Boffa Miskell

Memorandum

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Attention:	Sarah Brooks
Company:	Helios Energy Limited and Helios CAN Op LP
Date:	5 February 2025
From:	Emma McRae, Principal Landscape Architect
Message Ref:	Grampians Solar Farm, Referral memo in relation to Landscape and Visual Effects
Project No:	BM22390G

Introduction

Boffa Miskell Limited (BML) was engaged by Helios Energy Limited (Helios) and Helios CAN Op LP in 2022 to undertake a Landscape and Visual Effects Assessment (LVA) for a proposed utility scale solar farm, Battery Energy Storage System (BESS) and new grid injection point substation connecting to the existing Transpower operated 220kV overhead lines. The project site is located on ~574ha of farm land off Haldon Road and Mackenzie Pass Road, Mackenzie District (**Site**). This memo provides an outline of the initial findings of the LVA and has been prepared for inclusion in an application for Ministerial referral of the project under the Fast-track Approvals Act 2024.

Summary of findings

The initial analysis outlined below indicates that the proposed solar project will not have any significant adverse landscape, and visual effects.

Existing Environment

The site is situated in the south-eastern corner of the Mackenzie Basin, 21km to the southeast of the town of Tekapo, and 15km to the south and east of State Highway 8. The site is flanked by the Rollesby and Dalgety Ranges to the east and the Grampians Mountains to the south, see **Figure 1**. The wider Mackenzie Basin includes the large lakes and canals of the Upper Waitaki Power Development and the settlements of Twizel, Mt Cook and Tekapo. The District Plan describes the landscape as "vast and spacious with subtle colourings and vegetation patterns, dominated by natural features and extended views". Development in the high country has been generally unobtrusive, with isolated contained nodes of settlement, mostly confined to the townships and farm homestead nodes. The natural patterns of the outwash plains within the Mackenzie Basin have been modified in places over the past decade with extensive areas of centre pivot irrigation.

The Site

The site comprises pastoral blocks, located to the south of Mackenzie Pass Road and the east of Haldon Road, and framed to the north and west by extensive pine shelterbelts. The majority of the site is relatively low lying (around 580 metres above sea level (masl)) forming a part of the wider Mackenzie Basin landform. Landform south-east of the site boundary rises towards the Fett Stream/ Snow River fan at around 680masl, and directly east of the site boundary rises steeply into the Dalgety Range (1411masl).

The site itself has a degree of modification due to the established pine shelterbelts and more intensively grazed blocks of pasture which, while unirrigated, have supported an ongoing agricultural grazing operation by the same landowner family since 1914. The two high-voltage transmission lines and towers owned by Transpower that cross the site from southwest to northeast have also reduced its naturalness, see **Figure 1**. Buildings and structures within the site are limited to farm sheds near the northern site entrance. An existing farm access track runs north/south through the site and is accessible via a gap in the shelterbelt via a track of Mackenzie Pass Road.

A visit to the site and its surroundings was undertaken on 25th July 2022, with a subsequent site visit to the site and its surroundings on 24-25th April 2023 by Emma McRae. Weather conditions on the day of the first site visit were rainy, clearing later in the day, while weather conditions for the second site visit were fine on the first day with some high cloud, and fine and clear on the second day.

The Project

The proposed development will consist of rows of bi-facial solar photovoltaic panels mounted on a ground mounted single axis tracking system. Additional associated electrical infrastructure and a substation will facilitate connection to the existing 220kV Trasnspower overhead lines running through the project site. The solar farm has a connection capacity of 300MW. Energy storage facilities will be located in the centre of the site near to the substation.

The proposal will include:

- Approximately 500,000 photovoltaic panels for the purpose of generating electricity to be supplied to the National Grid.
- Solar panel mounting structures (including a tracking system), and steel piles. The mounting frames will be located approximately 6m to 8m apart (pole to pole) and the panels will have a maximum operational height of 2.8m. The bifacial solar panels and associated infrastructure will cover approximately 25% of the site. With the exception of the new areas of planting, the remainder of the Site will remain as open grassed areas to enable the grazing of sheep.
- Associated components including inverters, transformers and electrical cabling to connect the solar panel arrays to the substation.
- An operations and maintenance building, new and upgraded access tracks, parking and storage yard, fencing, and a security system.
- Energy storage facilities providing approximately 100MWh of storage capacity, located centrally within the site screened by an existing shelterbelt.
- A 220kV substation located centrally behind existing shelterbelt, connecting the facility to the National Grid operated by Transpower. No new transmission lines are required.
- New and infill planting along existing shelterbelts, boundaries and native species enhancement of gullies and intermittent waterways.

Methodology

This initial assessment considers the landscape and visual effects of the proposed project and has been undertaken with reference to Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. A full methodology will be outlined in the LVA, but in summary identified effects are rated using a seven-point scale which ranges from 'very low' to 'very high'.

That scale, together with the corresponding meaning in terms of Resource Management effects scales (i.e. less than minor, more than minor and significant), is illustrated in the following table:

<table>
<tr><th>Te Tangi a te Manu seven-point scale</th><th>Very Low</th><th>Low</th><th>Low-Moderate</th><th>Moderate</th><th>Moderate-High</th><th>High</th><th>Very High</th></tr>
<tr><td>Resource</td><td>Less</td><td colspan="2">Minor</td><td colspan="4" rowspan="2">More than Minor</td></tr>
<tr><td>Management</td><td>than</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Effects Scale</td><td>Minor</td><td colspan="5"></td></tr>
<tr><td></td><td colspan="5"></td><td colspan="2">Significant[1]</td></tr>
</table>

[1] Significant adverse effects' means those of major magnitude and importance. 'Significant adverse effects' applies to particular RMA situations, namely as a threshold for the requirement to consider alternative sites, routes, and methods for Notices of Requirement under RMA s171(1)(b), the requirements to consider alternatives in AEEs under s6(1)(a) of the 4th Schedule. It may also be relevant to

Landscape Context

The site lies within the Mackenzie Basin Subzone and Outstanding Natural Landscape, as defined under Plan Change 13 of the Mackenzie District Plan and is defined as an Outstanding Natural Feature and Landscape in the Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010) (the Landscape Study). The majority of the site is also identified as an area of High Visual Vulnerability in the District Plan, with a small part of the site on the eastern boundary classified as Medium Visual Vulnerability, see **Figure 2**.

Within the Landscape Study, the project site is located within the Intermontane Basins and Ranges landscape type, and within this forms a part of the Mackenzie Basin Floor Outwash Plains Land Type. The underlying geology of the site is that of an outwash plain, formed of glacial deposits due to meltwater outwash at the terminus of a former glacier. The site lies within a triangular area to the south of the Mackenzie Pass Road and northeast of the Hakataramea Pass Road, on part of the Fett Stream / Snow River fan. To the east of the site lies the Dalgety Range, while to the west is the form of the wider outwash plain, dissected by the Tekapo and Grays Rivers, Sawdon and Edwards Streams and Irishman Creek, see **Figure 1.**

Directly to the northeast of the site lies the Haldon Road/Mackenzie Pass Road Scenic Grasslands Area, see **Figures 1 & 2**. This grassland "extends along the east side of Haldon Road and both sides of the Mackenzie Pass Road. It is a fan-shaped area, encompassing the broad sweep of views eastwards from Haldon Road across the outwash fans of the Mackenzie River, and even broader views westward from Mackenzie Pass Road across those fans to the Tekapo Flats and Main Divide beyond." The scenic grasslands overlay seeks to maintain this area in an open condition, and the proposed development would not affect this. The area within and around the site has experienced significant modification and does not exhibit this open grassland character, with the presence of two high voltage transmission lines which meet to the east of the site at the Mackenzie Pass Road (as shown in **Figure 1**), and the presence of pine shelterbelts in and around the site which limit the open expansive nature of the this area compared to the Wider Mackenzie Basin.

There are a number of Scenic Viewing Areas as defined by the Mackenzie District Plan within the vicinity of the site. The nearest to the site is Scenic Viewing Area 10 on Haldon Road which provides views up to Burkes Pass (see **Figure 2**). Views from State Highway 8 across the Basin are recognised with the provision of Scenic Viewing Areas 12, 13 and 14 in the District Plan, see **Figure 1.**

Visual Context

Short distance views towards the site are limited to the nearest roads: Mackenzie Pass Road which passes the northern site boundary (0-2km distance), Haldon Road to the northwest (6.5-10km distance) and Hakataramea Pass Road to the southwest (2-4km distance), see **Figure 3** which shows the location of these viewpoint locations. Hakataramea Pass Road and Mackenzie Pass Road are unsealed roads which provide 4WD access to the Hakataramea and Rollesby Valleys. Haldon Road is unsealed past the junction with Hakataramea Pass Road.

Long distance views are possible towards the site across the outwash plain, from State Highway 8 between Irishman Creek/ The Wolds and Mary Burn (17-19km distance), State Highway 8 between Sawdon Picnic Area and Holbrook Station (12-15km distance), Mt John Observatory (24km distance) and the Tekapo River (10-15km distance). In distant views the site forms a very small part of the wider expansive landscape of the Basin. Its location can generally be identified through the presence of the existing shelterbelts in these expansive long-distance views. **Figure 3** includes a viewpoint from State Highway 8 near Mary Burn (VP5).

tests under other statutory documents such as for considering effects on natural character of the coastal environment under the NZ Coastal Policy Statement (NZCPS) Policy 13 (1)(b) and 15(b).

Statutory Provisions

The Site and all adjoining land is zoned Rural in the Operative District Plan. The site is also affected by the following landscape-related District Plan overlays:

- "Mackenzie Basin Sub-Zone" and associated "Outstanding Natural Landscape" overlay
- "Area of High Visual Vulnerability" (most of the site) and "Medium Visual Vulnerability" (part of the site). Visual Vulnerability is a measure of the capacity of the landscape to absorb development.

Other landscape provisions within the Plan, falling outside the site boundary, have been considered within this memo and will be considered further in the assessment of effects below. These include:

- Scenic Viewing Areas
- Scenic Grassland Areas

Mackenzie District Council (MDC) have confirmed that the solar project is defined as a Utility. Therefore, the Rules in Section 16 of the Mackenzie District Plan take precedence over the Rules in Section 7, Rural Zone.

Potential Visual Effects

While the majority of the site is low-lying (around 580masl), the southeastern corner is located on a slightly rising part of the Fett Stream/ Snow River fan at around 680masl. From short-distance viewpoints the site is relatively well screened by existing mature shelterbelts that extend along the northern and western boundaries of the site. In particular, from Mackenzie Pass Road the northern shelterbelt would provide effective immediate mitigation of visual effects (see Viewpoint 1, 180m from the site boundary). Visual effects from this area are therefore likely to be **low adverse**.

From parts of Haldon Road the existing southern shelterbelt is less effective in screening the entirety of the site, but there is potential to increase the mitigation by adding to the planting. A view from near the corner of Haldon and Hakataramea Pass Road is illustrated in Viewpoint 2 (approximately 3.9km from the site, and a view from the Haldon Road Scenic Viewing Area in Viewpoint 3 (1.8km from site boundary). Views range from low to moderate adverse depending on the distance of the viewer to the site, and the degree of the ground surface (and therefore potential views of solar panels) visible within the site. The extent of the site potentially visible has been highlighted in blue in these photographs. A small proportion of the ground surface of the site only is visible in Viewpoint 2. From Viewpoint 3, the nearest area of the site is screened from view by the existing pines, with the area of the site to the south on higher ground is visible, occupying a small portion of the view. Planting in gaps along the boundary will further obscure views of the panels. Once mitigated through additional planting, these effects would further reduce to low adverse.

The viewpoints along Hakataramea Road to the southwest are elevated with partial views into the site. The visual effects from this elevated aspect would be difficult to mitigate, see Viewpoint 4 (2.5km from the site boundary). However, at 2-4km distance the level of visual effect will be in the low to low-moderate adverse range depending on the location of the viewer along the road and the degree of the site that is visible.

From long-distance viewpoints the change in elevation from the northern to the southern corner of the site becomes more apparent and the existing shelterbelts are less effective in providing a screening function due to the viewing angles. This means that from State Highway 8 (SH8) the southeastern parts of the site would be relatively visible, albeit at a distance of around 15-20km, see Viewpoint 5 (16.4km from site boundary). While the viewing population is transient (i.e. moving along the road), the extent of intermittent visibility along the highway would be along two relatively long stretches of road (around 15km total). Visual effects are considered to be **low to low-moderate adverse**.

In addition, from elevated viewpoints (St John Observatory, distance 24 km) and around the Tekapo Basin (Rollesby and Dalgety Ranges) a viewer would potentially gain direct, unobstructed views of the majority of the site. These views cannot be mitigated due to the viewing angles, but are likely of a lesser importance and due to the distance visual effects are likely to be **low to very low adverse**.

Potential Landscape Effects

The site itself has a degree of modification relating to the shelterbelts and more intensive grazing that has taken place through its agricultural use. The two high-voltage transmission lines that cross the site have also reduced its naturalness. The combination of site modification due to both long term farming applications and also the route of two high voltage transmission circuits and associated transmission towers makes the proposed site more suitable for hosting a solar farm than most other parts of the Mackenzie Basin where the underlying geomorphology of the outwash plains remains more legible, without the presence of unnatural man-made patterns and elements.

There will be landscape effects within the site boundary as a result of the installation of the solar arrays. Landform within the site will generally remain as the proposed site is gently sloping. Earthworks will be required for the construction of the main access tracks (gravel finish) and for cable trenching. Scraping of topsoil will be required for foundations for equipment such as the inverters, substation and BESS. The BESS is estimated to occupy an approximately 1ha metalled surface area adjacent to the substation. There will be minor disturbance to the soil associated with the construction of the solar panels, ancillary structures, cable trenching, laydown and access and the proposed fencing around the site, which is required for an electricity utility. The panels themselves will be installed by pile driven foundations which result in minimal land disturbance. Physical effects on the landform are therefore anticipated to be low adverse.

It is recognised that the site lies within the Mackenzie Basin Outstanding Natural Landscape (ONL), which is characterised by its vast open landscapes, milky blue coloured lakes, wide river basins, golden tussock landcover and striking mountainous surrounds. The Canterbury Regional Landscape Study recognises that the landscape contains areas of exceptional legibility, aesthetic, transient, shared and recognised, very high natural science and high tangata whenua and historic landscape values.

The Study also acknowledges that landscape qualities vary across an area of this size, which contains areas of human modification. The proposed site is one such area of the Mackenzie Basin where human influence, in the form of the planting of a pine shelterbelt, a long history of fertilising of the land to obtain improved pasture, and the presence of large-scale transmission line structures have all modified the natural aspects of the local landscape.

The Upper Waitaki Hydro scheme has also caused substantial modification to the natural basin landscape, with canals, hydro dams and transmission structures also forming part of the built character of the landscape.

Effects on landscape character would include the temporary disruption to existing landscape characteristics and values during construction; and the modification of the existing landscape values and wider long-term impacts on the landscape character and amenity of the area. While the establishment of the solar farm would create unnatural lines in this part of the Mackenzie Basin, the existing modifications in the form of shelterbelts would provide the visual context.

The impact on the landscape character during construction would arise from the exposure of bare earth and the movement of construction vehicles, as each stage of the solar farm is constructed. These activities will be largely contained by the existing pine shelterbelt around the site boundary. Construction effects are therefore likely to be in the **low to low-moderate adverse** range.

The site forms a part of the Mackenzie Basin ONL but maintains a different character to that of the surrounding open outwash plain and scenic grassland areas, being physically separated from this area by the existing pine shelterbelt which surrounds the site and forming a notably greener area of pasture due to fertilising to achieve consistent grass cover. The shelterbelt around the site screens much of the ground surface of the site from view in the wider landscape, with only the southeastern parts of the site visible in the wider area. The site's location at the foot of the Dalgety Range and encompassing the two existing transmission line circuits also fits with the recommendations outlined in the Landscape Guidelines (Appendix K) of the Mackenzie District Plan, which recommends buildings and structures are grouped together, and located near a change in landform, such as at the base of a hill, avoiding central and open

locations. The proposed fencing will align with the shelterbelt boundary, which reflects the recommendations for fencing that they should be located adjacent to existing vegetation and subordinate to the backdrop.

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

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

With these measures in place, overall, the landscape effects of the proposed development are likely to be **low adverse** on the character values of the wider Mackenzie Basin Outstanding Natural Landscape.

Conclusions

On the basis of the above initial assessment, landscape character effects will be **low adverse** and visual effects with mitigation in place are expected to range from **very low adverse** to **moderate adverse**, depending on the nature and duration of the view experienced. The site proposed for the ~574ha solar farm is located in a discreet and remote part of the Mackenzie Basin that does not display the formative processes of the outwash plain as clearly as other areas. The existing modifications on and around the site in the form of shelterbelts and transmission lines would form the context for the solar farm. It is considered that the proposal could be absorbed in this location near the edge of the Mackenzie Basin.

The initial analysis therefore indicates there will not be significant adverse landscape and visual effects.

Boffa Miskell

GRAMPIANS SOLAR FARM

LANDSCAPE AND VISUAL ASSESSMENT - REFERRAL APPLICATION
GRAPHIC SUPPLEMENT

FEBRUARY 2025

GRAMPIANS SOLAR FARM

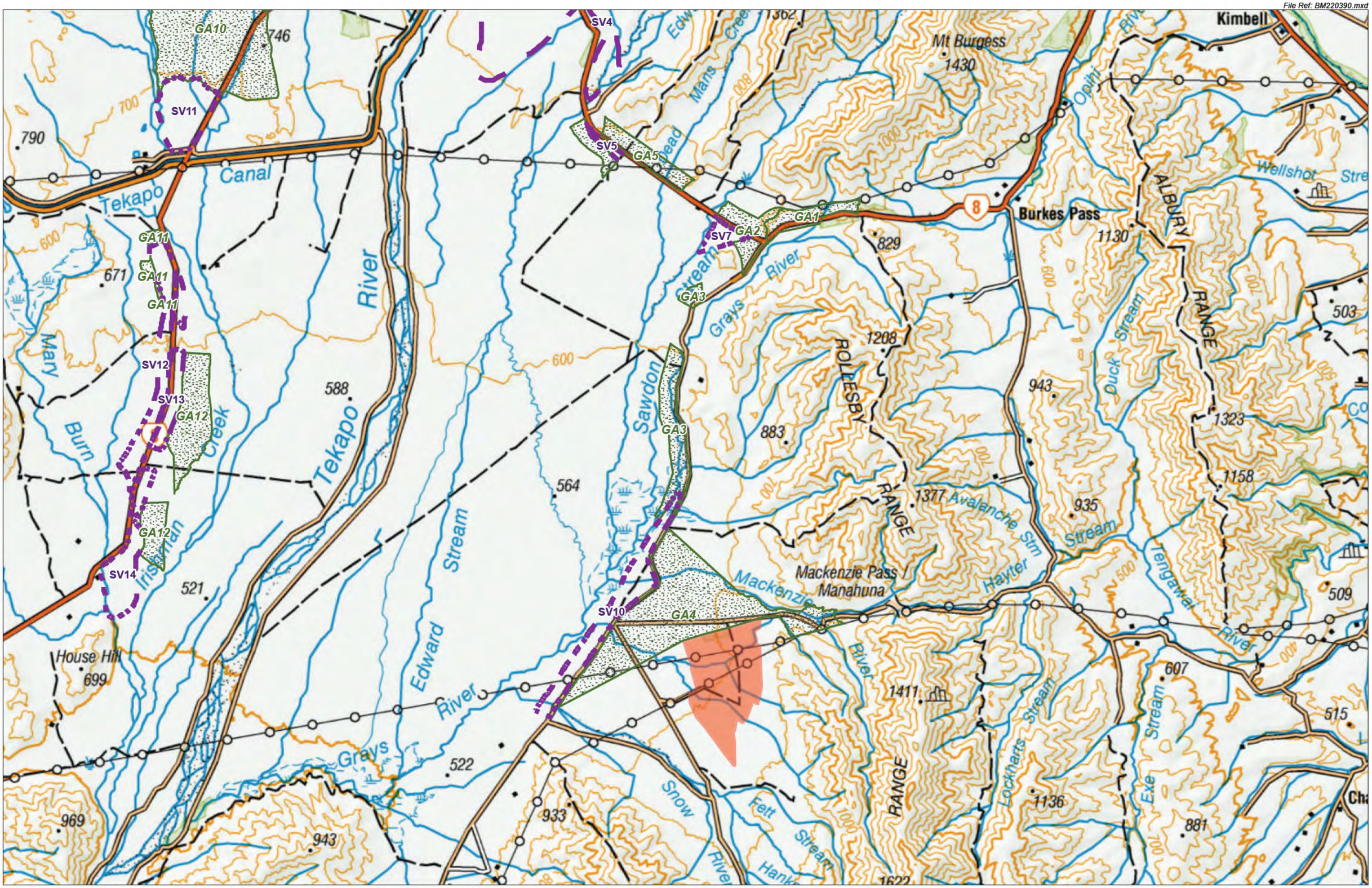
FIGURES

FIGURE 1: Landscape Context
FIGURE 2: Site Context
FIGURE 3: Viewpoints (Site Context Photos)

SITE CONTEXT PHOTOGRAPHS

VP1: View west from Mackenzie Pass Road
VP2: View from near corner of Haldon and Hakataramea Pass Rd
VP3: View from Haldon Road Scenic Viewing Area
VP4: View from Hakataramea Pass Road looking Southeast
VP5: View from SH58 near Mary Burn

File Ref: BM220390.mxd



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0 3 km

1:100,000 @ A3

Data Sources:

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Location of Site
- Scenic Grasslands
- Scenic Viewing Areas
- Transmission Line

GRAMPIANS SOLAR FARM

Landscape Context

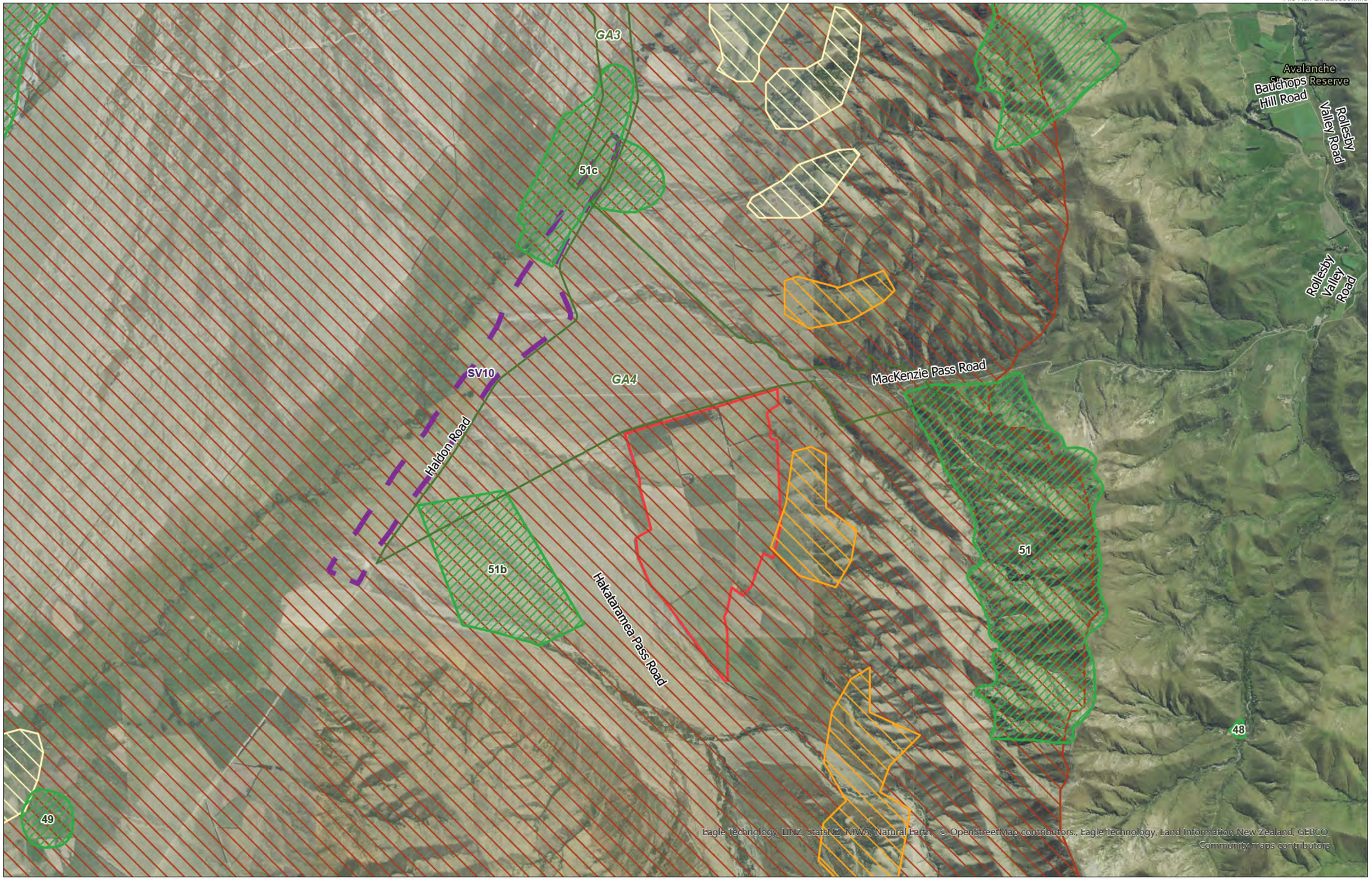
Date: February 2025 | Revision: 0

Plan prepared for Helios Energy by Boffa Miskell Limited

Project Manager s 9(2)(a) | Drawn: PMo | Checked: EMc

Figure 1

File Ref: BM220390.mxd



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0 1,000 m

1:50,000 @ A3

Data Sources:

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Areas of Visual Vulnerability
  - High
  - Medium
  - Low
- Sites of Natural Significance
- Scenic Grasslands
- Scenic Viewing Areas

GRAMPIANS SOLAR FARM

Site Context

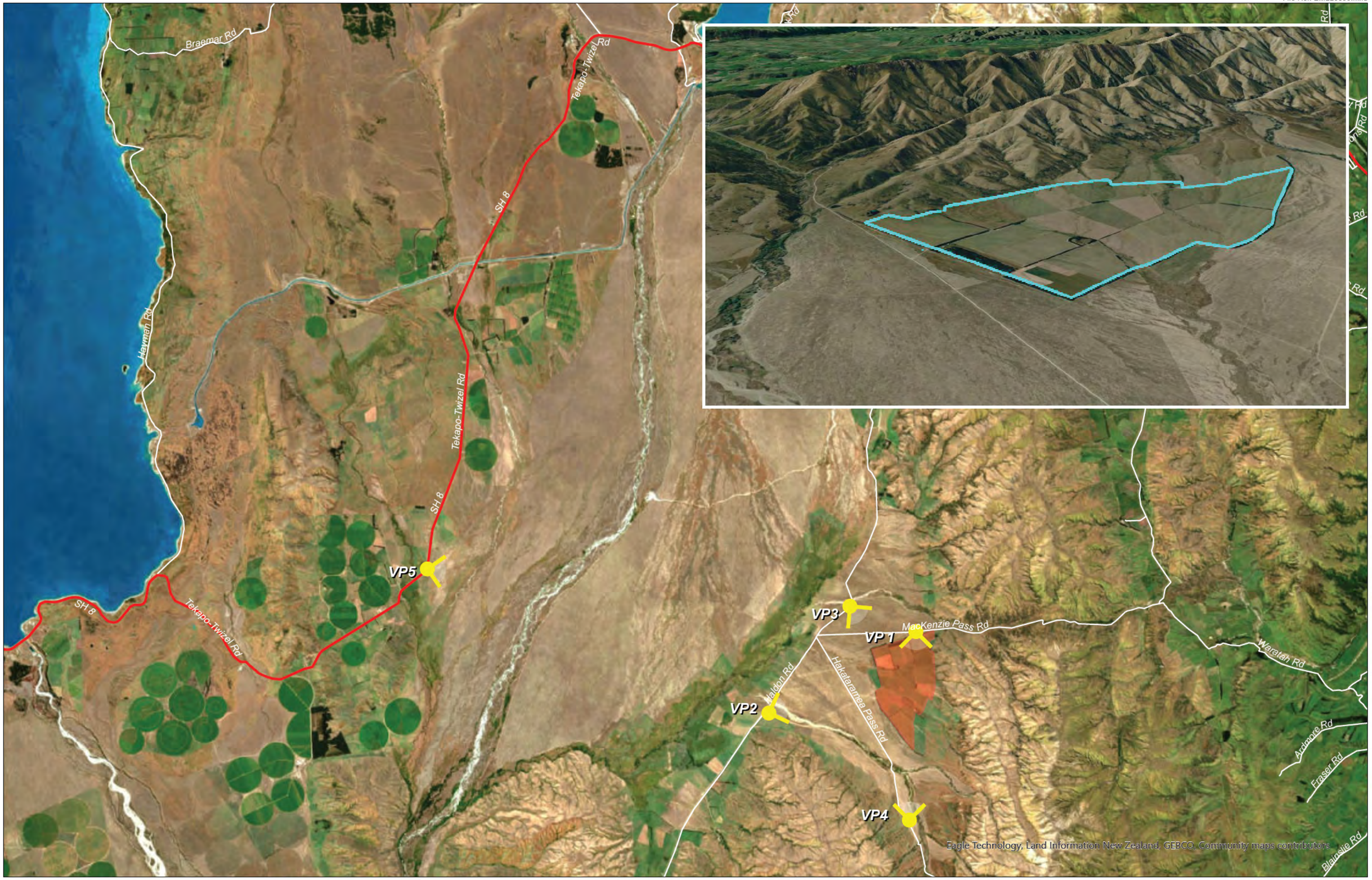
Date: April 2023 | Revision: 0

Plan prepared for Helios Energy by Boffa Miskell Limited

Project Manager: s 9(2)(a) | Drawn: PMo | Checked: -

Figure 2

File Ref: BM220390.mxd



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0 3,500 m

1:125,000 @ A3

Data Sources:

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

Site Boundary

Photo VPs

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Viewpoint Locations (Site Photos)

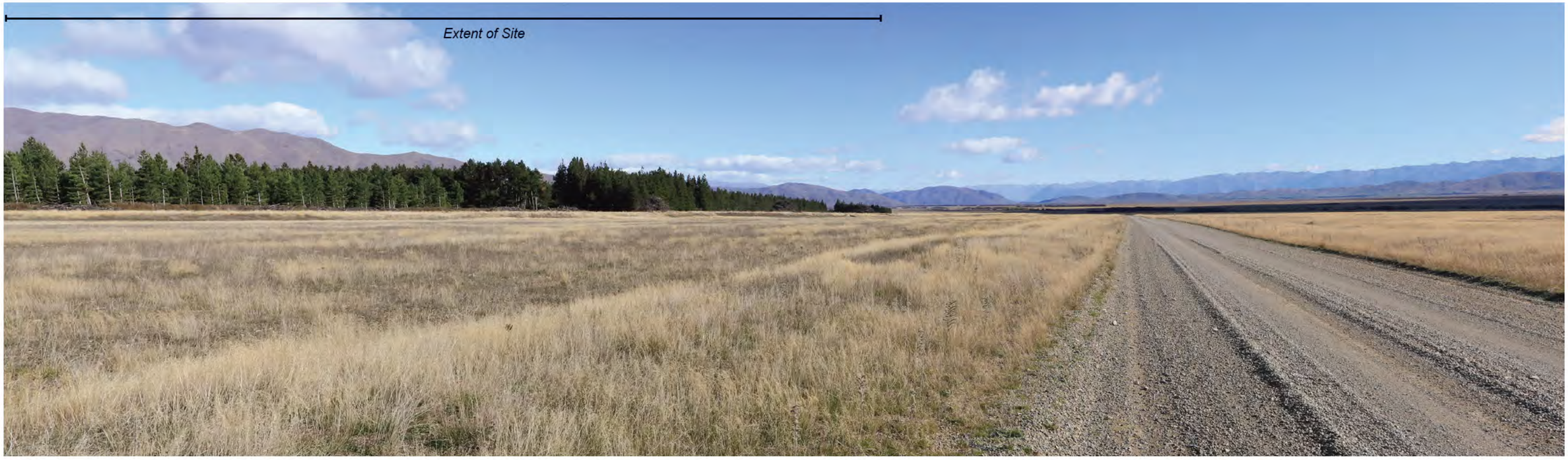
Date: April 2023 | Revision: 0

Plan prepared for Helios Energy by Boffa Miskell Limited

Project Manager: s 9(2)(a) | Drawn: EMc | Checked: XXx

FIGURE

3



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Viewpoint Details

NZTM Easting	: 1 404 452 mE	Horizontal Field of View	: 90°
NZTM Northing	: 5 103 601 mN	Projection	: Rectilinear
Ground Elevation	: 550 m	Image Reading Distance	: 20cm at A3
Date of Photography:	24 April 2023		

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View west from Mackenzie Pass Road

Date: May 2023 Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager s 9(2)(a) | Drawn: PMo | Checked: -EMc

VIEWPOINT

1

Extent of Site

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Viewpoint Details

NZTM Easting	: 1 399 132 mE	Horizontal Field of View	: 73° (24mm Focal Length)
NZTM Northing	: 5 100 654 mN	Projection	: NA
Ground Elevation	: 560m	Image Reading Distance	: 23cm at A3
Date of Photography:	25 April 2023		

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View from near corner of Haldon & Hakataramea Pass Rd

Date: May 2023 Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: s 9(2)(a) | Drawn: PMo | Checked: EMc

VIEWPOINT

2

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Viewpoint Details

NZTM Easting	: 1 402 067 mE	Horizontal Field of View	: 73° (24mm Focal Length)
NZTM Northing	: 5 104 516 mN	Projection	: NA
Ground Elevation	: 550m	Image Reading Distance	: 23cm at A3
Date of Photography	: 25 April 2023		

GRAMPIANS SOLAR FARM

View from Haldon Rd Scenic Viewing Area

Date: May 2023 Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager s 9(2)(a) | Drawn: PMo | Checked: EMc

VIEWPOINT

3

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Viewpoint Details

NZTM Easting	: 1 402 455 mE	Horizontal Field of View	: 90°
NZTM Northing	: 5 106 310 mN	Projection	: Rectilinear
Ground Elevation	: 550m	Image Reading Distance	: 20cm at A3
Date of Photography	: 25 April 2023		

GRAMPIANS SOLAR FARM

View from Hakataramea Pass Road looking north

Date: May 2023 Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager s 9(2)(a) | Drawn: PMo | Checked: -EMc

VIEWPOINT

4

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Viewpoint Details

NZTM Easting	: 1 386 767 mE	Horizontal Field of View	: 40°
NZTM Northing	: 5 105 866 mN	Projection	: NA
Ground Elevation	: 550 m	Image Reading Distance	: 50cm at A3
Date of Photography:	24 April 2023		

GRAMPIANS SOLAR FARM

View from SH58 near Mary Burn

Date: May 2023 Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager s 9(2)(a) Drawn: PMo | Checked: EMc

VIEWPOINT

5