planting along the southern side of the solar farm (refer Recommendation 1 above), when mature would visually screen the solar farm when viewed from the

entire stretch of track. Therefore, the adverse effects from this lower stretch of Old Iron Bridge Road would be reduced to a **nil** effect.

6.1.3 McAughtries Road – Viewpoints 10 – 20

Viewpoint Location Photographs 10 – 18 on **GA Sheets 32 – 37** represent the views over the Ōhau Canal towards the site and the proposed solar farm that are gained from McAughtries Road. Visual simulations from Viewpoints 11, 12, 14, 17, 18 and 20 have been prepared to assist in understanding how visible the proposed solar farm will be from this road.

These three viewpoint locations representing the view from McAughtries are from:

- Viewpoint 10 – NZMCA Campsite – 1.5kms from the solar farm.
- Viewpoint 11 – Eastern end under the powerlines – 1.3kms from the solar farm.
- Viewpoint 12 – Ōhau B Power Station – 900m from the solar farm.
- Viewpoint 13 – Ōhau B Power Station – facing away from the solar farm.
- Viewpoint 14 – Immediately east of Ōhau B Power Station – 700m from the solar farm.
- Viewpoint 15 – Opposite the Salmon Farm, western end – 900m from the solar farm.
- Viewpoint 16 – Opposite the Salmon Farm, eastern end – 1.1kms from the solar farm.
- Viewpoint 17 – Near the Glencairn Station Accessway – 1.3kms from the solar farm.
- Viewpoint 18 – Near the Glencairn Station Accessway – 1.3kms from the solar farm.
- Viewpoint 19 – Near the Ōhau C Power Station – 1.4kms from the solar farm.
- Viewpoint 20 – Ōhau C Power Station – 1.4kms from the solar farm.

McAughtries Road is not a public road as it is located within a private parcel of land associated with the Ōhau Canal, which is owned by Meridian Energy Ltd. However, this road appears to be public and is publicly accessible because it has a street sign and does not have any gates at its access point off SH8 to deter the public. Also, it is popular/well used providing the only vehicle access connection to Falstone Road (a public road), and Lake Benmore - Ōhau C, Benmore Views and Falston campgrounds, and access to multiple fishing locations along the Canal. Therefore, for the purpose of this assessment it is considered a public place.

A high degree of amenity is experienced when travelling along McAughtries Road, alongside the Ōhau Canal. This is due to the broad, open, and relatively uninterrupted views over the Mackenzie Basin, including the tranquil and reflective Ōhau Canal, albeit a man-made structure all of which is contained by the steep and enclosing mountain backdrop of the Grampian Mountains and Kirkliston Range.

When travelling along McAughtries Road, the nearby Twizel township, and the power generating structures including the hydro canal and the two large power stations, dam infrastructure and associated substations, and the National Grid transmission lines contribute to the power generating landscape character and reduce the perceived naturalness of the Mackenzie Basin. However, these elements remain subservient to the vastness and openness of the basin that is experienced. Also, the open and irrigated paddock land immediately west of McAughtries Road and the verdant green and intensively managed grass within the site does not contribute to dryland land cover and the perceptual values of the ONL.

Extent of Visibility and Visual Effects - Elevated Areas

The proposed solar farm will be most readily visible from the upper 2.2km stretch of McAughtries Road, northwest of the Ōhau B Power Station represented by Viewpoints 10 – 12, also from the 900m stretch of road near Ōhau C Power Station, represented by Viewpoint 20. This is because these two stretches of McAughtries Road are elevated above the site allowing clear views over parts of the solar farm in which the width / depth of the solar farm can be seen.

The expansiveness of the solar farm and the amount of built form it will introduce to the landscape will draw the eye and a road users' attention away from the wider basin. It will also reduce the perceived naturalness of the basin from these two stretches of road, which will adversely affect the visual amenity that road users currently experiences. Albeit the naturalness within the site has already been reduced due to landcover modification by pasture.

The low-profile nature of the solar panels means that the entire solar farm, and the way in which topography and vegetation interrupt the view towards the site means that they will not be seen from any one vantage point, and in most instances will appear as a thin horizontal sliver of development on this outwash plain. When seen the solar farm will draw the eye as it contrasts with the existing lighter brown / green ground cover due to its dark colour. This level of development will also reduce the perceived sense of naturalness over this outwash plain. Also, with reference to scale, the 10.6m tall transmission line appears very small and transparent from these distant locations, backdropped by the terrace itself or the willow trees. Most notably the proposed transmission line is dwarfed by the National Grid transmission line immediately beyond the Twizel River. Regarding this, the solar farm will not interfere with views over the site of the wider Mackenzie Basin and the surrounding mountains including Aoraki, to the point that the willow trees that line the Pukaki / Tekapo Rivers are seen.

The solar farm will only form part of the view from this road, and it will not interrupt the view to the south or west towards Lake Benmore or the Benmore Range. Also, the extent of the solar farm is well contained to the outwash plain between the Ōhau and Twizel rivers, and therefore it will not be perceived as expanding beyond the site, to the east, west and south.

At a wider scale, the proposal will be seen alongside the Ōhau Hydro Canal, its associated power stations dams and substations, an array of National Grid transmission lines extending across the basin and Lake Benmore, being Aotearoa New Zealand's largest man-made lake. These power generating elements, along with the associated knowledge of Mackenzie Basin being one of the sunniest locations in the country will contribute to the rationale of the solar farm in this location. This will assist with reducing the degree of potential adverse visual effects.

Overall, the proposed solar farm will have a **moderate to moderate-high degree** of adverse visual effects when seen from these two more elevated stretches of McAughtries Road.

Similar to SH8, and as illustrated on the Visual Simulations for Viewpoints 11, 12 and 20, the southern edge of solar farm appears a hard edge sitting just above and detracting from the visual coherence of the escarpment and the more natural, vegetated and unkept Ōhau River. As recommended above, native, grey shrubland vegetation maturing to 2 – 3m tall located along the southern edge of the site would visually screen the solar farms hard edge, slightly reducing the amount of visible built form and assist with visually separating it from the Ōhau River. This landscape mitigation would reduce the adverse visual effects of the proposed solar farm to a **low-moderate to moderate degree**.

Extent of Visibility and Visual Effects – Between Ōhau B and C Power Stations

The southern edge of the proposed solar farm is intermittently seen from the 6.5km lower stretch of McAughtries Road between the Ōhau B and Ōhau C Power Stations, as illustrated on the Visual

Simulations for Viewpoints 14, 17 and 18. This is because the elevation of this stretch of road is slightly below or generally level with the site.

When intermittently seen from this stretch of McAughtries Road, road users will see the hard southern edge of the solar farm as they travel alongside it for approximately 6.5kms. Whilst they cannot see it in its entirety, they will be able to perceive its size and scale, along with the elevated views from both ends of this road. Therefore, the size and scale of the development and its adverse effects on the perceived naturalness of the terrace are the key factors in contributing to the adverse visual effects.

These adverse effects will, in part be mitigated by the power generating infrastructure that the solar farm will be seen alongside and the fact that the proposal does not impede on the open and expansive views gained over the basin and to the surrounding mountains, being a key contributor to the amenity gained.

Overall, the proposed solar farm will have a **low-moderate to moderate degree** of adverse visual effects when seen from this 6.5km stretch of McAughtries Road. These adverse visual effects could be reduced to **nil** if as recommended above the southern side of the site is planted with native vegetation that can reach 3m tall. This is because this vegetation, when mature would screen the entire solar farm from view but would not interrupt the view of the basin.

6.1.4 Falston Road – Viewpoints 21 and 22

Viewpoint Location Photographs 21 – 22 on **GA Sheets 38** represent the views over the top end of Lake Benmore towards the site and the proposed solar farm that are gained when travelling north along Falston Road. The upper stretch of road is relatively flat, therefore a visual simulation from Viewpoint Location 21 has been prepared to assist in understanding how visible the proposed solar farm will be from this road.

These two viewpoint locations represent the view from Falston Road are from:

- Viewpoint 21 - McAughtries Road and Falston Road Intersection – 2kms from the solar farm.
- Viewpoint 22 - 45 Degree Corner along Falston Road – 2.8kms from the solar farm.

Falston Road is accessed off the southern end of McAughtries Road and provides access to Benmore Views and Falston campgrounds, and Peak Valley Station.

A high degree of amenity is experienced when travelling north along Falston Road, alongside Lake Benmore. This is due to the lakeside setting, including the boating activities that take place on its surface and the sense of openness of the Mackenzie Basin provided by distant and enclosing mountain backdrop, including views to Aoraki Mount Cook.

Similar to when travelling along McAughtries Road, the nearby hydro canal, the Ōhau C Power Station and the National Grid transmission lines contribute to the power generating landscape in which a road user is located and reduce the perceived naturalness of the Mackenzie Basin. However, these elements remain subservient to the vastness and openness of the basin and the amenity provide by the lake.

Extent of Visibility and Visual Effects

The southern corner of the site is seen, with the majority of the site obscured by the landform containing the canal.

As illustrated on Visual Simulation 21, the very southern extent of the solar farm will be seen at approximately 2kms away. The southern edge of the 1.85m tall panels standing above the escarpment will be recognisable. The size and extent of the solar farm will not be perceived from this

location as a road user is situated at a lower elevation to the site, which assists with mitigating the potential adverse effects. The solar farm will be seen to the immediate right of the Ōhau C substation, in the midground of the view, beyond the incised and vegetated Ōhau River corridor, backdropped by the distant mountains, including Aoraki, which is further to a viewer's right-hand side. Therefore, it will not be seen on a skyline, which reduces its potential prominence. Also, similar to all other viewpoints, the low-lying nature of the solar farm will not interfere / screen the views to the surrounding mountains, therefore it will adversely affect these views or reduce to the perceived vastness of the Mackenzie Basin.

As mentioned above, the potential visual effects resulting from seeing the proposal, can be mitigated by locating mitigation vegetation along the southern boundary of the site that can reach approximately 3m tall. This screening vegetation, when mature could screen the solar farm from view, and similarly not impact on the views to the surrounding mountains and would appear in keeping with the large swathes of mature vegetation at the northern edge of Lake Benmore and the confluence of the Ōhau and Tekapo Rivers.

Overall, the proposed solar farm will have a **low to low-moderate degree** of adverse visual effects when seen from Falston Road. These adverse visual effects could be reduced to **nil** if Recommendation 1 is adopted, and the southern side of the site is planted with native vegetation that can reach 3m tall.

6.1.5 Lake Benmore and the Lake Benmore – Ōhau C Campground – Viewpoint 23

Viewpoint Photograph 23 on **GA Sheet 39** represents the view from McAughtries Road facing north, alongside the top end of Lake Benmore, between the Ōhau C Power Station and the Lake Benmore – Ōhau C Campground.

Similar to the surrounding areas, a high degree of visual amenity is gained from this stretch of road and from the surface of Lake Benmore. This is due to the lakes setting, enclosed by the open mountainsides to the east and the Benmore Range to the west, and the long ranging views to the Southern Alps and Aoraki to the north. The sense of openness of the Mackenzie Basin is perceived and contributes to a lake users' amenity by the view of the distant mountains (Southern Alps) to the north.

Extent of Visibility and Visual Effects

As illustrated on Viewpoint Photograph 23, and when compared with the nearby Viewpoint Photographs 21 and 22, the terrace and its surrounding escarpment faces that the solar farm will be located on is not seen from this stretch of road and Lake Benmore. This is due to intervening landform and vegetation. Therefore, the proposed solar farm will **not** result in adverse visual effects.

6.1.6 The Twizel River Trail

The Twizel River and the Twizel River Trail run in a north-west to south-east direction adjacent to the site's north-east boundary.

The river and its margins are physically intact, the landcover has been modified containing willow trees and other exotic vegetation, but overall retains a relatively high level of natural character. The Twizel River Trail enables access and enjoyment of the river itself as well as the banks and terraces of its margins. The river corridor is valued by locals and tourists alike for its natural amenity, recreational values (fly fishing, walking and mountain biking).

Extent of Visibility and Visual Effects – Western 3kms

The Twizel River Trail is accessed beside the accessway to the Twizel oxidation ponds, opposite Ruataniwha Road, **refer to Viewpoint 1**. It follows the true right-hand side of the river (same side as the site) and extends for 12kms south-east of SH8 to the confluence with the Ōhau River.

The trail was damaged during a large rain event in 2022, which has made the trail near on impassable approximately 4kms from the state highway. This is due to the Twizel River bursting its banks and the trail being submerged in knee deep water. Due to this, it is likely that less people currently use this trail. However, given the community aspirations for more mountain biking it is likely that this trail will be reinstated.

The initial 3kms of the trail vary between being located on the elevated terrace north of the site, and being located alongside the river itself, that is below and separated from the terrace by an approximately 3 - 4m high scarp face. The more distant parts of the solar farm will be seen from the approximately 1.5kms of trail on the elevated terrace, with the terrace edge screening the nearby parts of the solar farm. The solar farm will not be seen from the stretch of trail alongside the river, due to the escarpment face screening it from view.

When seen from the initial 1.5kms of trail from the terrace, the solar farm will be a noticeable, but distant element within the landscape, being seen some 5-6kms away or more. Its prominence will come from its dark colouring, contrasting with the existing light brown / green grass and overall size consisting of a large area of development. Subsequently, the solar farm will also detract from the current open character that is afforded by the pastoral use of the site and how this contributes to the openness of the South Basin area within the Mackenzie Basin. However, the solar panels will be low lying in the landscape, therefore will not affect the long-range views towards Lake Benmore, or the surrounding mountains, including Aoraki towards the northeast. Also, the solar farm will not be perceived as impeding on a trail user because the visible parts of the solar farm are quite some distance away. Due to this, the proposed solar farm will have a **low degree** of adverse visual effects when seen from the initial, elevated, 1.5km stretch of the Twizel River Trail.

Mitigation vegetation that could screen the proposed solar farm from the initial stretch of the river trail would be required to be located along the terrace edge, east of the quarry within the site. A band of mitigation vegetation on this open outwash terrace would appear as contrived and out of place due to the way in which it would extend through a central portion of the terrace and would reduce the long ranging views currently gained. Therefore, in this instance, mitigation vegetation would perceptually result in a higher degree of adverse effects than the proposal.

Extent of Visibility and Visual Effects – Central 7kms

The central 7kms of the trail, north of the site is mostly situated alongside the river, where the trail is located amongst the mature riverside vegetation, and below and separated from the terrace by the scarp face. Also, the solar farm is situated some 50 - 400m from the terrace edge, therefore the solar farm will not be seen on the terrace edge, and overall will not be seen, or at best will be difficult to distinguish from this stretch of track. Therefore, the proposed solar farm will **not** result in adverse visual effects when seen from the majority of the Twizel River Trail, most notably, being the stretch alongside the river itself.

Extent of Visibility and Visual Effects – Eastern 2kms

The final 2kms of the trail is situated on the same terrace and alongside the solar farm in which it will be clearly seen. It will be a prominent element, that will interfere and detract from the views to the west over the narrowest part of the site towards the nearby Benmore Range. Due to the trail alignment, it will not impede on views to Lake Benmore, nor will it impact on the open views to the east over the South Basin area within the Mackenzie Basin towards the distant mountain range of the

Southern Alps, including Aoraki. Due to this, and likelihood that the number of trail users reduces on sections further along the trail, i.e. people not travelling the full length of track, the proposed solar farm will have a **low-moderate degree** of adverse visual effects.

Recommendation 2

Mitigation vegetation could screen the nearby area of the proposed solar farm from this final 2km of the river trail. This vegetation could be planted at a density to screen the solar farm, at a greater density than the areas of grey shrubland vegetation alongside the river. However, it would generally form part of the mosaic of vegetation in this area, therefore would not, in itself, result in adverse visual effects. Therefore, mitigation vegetation would reduce the potential adverse visual effects of the solar farm from this stretch of trail to a **very low-low degree**, noting that long ranging views of the solar farm would still be gained when facing north, prior to track users descending the scarp face.

6.1.7 Ōhau River Four-Wheel Drive Track

A gravel four-wheel drive track is located along the southwest side of the site, immediately northeast of the Ōhau River, on the same terrace as the solar farm. This four-wheel drive track provides access to the Ōhau River and Twizel River confluence. There is a river crossing at the confluence, where more capable vehicles can connect onto a wider network of trails that provide access alongside the Pukaki and Tekapo rivers. These gravel tracks are within land parcels owned by Meridian Energy, albeit they are accessible to the public. It is likely that it is a relatively small user group who use these tracks as they are not public places and are not advertised by DOC[36] as a place for four-wheel driving.

The amenity experienced when travelling along these four-wheel drive tracks is high and very similar to the amenity gained from McAughtries Road.

Extent of Visibility and Visual Effects – Western 2.8kms

The majority of the four-wheel drive track is located on the terrace and situated immediately south of the solar farm. The exception to this, is the western 2.8kms of track between Old Iron Bridge Road and the terrace. In this instance the four-wheel drive track is situated where it is at a lower elevation to the site where topography will screen the majority of the solar farm from view, albeit the southern edge of the panels will be visible sitting just above the top of the terrace. When seen from this western stretch of track the panels will draw the eye as an additional piece of energy infrastructure within the landscape and they will interfere with the cohesive appearance of the escarpment. However, they will not appear out of place being seen in close proximity of the Twizel Substation, National Grid transmission lines and the Ōhau Canal. Also, they will not interfere with views of the adjacent river or to the surrounding mountains. Therefore, the proposal will have a **low to low-moderate degree** of adverse effect on the amenity of four-wheel drive track users along this stretch of track.

Recommendation 1 mitigation planting along the southern side of the solar farm, when mature would visually screen the solar farm when viewed from the entire stretch of track. Therefore, these adverse effects can be reduced to a **nil** effect.

Extent of Visibility and Visual Effects – Eastern 6kms

When traveling along the remaining 6kms of track adjacent to the site, the solar farm will be a noticeable element within the landscape, being seen within 20m or so of the track. It will be a prominent element, that will interfere and detract from the views to the east and east towards the mountains, including Aoraki towards the northeast. In doing so it will detract from the current open character that is afforded by the pastoral use of the site and how this contributes to the openness of

[36] https://www.doc.govt.nz/globalassets/documents/parks-and-recreation/activity-finder/four-wheel-driving/4wd-in-mackenzie-waitaki.pdf

the South Basin area within the Mackenzie Basin. Due to this, the proposed solar farm will have a **moderate degree** of adverse visual effects when seen from the nearby stretch of the four-wheel drive track.

From the western end of the track the recommended planting would not reduce the long ranging views therefore would not in itself result in adverse effects. From the eastern 6kms, the vegetation would also reduce the views to the east. Such planting is a permitted activity that can occur as of right and would contribute to the physical attributes of the locality and perceived naturalness of the site and the Ōhau River. Overall, with the proposed mitigation planting in place the solar farm would have a **very low degree** of adverse visual effects.

6.1.8 Ben Ōhau – Greta Track

The Greta Track is a 16km loop track providing access to the top of Ben Ōhau (1522masl), on the northern side of Lake Ōhau. This track is used by people walking (6-7 hours) and mountain biking (4-5 hours).[37] The below assessment from this track is based on desktop research and on-site investigations, but not first-hand experience of the trail.

There is no firm data on the number of people who walk or cycle this trail. However, when comparing it to other nearby trails, Strava heat map[38] illustrates it as being used half as much as the Alps to Ocean Trail, more similar to the number of people walking the Te Araroa Trail west of Lake Ōhau.

A high degree of amenity is experienced from the top of Ben Ōhau, including the ridgeline that the Greta Track extends along. This is due to the elevated and expansive 360^0 views gained over the South Basin within the Mackenzie Basin, including Twizel, Lake Ruataniwha, the canal system, Lake Ōhau and the open plains within the Waitaki District. All of which is visually enclosed by the distant Mountain Ranges.

Extent of Visibility and Visual Effects

The majority of the solar farm will be seen directly across SH8 from Twizel township and Lake Ruataniwha from the elevated stretch of the trail along the ridgeline, where clear and open views over the basin can be gained, noting that the southern end of the solar farm will be screened by the Benmore Range. Visibility of the southern end of the solar farm will be screened from view as a trail user ascends the track to the west toward the Ben Ōhau Peak, in which some foreground screening is also afforded by adjacent topography. Only the northern half of the solar farm is visible prior to going around the peak of Ben Ōhau. The solar farm is not seen once beyond this approximately 3km stretch of trail.

When seen at 14.3kms away, the solar farm will replace the green pasture within the site and appear as a large dark object / singular mass sitting on top of the landscape, well contained to the terrace by the dark green (not light brown / green) coloured vegetation lining both its side. The solar farms size and extent will draw the eye when facing east, and will lie adjacent to the Twizel township, being the largest development area in the basin, and will form a relatively small part of the overall view gained to the southeast from this trail. Also, it will not impact on the views gained to the southwest or west.

Similar to most other surrounding public places, the proposal will also be seen alongside the hydro power scheme, and the National Grid transmission lines extending across the basin. These power

[37] https://www.doc.govt.nz/parks-and-recreation/places-to-go/canterbury/places/ruataniwha-conservation-park/things-to-do/tracks/greta-track/

[38] https://www.strava.com/heatmap#12.19/169.95178/-44.24283/hot/all

generating elements, along with the associated knowledge of Mackenzie Basin being one of the sunniest locations in the country contributes to the rational of the solar farm in this location.

The key mitigation factors that reduce the potential degree of adverse visual effects resulting from the solar farm are the low number of people who gain this view, the distance in which the solar farm is seen, the solar farm forming a relatively small part of the overall view, it being seen from short stretch of the overall trail, and it being seen in conjunction with Twizel township and the large scale hydro power scheme.

Overall, the proposed solar farm will have a **moderate degree** of adverse visual effects when seen from this elevated 3km stretch of Greta Track situated on Ben Ōhau.

6.1.9 The Benmore Range Easement Track

The Benmore Range Easement Track, accessed south of the Wairepo Arm provides access up and along the Benmore Range ridgeline to 1756masl. The below assessment from this track is based on desktop research and on-site investigations, but not first-hand experience of the trail.

Information found on the DOC website describes this track as difficult, infrequently used and is not listed on any DOC brochures as an advertised walk to do. Information regarding the Benmore Range Easement Track appears relatively limited. Information on Strava and Strava Heat Map illustrates that less than 10 people have recorded their use of the trail, and further the trail does not show up as a 'Strava Segment'[39] being a common way to illustrate a popular track.

Similar to the elevated view from Ben Ōhau, a high degree of amenity is experienced from the elevated ridgeline along the Benmore Range. This is due to the elevated and expansive views gained over the majority of the Mackenzie Basin and part of the open plains within the Waitaki District, including Lake Ōhau, straight down Lake Pukaki to Aoraki - Mt Cook, Lake Tekapo, Lake Benmore, Twizel township and the majority of the canal system and its hydro power scheme, Tekapo, Pukaki, Twizel and Ōhau Rivers, and the outwash plains they separate. All of which is visually enclosed by the surrounding mountain ranges.

Extent of Visibility and Visual Effects

The proposed 500ha solar farm will be clearly seen at the toe of the mountainside and at a distance of approximately 4kms from a relatively small part of the elevated stretch of the Benmore Range Easement Track.

Similar to the view from Ben Ōhau, the solar farm will replace the pasture grass within the site and appear as a large, dark object / singular mass on the landscape contained to the terraces well defined edges. It will not result in a loss of dryland grass colour due to the current 'greener' pastoral activities that it will replace, noting there is some seasonal variation. However, unlike the distance views from the Greta Track, in this instance, as it is seen from closer proximity a person will understand the more nuanced details and layout of the solar farm.

The size and extent of built form will draw the eye when facing east and downwards in which it will detract from the open character of the Mackenzie Basin. However, its location in this view, being at the toe of the mountainside and given the scale of view assists in mitigating its potential effects. This is because a person will easily look over the solar farm when enjoying the more broad, open and distant views to the north and east over the basin.

[39] www.strava.com

When seen at the toe of the slope, the solar farm will be seen alongside the hydro power scheme, with the majority of the canals, dams and power generating infrastructure being seen from this elevated area. extending across the basin. When seeing the proposal alongside these power generating elements, along with the associated knowledge of Mackenzie Basin being one of the sunniest locations in the country will contribute to the rational of the solar farm in this location.

When taking in the overall outlook, from this track, the solar farm will not form part of the view when facing west or south towards Lake Ōhau, Benmore Dam and Otematata.

Overall, the proposed solar farm will have a **moderate degree** of adverse visual effects when seen from the elevated section along the Benmore Range Easement Track.

6.1.10 Glencairn Station

Glencairn Station is located immediately west of McAughtries Road and takes in the east facing slopes of the Benmore Range. The dwellings and farm base area are accessed off McAughtries Road, and are highlighted on Viewpoint Location Plan 2, refer to **GA Sheet 26**. Whilst the dwellings are close to Viewpoints 17 and 18, the dwellings are slightly elevated above the road by approximately 10 – 15m, therefore their outlook to the north, east and south is more akin to the slightly more elevated views from Ōhau B and C Power Stations. Noting that this is a private property and RMM have not been to this property to undertake this assessment.

Similar to McAughtries Road, the residents and farm workers at Glencairn Station gain a high degree of amenity from their dwellings. This is due to the broad, open, and relatively uninterrupted views over the Mackenzie Basin, including the tranquil and reflective Ōhau Canal, albeit a man-made structure all of which is contained by the steep and enclosing mountain backdrop of the Grampian Mountains and Kirkliston Range. As residents of a high-country station (not commonly on-sold), they will have a more intimate relationship with the landscape, i.e., likely to have higher associative values and will be sensitive to any changes to the landscape (positive or adverse) they are familiar with.

Extent of Visibility and Visual Effects

The majority of the proposed solar farm extending approximately 9km long northwest to southeast will be seen in the foreground of the northeast through to the southeast facing views gained from the dwellings and sheds within Glencairn Station. Subsequently, the overall expansiveness and the amount of built form that the solar farm will introduce will draw the eye, will be relatively prominent and will reduce the perceived naturalness of the basin, which will adversely affect the visual amenity that is currently gained.

The low-lying nature of the solar panels means that the solar farm will appear as a thin sliver of development sitting on top of the outwash plain enclosed and following the terraces natural curved edges, enclosed by the Ōhau and Twizel rivers. The dark colouring of the panels will visually contrast with the existing lighter brown / green ground cover of the wider basin. The 10.6m tall transmission line will appear as a very small and transparent structure, backdropped by the terrace itself or the willow trees, therefore, will not overtly contribute to the potential degree of adverse effects. Most notably the proposed transmission line is dwarfed by the National Grid transmission line immediately beyond the Twizel River. Regarding this, the solar farm will not interfere with views over the site of the wider Mackenzie Basin and the surrounding mountains including Aoraki, to the point that the willow trees that line the Pukaki / Tekapo Rivers are seen.

At a wider scale, the proposal will be seen alongside the Ōhau Hydro Canal, its associated power stations dams and substations, an array of National Grid transmission lines extending across the basin and Lake Benmore, being Aotearoa New Zealand's largest dammed lake. These power generating elements, along with the associated knowledge of Mackenzie Basin being one of the

sunniest locations in the country contributes to the rational of the solar farm in this location. This will assist with reducing the degree of potential adverse visual effects.

Overall, the proposed solar farm will have a **moderate-high degree** of adverse visual effects when seen from Glencairn Station.

If recommendation 1 is adopted then native, grey shrubland vegetation maturing to 2 – 3m tall located along the southern edge of the site would visually screen the solar farms hard southern edge, slightly reducing the amount of visible built form and assist with visually separating it from the Ōhau River. This landscape mitigation will reduce the adverse visual effects of the proposed solar farm to a **low-moderate to moderate degree**.

6.1.11 Summary of Visual Effects

The below table summarise the above visual effects assessment resulting from the proposed solar farm with and without the inclusion of landscape mitigation measures:

Location	**Adverse visual effects without landscaping**	**Recommended landscaping**	**Adverse visual effects with landscaping**
State Highway 8	Moderate	Native, grey shrubland vegetation maturing to 2–3m tall located along the southern edge of the site.	Low-moderate
Old Iron Bridge Road – Upper Terrace	Low	N/A	Low
Old Iron Bridge Road – Lower Terrace	Low to low-moderate	Native, grey shrubland vegetation maturing to 2–3m tall located along the southern edge of the site.	Nil
Mcaughtries Road – Elevated Areas	Moderate to moderate-high		Low-moderate to moderate
Mcaughtries Road – Between Ōhau B and C Power Stations	Low-moderate to moderate		Nil
Falston Road	Low to low-moderate		Nil
Lake Benmore and the Lake Benmore – Ōhau C Campground	Nil	N/A	Nil
The Twizel River Trail – Western 3kms	Low	Native planting will be inappropriate.	Low

The Twizel River Trail – Central 7kms	Nil	N/A	Nil
The Twizel River Trail – Eastern 2kms	Low-moderate	Native, grey shrubland vegetation maturing to 2–3m tall located along the northern edge of the site, between the solar farm and the trail.	Very low-low
Ōhau River Four-Wheel Drive Track – Western 2.8kms	Low to low-moderate	Native, grey shrubland vegetation maturing to 2–3m tall located along the southern edge of the site.	Nil
Ōhau River Four-Wheel Drive Track – Eastern 6kms	Moderate		Very Low
Ben Ōhau - Greta Track	Moderate	N/A	Moderate
Benmore Range Easement Track	Moderate	N/A	Moderate
Glencairn Station	Moderate-high	Native, grey shrubland vegetation maturing to 2–3m tall located along the southern edge of the site.	Low-moderate to moderate

6.2 Assessment of Landscape Effects

"A landscape effect is an outcome for a landscape value. … Change itself is not an effect: landscapes change constantly. It is the implications of change on landscape values that is relevant." [40]

6.2.1 Physical Effects

The proposed solar farm is situated over 500ha of land within the Mackenzie Basin and will inevitably introduce elements of built form within the site replacing the rural character within the site with a semi-industrial and renewable power generation character.

The solar farm will be situated on the relatively flat topography of an outwash plain between the Ōhau and Twizel rivers. Earthworks associated with the solar farm will consist of creating new access tracks throughout the site, placing cables underground in which the landform and land cover will be immediately reinstated, levelling the ground where undulations may restrict the panel's ability to tilt

[40] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 135.

east to west and pile driving the supporting pole structures of each solar table into the ground. Poles are not concreted in situ.

These changes to landform are relatively small, to the point that the legibility of the outwash plain will not be affected by these earthworks. This includes levelling the ground as the majority of the site is flat, therefore there are only few places where such works need to occur, and notably large parts of the site have been tilled and the overall landform with the site remains intact. When seen, the low-profile nature of the solar farm, being approximately 1.85m tall, will be in keeping with the outwash plains flat topography, therefore the landforms legibility consisting of a flat terrace surrounded by steep scarp faces will remain evident and intact from beyond the site. Additionally, if the solar farm becomes redundant, the solar table structures will be relatively easy to dismantle. The poles holding up each solar table can be pulled out of the ground because they are not concreted in situ and the site would return to rural land and used for rural activities. The concept of reversibility (not to be mistaken with a temporary effect) is a key aspect contributing to the reduction of landscape effects.

The solar farm, as its name suggests, is a method of farming a readily available resource within the Mackenzie Basin being the 5th sunniest place within Aotearoa New Zealand[41]. Much like the current agricultural land use of the site, it will specialise in its task. Similar to a farm and the way paddocks and stock-lanes are carefully arranged, the solar farm has been arranged to optimise the best yield from the site. Whilst visually different, the solar farm's sinuous ribbon appearance following the terraces natural landform pattern visually mitigates and what could otherwise be a rectangular grid like appearance, noting that the majority of the viewing audiences will see the solar farm from more the 1-2km away.

The proposal, along with the management plans that will be prepared and implemented by Wildlands will focus on the management of activities within the sites of natural significance, areas of indigenous vegetation and natural wetlands within the site, outside the footprint of the solar farm, as recommended in the Wildlands Report[42], refer to **GA Sheets 4 and 9**. As mentioned above, it is clearly evident that the ecological habitats are situated on the periphery of the terrace, where the landform changes and micro climates occur, and where the agricultural land use has been less intensive with less disturbance to these habitats.

The Wildlands Report concluded that the solar farm layout should avoid development from the identified areas of ecological value. This has been done. Also, all recommended mitigation vegetation avoids these areas as they will change and subsequently may adversely affect these areas of ecological value. The Management Plans that Wildlands have prepared outline specific ways that the development will be undertaken to avoid and mitigate potential adverse effects on the ecological values within the site, overall concluding that adverse effects on ecological values will be 'no more than minor'.

One of the key characteristics of the Mackenzie Basin's rural landscapes is its open character which stems from its openness, vastness, and lack of built form, which is mostly clustered in discreet areas and in part due to the prevalence of large farms / stations, landholdings and the defined Farm Base Areas within The OMDP and PMDP.

[41] https://niwa.co.nz/sites/niwa.co.nz/files/2022_Annual_Climate_Summary_FINAL_v3.pdf

[42] Wildlands Consultants Ltd. Additional Lizard, Vegetation, and Invertebrate Surveys of a Proposed Twizel Solar Farm. April 2024. Page 23.

Within the receiving environment, the amount of built form will reduce the open character of the 'South Basin'[43] area, which is approximately 21,500ha in area. The 500ha solar farm will be situated on approximately 2.6% of land. Even though the solar farm remains large, this is a relatively small part of the receiving environment. Also, the reduction in open character will not impact on the wider basin as it is located within an area confined by two rivers and the associated topography of these features. Also, as assessed above, the solar farm will only be seen from a small viewing catchment based around the site, therefore it will not adversely affect the perceived open space from most public places beyond 5kms away, including the state highway.

The PMDP clearly recognises the renewable energy development pressure on the Mackenzie Basin due to the high amount of irradiance, particularly in Te Manahuna / the Mackenzie Basin and the potential to co-locate with the large-scale hydro-electric power stations in what is characterised as a power generating landscape. As alluded to above, a key constraint to the location of solar farms is proximity to and the ability to connect to the National Grid. This means that when analysing the location of the National Grid transmission lines on **GA Sheet 18** solar farms are most likely to be located within the southern part of the basin.

As mentioned, the solar farm has been located in close proximity and will connect into the Twizel Substation, a key piece of infrastructure for this development, and is situated within close proximity of Twizel township and the Ōhau B and C power stations. At a district wide scale, this is the most developed part of the Mackenzie Basin. Therefore, whilst the proposed solar farm is within the ONL of the Mackenzie Basin, the existing surrounding development assists with absorbing it into the receiving environment and the wider Mackenzie Basin. Whereas this may not be the case within other parts of the basin e.g. east of and between Lake Pukaki, SH8, Tekapo River and the Rollesby Range, refer to **GA Sheet 18** which doesn't contain large scale power generating structures.

6.2.2 Associative Effects

The Waitaki Hydro Scheme is the largest hydro power scheme in Aotearoa New Zealand which contributes to the associative values and character of the Mackenzie Basin.

The solar farm will introduce another renewable energy power source to this landscape. Regarding these associative values and the solar farm being situated in close proximity to the Ōhau Canal, Ōhau B and C Power Stations and alongside Lake Benmore, being the largest manmade lake in Aotearoa New Zealand. Therefore, in this instance, the co-locating of the solar farm within a concentrated part of the existing energy infrastructure within the basin assists in reducing its potential adverse landscape effects.

As mentioned above, the Mackenzie Basin is one of the sunniest places in the country, with over 2,500 hours of bright sunshine every year. Due to the basin's sunny nature and long summer days, a solar farm will be in keeping with this natural resource and these associative values.

At a wider scale, the solar farm will assist in retaining the associated values of the dammed Tekapo, Pukaki, Ōhau, Ruataniwha and Benmore Lakes and their recreational uses. This is because the solar farm will contribute a daytime power source, potentially relieving demand pressure on the hydro scheme. In doing so, the lake levels may be maintained at a higher level for longer, especially during the dry summer and winter months and during droughts, which are predicted to become more frequent as our climate continues to change.

[43] Graham Densem Landscape Architects Ltd. November 2007. The Mackenzie Basin Landscape Study: Character and Capacities. Map 4 - Page 16.

6.2.3 Perceptual Effects

As outlined on Appendix V of the OMDP and the PMDP, the site is within an area of high visual vulnerability, which indicates a low capacity to absorb change. This means that any changes to the character of the landscape are likely to be easily noticed and not easily mitigated.

The visibility and resulting adverse visual effects of the proposed solar farm has been assessed above in Section 6.1. In summary, the proposed solar farm will be seen from a relatively small viewing catchment all situated near the site, except for the top of Ben Ōhau.

The potential adverse effects, if landscape mitigation measures are not implemented will be of a 'more than minor degree' from SH8, McAughtries Road, the Ōhau River Four-Wheel Drive Track, the top of Ben Ōhau and Benmore Range, and Glencairn Station. From all other locations, the proposal will have a 'minor' or 'less than minor' degree of adverse visual effects.

The recommended native grey shrubland vegetation will reduce the potential degree of adverse visual effects to the point that the resulting adverse visual effects will be 'more than minor' from the top of Ben Ōhau and Benmore Range, where mitigation vegetation could not reduce such effects. Also, adverse visual effects will straddle the 'minor' and 'more than minor' degree of adverse visual effects when seen from the elevated areas along McAughtries Road (Ōhau B and C Power Stations) and Glencairn Station.

Unlike a dwelling or residential development, large portions of the solar farm, in particular the solar panels will be seen as sitting lightly and just above ground level at 1.85m tall. Within this expansive landscape this is a very low height. When visible, this is highlighted by a person's ability to see across the solar farm to the existing willow trees and other exotic vegetation lining the Twizel River, located on the far side of the outwash plain and views to the surrounding mountains will not be obstructed. Therefore, the solar farm does not interfere with the open and long ranging views over the Mackenzie Basin.

The visible changes arising from the solar farm will inevitably result in a change of character within the site, from that of an open rural pastoral character to a predominately semi-industrial and renewable power generation character, with underlying pastoral use that will continue to contribute to the rural character. In addition to the open character of the site, the site's aesthetic values also stem from its relatively flat topography, and the steep scarp faces that dramatically descend to the adjacent rivers. Because the solar farm sits so low on the site, the visual coherence of this landform will remain intact.

Also, the solar farm will be seen as directly associated with power generation in the fifth sunniest location in Aotearoa New Zealand[44]. Therefore, the power generation aspect of the solar farm will be perceived as in keeping with the large-scale hydro canals and the irradiance of the basin.

Based on the above, the proposed solar farm has been located and the recommended landscape mitigation will mitigate its potential adverse visual effects to a 'minor' or 'less than minor' degree from all but three public places, and the nearby Glencairn Station. Unavoidably, these **moderate** or 'more than minor' adverse effects will be experienced from elevated areas including Greta Track on the Ben Ōhau Range and the Benmore Range Easement Track. The adverse visual effects will straddle the 'minor' and 'more than minor' degree of adverse visual effects when seen from the elevated areas along Mcaughtries Road (Ōhau B and C Power Stations) and Glencairn Station.

[44] https://niwa.co.nz/sites/niwa.co.nz/files/2022_Annual_Climate_Summary_FINAL_v3.pdf

Also, once the mitigation vegetation has matured, the proposal will have **no to a low-moderate degree** of adverse visual effects on people travelling / spending time in **all other public places**.

6.2.4 Summary of Landscape Effects

In summary, the **proposed solar farm by itself**, due to its size and scale will have a **moderate to moderate-high** degree of adverse landscape effects on the Mackenzie Basin's outstanding natural landscape values. **These adverse landscape effects will be reduced** by the recommended landscape mitigation and the management activities suggested in Wildlands' four Management Plans..

Overall, the proposed solar farm, and its recommended landscape treatment and ecological and biodiversity enhancement activities will have a **low-moderate to moderate degree** of adverse landscape effects on the Mackenzie Basin's outstanding landscape values.

7 Recommendations

7.1.1 Recommended Landscape Mitigation

As outlined in the body of the report, it is recommended that native grey shrubland species that can mature to 2 – 3m tall, located between the solar farm and the southern boundary of the site and the eastern 2km stretch of the northern boundary of the site will meaningfully reduce the visibility and subsequently mitigate the potential degree of adverse visual effects.

The areas of recommended landscaping and two indicative cross sections illustrating how the planting relates to the nearby terrace edge, four-wheel drive track and cycle trail, fences and solar panels and their recommended width of between 10 – 20m wide, where practical is illustrated on **GA Sheets 10 – 17**.

The chosen plant species within these areas are to be finalised with input from an ecologist, but should consist of the following species, or similar:

- *Plagianthus regius* subsp. *regius* – ribbonwood/mānatu
- *Olearia lineata*
- *Corokia cotoneaster*
- *Kunzea robusta* – Kānuka
- *Coprosoma propinqua*
- *Phyllocladus alpinus*
- *Sophora microphylla*

When planted, plants will be of a root trainer grade or larger planted at 1.5m – 2m spacings.

Planting of all vegetation will start within the first or second planting season following the granting of the resource consent. This will assist with reducing the temporary adverse visual effects of the solar farm.

The landscape areas will be fenced off by rabbit-proof fencing. Additionally, all plants will be planted with pest protective sleeves.

Shade cloth will be located on the fences, at 1.2m tall to assist with protecting the plants from the prevailing winds. This shade cloth will be removed once the plants reach 2m tall.

A slow-release fertiliser will be included with every plant, at the time of planting.

All vegetation will be implemented with mulch, to suppress weeds and retain moisture.

An automatic irrigation system will be set up and will be used for the first five years following the implementation of the vegetation. This is likely to be by way of a dripline or K-line sprinkler, which will utilise the existing water that is consented for the site.

Any plant that becomes diseased or dies, will be replaced within the next planting season.

8 Conclusion

A 500ha solar farm is proposed to be located within Lot 3 DP422901. The site is approximately 868ha in area, is accessed via a private gravel road off SH8, and located between the Twizel and Ōhau Rivers, immediately north of the confluence of these two rivers.

The solar farm will introduce another renewable energy power source to this landscape. At a site-specific level, the solar farm will be located within close proximity of a concentrated area of the existing hydro energy infrastructure. This co-locating will assist in reducing the solar farms potential adverse landscape effects. Additionally, at a national level, the Mackenzie Basin is one of the sunniest places in the country. Due to this, a solar farm will be in keeping with this natural resource and these associative values.

Positive landscape effects resulting from the solar farm include:

- Remedying the greening effect within the site that has resulted from the current agricultural land use activities.
- Assisting with maintaining the aesthetic and associated values of the hydro lakes including Tekapo, Pukaki, Ōhau, Ruataniwha and Benmore Lakes and their recreational uses.

Regarding visibility and visual effects, the proposed solar farm will be seen from a relatively small viewing catchment all situated near the site, being SH8, Old Iron Bridge Road, Mcaughtries Road, Falston Road, The Twizel River Trail, the Ōhau River four-wheel drive track, the Benmore Range and Glencairn Station. The exception to this is the top of the Greta Track on Ben Ōhau.

The proposed solar farm will sit relatively lightly on the site meaning that it does not alter the landform of the outwash plain, therefore maintaining its legibility in part. This means that although the outwash patterns discernible on the land surface will remain, they will be obscured by the solar panels affecting the degree of legibility in that regard, albeit the legibility of the wider outwash plain landform and its scarp faces will remain intact. The size and scale of built form will result in adverse effects on the open character of the South Basin, which forms part of the Mackenzie Basin and contributes to its unique and outstanding character. However, the low-profile nature of the solar farm components will not interfere with or obscure long-distance views to the mountain ranges enclosing the basin.

Without landscape mitigation measures, the potential adverse effects, or temporarily prior to the vegetation establishing will vary between a **low to moderate-high degree**, from the surrounding public places and one private location. If the landscape mitigation measures are adopted, the long term adverse visual effects of the proposal will be **nil to low degree** when seen from Old Iron Bridge Road, McAughtries Road (between Ōhau B and C Power Stations, Falston Road, The Twizel River Trail, and the Ōhau River four-wheel drive track. From SH8, they will be of a **low-moderate degree**.

Unavoidably, due to their elevated locations, the solar farm will have a **moderate degree** of adverse visual effects on users on the top of Ben Ōhau and Benmore Range, where mitigation vegetation will not reduce such effects. Also, adverse visual effects will be of a **low-moderate to moderate degree** when seen from the private elevated sections along McAughtries Road (Ōhau B and C Power Stations) and private Glencairn Station dwellings.

Overall, the proposed solar farm and its associated activities will have a **low-moderate to moderate degree** of adverse landscape effects on the Mackenzie Basin's outstanding landscape values.

9 Appendix 1: The Relevant Policy Provisions

9.1 Operative Mackenzie District Plan

9.1.1 Section 7 – Rural Zone

Rural Objective 3A - Landscape Values

Protection of outstanding landscape values, the natural character of the margins of lakes, rivers and wetlands and of those natural processes and elements which contribute to the District's overall character and amenity.

Rural Policy 3A3 - Impacts Of Subdivision Use And Development

Avoid or mitigate the effects of subdivision, uses or development which have the potential to modify or detract from areas with a high degree of naturalness, visibility, aesthetic value, including important landscapes, landforms and other natural features.

Rural Policy 3A5 - In Harmony With The Landscape

To encourage the use of guidelines for the siting and design of buildings and structures, tracks, and roads, tree planting, signs and fences.

To encourage the use of an agreed colour palette in the choice of external materials and colours of structures throughout the district, which colours are based on those which appear in the natural surroundings of Twizel, Tekapo and Fairlie.

Rural Objective 3B – Activities in the Mackenzie Basin's outstanding natural landscape

(1) Subject to (2)(a), 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;

(2) To maintain and develop structures and works for the Waitaki Power Scheme:

(a) within the existing footprints of the Tekapo-Pukaki and Ōhau Canal Corridor, the Tekapo, Pukaki and Ōhau Rivers, along the existing transmission lines, and in the Crown-owned land containing Lakes Tekapo, Pukaki, Ruataniwha and Ōhau and subject only (in respect of landscape values) to the objectives, policies and methods of implementation within Chapter 15 (Utilities) except for management of exotic tree species in respect of which all objective (1) and all implementing policies and methods in this section apply;

(b) elsewhere within the Mackenzie Basin subzone so as to achieve objective (1) above.

Policy 3B1 – Recognition of the Mackenzie Basin's Distinctive Characteristics

(1) To recognise that within the Mackenzie Basin's outstanding natural landscape there are:

(a) Many areas where development beyond pastoral activities is either generally inappropriate or should be avoided;

(b) Some areas with greater capacity to absorb different or more intensive use and development, including areas of low or medium visual vulnerability and identified Farm Base Areas;

(c) Areas, places and features of particular significance to Ngāi Tahu.

(2) To identify, describe and map as overlays, specific areas within the Mackenzie Basin that assist in the protection and enhancement of the characteristics and/or values of the outstanding natural landscape contained in Objective 3B(1) being:

(a) Lakeside Protection Areas, shown on the planning maps

(b) Scenic Viewing Areas, in Appendix J and shown on the planning maps

(c) Scenic Grassland Areas, in Appendix J and shown on the planning maps;

(d) Sites of Natural Significance, in Appendix I and shown on the planning maps, and

(e) Land above 900m in altitude, shown on the planning maps.

(3) As part of an assessment of the suitability of an area for a change in use for development:

(a) To identify whether the proposed site has high, medium or low ability to absorb development according to Appendix V (Areas of Landscape Management);

(b) To require an assessment of landscape character sensitivity (incorporating natural factors including geomorphology, hydrology, ecology, vegetation cover, cultural patterns, landscape condition and aesthetic factors such as naturalness and remoteness).

Policy 3B7 – Views from State Highways and Tourist Roads

(a) To avoid all buildings and the adverse effects of irrigators in the Scenic Grasslands and the Scenic Viewing Areas;

(b) To require buildings to be set back from roads, particularly state highways, and to manage the sensitive location of irrigators to avoid or limit screening of views of the outstanding natural landscape of the Mackenzie Basin;

(c) To avoid clearance, pastoral intensification and/or agricultural conversion of Scenic Viewing Areas and Scenic Grasslands;

(d) Subject to Policy 3B13, to otherwise minimise the adverse visual effects of irrigation of pasture adjacent to the state highways or tourist roads.

Rural Objective 4 - High Country Land

To encourage land use activities which sustain or enhance the soil, water and ecosystem functions and natural values of the high country and which protect the outstanding landscape values of the high country, its indigenous plant cover and those natural processes which contribute to its overall character and amenity.

Rural Policy 4B - Ecosystem Functioning, Natural Character And Open Space Values

Activities should ensure that overall ecosystem functioning, natural character and open space values of the high country are maintained by:

- Retaining, as far as possible, indigenous vegetation and habitat.

- Maintaining natural landforms.

- Avoiding, remedying, or mitigating adverse effects on landscape and visual amenity.

Rural Objective 6 - Rural Amenity and Environmental Quality

A level of rural amenity which is consistent with the range of activities anticipated in rural areas, but which does not create unacceptably unpleasant living or working conditions for the District's residents or visitors, nor a significant deterioration of the quality of the general rural and physical environment.

9.1.2 Section 16 – Utilities

Objective 1 - Effect On The Environment

Utilities whose functioning and operation avoid, remedy or mitigate adverse effects on their surrounding environment.

Policies

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.

9.2 Proposed Mackenzie District Plan

9.2.1 Strategic Direction Chapter: NE – Natural Environment

NE-O1 Natural Environment

The values of the natural environment, including those that make the District unique, contribute to its character, identity and well-being, or have significant or outstanding intrinsic values, are recognised and provided for, and where appropriate protected and enhanced. This includes, but is not limited to, values associated with the following important natural resources:

1. mahika kai resources;
2. night sky darkness;
3. outstanding natural features and landscapes;
4. significant indigenous biodiversity; and
5. water bodies and their margins.

9.2.2 Renewable Electricity Generation Chapter

REG-O1 - General Output

The output from renewable electricity generation activities in the District for national, regional and local use is increased to support achievement of the New Zealand Government's national target for renewable electricity generation.

REG-O2 Adverse Effects

The adverse effects of renewable electricity generation activities are managed in a way that recognises and provides for the national significance of renewable electricity generation activities.

REG-P1 Benefits

Recognise and provide for the national, regional, and local benefits of renewable electricity generation activities and assets, including avoiding, reducing, or displacing greenhouse gas emissions.

REG-P6 Other Renewable Electricity Generation Activities – Within areas of significant indigenous vegetation and significant habitats of indigenous fauna, ONLs, ONFs, riparian areas and SASM or on highly productive land

Provide for renewable electricity generation activities (not otherwise specified in REG-P3 and REG-P4) within areas of significant indigenous vegetation and significant habitats of indigenous fauna, Outstanding Natural Landscapes, Outstanding Natural Features, Sites and Areas of Significance to Māori, riparian areas, or within area of Highly Productive Land, where:

1. there is a functional need or operational need for the activity to be in that location;

2. adverse effects on the values of the area are avoided as far as practicable, including through site, route or method selection, design measures and other management methods;

3. adverse effects on the values of the area that cannot be avoided are remedied or mitigated, where practicable;

4. other adverse effects (that do not affect the values of the area) are avoided, remedied or mitigated as far as practicable;

5. regard is had to any proposed offsetting measures or environmental compensation, where there are significant residual adverse effects that cannot be avoided, remedied or mitigated; and

6. particular regard is had to the practical constraints associated with renewable electricity generation activities, including the:

> *a. location and efficient use of existing electricity generation, transmission and distribution infrastructure; and*
> *b. the need to locate the renewable electricity generation activity where the renewable energy resource is located.*

7. The direction in REG-P6 does not apply in relation to managing adverse effects on the outstanding natural landscape and features of Te Manahuna / the Mackenzie Basin where REG-P2 applies.

RMM

ROUGH MILNE MITCHELL
LANDSCAPE ARCHITECTS

Proposed Solar Farm - Nova Energy, Mackenzie Basin
Appendix 2: Graphic Attachment to Landscape Assessment Report

04 March 2025

Document Information

Project

Proposed Solar Farm - Nova Energy, Mackenzie Basin

Address

Lot 3 DP 422901, State Highway 8, Twizel

Client

Nova Energy Ltd

Document

Appendix 2: Graphic Attachment to Landscape Assessment Report

Status

For Resource Consent

Revision

1	For Resource Consent	04.03.2025

Prepared By

Rough Milne Mitchell Landscape Architects Ltd

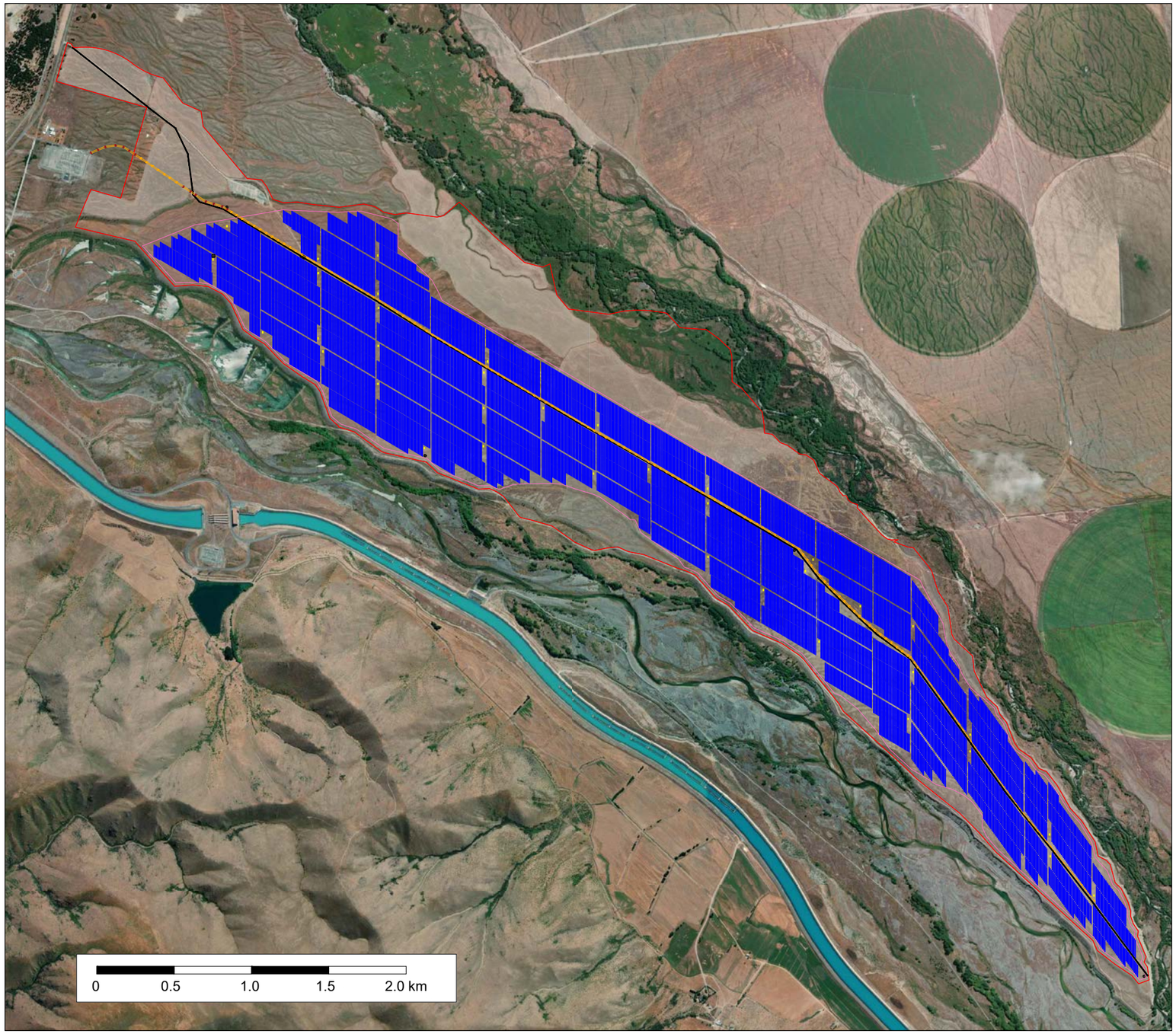
Project Number: 24107

Author: Zoe Cox & Paul Smith

Peer Reviewed By: Nikki Smetham

Contents

Proposed Solar Farm - Site Layout Plan



LEGEND

- Site boundary
- PV area
- PV panel row
- MVPS block
- MV 33kV overhead line
- 10.6m overhead line pole
- 15.2m overhead line pole
- Road
- Constraint (water tank or monitoring bore)

CONFIGURATION

Module type	Canadian Solar TOPBiHiKu7 CS7N 685W
MVPS type	SMA Sunny Central UP 4200
String configuration	29 modules per string, 2 or 3 strings per row
Total number of modules	495,465
Total number of MVPS	74
Total DC capacity	339,394 kW
Total inverter capacity	310,800 kW

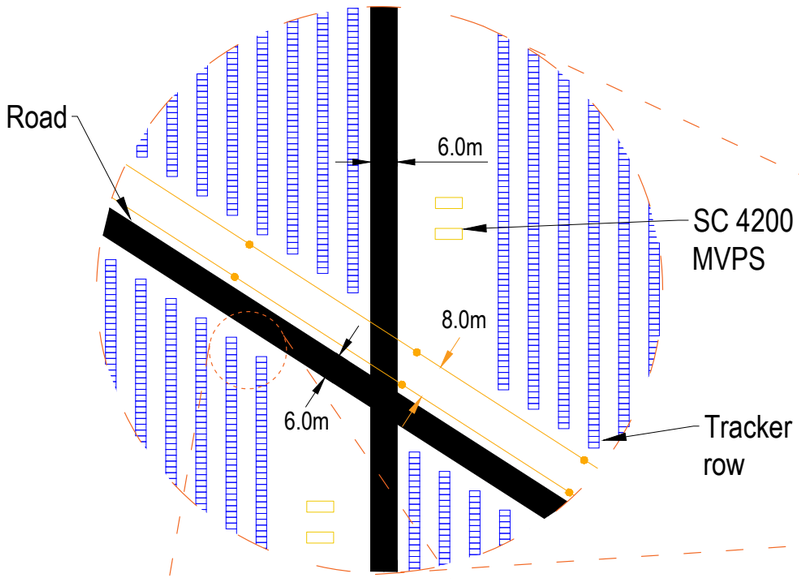
P520475-007 **Nova Energy** Twizel Development

Twizel indicative layout

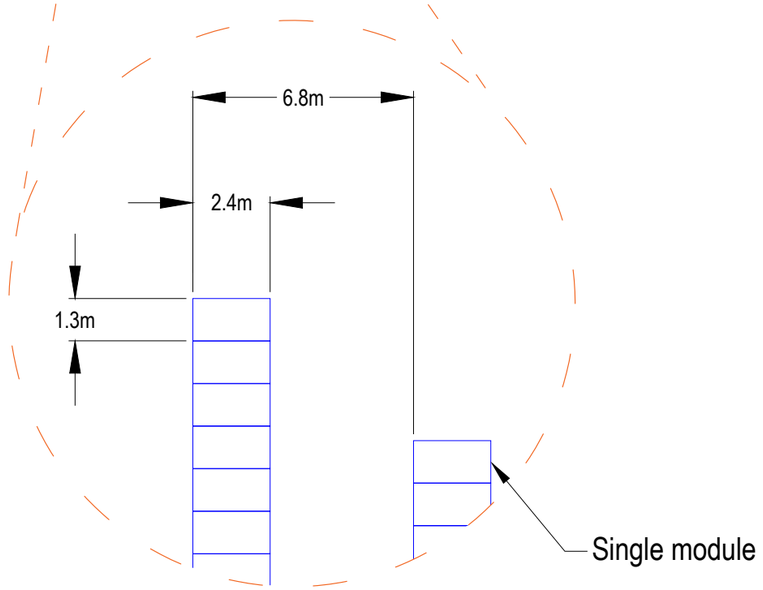
Revision	Date	Comment
H	19/12/2024	

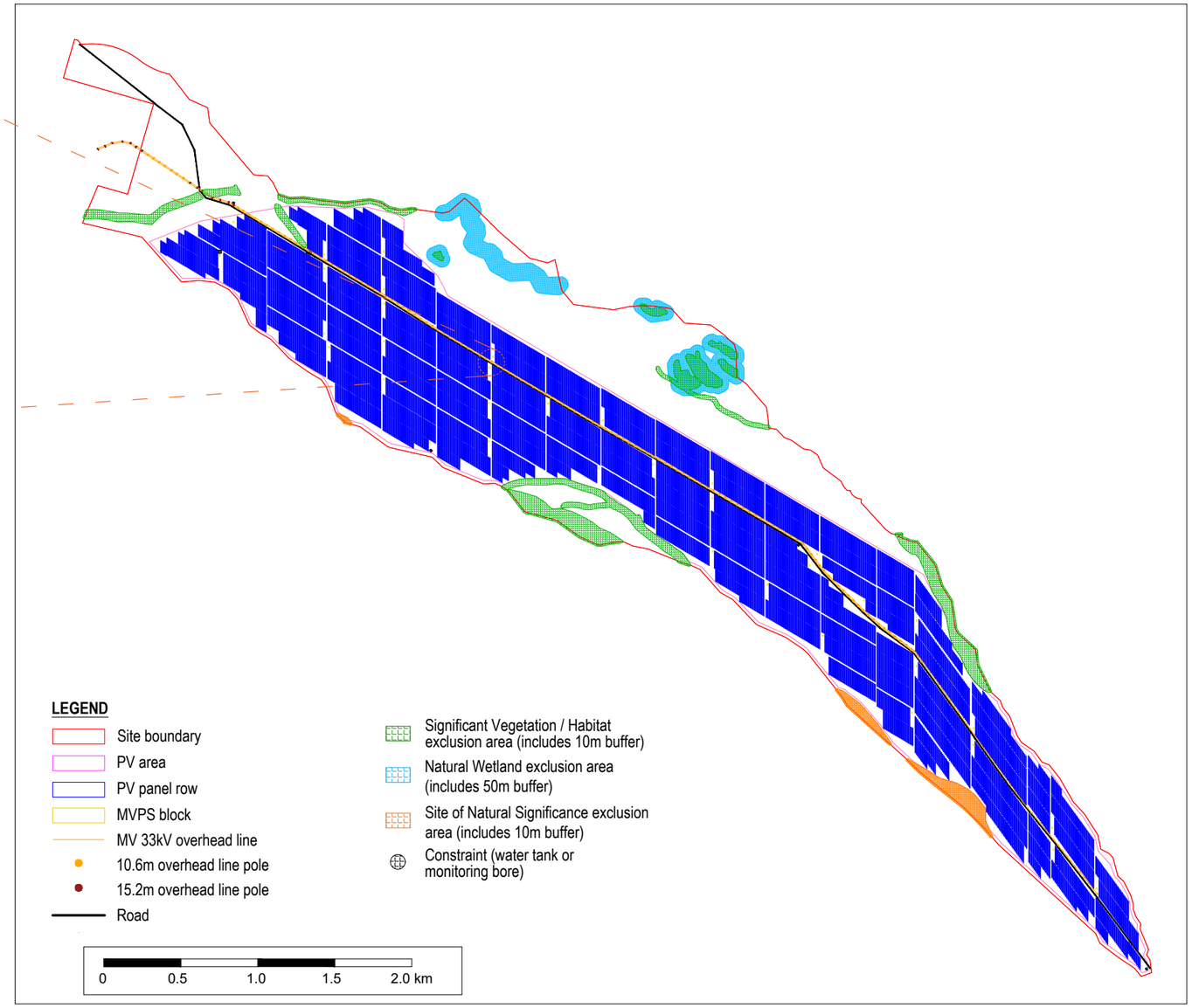
Proposed Solar Farm - Detail Excerpts Plan

INVERTER (MVPS) BLOCK - DETAILED VIEW



TRACKER ARRAY TABLE - DETAILED VIEW



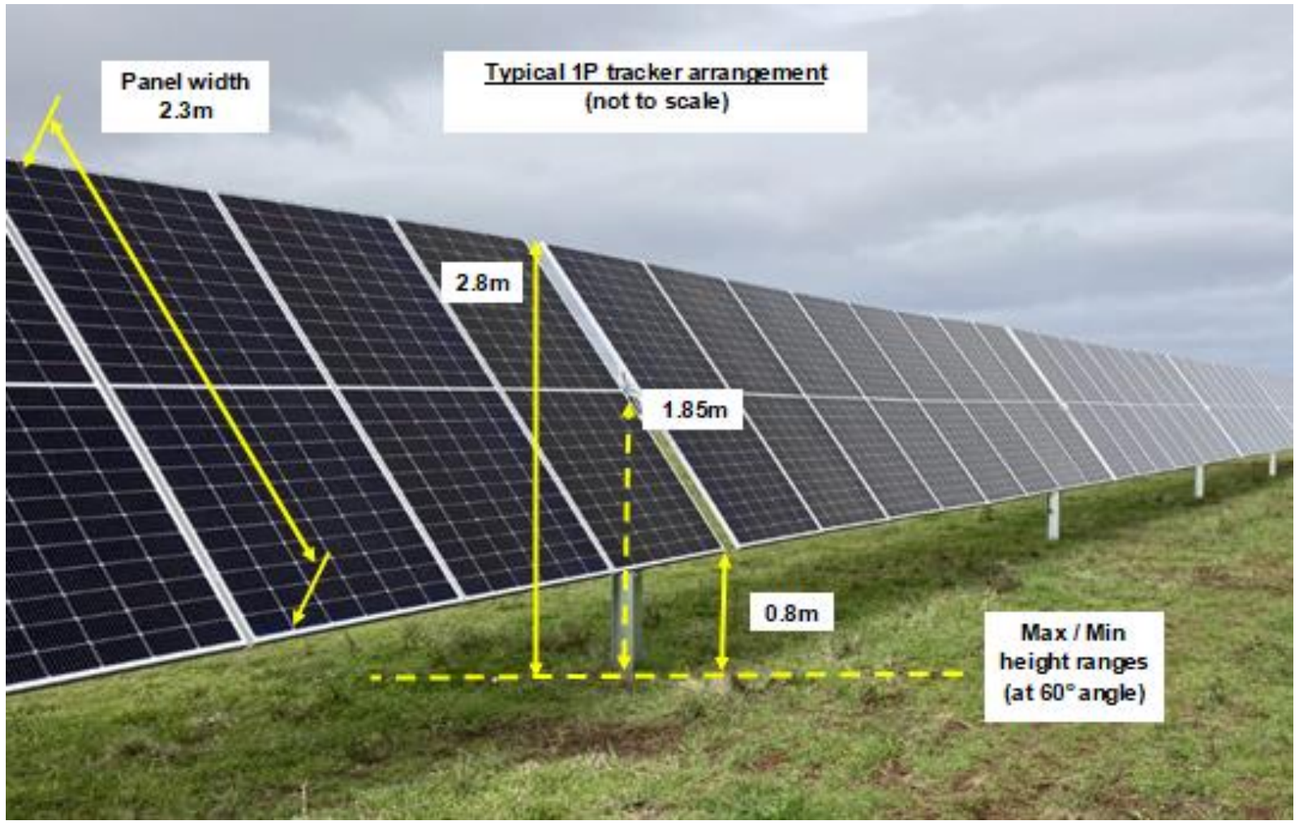


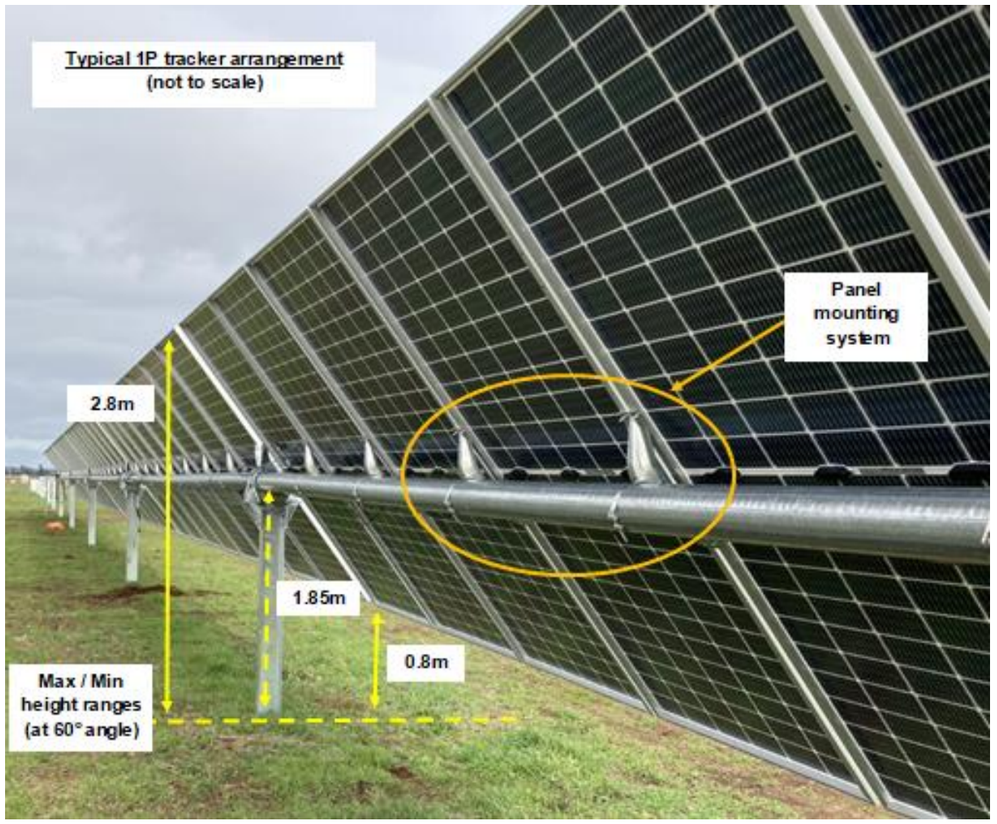
P520475-007 **Nova Energy** Twizel Development

Twizel indicative layout - Detailed excerpts

Revision	Date	Comment
H	20/12/2024	

Proposed Titling Solar Table





Data Source: Nova Energy Ltd.

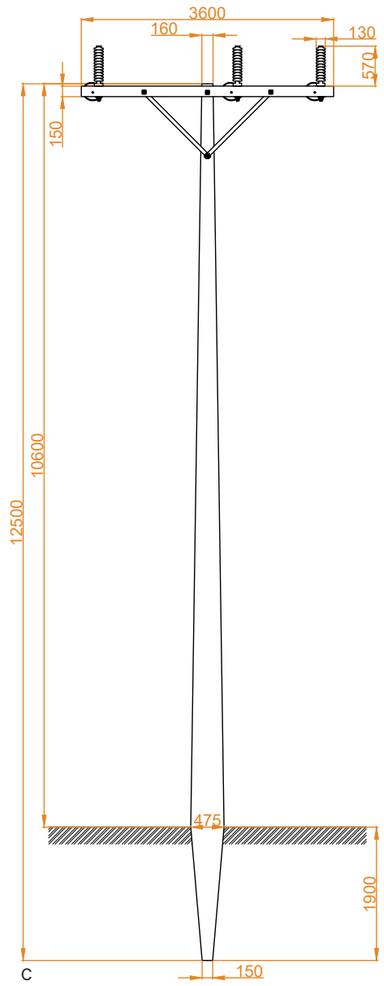
Proposed Inverters and Transmission Poles

A - B Example images of the proposed inverters which are the same size a 20 foot shipping container. Source: Far North Solar Farm Ltd.

C Example elevation of a 12.5m tall transmission pole. The 18.5m tall tranmission poles are the same design, with the pole being 6m taller.

A

B



C

Solar Panel Exemplar Images

A Example of a Solar Farm in Marlborough
B - C Examples of Solar Farms in Australia

A

B

C

Solar Panel Exemplar Images

A-B Examples of Solar Farms in Australia

A

B

Ecological Assessment - Location of Indigenous Values Plan

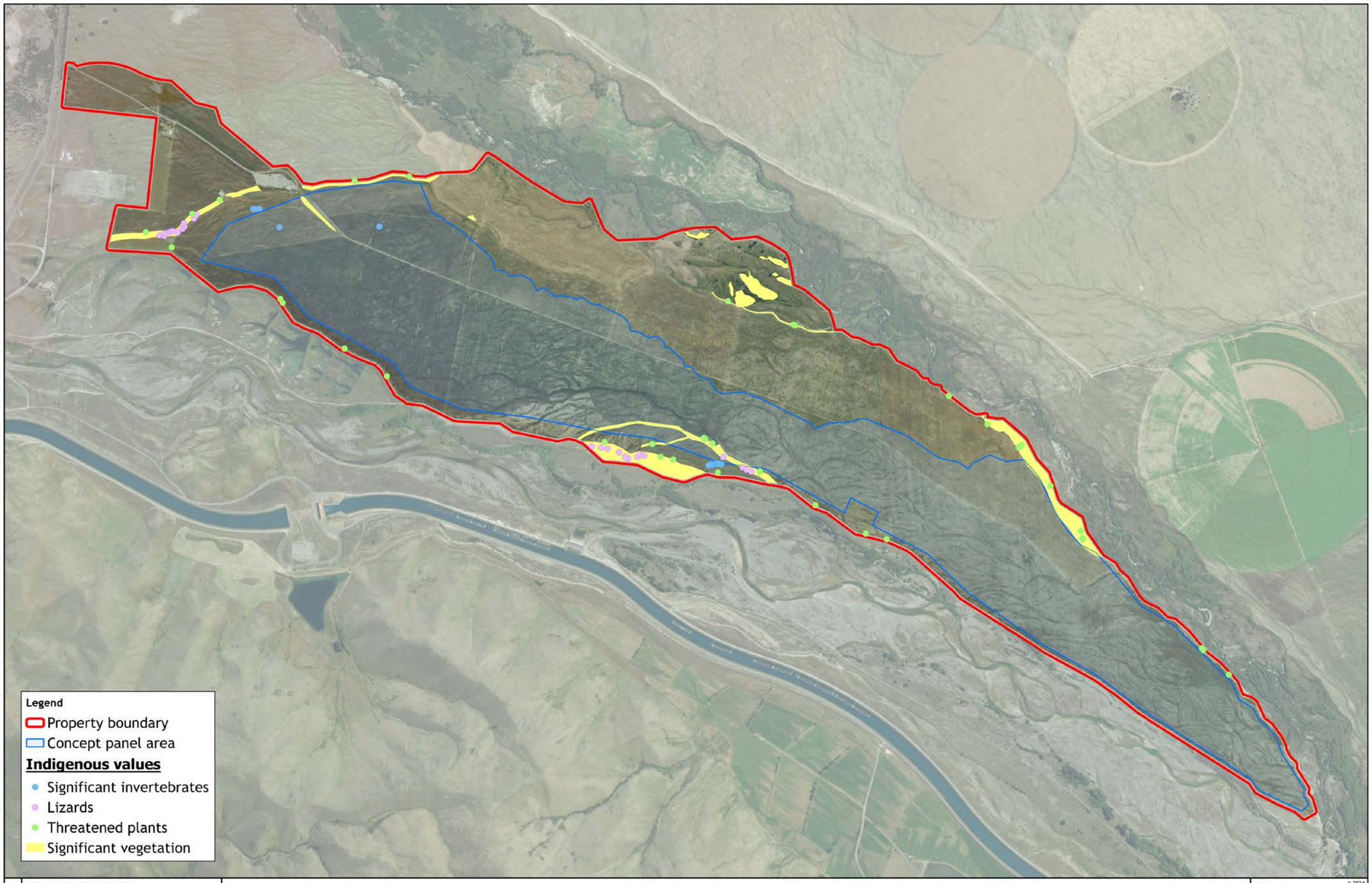
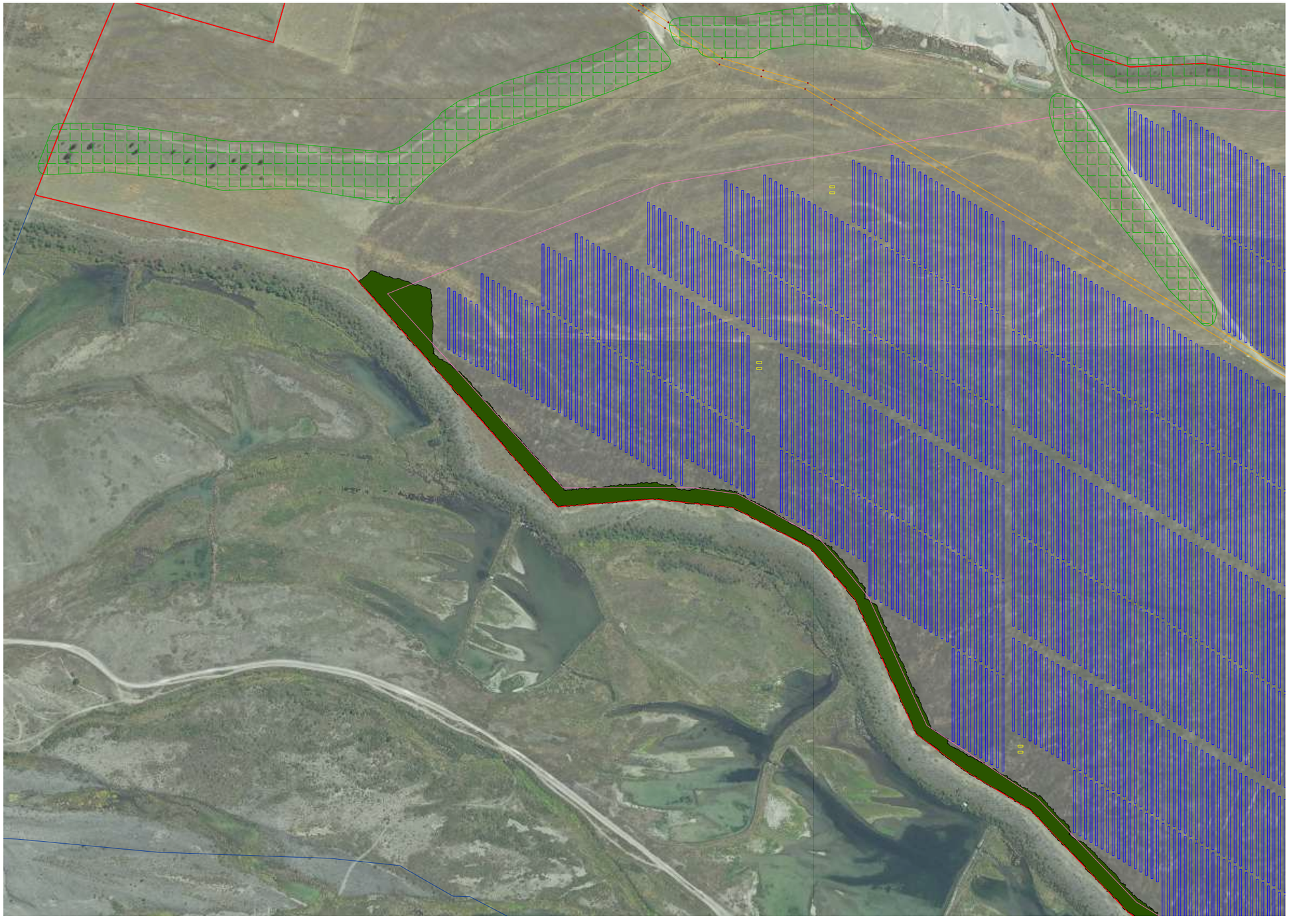


Figure 4. Areas and locations containing indigenous values

Recommended Landscape Mitigation Plan

Legend

	The Site
	Recommended Landscape Mitigation Vegetation - 17.6ha
	Solar Panels
	Vegetation Exclusion Zone
	Significant Natural Area
	Main accessway
	Inverters
	Constraint (water tank or monitoring bore)



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0 10 50 100 300m

Recommended Landscape Mitigation Plan

Legend

	The Site
	Recommended Landscape Mitigation Vegetation - 17.6ha
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Scale 1:5,000 @ A3

0 10 50 100 300m

Recommended Landscape Mitigation Plan

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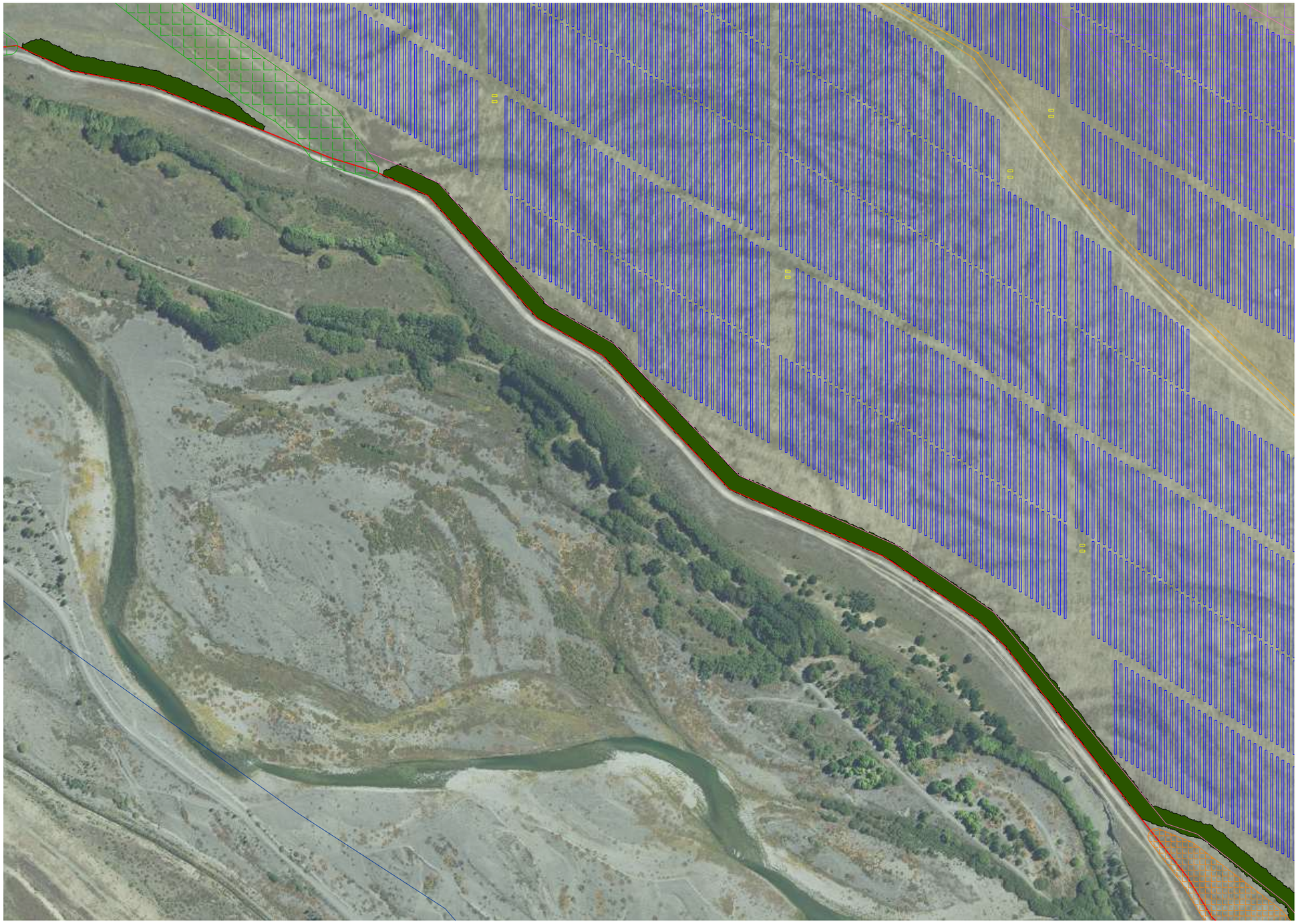

Scale 1:5,000 @ A3

0 10 50 100 300m

Recommended Landscape Mitigation Plan

Legend

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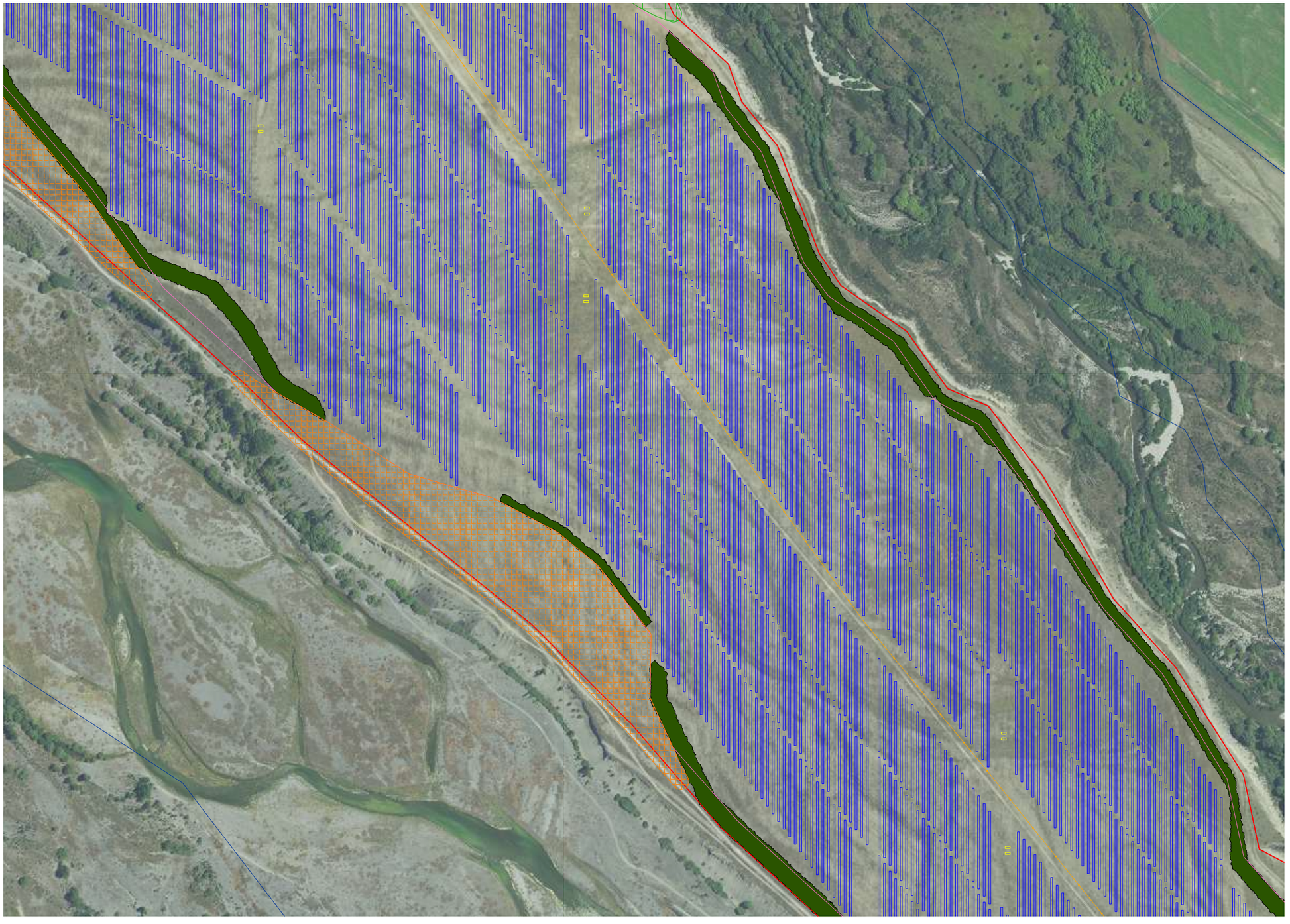
- Inverters
- Constraint (water tank or monitoring bore)



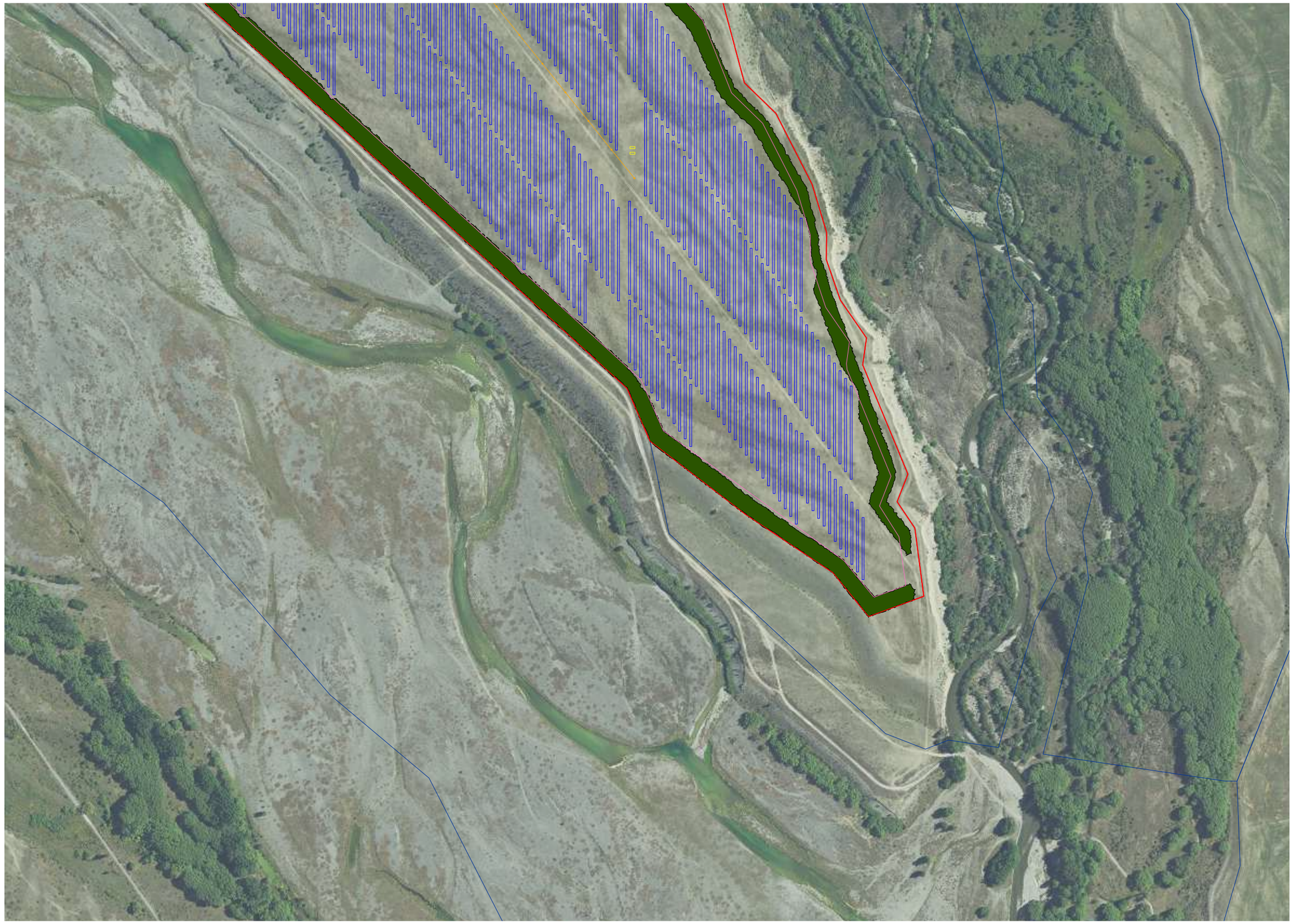
Scale 1:5,000 @ A3

0 10 50 100 300m

Recommended Landscape Mitigation Plan

Legend

- The Site
- Recommended Landscape Mitigation Vegetation - 17.6ha
- Solar Panels
- Vegetation Exclusion Zone
- Significant Natural Area
- Main accessway
- Inverters
- Constraint (water tank or monitoring bore)

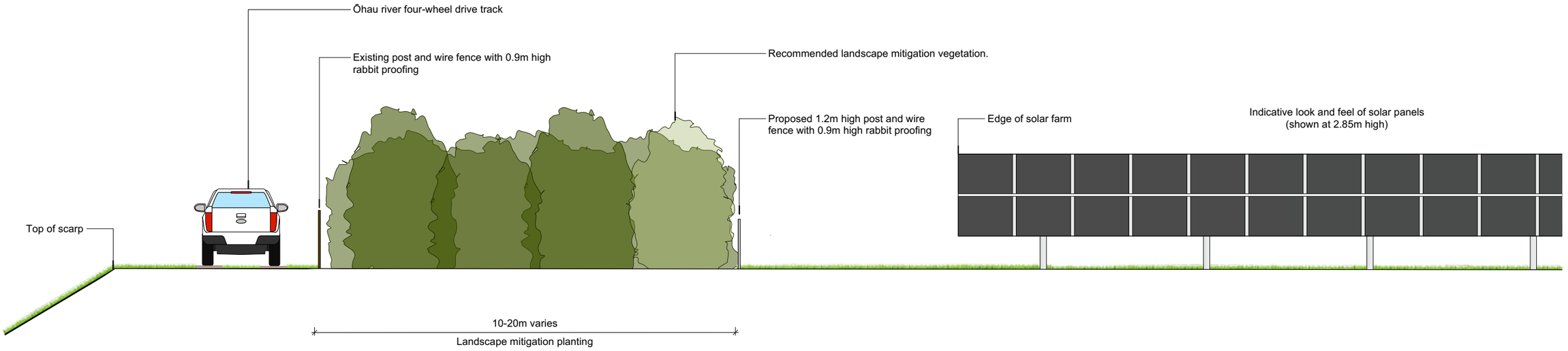


Scale 1:5,000 @ A3

0 10 50 100 300m

Recommended Landscape Mitigation

Indicative Cross Section - Ōhau River



Scale 1:100 @ A3

0 1 2 3 5m

Recommended Landscape Mitigation

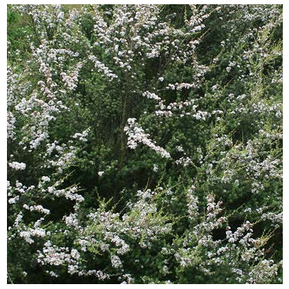
Indicative Cross Section - Twizel River

Scale 1:100 @ A3

0 1 2 3 5m

Recommended Landscape Mitigation Plant Palette

Plagianthus regius
Ribbonwood/Mānatu
Mature height: 10-12m
Fast growing



Kanuka
Kunzea robusta
Mature height: 18m
Threatened

Corokia cotoneaster
Korokio
Mature height: 3m
Withstands wind

Sophora microphylla
Kowhai
Mature height: 8m
Medium growth rate

Olearia lineata
Tree Daisy
Mature height: 8m
Grows well in tussock land

Coprosoma propinqua
Mingimingi
Mature height: 3m
Most robust Coprosma

Phyllocladus alpinus
Mountain Celery Pine
Mature height: 6m
Slow growing

The Receiving Environment Plan

Legend

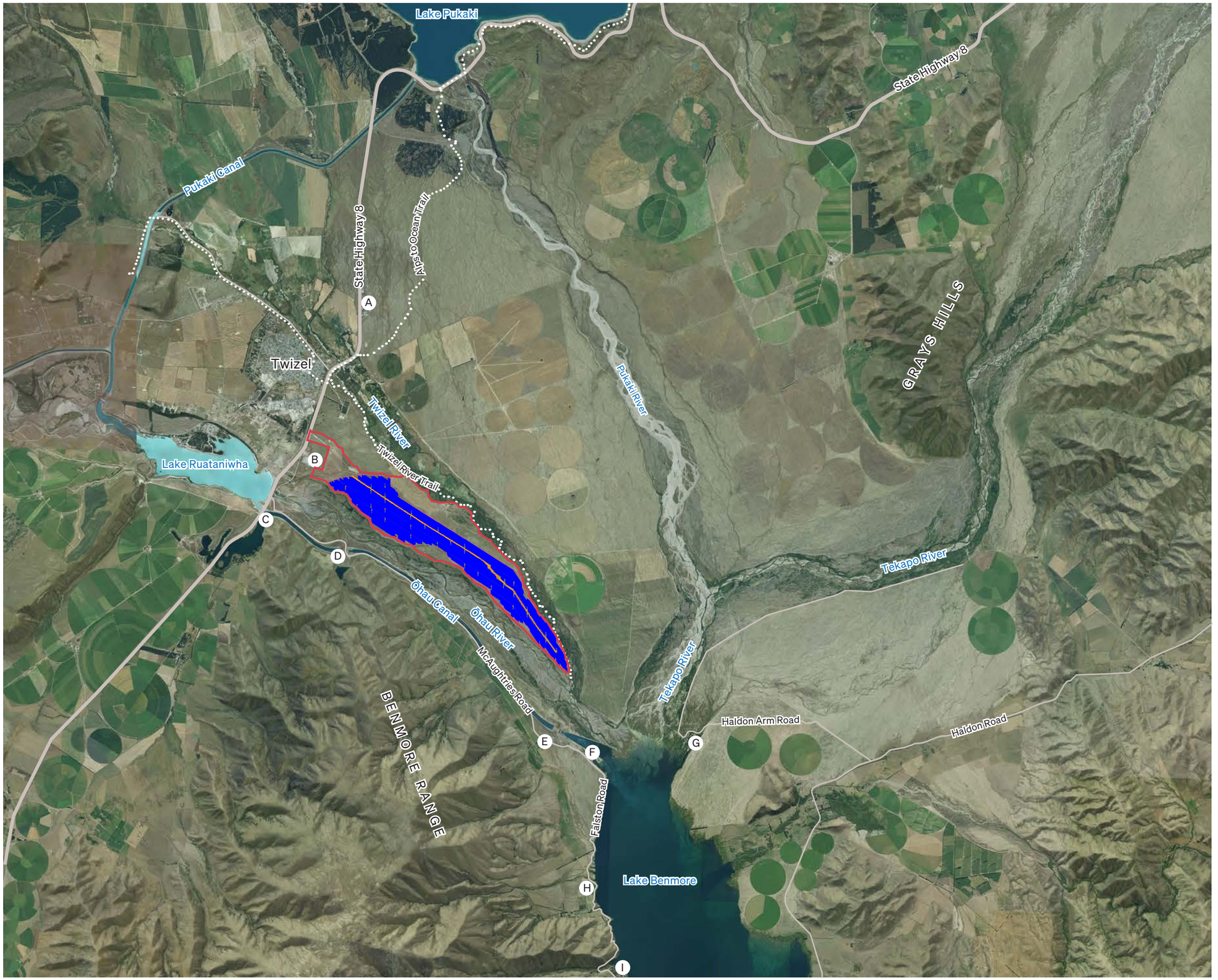
	The Site
	Mackenzie Basin Subzone
	The Receiving Environment

Scale: Grid Square - 5km x 5km
Data Source: www.topomap.co.nz

Local Context Plan

Legend

	The Site
	Solar Panels
A	Pukaki Airport
B	Twizel Substation
C	High Country Salmon Farm
D	Ōhau B Power Station
E	Ōhau C Power Station
F	Lake Benmore Ōhau C Campground
G	Haldon Arm Campground
H	Benmore Views Campground
I	Falston Campground

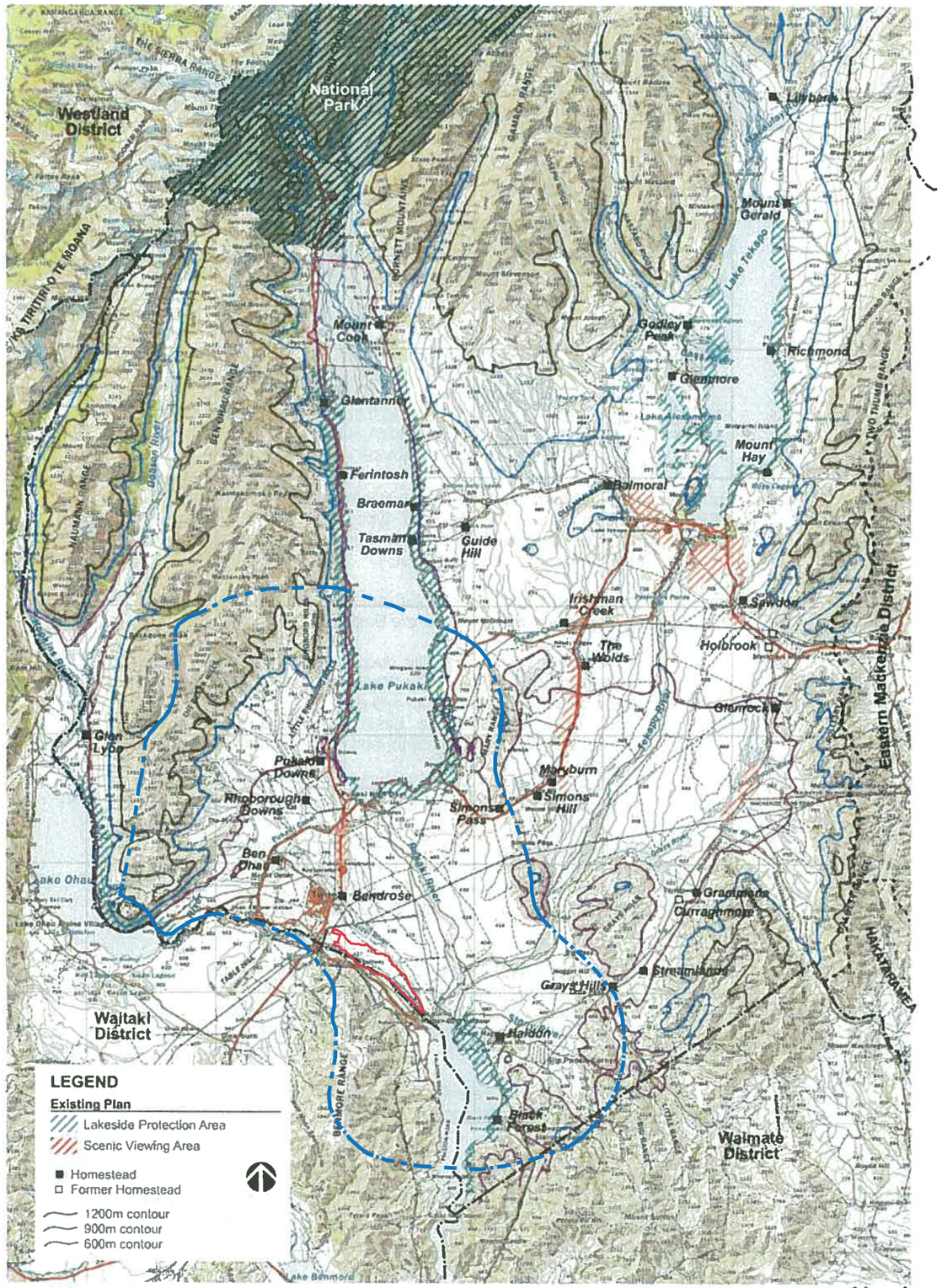


Scale 1:100,000 @ A3
Data Source: grip.co.nz

Mackenzie Basin Landscape Character Areas

Legend

	The Site
	The Receiving Environment



Mackenzie Basin Landscape Map 1

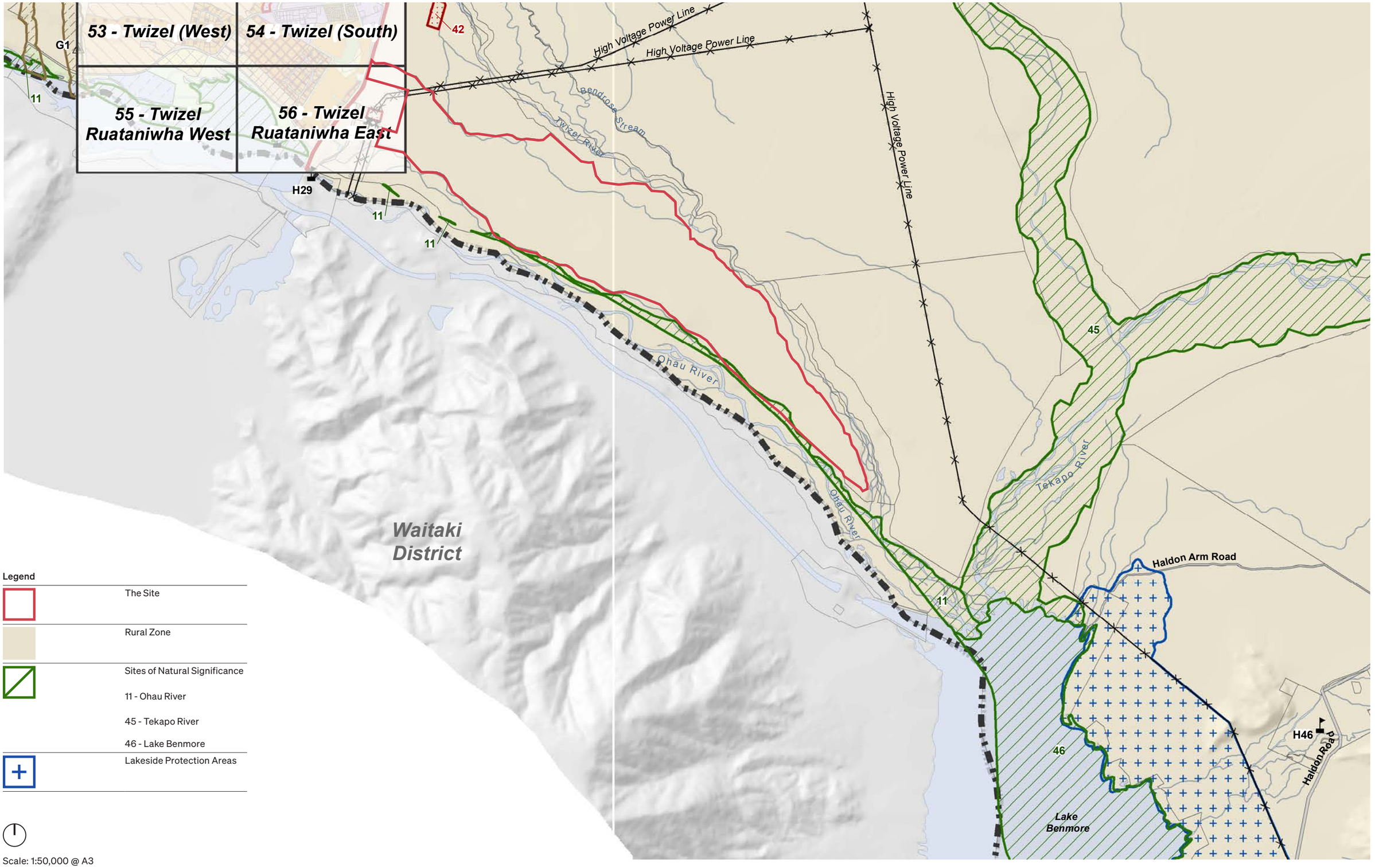
MACKENZIE BASIN, TOPOGRAPHY, BOUNDARIES

December 2007

Not to Scale

Data Source: The Mackenzie Basin Landscape: Character and Capabilities. Graham Densem Landscape Architects. November 2007.

Mackenzie District Planning Map 38



Legend

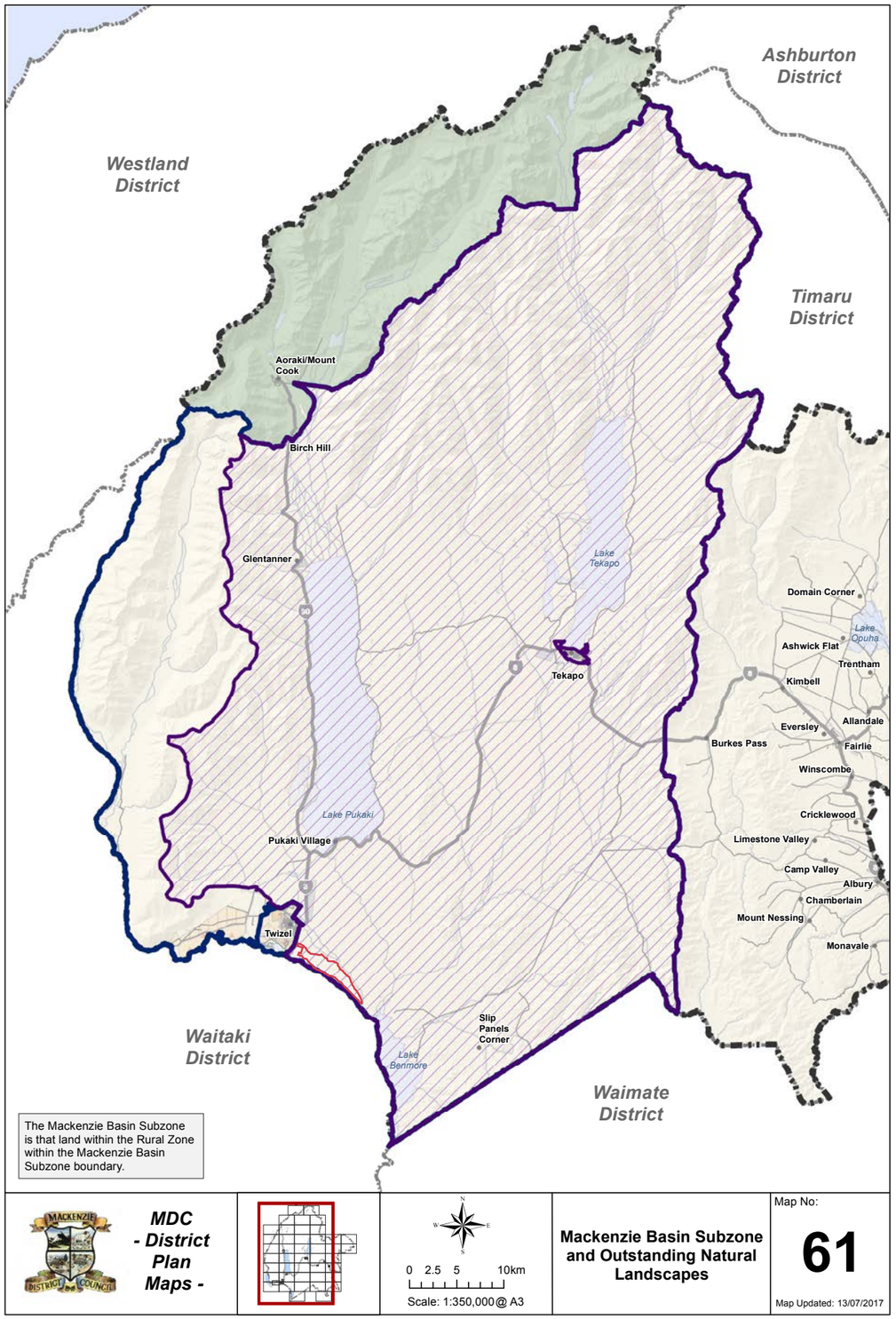
	The Site
	Rural Zone
	Sites of Natural Significance 11 - Ohau River 45 - Tekapo River 46 - Lake Benmore
	Lakeside Protection Areas

Scale: 1:50,000 @ A3
Data Source: Mackenzie District Plan

Mackenzie District Plan - Map 61

Legend

	The Site
	Outstanding Natural Landscapes
	Mackenzie Basin Sunzone Boundary



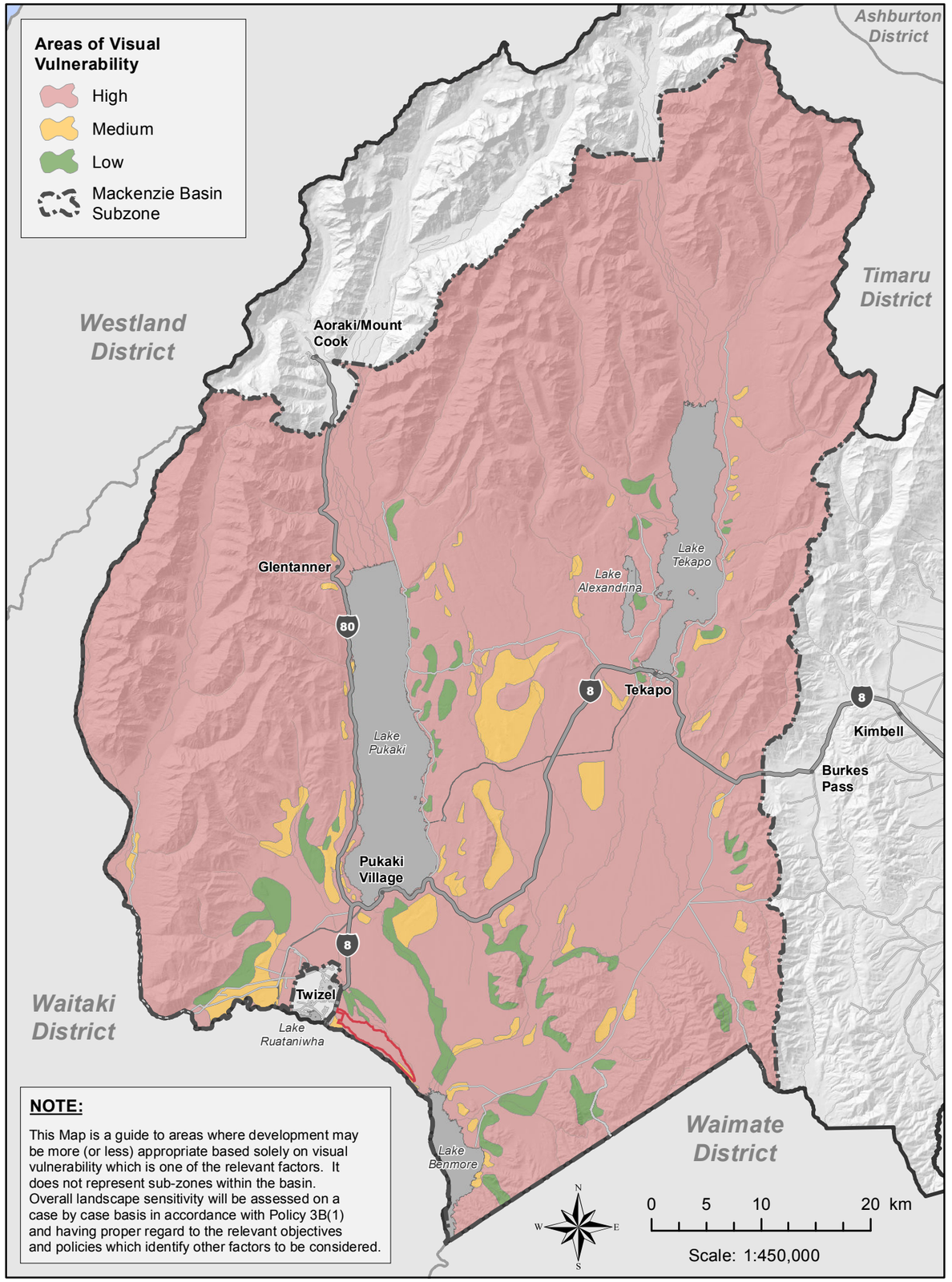
1:350,000 @ A3

Data Source: Mackenzie District Plan

Mackenzie District Plan: Appendix V - Areas of Landscape Management

Legend

The Site



Scale: 1:450,000 @ A3
Data Source: Mackenzie District Plan

Mackenzie District Plan

Legend

- The Site
- Rural Zone
- Sites of Natural Significance
  - 11 - Ohau River
  - 45 - Tekapo River
  - 46 - Lake Benmore
- Outstanding Natural Landscape
- Areas of Visual Vulnerability - Low
- Areas of Visual Vulnerability - Medium
- Areas of Visual Vulnerability - High

Not to Scale
Data Source: Mackenzie District Plan

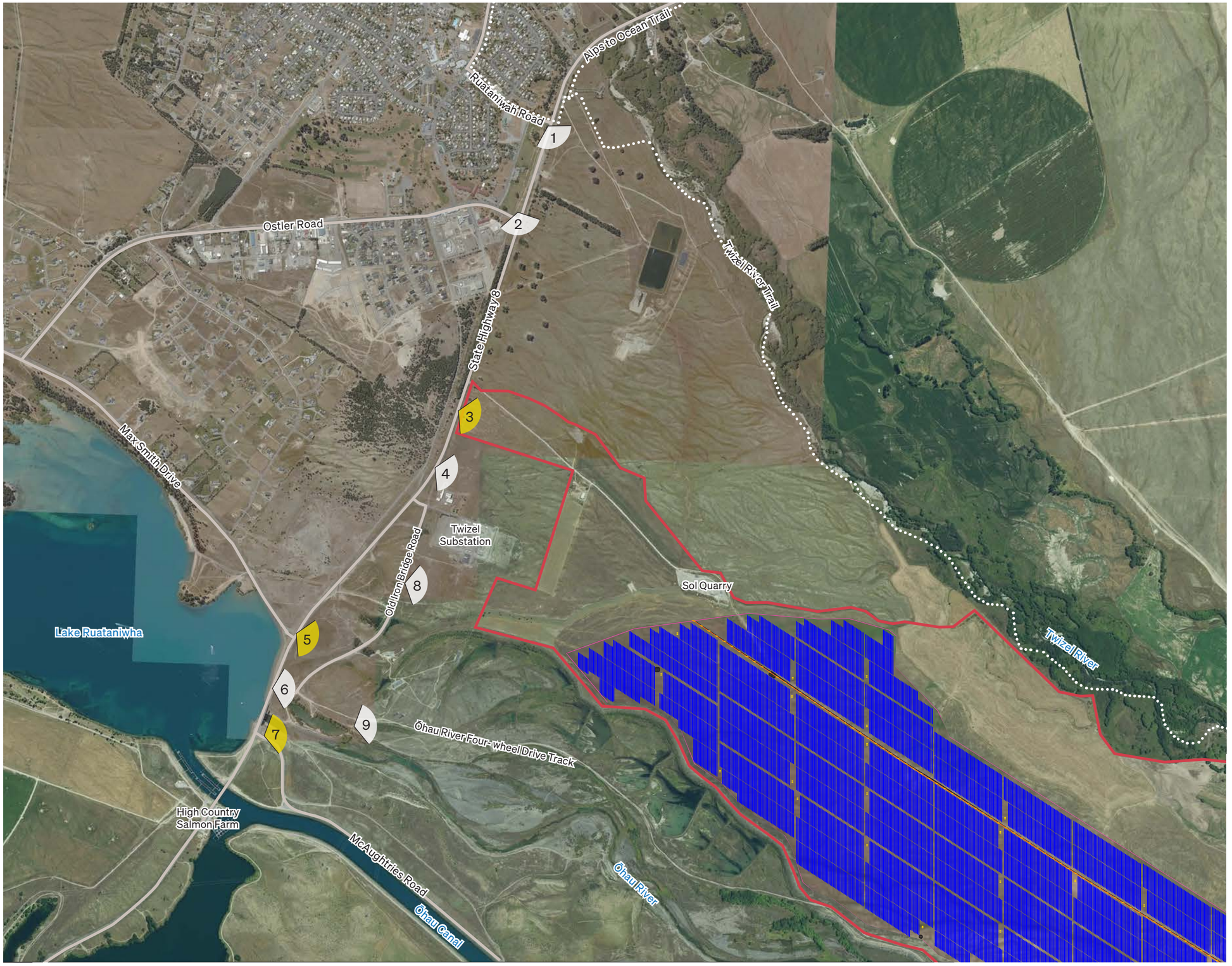
Viewpoint Location Plan 1

Legend

	The Site
	Solar Panels
#	Viewpoint Locations
#	Viewpoint Locations with a corresponding Visual Simulations - Refer to Appendix 2 for Visual Simulations

Note

The panorama photographs were taken by Virtual View Ltd. These photos have been included as the weather was much nicer when they were on site. These photos directly line up with the visual simulations they prepared.
Refer to Appendix 2 for visual simulations.

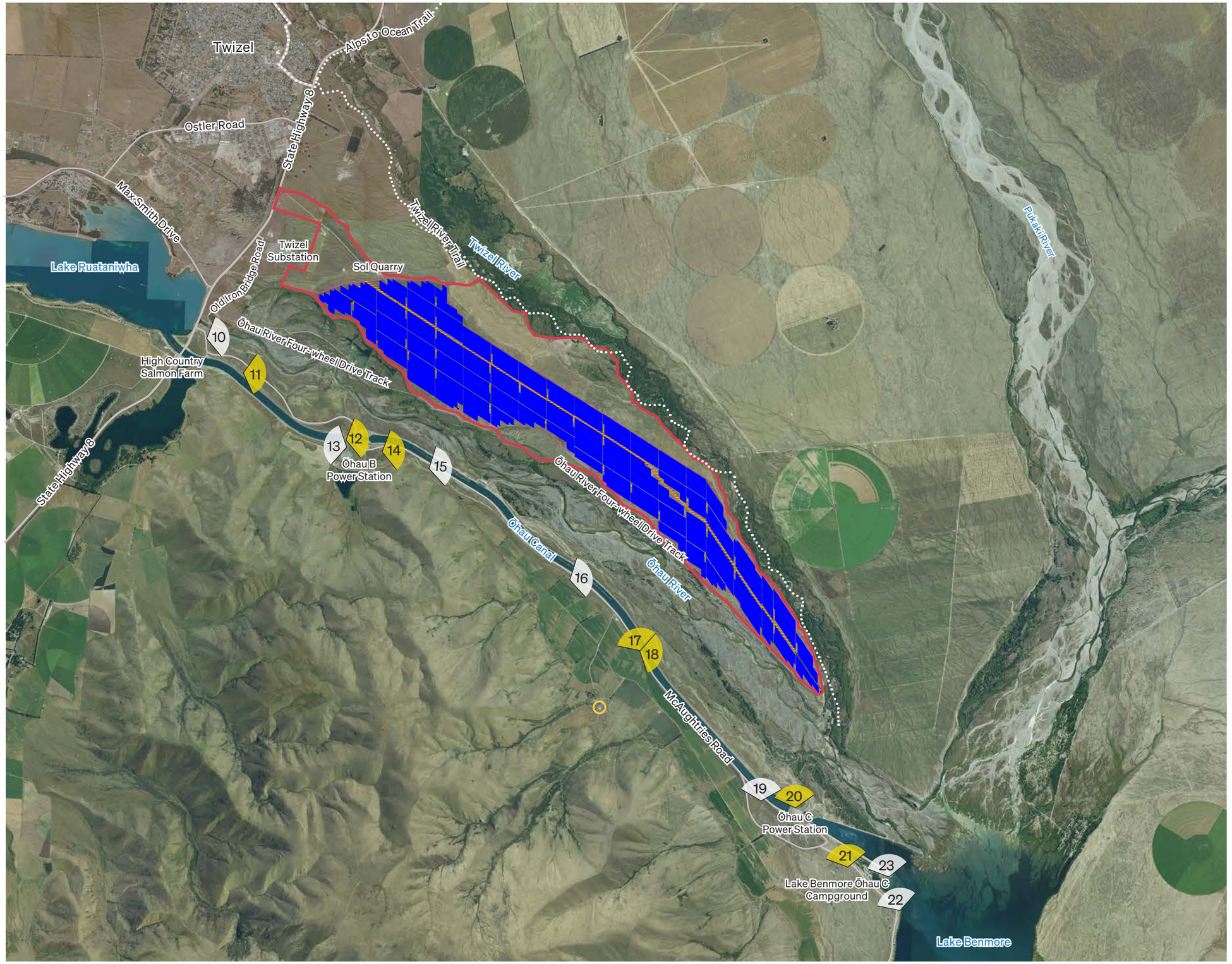


Scale 1:20,000 @ A3
Data Source: grip.co.nz

Viewpoint Location Plan 2

Legend

- The Site
- Solar Panels
- Viewpoint Locations
- Viewpoint Locations with a corresponding Visual Simulations - Refer to Appendix 2 for Visual Simulations
- Neighbouring dwelling within Glencairn Station



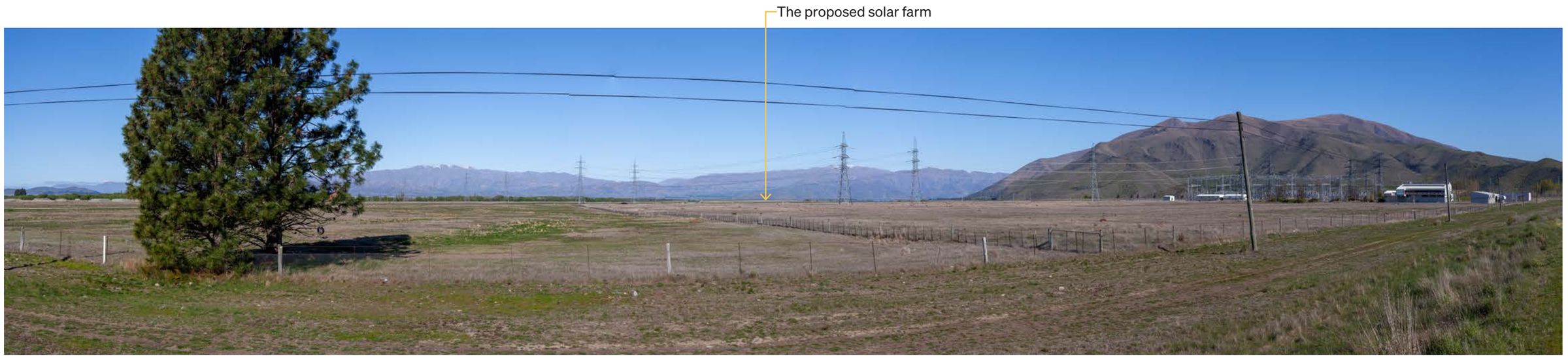
Scale 1:50,000 @ A3
Data Source: grip.co.nz

Viewpoint Photographs - SH8

Viewpoint 1: Located at the intersection of SH8 and Ruataniwha Road, facing southeast towards the site. The proposed solar farm at its closest is located approximately 2.4km away. The proposal will not be seen from this viewpoint due to future development within the Twizel East Special Purpose Zone.

Viewpoint 2: Located at the intersection of SH8 and Ostler Road, facing southeast towards the site. The proposed solar farm at its closest is located approximately 2km away. The proposal will not be seen from this viewpoint due to future development within the Twizel East Special Purpose Zone.

Viewpoint Photographs - SH8



Viewpoint 3: Located along SH8, facing east towards the site. The proposed solar farm at its closest is located approximately 1.4km away, on the lower terrace.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint 4: Located along SH8, facing east towards the site. The proposed solar farm at its closest is located approximately 1km away, on the lower terrace.

Viewpoint Photographs - SH8

Viewpoint 5: Located at the intersection of SH8 and Max Smith Drive, facing east towards the site. The proposed solar farm at its closest is located approximately 1.3km away, on the terrace beyond the transmission lines.
A visual simulation from this viewpoint is included in Appendix 2.

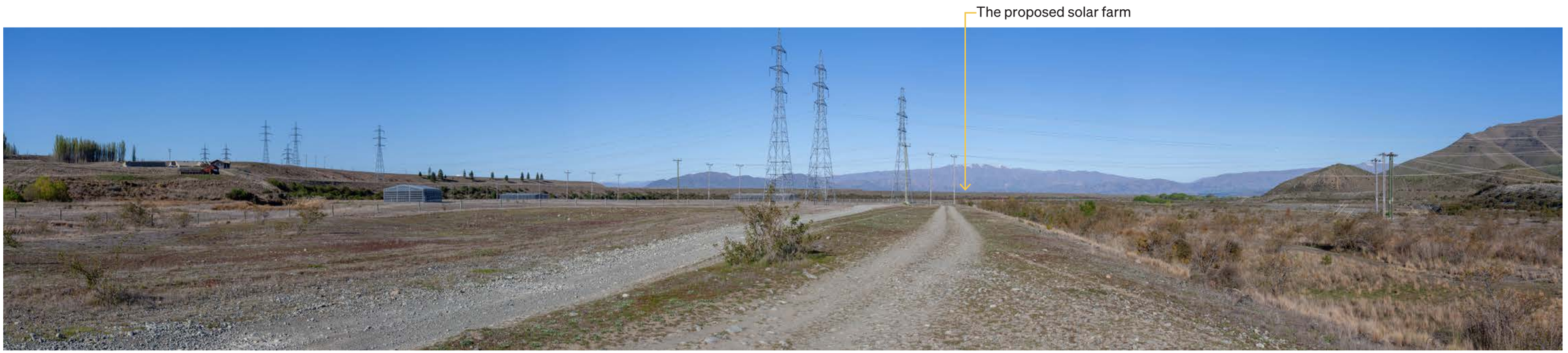
Viewpoint 6: Located along SH8, facing east towards the site. The proposed solar farm at its closest is located approximately 1.4km away, on the terrace beyond the transmission lines.

Viewpoint Photographs - SH8

Viewpoint 7: Located at the Pukaki Canal Bridge alongside SH8 facing east towards the site. The proposed solar farm at its closest is located approximately 1.5km away, on the terrace beyond the transmission lines.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint Photographs - Old Iron Bridge Road

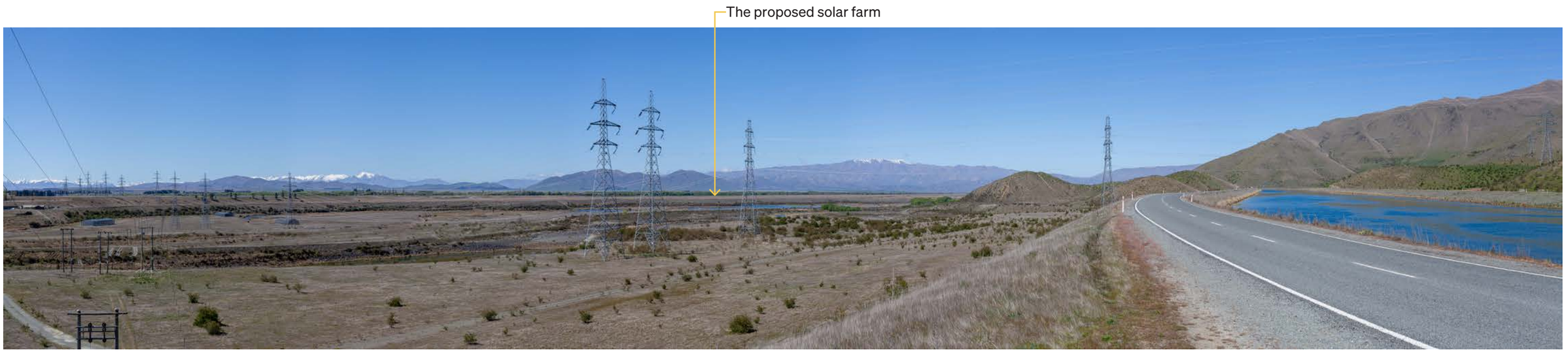
Viewpoint 8: Located along Old Iron Bridge Road, facing east towards the site. The proposed solar farm at its closest is located approximately 1.5km away, on the lower terrace.



Viewpoint 9: Located along Ōhau River, facing east towards the site. The proposed solar farm at its closest is located approximately 1.5km away, located on the terrace beyond the transmission lines.

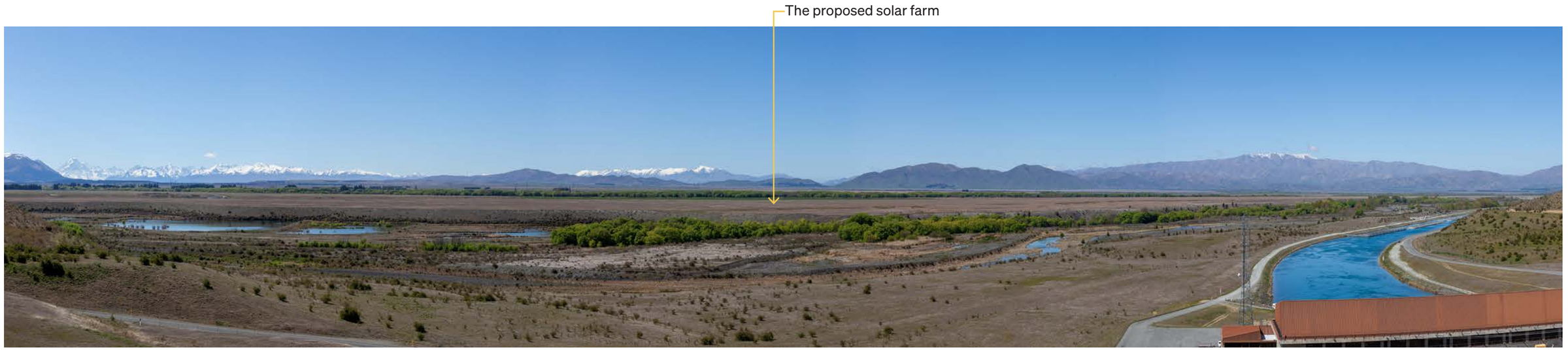
Viewpoint Photographs - McAughtries Road

Viewpoint 10: Located along McAughtries Road, facing east towards the site. The proposed solar farm at its closest is located approximately 1.5km away, located on the terrace beyond the transmission lines.



Viewpoint 11: Located along McAughtries Road, facing east towards the site. The proposed solar panels at their closest are located approximately 1.3km away, located on the terrace beyond the transmission lines.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint Photographs - McAughtries Road / Ōhau B Power Station



Viewpoint 12: Located at Ōhau B Power Station, facing east towards the site. The proposed solar farm at its closest is located approximately 900m away, located on the terrace beyond Ōhau River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint 13: Located at Ōhau B Power Station, facing west towards Ben Ōhau and Benmore Range, with the site behind.

Viewpoint Photographs - McAughtries Road

Viewpoint 14: Located along McAughtries Road, facing east towards the site. The proposed solar farm at its closest is located approximately 700m away, located on the terrace beyond the Ōhau Canal and River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint 15: Located along McAughtries Road, facing east towards the site. The proposed solar farm at its closest is located approximately 900m away, located on the terrace beyond the Ōhau Canal and River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint Photographs - McAughtries Road

Viewpoint 16: Located along McAughtries Road, facing east towards the site. The proposed solar farm at its closest is located approximately 1.1km away. The proposal will not be seen from this viewpoint due to landform.

Viewpoint 17: Located along McAughtries Road, facing nothwest towards the site. The proposed solar farm at its closest is located approximately 1.3km away, located on the terrace beyond the Ōhau Canal and River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint Photographs - McAughtries Road

Viewpoint 18: Located along McAughtries Road, facing east towards the site. The proposed solar farm at its closest is located approximately 1.3km away, located on the terrace beyond the Ōhau Canal and River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint 19: Located along McAughtries Road, facing north towards the site. The proposed solar farm at its closest is located approximately 1.4km away, located on the terrace beyond the Ōhau Canal and River.

Viewpoint Photographs - McAughtries Road / Ōhau C Power Station

Viewpoint 20: Located at Ōhau C Power Station, facing north towards the site. The proposed solar farm at its closest is located approximately 1.4km away, located on the terrace beyond the Ōhau River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint Photographs - Falston Road

Viewpoint 21: Located along Falston Road, facing north west towards the site. The proposed solar farm at its closest is located approximately 2km away, located on the terrace beyond the Ōhau Canal and River.
A visual simulation from this viewpoint is included in Appendix 2.

Viewpoint 22: Located along Falston Road, facing northwest towards the site. The proposed solar farm at its closest is located approximately 2.8km away, located on the terrace beyond Lake Benmore and Ōhau River.

Viewpoint Photographs - Lake Benmore Camping Ground

Viewpoint 23: Located near Lake Benmore Camping Ground, facing northwest towards the site. The proposed solar farm at its closest is located approximately 2.3km away. The proposal will not be seen from this viewpoint due to topography and existing vegetation.

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ROUGH MILNE MITCHELL
LANDSCAPE ARCHITECTS

Proposed Solar Farm - Nova Energy, Mackenzie Basin
Appendix 3: Visual Simulations

04 March 2025

Nova Energy Ltd

Proposed Solar Farm,
Mackenzie Basin,
Twizel

Virtual View

Photo Simulation Information

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

INFORMATION FOR THE PREPARATION OF THE PHOTO SIMULATIONS

1. Virtual View was engaged by Nova Energy Ltd to produce visual simulations of the proposed solar farm in the Mackenzie basin, Twizel. The simulations have been produced from various viewpoints and show the solar farm at various times of day.

2. To create the 3D model for the simulations, Virtual View used the below data:
   A. Viewpoint locations were chosen by Paul Smith of Rough Milne Mitchell Landscape Architects Ltd (RMM).
   B. Viewpoint locations were surveyed by Virtual View Ltd using a hand-held Leica Zeno FLX100 GPS. The accuracy of the positions taken was 2cm.
   C. Terrain data was downloaded from Land Information New Zealand. The terrain data included 1m Lidar digital surface model (DSM), 1m Lidar digital elevation model (DEM) and the New Zealand 8m DEM. Aerial photographs were also downloaded from Land Information New Zealand.
   D. The above terrain data was used to make a 0.5m DEM terrain model for the site and surrounding area. A 0.5m DSM terrain model was also created to assist with camera alignment and foreground vegetation identification.
   E. Nova Energy Ltd provided the specifications for the solar panel sizes, table layouts and the overall site plan.
      - The solar panel module size is simulated at 2384mm high by 1303mm wide.
      - Solar panels are fixed to a single axis tracking table in portrait orientation. The table rotates 60 degrees + and -.
      - 2 x table layouts were simulated. Table layout 1 has 86 panels and table layout 2 has 57 panels. The solar panels are in portrait orientation with 1 module vertically.
      - Panel tables are spaced as per the supplied plans.
      - The front edge of the solar panels is 0.8m above ground level when tilted to 60 degrees.
   F. From the overall site plan roads, transmission lines, inverter power stations and water tanks were also added to the 3D model.

G. The solar panels have been rotated horizontally at 10 degree increments to align with the sun angle and azimuth at the corresponding time of day.

0 degrees = Parallel to the ground surface.

Negative degrees = Facing east.

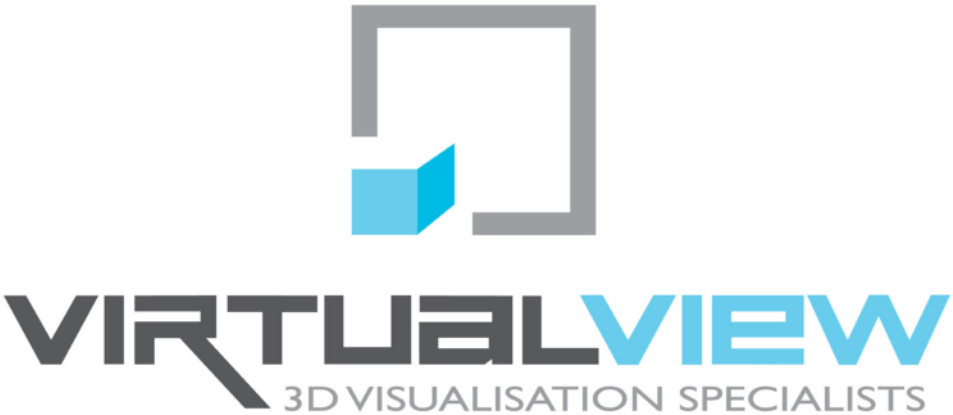
Positive degrees = Facing west.

Below are the angles for each viewpoint:

- Viewpoint 03 = +60 degrees
- Viewpoint 05 = +50 degrees
- Viewpoint 07 = +40 degrees
- Viewpoint 11 = +40 degrees
- Viewpoint 12 = +30 degrees
- Viewpoint 14 = +20 degrees
- Viewpoint 17 = -30 degrees
- Viewpoint 18 = -30 degrees
- Viewpoint 20 = -40 degrees
- Viewpoint 21 = -50 degrees

Overview of the 3D model, showing the digital terrain model with the solar panel layout.

Close-up view of the 3D model solar components.



METHODOLOGY FOR THE PREPARATION OF PHOTO SIMULATIONS

September 2024

1.0 Overview

The main objective of a photo simulation is to provide an image that, as realistically as possible, conveys the modification or change caused by a proposed activity. The most appropriate technical methodology has been applied to ensure the accuracy of what is depicted, in terms of its relative position, elevation, scale, and appearance. Photo simulations can never replace the real experience of being at a location, but they are a useful tool to assist in the decision making process. To achieve a photo simulation, a 3D model is rendered into a series of two-dimensional photographs.

2.0 On-Site Photography and Reference Points

A series of photographs are taken from a specified location using a full-frame Digital SLR Camera with a 50mm lens. The camera is mounted to a tripod with a panoramic head to ensure a consistent overlap of approximately 40%.

On Site photography - survey marked camera location.

Reference Points are also identified during the site visit. Reference points are fixed objects that are selected from within the captured photos. Reference points can include, but are not limited to, objects such as fences, buildings, trees and road signs. These objects help to accurately align the 3D model within the simulation software.

The reference points and photo position (or camera location) is accurately survey marked by using a professional surveyor or using professional survey equipment.

Reference points identified and surveyed which are used for camera alignment.

3.0 Creating the Photo Panoramic

The photos captured from the site visit are then selected. Five photos from each viewpoint are used. The selected photos are colour matched to ensure consistency throughout the image and manually stitched together to form a photo panoramic. The panoramic image is then cropped to create the 124° wide panorama.

The photos are colour matched and stitched together to form a panoramic image

The completed panoramic image

4.0 The Photo Simulation Process

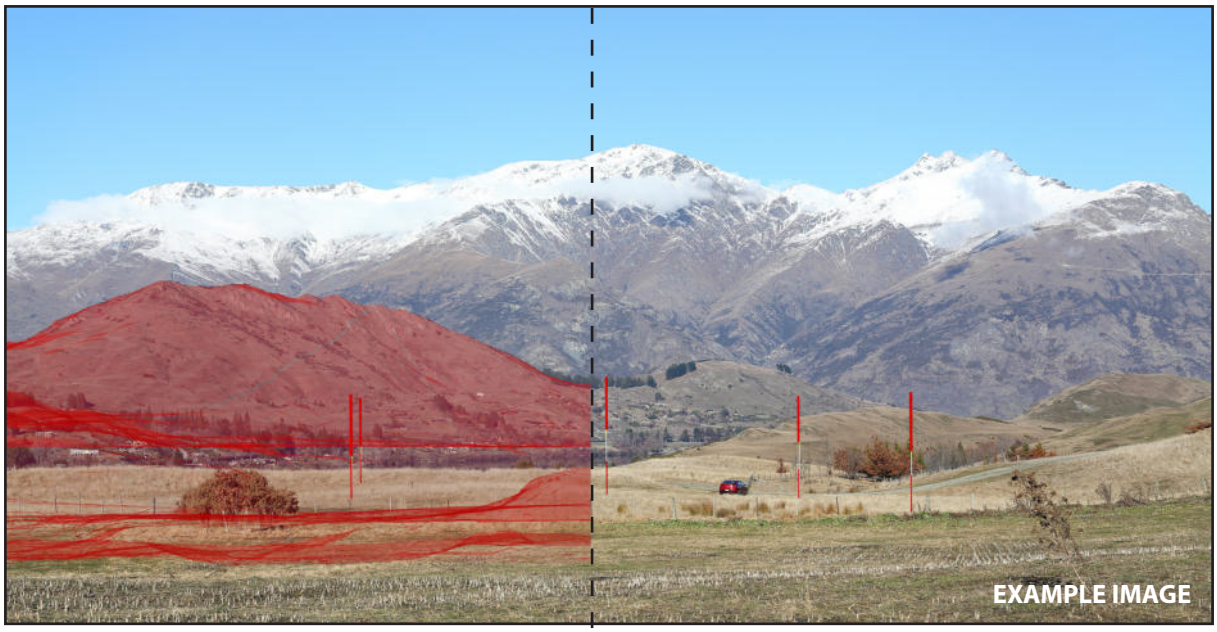
Within the simulation software the next step is to create the 3D computer model.

A series of 3D computer cameras are created. These cameras are positioned accurately to the corresponding survey marked photo position from where the photos were taken on the site visit. The computer camera depicts a real world camera, including matching the focal length of the 50mm lens.

Reference points surveyed from the site visit are then imported. Reference points within the simulation software will generally be represented as extruded cylinders.

Digital Elevation Model (DEM), Lidar data and contour data is used to created a digital terrain model of the site and surrounding area.

To replicate the 3D view through the real world camera, it is necessary to match the digital terrain model and reference points to the respective land-form and physical objects in the photo - thus ensuring an accurate horizontal and vertical alignment.



Digital terrain model and reference points used for camera alignment.

5.0 Adding The Proposed Development

The digital 3D model of the proposed development and associated design surfaces such as roads are accurately created. 3D landscaping and vegetation are created to the correct specifications.

A sunlight system is created which follows the geographically correct angle and movement of the sun over the earth at a given location. Location, date, time and compass orientation are matched to the on-site photography which allows the simulated model to reflect actual lighting conditions.

Within the 3D software, the new image is rendered containing the accurately positioned 3D model over top of the original photograph.

3D model rendered and accurately positioned in photograph

6.0 Photo Editing

Photo editing software is used to composite the proposed development. Using a combination of the digital terrain model and aerial photography the proposed development is masked into the original photo so that it appears behind any existing landforms and foreground vegetation. Proposed landscaping and vegetation is added to the photos using the same process.

Rendered model is masked within the image to appear behind existing landforms and vegetation.

Proposed vegetation and landscaping is created in 3D, rendered and added.

The masked renders of the proposed development, landforms and landscaping are combined into the original panoramic image to complete the photo simulation.

Section of rendered development within full panorama.

The completed photo Simulation

7.0 Viewing The Photo Simulation

All photo simulations comply with the New Zealand Institute of Landscape Architects' document: Visual Simulations Best Practice Guide 10.2.

For the resulting photo simulations, the viewing scale is 50 centimeters from the eye when printed at full scale A3. This scale produces an image that is 240mm high and is a comfortable viewing distance to hold at approximately an arm's length, to appreciate what the view would be in real life. (Refer to Figure 1.0 below for viewing guide).

Viewing on a digital screen should be done tentatively as there are numerous variables such as screen size, zoom level and the application being used, that can affect the scale of what would be seen by the naked eye.

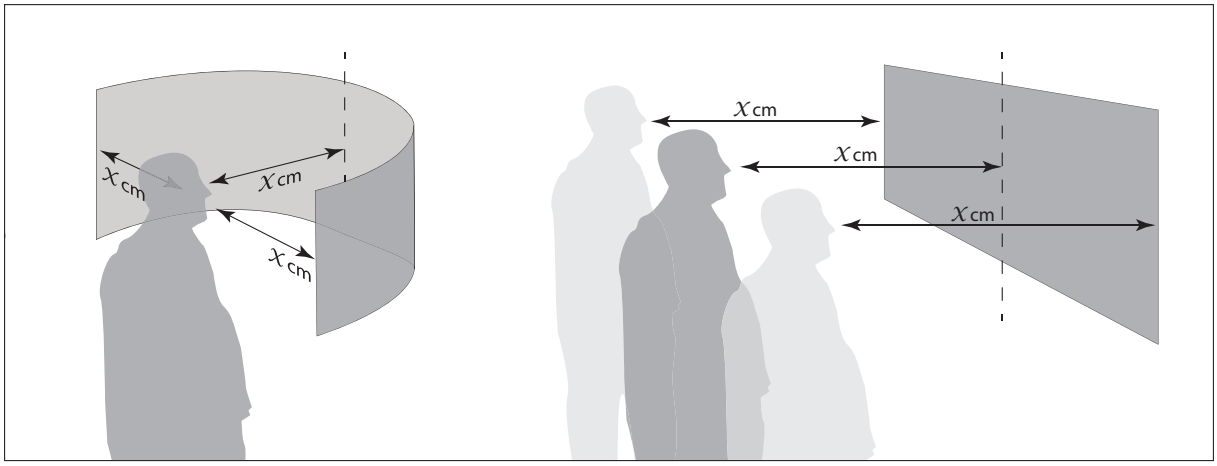


Fig 1.0 Viewing guide for printed photo simulations

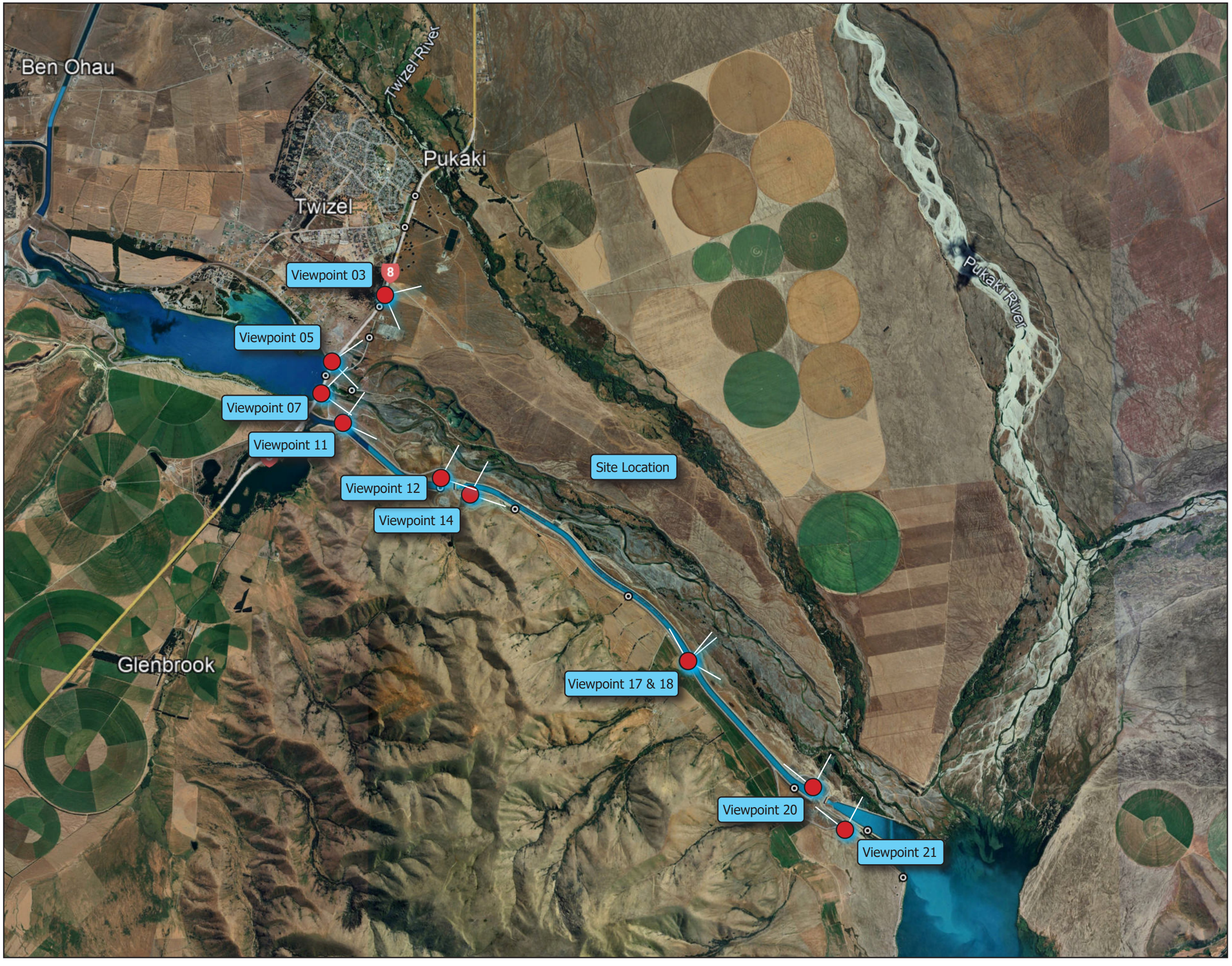
Nova Energy
Twizel Solar Plant

Twizel Solar Plant - Photo Simulations

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Date Printed : 02-12-2024

Viewpoint Location Map



Nova Energy
Twizel Solar Plant

- Viewpoint 03
  State Highway 8
  (E)323519.963 (N)813823.618
- Viewpoint 05
  Cnr of State Highway 8 and Max Smith Drive
  (E)322750.194 (N)812803.596
- Viewpoint 07
  Pukaki Canal Bridge Lookout
  (E)322600.799 (N)812327.980
- Viewpoint 11
  Mcaughtries Road
  (E)322892.225 (N)811892.684
- Viewpoint 12
  Ohau B
  (E)324429.889 (N)811013.901
- Viewpoint 14
  Mcaughtries Road
  (E)324835.898 (N)810825.654
- Viewpoint 17
  Mcaughtries Road
  (E)328163.295 (N)808334.452
- Viewpoint 18
  Mcaughtries Road
  (E)328163.295 (N)808334.452
- Viewpoint 20
  Ohau C
  (E)330073.202 (N)806496.427
- Viewpoint 21
  Falston Road
  (E)330552.735 (N)805863.183

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Date Printed : 02-12-2024

Viewpoint 03 - Existing

Viewpoint 03 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 323519.963
Northing: 813823.618
Elevation : 461.808m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 17:09pm

Nova Energy - Twizel Solar Plant

Viewpoint 03 - State Highway 8

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 03 - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 323519.963
Northing: 813823.618
Elevation : 461.808m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 17:09pm

Nova Energy - Twizel Solar Plant

Viewpoint 03 - State Highway 8

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 03 - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 323519.963
Northing: 813823.618
Elevation : 461.808m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 17:09pm

Nova Energy - Twizel Solar Plant

Viewpoint 03 - State Highway 8

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 05 - Existing

Viewpoint 05 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322750.194
Northing: 812803.596
Elevation : 464.647m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 16:34pm

Nova Energy - Twizel Solar Plant

Viewpoint 05 - Cnr of State Highway 8 and Max Smith Drive

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 05 - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322750.194
Northing: 812803.596
Elevation : 464.647m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 16:34pm

Nova Energy - Twizel Solar Plant

Viewpoint 05 - Cnr of State Highway 8 and Max Smith Drive

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 05 - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322750.194
Northing: 812803.596
Elevation : 464.647m
Height of Camera : 1.5m
Orientation of View : SE
Date of Photography : 16 October 2024
Time of Photography : 16:34pm

Nova Energy - Twizel Solar Plant

Viewpoint 05 - Cnr of State Highway 8 and Max Smith Drive

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 07 - Existing

Viewpoint 07 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322600.799
Northing: 812327.980
Elevation : 464.062m
Height of Camera : 1.5m
Orientation of View : E
Date of Photography : 16 October 2024
Time of Photography : 15:42pm

Nova Energy - Twizel Solar Plant

Viewpoint 07 - Pukaki Canal Bridge Lookout

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 07 - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322600.799
Northing: 812327.980
Elevation : 464.062m
Height of Camera : 1.5m
Orientation of View : E
Date of Photography : 16 October 2024
Time of Photography : 15:42pm

Nova Energy - Twizel Solar Plant

Viewpoint 07 - Pukaki Canal Bridge Lookout

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 07 - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322600.799
Northing: 812327.980
Elevation : 464.062m
Height of Camera : 1.5m
Orientation of View : E
Date of Photography : 16 October 2024
Time of Photography : 15:42pm

Nova Energy - Twizel Solar Plant

Viewpoint 07 - Pukaki Canal Bridge Lookout

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 11 - Existing

Viewpoint 11 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322892.225
Northing: 811892.684
Elevation : 463.312m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 15:26pm

Nova Energy - Twizel Solar Plant

Viewpoint 11 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 11a - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322892.225
Northing: 811892.684
Elevation : 463.312m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 15:26pm

Nova Energy - Twizel Solar Plant

Viewpoint 11 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 11a - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322892.225
Northing: 811892.684
Elevation : 463.312m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 15:26pm

Nova Energy - Twizel Solar Plant

Viewpoint 11 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 11b - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322892.225
Northing: 811892.684
Elevation : 463.312m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 15:26pm

Nova Energy - Twizel Solar Plant

Viewpoint 11 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 11b - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 322892.225
Northing: 811892.684
Elevation : 463.312m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 15:26pm

Nova Energy - Twizel Solar Plant

Viewpoint 11 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12 - Existing

Viewpoint 12 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12a - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12a - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12b - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12b - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12c - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 12c - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324429.889
Northing: 811013.901
Elevation : 463.204m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:48pm

Nova Energy - Twizel Solar Plant

Viewpoint 12 - Ohau B

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

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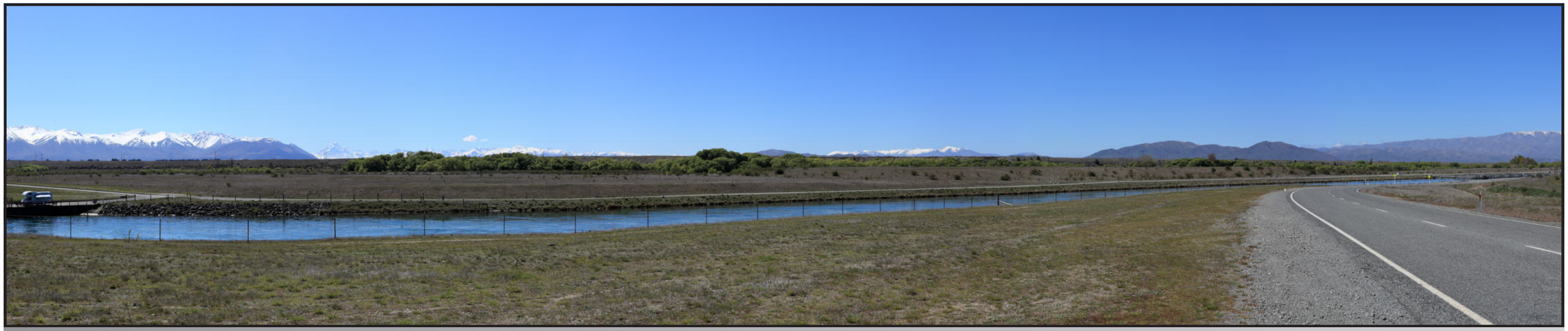

Viewpoint 14 - Existing

Viewpoint 14 - Proposed

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

Viewpoint 14a - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 14a - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 14b - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 14b - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 14c - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 14c - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 324835.898
Northing: 810825.654
Elevation : 419.02m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 14:27pm

Nova Energy - Twizel Solar Plant

Viewpoint 14 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17 - Existing

Viewpoint 17 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17a - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17a - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17b - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW 3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17b - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW 3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17c - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 17c - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : N
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 17 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 18 - Existing

Viewpoint 18 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 18 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 18 - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 18 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 18 - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 328163.295
Northing: 808334.452
Elevation : 413.42m
Height of Camera : 1.5m
Orientation of View : NE
Date of Photography : 16 October 2024
Time of Photography : 11:20am

Nova Energy - Twizel Solar Plant

Viewpoint 18 - Mcaughtries Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 20 - Existing

Viewpoint 20 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330073.202
Northing: 806496.427
Elevation : 413.752m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:44am

Nova Energy - Twizel Solar Plant

Viewpoint 20 - Ohau C

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 20a - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330073.202
Northing: 806496.427
Elevation : 413.752m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:44am

Nova Energy - Twizel Solar Plant

Viewpoint 20 - Ohau C

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 20a - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330073.202
Northing: 806496.427
Elevation : 413.752m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:44am

Nova Energy - Twizel Solar Plant

Viewpoint 20 - Ohau C

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 20b - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330073.202
Northing: 806496.427
Elevation : 413.752m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:44am

Nova Energy - Twizel Solar Plant

Viewpoint 20 - Ohau C

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 20b - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330073.202
Northing: 806496.427
Elevation : 413.752m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:44am

Nova Energy - Twizel Solar Plant

Viewpoint 20 - Ohau C

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 21 - Existing

Viewpoint 21 - Proposed

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330552.735
Northing: 805863.183
Elevation : 385.446m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:01am

Nova Energy - Twizel Solar Plant

Viewpoint 21 - Falston Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.
Dashed white line indicates cropped viewpoint portion.

Version info: 0001
Date Printed: 02-12-2024

nova energy

Viewpoint 21 - Existing

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330552.735
Northing: 805863.183
Elevation : 385.446m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:01am

Nova Energy - Twizel Solar Plant

Viewpoint 21 - Falston Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

Version info: 0001
Date Printed: 02-12-2024

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Viewpoint 21 - Proposed

IMAGE TO BE VIEWED AT 50cm FROM EYE FOR CORRECT VIEWING SCALE WHEN PRINTED AT A3

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Easting: 330552.735
Northing: 805863.183
Elevation : 385.446m
Height of Camera : 1.5m
Orientation of View : NW
Date of Photography : 16 October 2024
Time of Photography : 10:01am

Nova Energy - Twizel Solar Plant

Viewpoint 21 - Falston Road

NOTES: All photos were taken by Virtual View with a Canon 5Dmk2 and a 50mm lens.
Photo positions were surveyed by Virtual View Ltd.

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