ANNEXURE D:

LANDSCAPE ASSESSMENT AND PLANS

RMM

ROUGH MILNE MITCHELL
LANDSCAPE ARCHITECTS

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Landscape Assessment Report

Proposed Solar Farm 87 Upper Sefton Road, Ashley 15 May 2024

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1 Introduction

1.1 Purpose and Scope

Rough Milne Mitchell Landscape Architects (**RMM**) have been engaged by Solar Bay Ltd (**the Applicant**) to assess the actual and potential landscape and visual effects of a proposed solar field located at 87 Upper Sefton Road, Ashburton (**the site**).

The site is legally described as PT RS2588 and RS2732 and is 79.96ha in area. Under the Waimakariri Operative District Plan (**ODP**), the proposed solar farm is a *discretionary activity* and under the Waimakariri Proposed District Plan (**PDP**), the proposed solar farm is a *restricted discretionary activity*.

Figure 1. The location of the site at the corner of Upper Sefton and Beatties Roads.

This landscape assessment report is formatted as per the following:

- A description of the proposal.
- An outline of the relevant policy provisions within the ODP and PDP.
- The identification and description of the receiving environment, including the site. The receiving environment is described in terms of the landscape's landform, land cover and land use and how those landscape attributes contribute to the receiving environment's existing landscape values.
- An assessment of the actual and potential landscape and visual effects.
- An assessment against the relevant ODP and PDP policy provisions.
- A conclusion.

This report is accompanied by a Graphic Attachment (**GA**), that contains maps and aerial images of the site location, the relevant ODP and PDP planning maps, plans of the proposed solar farm, solar panels and ancillary structures, exemplar images of similar solar farms in Aotearoa and Australia, photographs of the site from within the site, and photographs of the site taken from the surrounding public places.

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].

A site visit was undertaken on 5 May 2022 and 13 September 2023 to assist in understanding the landscape character and values within the receiving environment, understanding the extent of the proposed solar farm and to assess the proposals actual and potential landscape and visual effects.

This report is tailored to suit the nature of the project and its context including the framework of the governing legislation. The statutory documents containing provisions relevant to the proposal are found in the Resource Management Act 1991 (**RMA**) and the ODP and PDP. The ODP and PDP give effect to the RMA within the context of the site and provides the policy framework against which this landscape assessment has been evaluated.

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 for the RMA s95 notification determination test and the RMA s104D 'gateway' test for non-complying activities (the latter is not 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]

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

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

It is proposed to locate a solar farm within the site, as illustrated on **GA Sheets 3 - 16**.

This site has been chosen to contain a solar farm because it is adjacent to Transpower's Ashley Substation, that is a required piece of infrastructure that enables the power sourced from the solar farm to feed into the National Power System. Part of the site selection process was also determined by the number of sunshine hours recorded for Christchurch, which had 2,288 hours in 2021, and is in the upper third of sunshine hours for cities and towns within Aotearoa New Zealand.[4] Therefore, the sun is a readily available source of renewable energy that can be utilised within Ashley.

The Solar Farm

The solar farm will consist of the following structures. Images of the following structures, including exemplar images as to assist in understanding what is proposed are included in **GA, Sheets 3 – 16.**

An approximate 79.96ha solar farm will be situated within the site. To allow for further optioneering, a fixed solar table option and two single axis tracking options have been assessed, refer to **GA Sheets 6 and 11**. The details of each of the three solar farm options are described below.

One Panel Single Axis Tracking Option

- The one panel single axis tracking option will consist of 58,928 solar panels. Each solar panel measures approximately 2.4m long by 1.1m wide (2.64m^2 in area).
- The solar panels will be connected to two different sized solar tables and extend north to south in a grid pattern, throughout the site. There will be 294 short tables, each comprised of 29 panels, and 869 long tables, each comprised of 58 panels. In total, there will be 1163 tables.
- Nine inverters will be located within the site. The inverters convert the DC current from the solar panels to an AC current so the solar power can be transferred to the nearby substation. Each inverter is approximately 2.8m long, 1.6m wide and 2.3m high (4.48m^2 in area) and are white / off white in colour.
- The overall site coverage for the solar panels, inverters, switch station, storage, and operations building will be 15.6ha or 19.5%.[5] In other words, 64.36ha or 80.5% of the site will not be located underneath a solar table.
- The solar panels have a 3.2mm thick glass surface with an anti-reflection coating. This coating reduces the amount of potential light that is reflected away from the solar panel and directs the reflection from the solar panels back to its source.
- The solar tables are steel structures, and each table is attached to the ground by four (short table) or eight (long table) centralised steel poles. 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 morning the solar panels will face east, at mid-day the solar panels will be more or less horizontal and at the end of the day the solar panels will face west.

4 https://niwa.co.nz/sites/niwa.co.nz/files/2021_Annual_Climate_Summary_NIWA11Jan2022.pdf. Page 13

5 The solar panels were calculated when the panels are parallel to the ground.

- The top of the solar table, when parallel with the ground stands approximately 1.5m above ground level. When the solar tables are tilted as far east or west as possible the top of the solar table will stand 2.2m above ground level with the bottom approximately 1.0m above ground level.
- The centre of the rows of solar tables are approximately 4m apart. The solar table is 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 start and finish the 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.

Two Panel Single Axis Tracking Option

- The two-panel single axis tracking option will consist of 58,986 solar panels. Each solar panel measures approximately 2.4m long by 1.1m wide (2.64m^2 in area).
- The solar panels will be connected to two different sized solar tables and extend north to south in a grid pattern, throughout the site. There will be 129 short tables, each comprised of 58 panels, and 444 long tables, each comprised of 116 panels. In total, there will be 573 tables.
- Nine inverters will be located within the site. The inverters convert the DC current from the solar panels to an AC current so the solar power can be transferred to the nearby substation. Each inverter is approximately 2.8m long, 1.6m wide and 2.3m high (4.48m^2 in area) and are white / off white in colour.
- The overall site coverage for the solar panels, inverters, switch station, storage, and operations building will be 15.6ha or 19.5%.[6] In other words, 64.36ha or 80.5% of the site will not be located underneath a solar table.
- The solar panels have a 3.2mm thick glass surface with an anti-reflection coating. This coating reduces the amount of potential light that is reflected away from the solar panel and directs the reflection from the solar panels back to its source.
- The solar tables are steel structures, and each table is attached to the ground by three (short table) or seven (long table) centralised steel poles. 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 morning the solar panels will face east, at mid-day the solar panels will be more or less horizontal and at the end of the day the solar panels will face west.
- The top of the solar table, when parallel with the ground stands approximately 2.4m above ground level. When the solar tables are tilted as far east or west as possible the top of the solar table will stand 4.5m above ground level with the bottom approximately 0.3m above ground level.
- The centre of the rows of solar tables are approximately 7m apart. The solar table is 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 start and finish the 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.

Fixed Solar Table Option

- The solar farm will consist of approximately 88,624 solar panels. Each solar panel measures approximately 2.4m long by 1.1m wide (2.64m^2 in area).

6 The solar panels were calculated when the panels are parallel to the ground.

- The solar panels will be connected to 1528 solar tables extending east to west in a grid pattern, throughout the site. Each table will comprise of 58 solar panels.
- Thirteen inverters will be located within the site. The inverters convert the DC current from the solar panels to an AC current so the solar power can be transferred to the nearby substation. Each inverter is approximately 2.8m long, 1.6m wide and 2.3m high (4.48m^2 in area) and are white / off white in colour.
- The overall site coverage for the solar panels, inverters, switch station, storage, and operations building will be 23.4ha or 29%.[7] In other words, 56.56ha or 71% of the site will not be located underneath a solar table.
- The solar tables are steel structures, and each table is attached to the ground by 16 steel poles. The tables are fixed in place at a 20 – 30-degree angle. At their lower end, they will stand 0.5 – 1.0m above ground level. At their taller end, they will stand 3 – 3.5m above ground level.
- There is an approximate gap of 5m between each row of solar panels.

Associated Structures

- A switch station, storage building, and operations building will be located within the eastern corner of the site, immediately south of the Ashley Substation. These buildings will have a combined area of 240m^2.
- Upgrades to the existing farm tracks may occur if the current tracks are inaccessible in inclement weather. Upgrades to the tracks will likely consist of a gravel surface.
- Earthworks will consist of trenching of approximately 5kms of cables associated with the solar panels and inverters. The poles that the solar tables are attached to are pile driven into the ground, therefore earthworks are not required. All excavated material will remain on site.
- The pastoral grass cover around the supporting structures, inverters and underneath the solar tables will be maintained, as per the exemplar images. Stock will continue to graze this pasture although stock will be limited to sheep only to avoid damage to the solar panels.

Landscape Mitigation

The landscape mitigation treatment for the site includes planting a Leyland Cypress – 'Leighton Green' *Cupressus x Leylandii* shelterbelt along the majority of the site's boundary lines. Refer to **GA Sheets 13 and 14**. These trees have a rapid growth rate and based on experience, these trees will reach 4m tall after three to four years.[8]

The shelterbelt will be implemented within the first planting season following the Resource Consent Application being granted. The proposed solar farm will only be constructed once the shelterbelt is 2m tall.

The implementation and maintenance of the shelterbelt includes the following:

- Each tree will be planted as bare root stock at a height of 25cm – 40cm tall.
- The shelterbelt will be fenced off so it will not be affected by stock grazing.
- The shelterbelt will be irrigated for the first five years.

7 The solar panels were calculated when the panels are parallel to the ground.

8 https://www.southernwoods.co.nz/shop/cupressus-x-leylandii-leighton-green/

- The shelterbelt along the sites northern boundary line will be maintained at a minimum height of 6m tall. The remainder of the shelterbelt, including along Upper Sefton Road and Beatties Road will be maintained at a minimum height of 4m tall.
- If any tree dies or becomes diseased, it will be replaced with the same or similar tree species that can grow to a similar bulk and height as the existing trees.

Native riparian vegetation will be located up to 7m from the edge along the two ephemeral streams within the site, as indicatively illustrated on **GA Sheet 13**.

A planting plan that outlines the native riparian vegetation's species, their size at planting, spacings and a maintenance schedule will be provided to Council within one year of obtaining Resource Consent. All native vegetation will be implemented within two years of gaining Resource Consent, prior to the solar panels are installed.

3 Relevant Policy Provisions

3.1 National Environmental Standard for Renewable Electricity Generation.

The National Environmental Standard for Renewable Electricity Generation 2011 (**NES-REG**) sets out one objective and eight policies to enable the sustainable management of renewable electricity generation under the RMA. The NES-REG objective, as included below is relevant to the proposed solar farm.

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 solar farm.*"

3.2 Waimakariri District

The Waimakariri District Plan is currently under review. Formal submissions closed in November 2021 and the Hearings process has commenced. Based on this, and the number of submissions that may relate to the proposed zoning of the site, the PDP is in the early stages of its review process, therefore little weight is placed on it.

However, with regard to the proposal, the PDP recognises that the ODP does not reflect the current range of different utility types and includes more comprehensive policy provisions for renewable electricity generation. Therefore, the relevant policy provisions for the PDP have also been taken into consideration.

3.3 The Waimakariri Operative District Plan

The site is located within the Rural Zone, refer to **GA Sheet 17**. The site is not located within an Outstanding Natural Landscape (**ONL**), or within the Coastal Environment.

Under the ODP the proposed solar farm is defined as a 'utility' and is a *discretionary activity* because it does not comply with one or more of the conditions under 30.1.1 and is not listed as a restricted discretionary activity.

The relevant objectives, policies and assessment matters are contained within Section 3: Rural Zone and Section 14: Utilities, Energy and Designations, and an assessment against them is included in Section 6 of this report.

3.4 The Waimakariri Proposed District Plan

The site is located within the Rural Lifestyle Zone, **refer to GA Sheet 18**. The Rural Lifestyle Zone rules provide for properties to have a minimum size of 4ha. The planning framework for renewable electricity generation, is included in the EI - Energy and Infrastructure Chapter.

Under the PDP Rule EI-R43, a proposed solar farm for the primary purpose of inputting power into the grid is a *restricted discretionary activity* within any zone. This is because the electricity generated will not be used on site. If it were, it would be a *permitted activity* under Rule EI-R41.

The relevant Rural Lifestyle Zone objectives and policies and the relevant Energy and Infrastructure objectives, policies and matters of discretion that are limited to EI-MD1 – EI-MD5 and EI-MD8 and an assessment against the is included in Section 6 of this report.

4 Landscape Description

4.1 Description of the Receiving Environment

The extent of the receiving environment is illustrated on **GA Sheet 3.** To the north, it extends to the toe of the Mt Grey foothills containing the Ashley Forest (3km), to the east it extends to Stony Creek (1.5km), to the south it extends to the Ashley River's true left bank (1km), and to the west Cones Road (2km).

Landform

The receiving environment is situated between the major landscape features of the braided Ashley River / Rakahuri and the foothills of Mt Grey and Ashley Forest of the Canterbury Plains. The underlying geology is largely composed of old gravel alluvial fans interspersed with younger material and occasionally extending into the more elevated areas of greywacke conglomerate.[9]

Naturally, as the receiving environment sits between the hills to the north and the Ashley River to the south, the topography gently descends northwest to southeast. A number of streams and creeks run northwest to southeast between the hills and Ashley River, with two ephemeral streams extending through the site.

The underlying landform within the receiving environment forms part of a shingle fan formed by the Ashley River's natural braided river pattern and processes.

The Ashley River / Rakahuri is located approximately 1km south of the site, and is also one of the few rare, braided rivers in Aotearoa New Zealand. It has been identified as a Significant Amenity Landscape because it displays moderate-high and high landscape values.[10]

Land Cover and Land Use

The majority of the receiving environment is comprised of medium and small sized pastoral farm properties, with small tracts of forestry and vegetated gullies extending into the area from the adjacent steeper slopes. [11]

While areas of pasture remain evident within the receiving environment, numerous rural residential and lifestyle properties have extended out to the northeast and northwest. This is because of its close proximity to Rangiora, the principal town within North Canterbury, and rural service towns Ashley and Sefton.

The settlement pattern is distinctly rural residential, with parcel sizes ranging between around 2 - 4ha. This finer grained settlement pattern and the patchwork of smaller parcels are highlighted by the shelterbelts and hedgerows that frame and enclose them.

The PDP recognises the increasingly intensive development pattern of rural living activities north of Ashley township and the Ashley River by proposing to zone it Rural Lifestyle to capture the fine-

9 Boffa Miskell 2018. Waimakariri District - Rural Character Assessment: Rural Zone – Character Assessment Report. Report prepared by Boffa Miskell for Waimakariri District Council. Page 33.

10 Boffa Miskell Limited 2019. Waimakariri District Landscape Evaluation: Landscape Characterisation and Evaluation Report. Report prepared by Boffa Miskell Limited for Waimakariri District Council.

11 Boffa Miskell 2018. Waimakariri District - Rural Character Assessment: Rural Zone – Character Assessment Report. Report prepared by Boffa Miskell for Waimakariri District Council. Page 33.

grained pattern of development and human induced characteristics, refer to **GA Sheet 4, 5, 17 and 18**.

Within the receiving environment, rural living development mostly occurs along Marshmans Road, Boundary Road and at the northern end of Beatties Road, north and west of the site. To the south and east, the land between the site, Sefton and the Ashley River is predominately comprised of open paddocks and rural living development lining rural roads and along Stony Creek.

In addition to the above, individual land use activities within the receiving environment are varied. Immediately east and adjoining the site is the Ashley Substation and associated National Grid transmission lines. A commercial pig farm containing large buildings housing stock is located east and opposite the site. To the south of the site is a large-scale timber mill that processes MDF board, and the Ashley oxidation ponds. The noise created by the timber mill is recognised and provided for by way of a noise overlay in the PDP. This overlay covers the southern third of the site. The timber mill and in part the substation, oxidation ponds, have a semi-industrial character that does not contribute to the character and amenity of the rural environment.

4.2 Description of the Site

The site is 79.96ha in area, is rectangular in shape, extending north to south by approximately 900m and east to west by approximately 1km. A small cut out along its eastern boundary accommodates the Ashley Substation. The site is also bounded to the east and south by Beatties Road and Upper Sefton Road, respectively. Immediately north and west of the site are rural lifestyle properties.

Landform

The underlying landform forms part of a shingle fan formed by the Ashley River's natural braided river pattern and processes. It gently slopes northwest to southeast with approximately 10m – 15m elevation difference.

There are two unnamed ephemeral watercourses that traverse north-south across the site. The 'large' ephemeral watercourse, starts from the toe of the hills to the north, snakes its way through the western quarter of the site, flowing into Saltwater Creek to the south. A 'low terrace' sits alongside the stream and its gently sloping, 5m tall escarpment separates this watercourse from the remainder of the site.

The 'small' ephemeral watercourse appears relatively dry as it rises from within the central part of the site. This watercourse has been modified to hold water during the dryer summer months for stock.

Land Cover and Land Use

The majority of the site is covered in pasture grass used for stock grazing. Post-and-wire fence lines divide the site into 10 paddocks. Farm tracks run parallel and alongside these fence lines. Troughs are mostly centralised and located where four paddocks converge. Water tanks are located at the highest point of the site situated between the large and small ephemeral streams.

The farm base activities are located in two areas adjacent to Upper Sefton Road. The farm sheds and storage area are situated immediately southwest of the large ephemeral stream. The sheep pens are situated immediately southwest of the small ephemeral stream. In both instances, these areas are enclosed by mature pine and eucalyptus trees.

A small stand of mature pine trees and willows are located at the top end of the large ephemeral stream, and several willow trees line its bank.

There is no dwelling or farm cottage within the site, nor are there any shelterbelts within the site. For reference, there was a shelterbelt along the eastern side of the large ephemeral stream, which is

illustrated on old aerial images. However, this has recently been removed, although the tree stumps remain as seen on **GA Sheets 20 - 21**.

4.3 Landscape Values of the Receiving Environment

The landscape values of the receiving environment (physical, perceptual and associative) form the baseline, along with the 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 development are listed below.

Physical

"***Physical*** [12] *means both the natural and human features, and the action (and interaction of natural and human processes over time*."[13]

The site and the remaining larger rural land holdings to the east, along with the less intensive areas of rural lifestyle development have been highly modified for farming so overall natural character is reduced however there is a moderate degree of open character due to the modest scale of pastoral farming and cropping activities that currently occur.

The ephemeral streams have a low degree of natural character as their margins are predominantly covered pasture and are not fenced off from stock.

The Ashley River has been recognised in the PDP as a SAL due to its moderate-high and high landscape values.

Perceptual

"*Perceptual* *means both direct sensory experience and broader interpretation through the senses. While sight is the sense most typically applied to landscape assessment, direct sensory perception importantly includes all the senses.*"[14]

The more intense pattern of rural lifestyle development, its fine-grained pattern of development and human induced characteristics, north of Ashley township and the Ashley River, has been recognised in the PDP. This is because it is proposed to be zoned Rural Lifestyle, and will provide for rural living at increased densities. This means the Rural Zone will inevitably change and an open character is likely to reduce.

Currently the remaining medium sized land holdings, open pasture and shelterbelts are a key characteristic of the area that contributes to a pleasant agricultural aesthetic, open rural character and visual amenity that people experience from their properties and along these roads. This includes views to the surrounding hills.

Associative

12 'Physical' means both natural and human features, whereas 'biophysical' is potentially problematic if it is taken to mean only the natural aspects of the landscape rather than both natural and human features/processes. 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 79.

13 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 79.

14 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 79.

"*Associative* *means the intangible things that influence how places are perceived – such as history, identity, customs, laws, narratives, creation stories, and activities specifically associated with the qualities of a landscape.*"[15]

There are no known cultural or historic sites of significance within the site or the receiving environment, as listed in the ODP or PDP or any obvious signs from site investigations.

15 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines'. Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022. Page 79.

5 Assessment of Landscape and Visual Effects

5.1 Potential Issues

The proposal will result in a solar farm consisting of long lines of solar panels running north to south, or east to west within the site, located on the northwest corner of the Upper Sefton Road and Beatties Road intersection.

The solar farm will consist of a significant amount of built form that may detract from the open space rural landscape values and amenity. However, this is anticipated to reduce due to the PDP's Rural Lifestyle Zone.

Also, it may impact on the amenity experienced from the rural lifestyle properties that surround the site, whilst being situated in the context of and on the periphery of an industrial land use and factory farming.

5.2 Assessment of Visibility and Visual Effects

"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." [16]

A desktop analysis and on-site investigations found that the site can currently be seen from the adjacent stretch of Upper Sefton Road and Beatties Road, a 200m stretch of Marshmans Road and from onsite investigations several surrounding private properties.

The viewpoint location photographs illustrate the relationship between the proposed solar farm and the views gained from these three public roads. Refer to **GA Sheets 22 – 32**. The site photographs assist in illustrating the relationship between the proposed solar farm and the view gained from the surrounding private properties. Refer to **GA Sheets 19 - 21**.

The visibility and actual and potential visual effects of the solar farm have been assessed from these public and private locations, under the following headings.

Upper Sefton Road - Viewpoint Location Photographs 1 – 4

Upper Sefton Road extends southwest to northeast between rural service towns at Ashley, Sefton and Balcairn. The ODP identifies Upper Sefton Road as a 'strategic road', which means it is a present, former or proposed State Highway serving as an inter-district route. Regarding this and information on the Waka Kotahi website, Upper Sefton Road has approximately 4000 vehicle movements per day, which is a relatively high number of road users for the area.[17]

A low-moderate degree of visual amenity is experienced when travelling along this road with an eclectic mix of rural lifestyle properties, farm sheds, storage areas, small to medium sized paddocks, pine tree shelterbelts maintained to varying standards, native and exotic hedges, the National Grid powerlines, the upper part of the timber mill including its smoke stacks, and other semi-industrial activities and their associated activities. The Ashley River is not seen from this stretch of road,

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

17 https://nzta.maps.arcgis.com/apps/webappviewer/index.html?id=95fad5204ad243c39d84c37701f614b0

however, views to some hills and distant mountains are intermittently gained, which contributes to the amenity.

Visibility

The site is currently clearly seen from the 1km stretch of Upper Sefton Road alongside the site. Beyond this stretch of road, the site is not seen due to mature vegetation within neighbouring properties. Refer to **Viewpoint Location Photographs 1 – 4, GA Sheets 23 – 26.**

The proposed shelterbelt growing alongside Upper Sefton Road will be seen for the first two years prior to it reaching 2m tall. At this height these trees will be taller than most road users eye height[18]. However, the conifer trees will not fully form a hedge, as there will be small gaps between them. The small gaps between the juvenile trees will allow a road user to gain intermittent views through to the solar farm once it is constructed.

In addition to the juvenile shelterbelt, mature vegetation around the farm sheds and sheep pens will also provide some screening of the solar farm and break up the potential opportunity for the solar farm to be continuously seen when travelling along this stretch of road.

For a relatively short timeframe in the mornings and evenings the Single Axis Tracking solar table option will stand at a 60-degree angle, being their most vertical position at a height of 4.45m tall, which will initially be visually prominent above the proposed shelterbelt and will likely draw attention during these limited times of the day. Refer to **GA Sheet 14 - Cross Sections A and C.** The length of time they stand in this more vertical position, and the actual time of the day differs throughout the year due to the movement of the sun. In general, this is when the sun has just risen or is about to set. In summer it will occur approximately between 6am-7am and 8pm-9pm, and in winter it will occur between 8am-9am and 4pm-5pm. Also, because the sun travels through the sky quicker in the winter, they will be in this position for a shorter period of time, when compared with the summer.

For the majority of the day the Single Axis Tracking solar tables are situated in a more parallel position to the ground surface as they face upward towards the sun when it is high in the sky. Refer to **GA Sheet 14 - Cross Section B**. During this time the solar farm will be less prominent and road users will also be able to intermittently see the paddocks and grazing stock between these gaps in the juvenile shelterbelts.

The Fixed Solar Table Option will be 2.9 – 3.4m tall, depending on the angle of the solar table. Similar to the Single Axis Tracking option, the upper parts of the panels will be seen and potentially prominent between gaps in the juvenile shelterbelt and above its initial 2m height.

The proposed trees will take approximately 2 years to grow from 2m to 4m tall. When the shelterbelt is established, it will be of a height and width that will visually screen both proposed solar farm options. Therefore, the solar farm will be seen for up to two years, and during this short time frame, the intermittent views will continue to reduce.

Visual Effects

The size and extent of the solar farm, when seen with the Single Axis Tracking solar tables standing generally above 3.5m tall, will be at a height where they draw the eye and will detract from the current visual amenity experienced along this stretch of road. However, in some instances it may also create visual intrigue.

18 Eye height of a person in a car is approximately 1.2m, an SUV is approximately 1.5m and a truck is approximately 2.1m.

The potential day-to-day visual effects of this will vary depending on the time of the year. But on a whole, these effects will be short lived. This is because in the summer they will be in their more vertical position in the very early morning and late evening, when less people travel along this road, and in the winter, the sun travels across the sky a lot quicker, therefore they will be in this position for a shorter period of time. Additionally, once the shelterbelt has reached 2.5 - 3m tall, it will be at a height where it starts to meaningfully reduce the initial adverse visual effects of both solar table options.

As assessed in the Glint and Glare Report[19], when the shelterbelt is 2m tall potential glare may exacerbate the visual effects. Depending on the type of solar panel type used (fixed or tilting), there is an approximate window of 3 minutes to 56 minutes per day during specific times of the year when glare may be experienced. This is a mix of green and yellow glare, in which the Glint and Glare Report recommends that yellow glare has a moderate impact and should be mitigated. The proposed shelterbelt will assist with mitigation.

When the shelterbelt is 4m tall there may be a 2 minute window of time per day, between 5pm and 6pm during the months of April, May and August when green glare may be experienced, 19 minutes in total annually. The report considers that green glare is of low impact and does not require further mitigation.[20]

The proposed shelterbelt is a common landscape element within the receiving environment and wider landscape. Therefore, the proposed shelterbelt, in itself, will not result in any adverse visual effects.

Overall, the Single Axis Tracking solar farm will have a **moderate degree** of adverse effects on the visual amenity experienced by road users when it is first constructed and during those periods when the solar panels stand above 3.5m in height. However, for the majority of the day, when the Single Axis Tracking solar tables are in a more horizontal position and because the Fixed Angle solar tables will be less than 3.5m tall, these initial adverse effects will be of a **low to low-moderate degree**.

Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to **no more than a low-moderate degree** and when the shelterbelt reaches 4m tall these adverse effects will be **nil**.

Beatties Road - Viewpoint Location Photographs 4 – 9

Beatties Road is a rural road extending north to south between Marshmans Road to Lower Sefton Road. The northern stretch of Beatties Road provides access to the Ashley Substation, a commercial pig farm and 13 rural lifestyle properties. The southern stretch of Beatties Road provides access to the timber mill, the oxidation ponds, and one rural property.

Under the ODP Beatties Road is a ‘collector road’, which means it is a preferred route for travel within, and between, areas of population and principal activities. Regarding this and information on the Waka Kotahi Website, Beatties Road, north of Upper Sefton Road, which runs past the site has approximately 200 vehicle movements per day.

A moderate degree of visual amenity is experienced when travelling along the northern stretch of road, provided by the well-kept rural lifestyle properties, including their dwellings, amenity plantings, and roadside hedgerows and some large open paddocks, including the site. When facing south, the timber mill, Ashley Substation and the National Grid powerlines are clearly visible and reduce the overall rural amenity experienced.

19 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 2m Tall Trees. Dated 29.09.2023.

20 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 4m Tall Trees. Dated 03.10.2023.

Visibility

The site is clearly seen from the adjacent 840m stretch of Beatties Road that runs along the site boundary. Beyond this stretch of road, the site is not seen due to mature vegetation within neighbouring properties. Refer to **Viewpoint Location Photographs 4 – 9, GA Sheets 26 – 31.**

A road user will see the two solar farm options and shelterbelt in a very similar way to a road user along Upper Sefton Road, as described above. However, there are two main differences when compared with the above description.

The Single Axis Tracking solar tables will appear like a continuous wall when they are standing in their most vertical position whilst a road user travels north along this road. This is because the road and the solar tables will be near on parallel to one another and gaps between the rows of solar tables will be difficult to see.

During the two years when the two solar farm options are intermittently seen, it will be clearly seen alongside the Ashley Substation.

Visual Effect

Because the solar farm will be seen in a very similar manner, the potential adverse visual effects will also be similar. Based on the above, the key differences are:

- A road user gains a slightly higher degree of amenity when compared with Upper Sefton Road, therefore potential adverse effects may be higher.
- The wall like appearance of the Single Axis Tracking solar tables will be prominent when it is seen for a short period of the day until the shelterbelt establishes and affords screening.
- A relatively small number of people travel along this road in comparison to other local roads. Due to this, fewer people may see the solar farm in its most upright position, therefore potential adverse effects may be less.
- The solar farm will be co-located with the Ashley Substation which provides the visual context for both utility infrastructure activities being located adjacent to one another.

As assessed in the Glint and Glare Report[21], when the shelterbelt is 2m tall potential glare from a tilting solar table may exacerbate the visual effects, not a fixed solar table. There is an approximate 7-minute window per day, between April and August when glare may be experienced. This is a mix of green and yellow glare, in which the Glint and Glare Report recommends that yellow glare has a moderate impact and should be mitigated. The proposed shelterbelt will assist with mitigation.

When the shelterbelt is 4m tall there may be a 5-minute window of time per day, between 4pm and 6pm during the months of May to August when glare may be experienced. Additionally, this may only be experienced from an approximate 200m stretch of this road near the intersection with Upper Sefton Road. This window of time is very short, and may only be experienced by the few people travelling north along this road during this time of the day.

Overall, the Single Axis Tracking solar farm will have a **moderate degree** of adverse effects on the visual amenity experienced by road users when it is first constructed stands above 3.5m for a limited period of the day. However, for the majority of the day, when the Single Axis Tracking solar tables are in a more horizontal position and because the Fixed Angle solar tables will be less than 3.5m tall, these adverse effects will be of a **low to low-moderate degree**.

21 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 2m Tall Trees. Dated 29.09.2023.

Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to **no more than a low-moderate degree** and when the shelterbelt reaches 4m tall these adverse effects will be **nil**.

Marshmans Road - Viewpoint Location Photograph 10

Marshmans Road is a rural road extending northeast to southwest providing access to the rural and rural lifestyle properties between Sefton and the Ashley Forest.

Under the ODP Marshmans Road is a 'collector road', which means it is a preferred route for travel within, and between, areas of population and principal activities. Regarding this and information on the Waka Kotahi Website, Marshmans Road has approximately 1,300 vehicle movements per day.

A moderate degree of visual amenity is experienced when travelling along its south-western end, provided by the well-kept rural lifestyle properties, including their dwellings, amenity plantings, and roadside hedgerows and some large open paddocks. When facing east, the timber mill, in particular the smoke coming out of the smoke stake is visible and reduce the overall rural amenity experienced.

Visibility

The central portion of the site can be seen from a 200m stretch of Marshmans Road adjacent to 167 Marshmans Road, refer to **GA Sheet 32**. The north, south, east, and western sides of the paddock are not seen due to intervening vegetation and topography sloping away from Marshmans Road. The central portion of the site comes into view as a road user crests a rise in the road. It is seen perpendicular to the road alignment for approximately 200m when travelling at approximately 100km/h.

As mentioned, the solar farm will not be constructed until the shelterbelt reaches 2m tall. An eclectic mix of trees and shrubs are located adjacent to the site's boundary line, with most plants varying in height between 2m – 4m tall. Some of the smaller plants appear to be similar in height to the farm fence, in which they will be approximately 1.2m – 1.5m tall.

Regarding this, the proposed shelterbelt, when 2m tall will provide additionally screening of the eastern part of the solar farm. The solar farm within the central part of the site when it is first constructed because the topography within the site descends to the ephemeral stream and in part towards the road. Once the shelterbelt is 4m tall, it will screen the bulk of the solar farm and at 6m tall, the solar farm will not be seen.

Visual Effect

The size and extent of the solar farm, when noticed, may draw the eye as they are an unfamiliar element within the landscape, and may detract from the current visual amenity experienced along this stretch of road due to the loss in open character and the solar farms appearance not being in keeping with the current rural or rural lifestyle activities that contribute to the amenity that is experienced. However, in some instances it may also create visual intrigue.

The key mitigating measures consist of:

- The site forms a small part of the mid ground of the view, beyond the roadside properties which will not be altered by the proposal.
- Visibility of the proposal is best described as 'fleeting' as it is experienced from a short 200m stretch of road, with the site being outside of a road users' primary field of view. i.e. a road user has to turn their head to the right to see the site.

- Vary amounts of the solar farm may be seen for up to four years, whilst the shelterbelt increases in height to 6m tall. However, the amount of built form that may be seen will be constantly reducing as the shelterbelt matures.
- In the mid to long term the proposed shelterbelt will be the only landscape element that is seen, in which it is a common landscape element within the receiving environment and will not result in any adverse visual effects.

As assessed in the Glint and Glare Report[22], when the shelterbelt is 2m tall potential glare may exacerbate the visual effects. Depending on the type of solar panel type used (fixed or tilting), there is an approximate window of 2 to 3 minutes per day during March, April, August and September when glare may be experienced. This is a mix of green and yellow glare, in which the Glint and Glare Report recommends that yellow glare has a moderate impact and should be mitigated.

The shelterbelt, when 4m tall will mitigate glare.[23]

Overall, the solar farm will have a **low to low-moderate degree** of adverse effects on the visual amenity experienced by Marshman Road users when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to **very low to low** and when the shelterbelt reaches 6m tall these adverse effects will be **nil**.

Private Places - Site Photos 1 – 7

Parts of the proposed solar farm may be visible from the 14 properties neighbouring the site, as identified on the Site Photograph Plan on **GA Sheets 19 - 21**.

Upper Sefton Road

Owners and occupiers of 47 Upper Sefton Road do not see the site due to vegetation within their own property. This vegetation will be bolstered by the proposed shelterbelt to provide certainty that the solar farm will not be seen in the long-term.

Very limited opportunities to see the solar farm from 53 Upper Sefton Road will occur because although there are a small number of gaps in their boundary vegetation, these will be bolstered by the proposed shelterbelt. Once the proposed shelterbelt matures, the solar farm will be fully screened.

Overall, the solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed and during a limited period of the day when the solar panels stand above 3.5m. However, for the majority of the day, these adverse effects will be of a very low to low degree. Once the shelterbelt reaches 4m tall these adverse effects will reduce to nil.

Marshmans Road

Properties at 159, 167, 200 and 204 Marshmans Road each contain a single-story dwelling, sheds, outdoor living areas, amenity planting and the like. These properties lie some 300m north or more of the site, in a slightly more elevated area when compared with the site, as the underlying topography gently descends from the Ashley Forest to the Ashley River.

These dwellings and outdoor areas have been designed to generally face north and have mature vegetation to the south that provides some internal screening of the site. Therefore, the primary outlook from these properties is away from the site and will therefore not be affected.

22 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 2m Tall Trees. Dated 29.09.2023.

23 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 4m Tall Trees. Dated 03.10.2023.

The site can be seen when facing south from the less formal outdoor areas around these dwellings and the paddocks. The shelterbelt will start to provide meaningful screening when it is 3 – 3.5m tall. This shelterbelt will entirely screen the solar farm from 159 and 167 Marshmans Road approximately four years after the solar farm is constructed. This will be two to three years for 200 and 204 Marshmans Road.

Due to the above, the solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 3 – 4m tall these effects will be reduced to a low degree and when the shelterbelt reaches 6m tall adverse effects will be nil.

Properties at 152 and 224 Marshmans Road are both comprised of 8ha of paddocks and do not contain dwellings or sheds. Views from these paddocks will be similar as those gained from the properties at 200 and 204 Marshmans Road. However, because these properties are less frequented, the potential degree of adverse effects will be less. With reference to the PDP, it is likely that these properties will be developed, and in that event visual effects arising from the solar farm will be similar to the two neighbouring properties. Therefore, at most, potential adverse effects will be the same as those effects experienced from 200 and 204 Marshmans Road.

Beatties Road

Owners and occupiers of 178 Beatties Road will may see parts of the solar farm from one or two windows at the western end of their dwelling, the driveway, front lawn and front verge. It will not be seen from the eastern three quarters of their dwelling, main outdoor living area that faces north and the ‘second’ dwelling located east of the main dwelling.

The solar farm will be seen in a similar manner as described above, under the heading ‘Beatties Road’. The degree of adverse visual effects will be marginally higher because they will be experienced from a number of locations within this property. Notwithstanding this, the solar farm will have a moderate degree of adverse effects on the visual amenity when it is first constructed and when for limited periods of the day the solar panels stand above 3.5m. For the majority of the day, adverse effects on visual amenity or landscape values will be of a low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to a low to low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.

189 Beatties Road is situated immediately north of the site and contains a two-storey dwelling and sheds within the western third of the property. Notable vegetation within this property includes a mature poplar shelterbelt along the majority of its southern boundary line and mature conifer hedges around the dwelling.

The mature vegetation, along with the proposed shelterbelt will result in multiple layers of vegetation that will meaningfully screen the solar farm from most of this property, when it is first constructed.

Site investigations and Site Photograph 4 on **GA Sheet 21** illustrate that the solar farm may be seen from two small, elevated windows within this dwelling. These small windows, being on the south side of the dwelling are likely to be associated with a bathroom or toilet. Therefore, the outlook from these windows will not be as important / valued as a view from a lounge or dining area that faces north towards the hills. The solar farm will be seen for up to four years from these two windows. Once the shelterbelt has reached 6m tall it will screen the solar farm from view.

Overall, the solar farm will have a low degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to no more than a very low degree and when the shelterbelt reaches 6m tall these adverse effects will be nil.

Owners and occupiers of 126, 190 and 196 Beatties Road will only see the solar farm when exiting their properties due to their own internal vegetation. For this reason, potential adverse effects on these people will be the same as a road user travelling along Beatties Road.

The property at 217 Beatties Road is comprised of 33ha of paddocks and does not contain a dwelling. Views from this paddock will be similar as those gained from Beatties Road. However, because this property is uninhabited, the potential degree of adverse effects will be less than a road user travelling along Beatties Road.

Glint and Glare

The Glint and Glare Report[24] has assessed the length of time (day and annually) that people at each of the above-mentioned neighbouring properties may be affected by glare. Noting that it does not take into consideration the existing vegetation within these properties.

When the shelterbelt is 2m tall potential glare may be experienced from most properties for less than 10 minutes per day, and less than 10 hours per year. Noting that there are no Aotearoa – New Zealand guidelines for this, Vector Powersmart have advised RMM that the Large-Scale Solar Energy Guideline document prepared by New South Wales Government in August 2022 outlines that no mitigation is required.[25]

The exception to this is that potential glare may be experienced from 53 and 47 Upper Sefton Road for 15 minutes and 2 hours per day, respectively. As mentioned, there is a mature shelterbelt separating the majority of these properties from the site. Based on the finding of the second Glint and Glare report[26], these shelterbelts will mitigate this glare.

When the shelterbelt is 4m tall potential glare may be experienced from 126 Beatties Road for less 3 minutes per day, with a total of 37 minutes annually during July and August, which will also be mitigated by internal amenity planting within this property. According to the New South Wales guidelines no further mitigation is required.

Summary

Visual effects resulting from the proposed solar farm are summarised as:

- Upper Sefton Road and Beatties Road. The solar farm will have a moderate degree of adverse effects on the visual amenity experienced by road users when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, adverse effects will be of a low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to a low to low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.
- Marshmans Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity experienced by Marshman Road users when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to very low to low and when the shelterbelt reaches 6m tall these adverse effects will be nil.
- 47 Upper Sefton Road - No adverse visual effects.

24 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 2m Tall Trees. Dated 29.09.2023.

25 New South Wales Government. Large-Scale Solar Energy Guidelines. August 2022. Page 23.

26 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 4m Tall Trees. Dated 03.10.2023.

- 53 Upper Sefton Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a very low to low degree. Once the shelterbelt reaches 4m tall these adverse effects will be nil.
- 152, 159, 167, 200, 204 and 224 Marshmans Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 3m – 4m tall these effects will be reduced to a low and when the shelterbelt reaches 6m tall adverse effects will be nil.
- 178 Beatties Road. The solar farm will have a moderate degree of adverse effects on the visual amenity when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to a low to low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.
- 189 Beatties Road. The solar farm will have a low degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to no more than a very low degree and when the shelterbelt reaches 6m tall these adverse effects will be nil.
- 126, 190, 196 and 217 Beatties Road. The solar farm will have a low-moderate to moderate degree of adverse effects on the visual amenity experienced when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a low to low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to no more than a low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.

5.3 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."[27]

The way in which the landscape will be affected in terms of visibility, visual amenity and perceptual values is set out above. In a visual sense, the proposed solar farm may be briefly seen at varying times of the day for approximately two years, with the exception of one dwelling being four years. Once the shelterbelt has reached 4m tall, and 6m tall for the northwest boundary line, the solar farm will be well contained and not seen from any surrounding public or private places.

The shelterbelt that will extend around the perimeter of the site, will become the most visually prominent feature and will be in keeping with the vegetation patterns within the receiving environment and wider landscape, as experienced from the surrounding roads and nearby private properties.

The site's rural landscape character, which is consistent with the larger land holdings to the east will inevitably be modified by the solar farm, due to the amount of built form associated with the solar farm.

The character of the site will change from a rural open pastoral character to a predominantly rural utility / industrial character, albeit while maintaining an underlying pastoral use. However, the potential

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

adverse landscape effects resulting from this change will in part be mitigated by the shelterbelts that screen the solar farm and the context of the site, which contains the Ashley Substation and over-head transmission lines.

The substation itself is an important element in this landscape as it provides the context for the solar farm within this landscape setting.

Locating the solar farm near an existing substation, rather than elsewhere in the landscape, reduces the amount of potential additional infrastructure that would be required and would add to potential effects on landscape values, including for example, transmission towers and overhead power lines.

The solar farm will also be located across the road from the timber mill, a commercial pig farm and near the Ashley oxidation ponds. Although also part of the context, these activities are generally not in keeping with, nor do they positively contribute to the general amenity of a rural or rural lifestyle area. The solar farm, which is a relatively inactive use of the site, i.e not heavily trafficked by people and the proposed shelterbelts will positively act as a buffer between these commercial, industrial and waste activities and the existing and potential rural lifestyle development that will or may occur in the area.

The site will be dominated by long lines of solar panels as built components running north to south through the site. Although this will inevitably reduce the open character currently associated with the site, in reality the solar farm will cover 19.5% or 29% of the 79.96ha site, depending on the preferred option and will allow pastoral grazing to continue. Also, the solar tables have been situated where they are setback from all watercourses, as per the ODP rule and all watercourses will be fenced off from stock. Also, the proposal will enhance the natural character of the ephemeral streams due to the riparian margin vegetation.

Unlike regular buildings, the solar tables will retain some of the rural pastoral character within the site, that contributes to and maintains an association with the wider rural landscape setting and will be seen as relatively ‘light’ structures that sit over top of the site. If the solar farm become redundant, the solar table structures would be relatively easily dismantled. The respective seven poles for each solar table could be pulled out of the ground because they are not concreted in situ and the site would return back to a rural land use and used for rural lifestyle activities. The concept of reversibility is a key aspect contributing to the reduction of landscape effects.

At a wider scale, the existing landscape elements and the site’s wider context and the presence of a natural resource indicate that the solar farm will be appropriately located in this receiving environment. This is because the solar farm will be situated in a geographical area that has high sunshine hours, being in excess of 2200 hours per annum[28]. It will also be well contained by the proposed shelterbelts. The site has been selected also because it is located adjacent to an existing substation, transmission towers and lines, which minimises the amount of potential infrastructure required to operate effectively and efficiently as a solar farm.

Overall, the proposal will have a **low** degree of adverse effects on the landscape values of the site and its receiving environment.

28 For reference, Palmerston North is an area which has one of the lowest annual high sunshine hours in Aotearoa, being 1600 hours. On the contrary to this, Palmerston North is a windy area, in which wind farms are used as a renewable energy source.

6 An Assessment Against the ODP and PDP Policy Provisions

6.1 Waimakariri Operative District Plan

Under the ODP the site is located within the Rural Zone. The solar farm is a utility is a ***discretionary*** activity. Below are the relevant ODP objectives, policies and an assessment of the proposed solar farm against them.

ODP - Rural Zone

Objectives

Objective 14.1.1
Maintain and enhance both rural production and the rural character of the Rural Zones, which is characterised by:

a. the dominant effect of paddocks, trees, natural features, and agricultural, pastoral or horticultural activities;
b. separation between dwellinghouses to maintain privacy and a sense of openness;
c. a dwellinghouse clustered with ancillary buildings and structures on the same site;
d. farm buildings and structures close to lot boundaries including roads;
e. generally quiet – but with some significant intermittent and/or seasonal noise from farming activities;
f. clean air – but with some significant short term and/or seasonal smells associated with farming activities; and
g. limited signage in the Rural Zone.

Policies

Policy 14.1.1.2
Maintain the continued domination of the Rural Zones by intensive and extensive agricultural, pastoral and horticultural land use activities.

The more modified character of the Rural Zone within the receiving environment is acknowledged in the PDP, which includes a predominance of small rural lots with a resulting pattern of residential dwellings, buildings, fencing, amenity and domestic planting mixed with smaller scale primary production activities and a dominance of human modified open space and vegetation, including paddocks and trees over buildings.

Therefore, the Rural Zone within the receiving environment does not display all of the characteristics listed above, specifically a. and b. However, the site is one of several remaining properties that retains these characteristics.

The solar farm will detract from the current level of openness within the site and its surrounds. The solar farm will continue to be used for grazing stock, it will remain a relatively in active property, i.e. it will not heavily trafficked like a regular industrial activity, or like a rural lifestyle property. Therefore, the proposal will slightly reduce the rural character within the site.

Policy 14.1.1.3
Maintain and enhance the environmental qualities such as natural features, air and noise levels, including limited signage and rural retail activities that contribute to the distinctive character of the Rural Zones, consistent with a rural working environment.

The proposed solar farm meets all of the required setbacks from the waterways within the site. These water ways will be fenced and therefore they will no longer be traversed by stock. Due to this, the quality of these water ways will be maintained and slightly enhanced.

Policy 14.1.1.4
Maintain rural character as the setting for Residential 4A and 4B Zones.

The Residential 4A Zone relates to Oxford, therefore the proposal will not impact on their setting. There are two Residential 4B Zones located within 3 - 4 kms of the site, beyond the receiving environment. The solar farm will not be seen from these areas and is situated at such a distance that it will not impact on their setting.

ODP - Utilities and Traffic Management

Objective 11.2.1
Adverse effects on the environment caused by the provision, use, maintenance and upgrading of utilities are avoided, remedied or mitigated.

Policy 11.2.1.1
Avoid, remedy or mitigate adverse environmental effects created by the provision, use, maintenance and upgrading of utilities by:

a. meeting environmental standards set by the Plan;
b. having regard to the particular amenity or character of the area in which it is placed;

Section 5 of this report includes an assessment of the actual and potential landscape and visual effects that may result from the solar farm. Overall, the potential adverse effects are appropriately mitigated.

c. integration with, and co-siting of, existing utilities where they are accessible and are, or can be, expanded to manage any additional loading and where such loading is technically and operationally feasible;

The site was chosen so the solar farm can be co-sited with the adjacent Ashley Substation. Due to its location, additional powerlines or infrastructure that may be required if the site were further away are not required, which minimises the potential adverse effects.

d. meeting accepted design standards;

The proposed solar farm meets the ODP setback rules in a Rural Zone. When taken a conservative approach, the solar farm, including the inverters do not meet the site coverage rules. However, any solar farm in the Rural Zone would not be able to meet this standard due to the size of this infrastructure.

h. protection of areas of outstanding landscape, or areas of significant indigenous vegetation or significant habitat of indigenous fauna;

The site will not affect the landscape values of any outstanding landscape, or affect any areas of significant indigenous vegetation or significant habitat of indigenous fauna.

6.2 Waimakariri Proposed District Plan

Under the PDP the site is located within the Rural Lifestyle Zone. Under the PDP Rule EI-R43, a proposed solar farm for the primary purpose of inputting power into the grid is a ***restricted discretionary activity***. This is because the electricity generated will not be used on site. If it were, it would be a ***permitted activity*** under Rule EI-R41.

PDP - Rural Lifestyle Zone

Objectives

RLZ-O1 - Purpose of the Rural Lifestyle Zone

Primary production activities and activities reliant on the natural and physical resources of the rural environment occur while recognising that the predominant character is small rural sites with a more intensive pattern of land use and buildings than the General Rural Zone.

Policies

RLZ-P1 - Character of the Rural Lifestyle Zone

Maintain the character in the Rural Lifestyle Zone which comprises:

1. a highly modified landscape strongly influenced by fine grained patterns and processes of human induced activity, including a predominance of small rural lots with a resulting pattern of residential units, buildings, fencing, amenity and domestic planting mixed with smaller scale primary production activities;

2. a dominance of human modified open space and vegetation, including paddocks and trees over buildings; and

3. a zone supporting activities reliant on the natural and physical resources of the Rural Lifestyle Zone.

The proposed solar farm will not be entirely in keeping with the character of the rural lifestyle zone, that would provide for approximately 20 rural lifestyle properties.

Solar farm infrastructure relies on large areas of land being a physical resource primarily found in rural environments. This is largely due to economies of scale and the significant number of solar panels required, in addition to other renewable energy resources, to assist in meeting the objectives of Aotearoa New Zealand's NES-REG. However, with regard to the Rural Lifestyle zoning, the proposal will be co-located with the Ashley Substation, an industrial timber mill and factory farming, none of which are ideal or desirable activities in proximity to rural lifestyle activities due to reverse sensitivity effects. So, while the proposal will not meet this policy, in reality the solar farm will provide an appropriate buffer between these activities and the proposed Rural Lifestyle zone.

RLZ-P2 Activities in the Rural Lifestyle Zone

Retain opportunities for land within the zone to be used for primary production activities while maintaining the predominant character of small rural lots by avoiding new sites being created, or residential units being erected on sites, that are less than 4ha, unless:

1. associated with the development of infrastructure which reduces the size of the balance lot or site to below 4ha;

2. associated with the establishment of a bonus residential unit or creation of a bonus allotment;

3. the erection of a residential unit is protected by a legacy provision in this Plan; and

4. is the establishment of a minor residential unit, where the site containing a residential unit is 4ha or greater, or is protected by a legacy provision in this Plan.

The site will continue to be used for primary production as well as being a source for renewable energy. The site will not be subdivided nor will it contain living activities.

PDP - Energy and Infrastructure

Objectives

EI-O2 Adverse effects of energy and infrastructure

Adverse effects of energy and infrastructure on the qualities and characteristics of surrounding environments and community well-being are avoided, remedied or mitigated.

Policies

EI-P5 Manage adverse effects of energy and infrastructure

Manage adverse effects of energy and infrastructure, including by the following:

1. enabling or providing for the ongoing operation, maintenance, repair, renewal, removal and minor upgrade of existing energy and infrastructure;

The potential landscape and visual effects resulting from the solar farm have been assessed above. The potential adverse effects that can be managed, primarily visual, and glint and glare effects have been by screening the solar farm from the surrounding public and private places. Also, the site selection process has resulted in the potential reduction of associated infrastructure, such as powerlines.

2. avoiding, remedying or mitigating adverse effects of more than minor upgrades to existing energy and infrastructure, including effects on:

a. natural and physical resources;
b. amenity values;
c. sensitive activity;
d. the safe and efficient operation of other infrastructure;
e. the health, safety and well-being of people and communities;

The proposal is for a new solar farm, not an upgrade. Refer to 3, below.

3. new energy and infrastructure, or major upgrades to existing energy and infrastructure, should, to the extent considered practicable, ensure that the route or site is located outside of the following types of sensitive environments to protect such environments from significant adverse effects, taking into account the constraints imposed by the functional need or operational need of the energy and infrastructure:

a. ONF, ONL and SAL;

b. areas of ONC, VHNC and HNC, and natural character of scheduled freshwater bodies setbacks;

c. SNAs;

d. buildings, other structures and settings with heritage values, and archaeological sites;

e. SASM;

f. places adjoining the coastal marine area;

The site is not situated within any of the above-mentioned sensitive environments.

4. where new energy and infrastructure, or major upgrades to existing energy and infrastructure, cannot locate outside of the sensitive environments in (3) above, the energy and infrastructure should, to the extent considered practicable, ensure that the proposed route, site, structure and construction method demonstrate the following, taking into account the constraints imposed by the functional need or operational need of the energy and infrastructure:

a. energy and infrastructure will be located in more compromised parts of the areas in (3) above where that reduces adverse effects on the values of those areas;

b. techniques (such as structure selection or construction methodology) will be used to mitigate adverse effects on the areas in (3) above;

c. adverse effects on the areas in (3) above will be remedied or mitigated;

The site is not situated within, and is situated far enough away from these above-mentioned sensitive environments so it will not adversely affect their landscape values.

5. consider biodiversity offset for residual adverse effects on indigenous biodiversity that cannot otherwise be avoided, remedied or mitigated;

The solar farm will not result in any adverse effects on indigenous biodiversity.

PDP - Activity status: RDIS

Matters of discretion are restricted to:

- *EI-MD2 - Amenity values, location and design*
- *EI-MD3 - Operational considerations*
- *EI-MD4 - Health and safety*
- *EI-MD5 - Electricity generation*
- *EI-MD8 - Water supply, wastewater system, and stormwater infrastructure*

EI-MD2 - Amenity values, location and design

1. The practicality and effectiveness of screening the infrastructure.

2. For infrastructure attached to other structures, the extent to which the infrastructure is within the visual envelope of an existing structure, and the extent to which the colour and design of the infrastructure corresponds to the existing structure.
3. The extent of consideration of the number, size, location and design of any other existing infrastructure in the vicinity.
4. The extent to which any adverse effects of the infrastructure have been avoided, remedied or mitigated by the route, site and construction method selection.
5. The extent to which the location and size of the infrastructure impacts on the ability of people to access any existing facility or activity on the site.

The proposed shelterbelt will provide effective screening from all public places and all bar one private places two years following the construction of the solar farm. The shelterbelt will screen the solar farm from two upstairs windows from one neighbouring dwelling four years after it is constructed.

The solar farm will not be attached to the Ashley Substation, however for the two years that the solar farm is seen, they will be seen alongside one another.

Apart from the Ashley Substation, which has been considered, there is no other existing infrastructure in the vicinity although the treatment ponds are located in the vicinity.

The solar farm can only be constructed once the shelterbelt reaches 2m tall, which reduces the timeframe for and assists with mitigating its potential adverse effects.

The solar farm will not impact on the existing access and use of sheds and sheep pens within the site.

EI-MD3 - Operational considerations

1. The extent to which the location and scale of structures proposed are necessary to meet the operational need or functional need of the infrastructure.
2. The extent to which placing infrastructure underground is unreasonable in terms of technical constraints, additional costs or environmental effects.
3. The extent to which there is any risk to, and effects on, the operation, maintenance, upgrading and development of the infrastructure.
4. The extent to which buildings, other structures or vegetation obstruct or otherwise adversely affect radiocommunication pathways, either individually or cumulatively, and the extent to which such adverse effects can be avoided, remedied or mitigated.

These matters of discretion are not applicable to an assessment of landscape effects except matter 1. Where the location of the solar farm is required to be located in proximity to a substation to ensure the energy captured can be readily transferred to the national grid.

EI-MD4 - Health and safety

1. The extent to which the infrastructure will be located in close proximity to any sensitive activity, and the extent of any effect on human health.

This matter of discretion is not applicable to an assessment of landscape effects.

EI-MD5 - Electricity generation

1. The extent to which the infrastructure will make a meaningful contribution to renewable electricity generation targets.

2. The distance between the infrastructure and residences, public places, or places from which the infrastructure would be visible, and the extent to which the infrastructure would pose significant adverse visual effects on or dominate the surrounding landscape.

The actual and potential visual effects resulting from the solar farm have been assessed in Section 5 of this report.

3. The extent to which views to the infrastructure are expansive or constrained.

The views to the solar farm are constrained to the two adjacent and relatively short stretches of road along the site boundary and immediately adjoining neighbouring properties.

4. The extent to which the design, siting and size of the infrastructure responds to its landscape context.

The solar tables have been located to maximise yield within the entire site, whilst meeting the required setbacks from the ephemeral streams with the site and providing for the enhancement of their natural character.

5. The relative elevation of the infrastructure, in relation to residences, public places or place from which the infrastructure will be visible, including the extent to which the infrastructure is located on a ridgeline or series of ridgelines, or would form part of a skyline.
6. Number, design and extent of wind turbines and associated structures, and predominant orientation in relation to the landform.

Matters 5 and 6 appear to be directed at wind turbines. However, for completeness, the solar farm is not situated in an elevated area.

7. Effects on topography, landforms and geological forms.

The solar farm will not affect topography, landforms and geological forms. The proposed solar panels are relatively 'light' structures that sit above the ground. If the solar farm becomes redundant the solar panels etc can be easily removed from the site returning it to a rural pastoral landscape.

8. Ecological effects including any loss of indigenous flora, fauna, habitat and effects on riparian margins.

The solar farm will not result in any adverse effects on indigenous flora, fauna, habitat and effects on riparian margins but the proposed riparian planting along the ephemeral streams will provide beneficial effects to natural character and ecological values.

9. Effects on adjoining land uses of noise levels, noise modulation, glint/glare, and shadow flicker.

Glint / glare is assessed under 12 below. The other matters are not relevant.

10. Need to locate wind turbines and associated structures where the wind resource is available and the quality of the wind resource.

Matter 10 is directed at wind turbines.

11. Extent and visibility of roads, access tracks, earthworks and vegetation clearance associated with the construction, operation or maintenance of the infrastructure.

Earthworks to create farm tracks and modify landform to accommodate the solar farm will be relatively minimal and will occur once the shelterbelts have been planted. Therefore, the construction process of modifying the landform will not be overly prominent and will be meaningfully screened by the proposed vegetation. No vegetation clearance is required.

12. For solar cells, as well as the above matters:
a. the time of day, year, and time per day when adjoining or adjacent sites would be affected by reflected solar glare and the degree of luminescence;
b. the number of sites affected and their relative proximity; and
c. whether there is a hazard from any glare.

Vector Powersmart have assessed the potential glint and glare effects of the proposal when the shelterbelt is 2m[29] and 4m tall[30], and this has been summarised in the body of this report. In the short-term glare may be experienced for short periods of time (less than 10minutes per day and less than 10 hours per year), and a few short stretches of road. In the long term, glare will be effectively mitigated by the 4m tall shelterbelt.

13. The necessity for electricity generation other than renewable electricity generation in the District's electricity supply network, including for resilience.

Matter 13 is not applicable to an assessment of landscape effects

EI-MD8 - Water supply, wastewater system, and stormwater infrastructure

1. The requirements of the ECOP, and any other relevant regulations.
2. The extent to which the proposed servicing will adequately serve its intended purpose.
3. The extent to which existing infrastructure is available to connect to.
4. The extent to which the infrastructure will incorporate existing indigenous vegetation, or proposes new planting of indigenous vegetation naturally occurring within the ecological district within which planting will take place or of ecologically similar origin.
5. The extent of any actual or potential adverse effects on the capacity, efficiency and function of existing infrastructure.
6. The provision for, and protection of, the flood storage and conveyance capacity of waterways.
7. The requirements of AS/NZS 1547:2012 On-site Domestic Wastewater Management.
8. The extent to which interference with public use and enjoyment of open space and recreation land is or can be minimised where infrastructure is located or proposed to be located in Open Space and and Recreation Zones.
9. The extent to which safe and direct access can be provided to enable the maintenance of infrastructure.
10. The extent to which there will be health and safety adverse effects associated with infrastructure and the extent to which these can be avoided, remedied or mitigated.

29 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 2m Tall Trees. Dated 29.09.2023.

30 Vector Powersmart. Solar Bay – Ashley Glint/glare Assessment – 4m Tall Trees. Dated 03.10.2023.

11. The outcome of any consultation undertaken with the District Council regarding the availability, adequacy or suitability of the water supply, wastewater system or stormwater infrastructure servicing proposed.

Matter 1 – 3 and 5 - 11 are not applicable to an assessment of landscape effects. Regarding matter 4, the proposal will achieve this through the proposed native riparian vegetation that will be located along the two ephemeral streams.

7 Conclusion

It is proposed to locate a solar farm within 87 Upper Sefton Road, Ashley, which is located on the northwest corner of the Upper Sefton Road and Beatties Road intersection and adjacent to the Ashley Substation.

Visual effects resulting from the proposed solar farm are summarised as:

- Upper Sefton Road and Beatties Road. The solar farm will have a moderate degree of adverse effects on the visual amenity experienced by road users when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, adverse effects will be of a low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to a low to low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.
- Marshmans Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity experienced by Marshman Road users when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to very low to low and when the shelterbelt reaches 6m tall these adverse effects will be nil.
- 47 Upper Sefton Road - No adverse visual effects.
- 53 Upper Sefton Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a very low to low degree. Once the shelterbelt reaches 4m tall these adverse effects will be nil.
- 152, 159, 167, 200, 204 and 224 Marshmans Road. The solar farm will have a low to low-moderate degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 3m – 4m tall these effects will be reduced to a low and when the shelterbelt reaches 6m tall adverse effects will be nil.
- 178 Beatties Road. The solar farm will have a moderate degree of adverse effects on the visual amenity when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to a low to low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.
- 189 Beatties Road. The solar farm will have a low degree of adverse effects on the visual amenity when it is first constructed. Once the shelterbelt is 4m tall these effects will be reduced to no more than a very low degree and when the shelterbelt reaches 6m tall these adverse effects will be nil.
- 126, 190, 196 and 217 Beatties Road. The solar farm will have a low-moderate to moderate degree of adverse effects on the visual amenity experienced when it is first constructed and for the limited period of the day when the solar panels will stand above a height of 3.5m. However, for the majority of the day, these adverse effects will be of a low to low-moderate degree. Once the shelterbelt is 2.5m - 3m tall these effects will be reduced to no more than a low-moderate and when the shelterbelt reaches 4m tall these adverse effects will be nil.

The proposal will not alter the landform, land cover or land use within the site. The solar farm will change the perceptual values within the site as the character will change from a rural pastoral character to a predominantly rural utility / semi-industrial character, with an underlying pastoral use.

The potential adverse effects will be mitigated by the vegetation that screens the proposal from view, the proposed shelterbelt planting and the landscape context including its proximity to the adjacent substation. Notwithstanding this, the proposal will retain some of the rural pastoral character within the site with a continued productive land use, that enables the solar farm to coexist with the rural and rural lifestyle landscape setting and contribute to the appropriateness of the proposal within this landscape.

Overall, the proposal will have a **low** degree of adverse effects on the landscape values of the site and its receiving environment.

RMM

ROUGH MILNE MITCHELL
LANDSCAPE ARCHITECTS

Proposed Solar Farm - 87 Upper Sefton Road, Ashley, Canterbury
Graphic Attachment to Landscape Assessment Report

14 May 2024

Document Information

Project	
Proposed Solar Farm	
Address	
87 Upper Sefton Road, Ashley	
Client	
Solar Bay Ltd	
Document	
Graphic Attachment to Landscape Assessment Report	
Status	
For Resource Consent	
Revision	
1	For Resource Consent	11.10.2023
2	RFI Response	14.05.2024
Prepared By	
Rough Milne Mitchell Landscape Architects Ltd	
Project Number: 21322	
Author: Zoe Cox and Paul Smith	
Peer Reviewed: Nikki Smetham	

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Contents

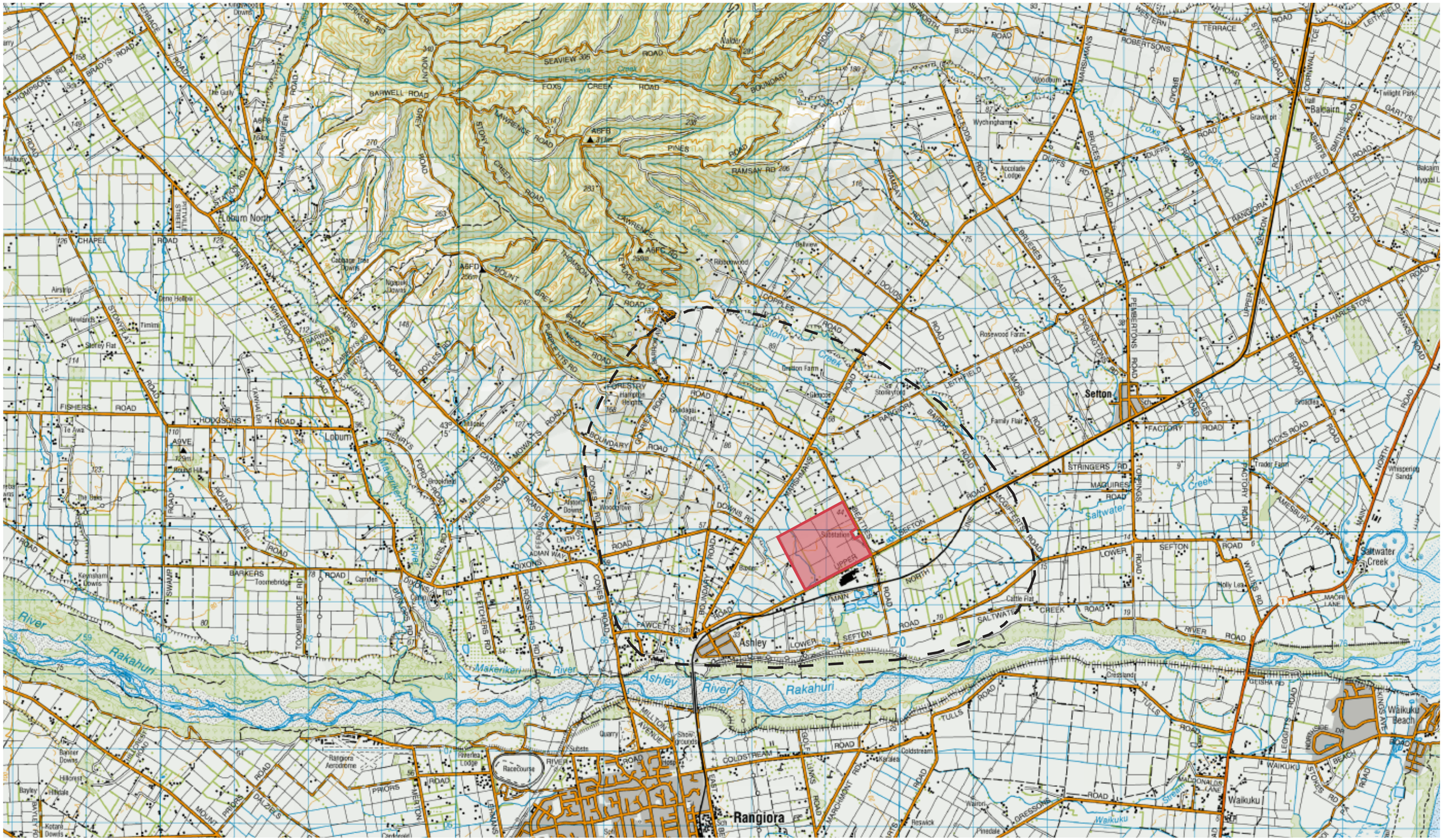
Receiving Environment Plan

Legend

	The Site
	The Receiving Environment

Not to Scale

Data Source: topomap.co.nz



Local Context Plan

Legend

The Site

Not to Scale

Data Source: canterburymaps.govtnz

Site Context Plan

Legend

The Site

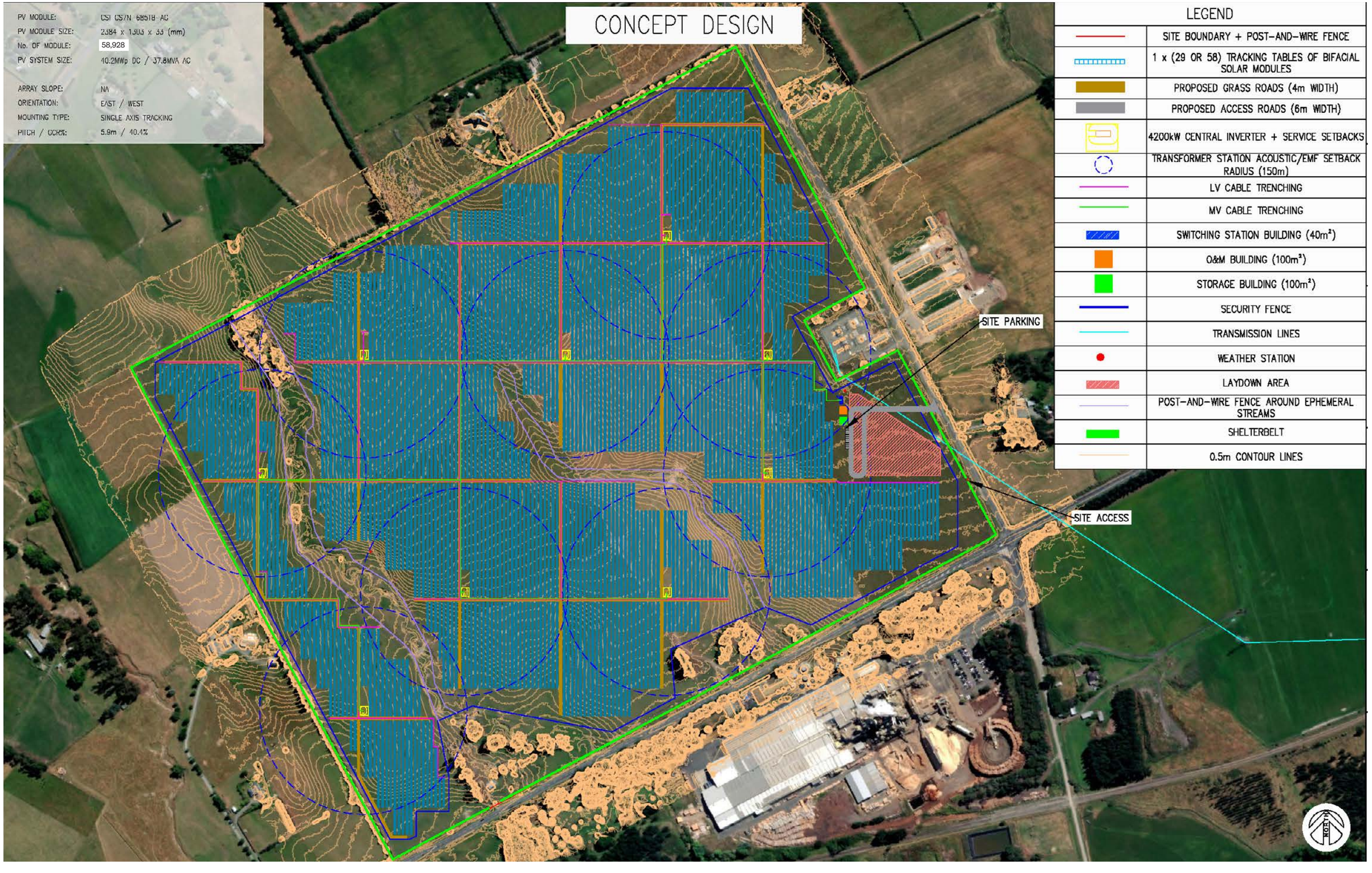
Scale : 1:6,000

Data Source: grip.co.nz

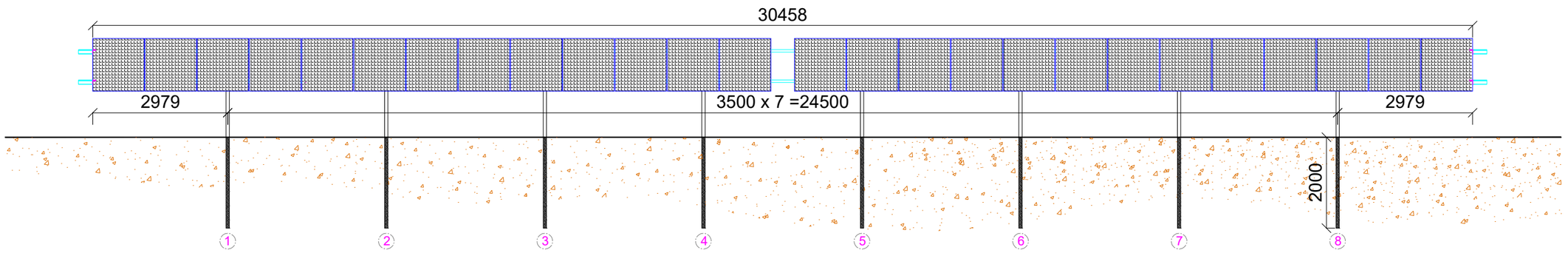
One Panel Tilting Solar Table - General Arrangement Plan

Not to Scale - To Fit Page

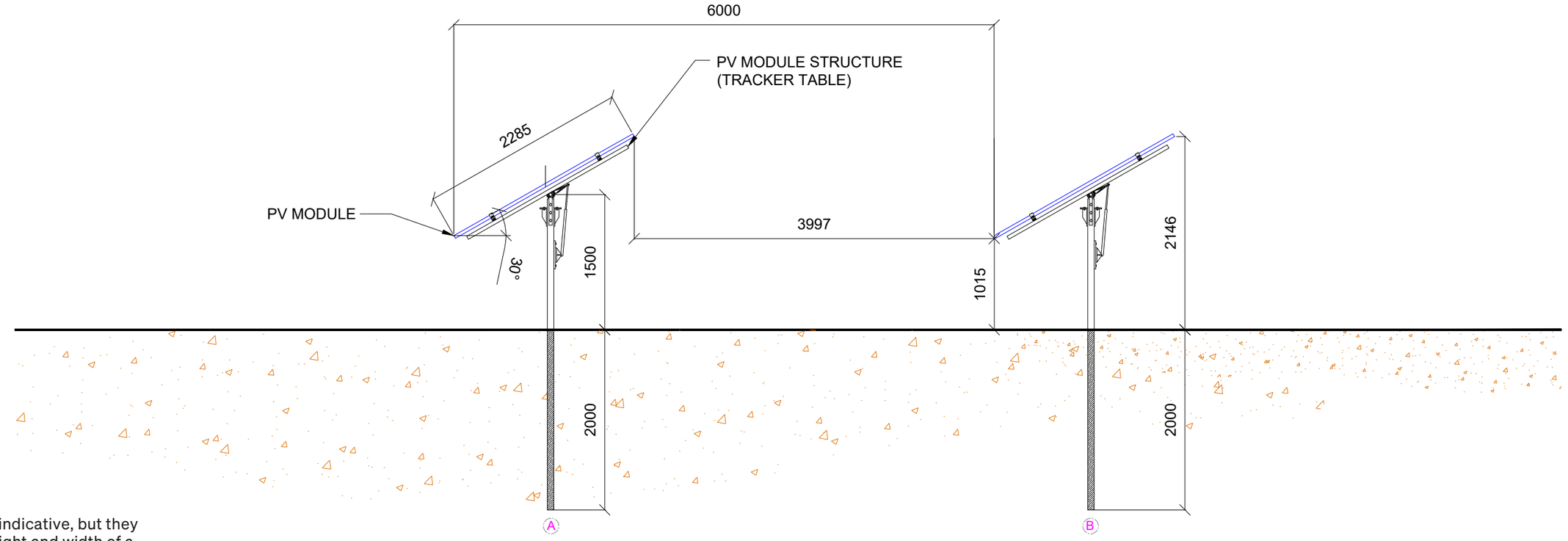
Data Source: Vector Powersmart



One Panel Tilting Solar Table - Indicative Cross Sections



Typical Cross Section Detail For Tracker Table (Front View)



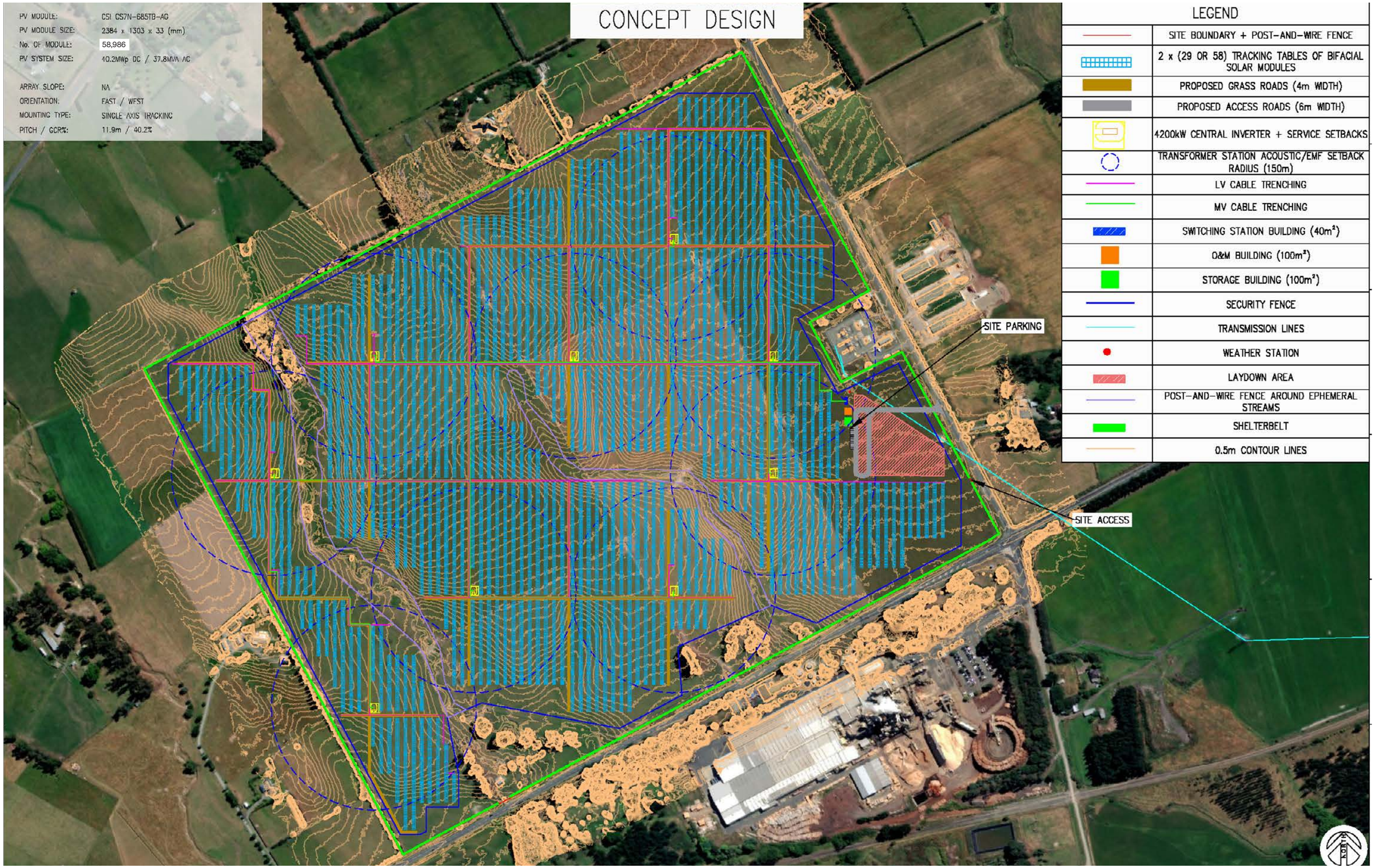
Typical Cross Section Detail for Tracker Table (Side View)

Note:
These cross sections are indicative, but they generally illustrate the height and width of a one panel single axis tracking solar table.

Not to Scale

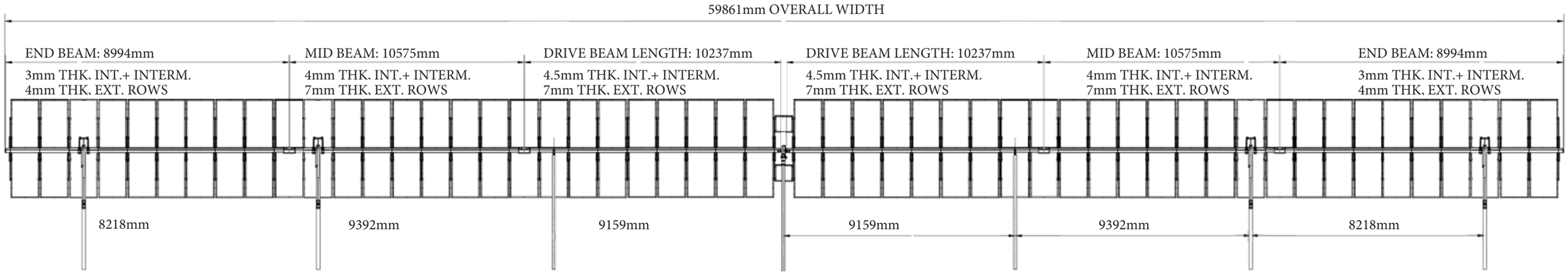
Data Source: Aquila Capital Renewables Asia Pte. Ltd.

Two Panel Tilting Solar Table - General Arrangement Plan

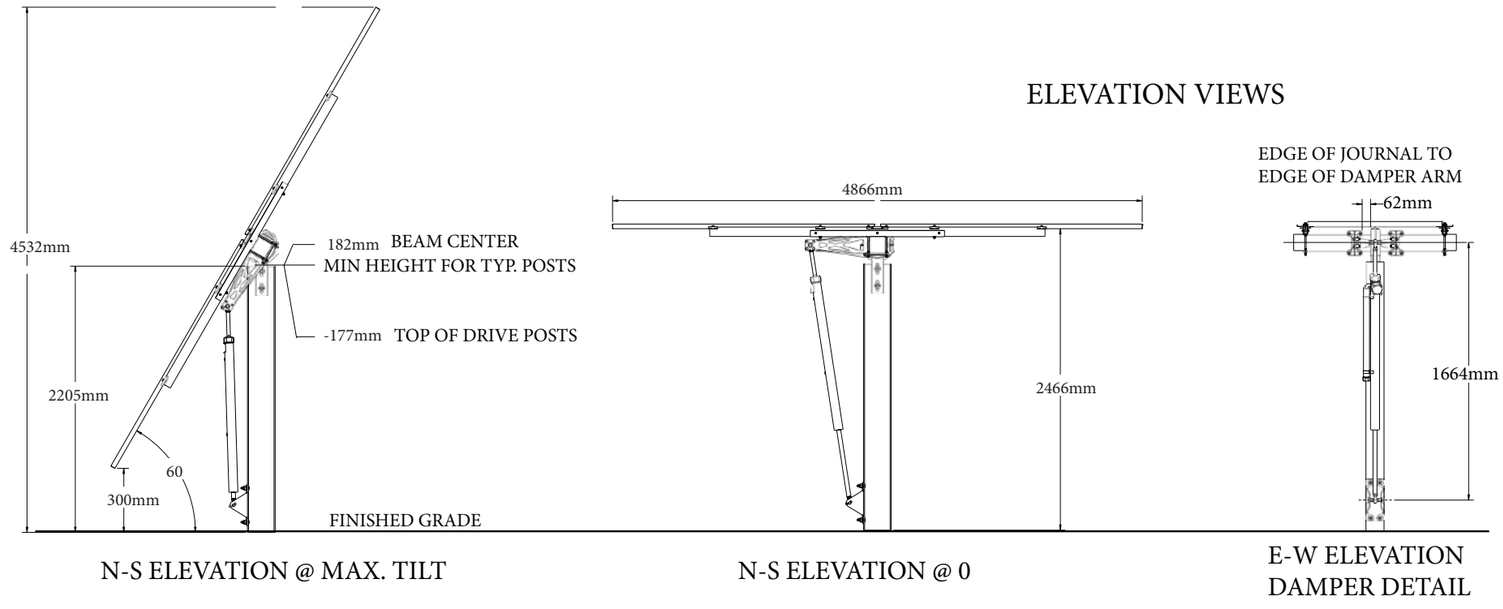


Two Panel Tilting Solar Table - Indicative Cross Sections

MECHANICAL LAYOUT



ELEVATION VIEWS



N-S ELEVATION @ MAX. TILT

N-S ELEVATION @ 0

E-W ELEVATION
DAMPER DETAIL

Example of a similar Solar Farm in Marlborough

Not to Scale - To Fit Page

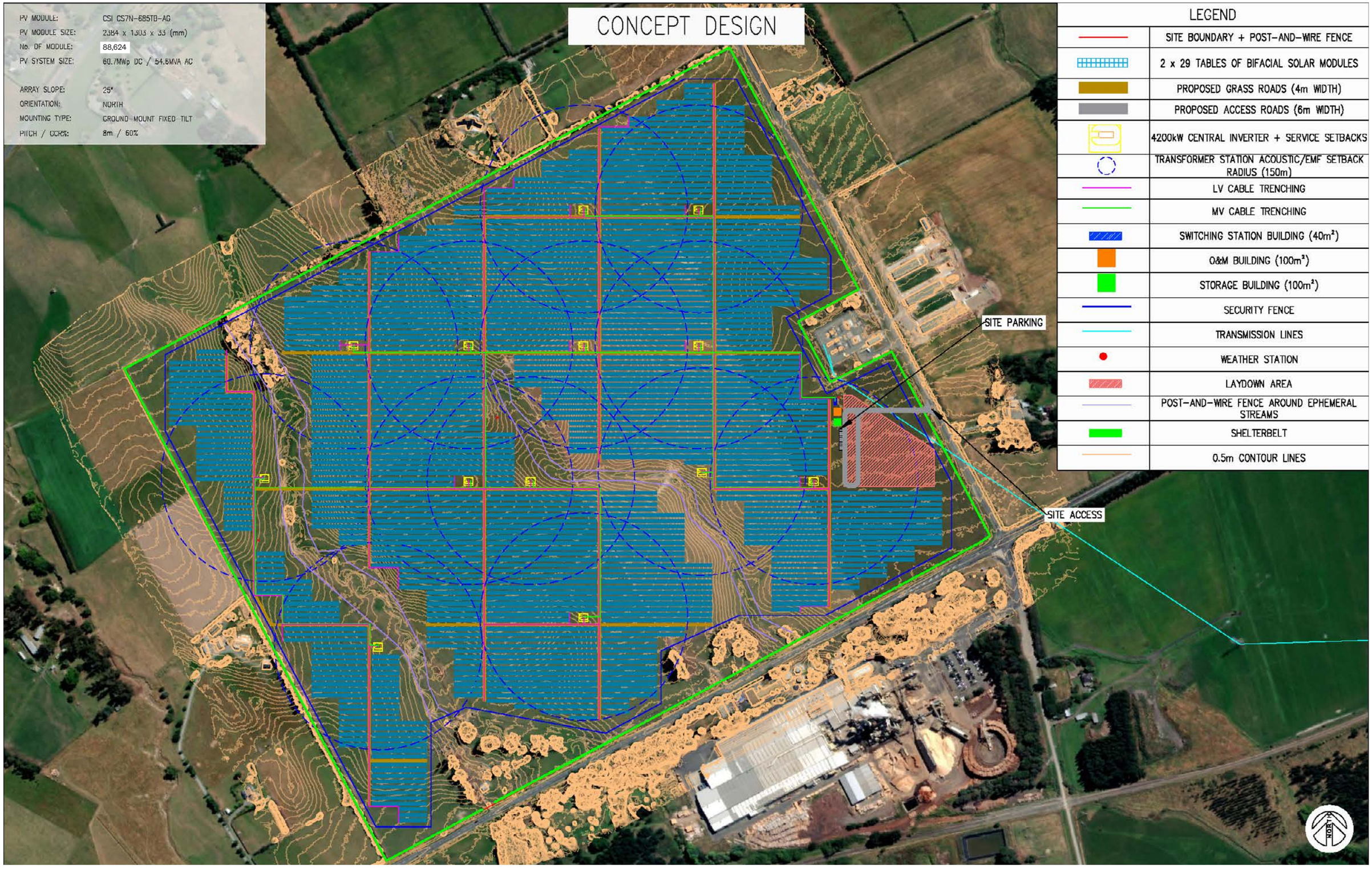
Data Source: Vector Powersmart Indicative Proposal

Note:
These cross sections are indicative, but they generally illustrate the height and width of a two panel single axis tracking solar table.

Fixed Solar Table - General Arrangement Plan

Not to Scale - To Fit Page

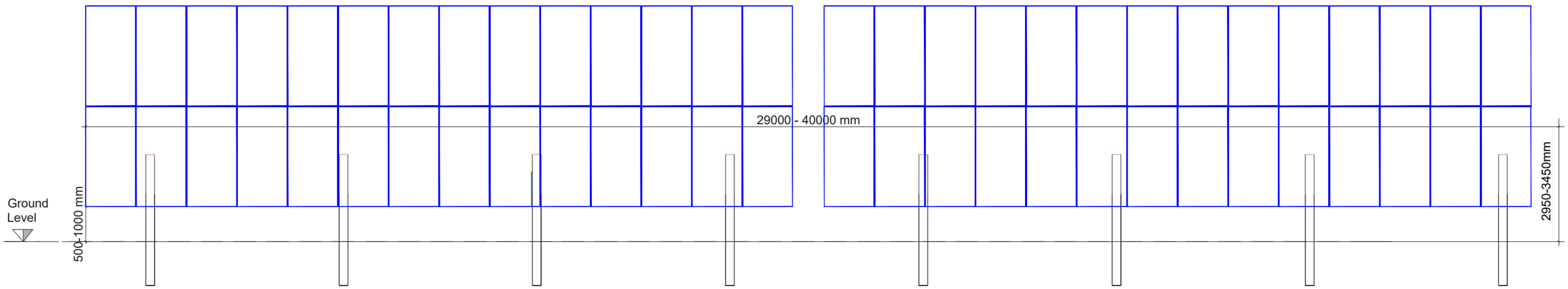
Data Source: Vector Powersmart



Fixed Solar Table - Indicative Cross Sections

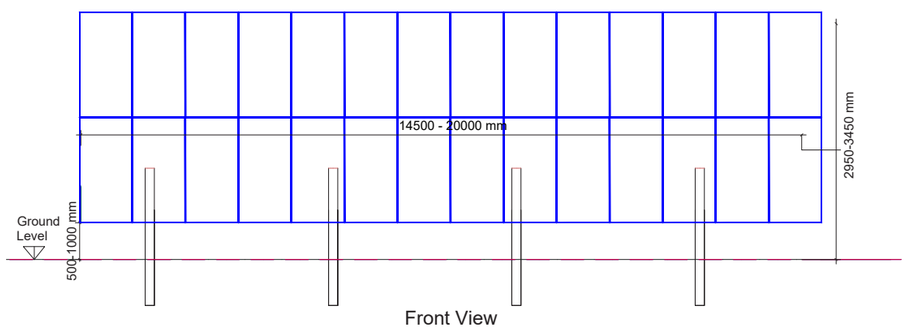
Technical Details - Mounting Structure

Example: 2P x 26 (full table) Mounting Structure



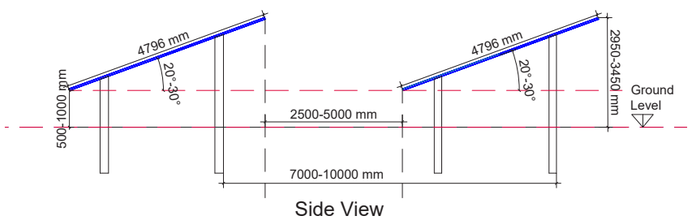
Front View

Example: 2P x 13 (half table) Mounting Structure



Front View

Example: 2P x 26 & 2P x 13 Mounting Structure



Side View

Example of a similar Solar Farm

Not to Scale - To Fit Page

Data Source: Solar Bay

Note:
These cross sections are indicative, but they generally illustrate the height and width of a fixed tilt solar table.

Solar Panel and Inverter Information

A Example of Solar Panels
B Mechanical Characteristics of Solar Panels
C Example of Inverter

Tiger Pro 7RL4-TV

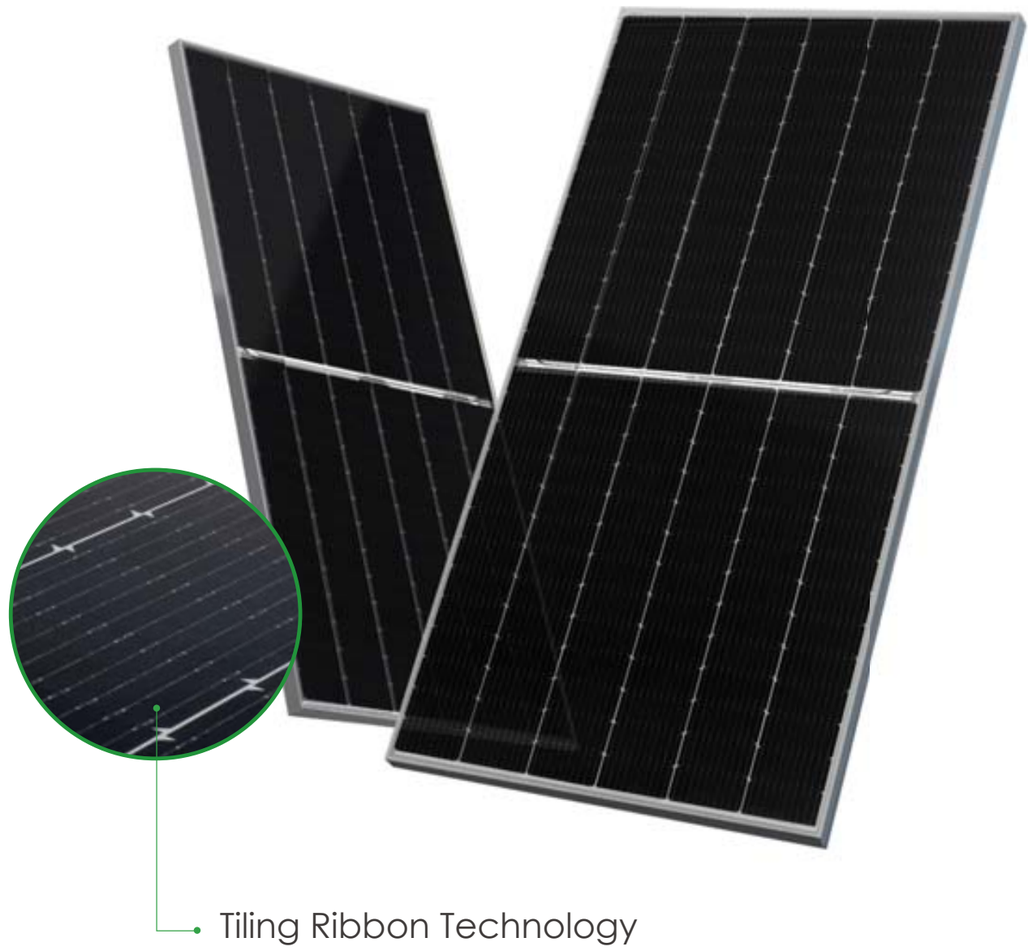
565-585 Watt

BIFACIAL MODULE
TILING RIBBON (TR)

P-Type

Solar JinKO

*Building **Your Trust** in Solar*



A.

Mechanical Characteristics

Cell Type	P type Mono-crystalline
No. of cells	156 (2×78)
Dimensions	2411×1134×35mm (94.92×44.65×1.38 inch)
Weight	30.6 kg (67.46 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm² (+): 400mm , (-): 200mm or Customized Length
Conector	JK03M/2B, genuine MC4 evo 2
Fire Rating	Class C

B.

Dimensions 2.815m (W) x 2.318m (H) x 1.588m (D)

C.

Landscape Mitigation Plan

Legend

	The Site
	Proposed Shelterbelt
	Proposed Native Riparian Vegetation
	Solar Panel Layout
	Inverters
	Accessway
	Security Fence
	Switching Station, O&M, Storage Buildings
	Extent of Waterways

Shelterbelt Notes

- Proposed exotic shelterbelts will consist of one row of *Cupressus x Leylandii* - Leyland Cypress 'Leighton Green' or similar.
- The individual plants will be planted at 1m spacings.
- Plants will be implemented at a height of 25 - 40cm tall.
- Plants will be planted within the first planting season once the resource consent is approved.
- The shelterbelt will be irrigated via an automatic irrigiation system for the first 5 years following planting.
- The shelterbelt along the sites northwest boundary will be maintained at a minimum height of 6m.
- The shelterbelt along all other boundary lines will be maintained at a minimum height of 4m.

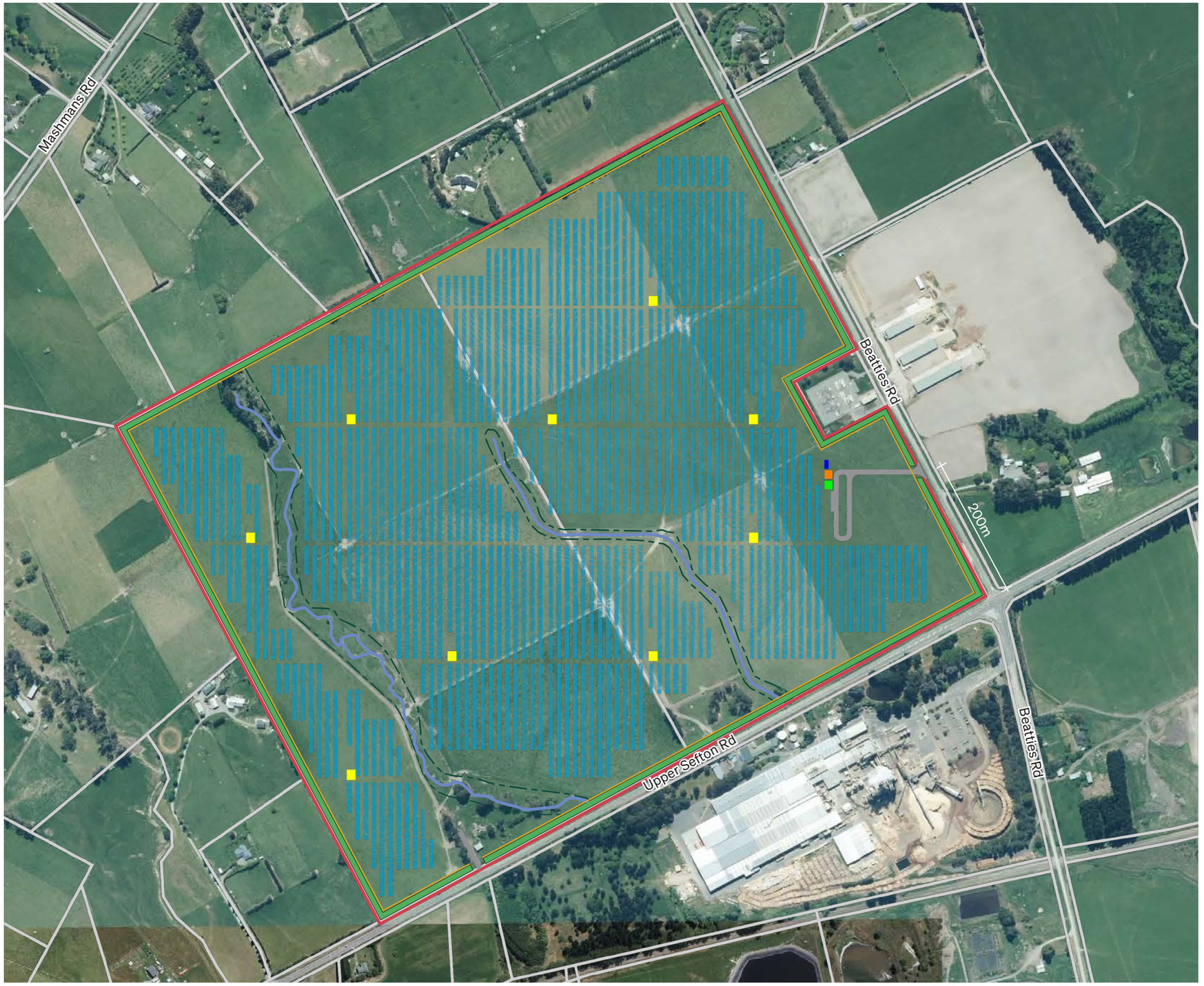
Native Riparian Vegetation Notes

- Native riparian vegetation will be located up to 7m from the edge of the ephemeral watercourse. The area shown indicates the approximate extent of this vegetation.
- A planting plan that outlines the plant species, their size at planting, spacings and a maintenance schedule will be provided to Council within 6 months of obtaining Resource Consent.
- All native vegetation will be implemented within 2 years of gaining Resource Consent, prior to the solar panels are installed.

Note:
Solar panel layout based on two panel tilting solar table option.

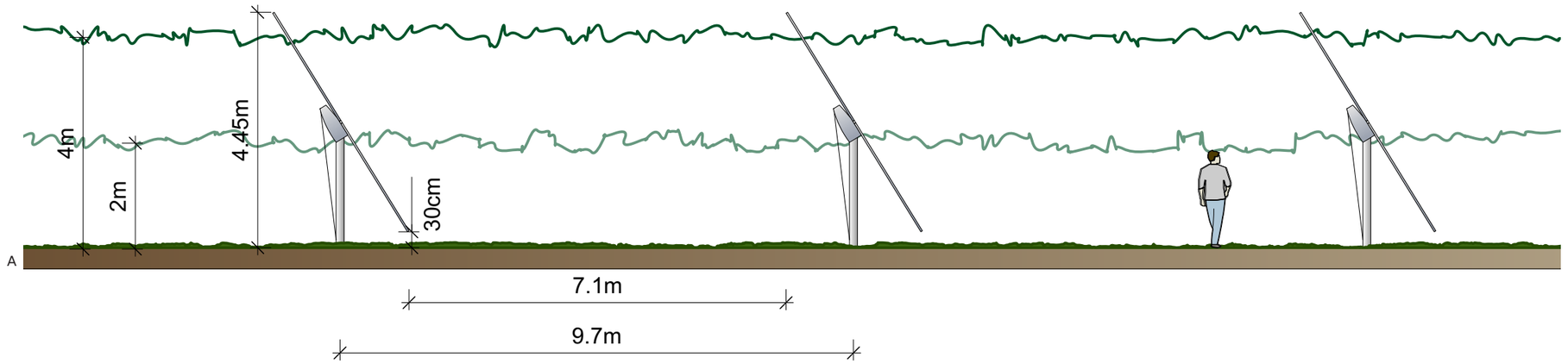
Scale : 1:6,000

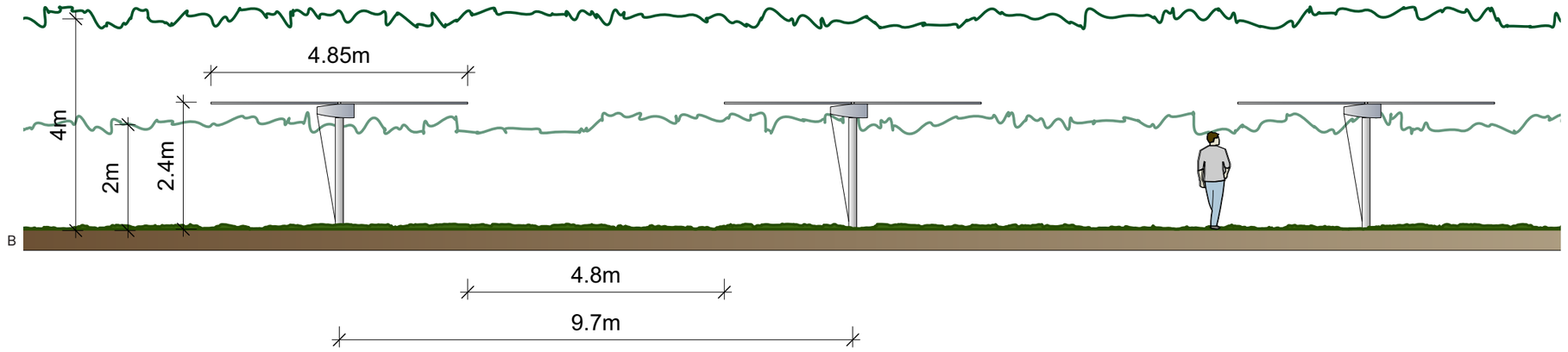
Data Source: grip.co.nz

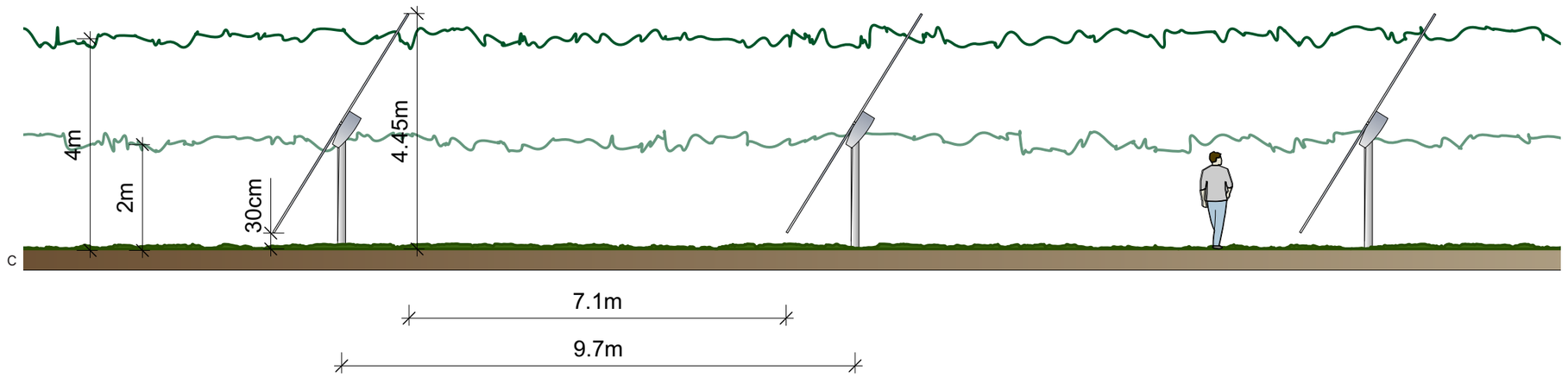


Landscape Mitigation Plan - Indicative Cross Sections

A Morning - Solar Tables at their Maximum East Facing Extent
B Midday - Solar Tables Parallel to the Ground
C Afternoon - Solar Tables at their Maximum East Facing Extent

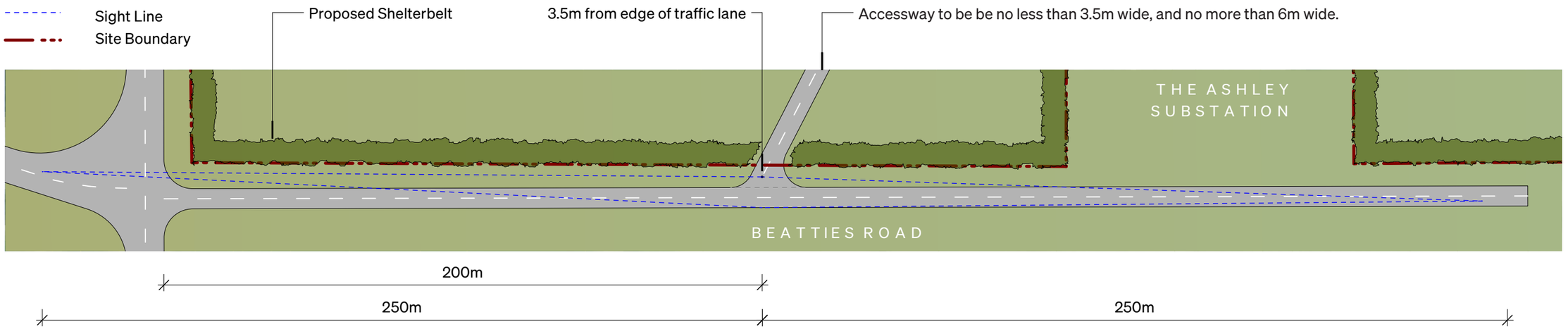






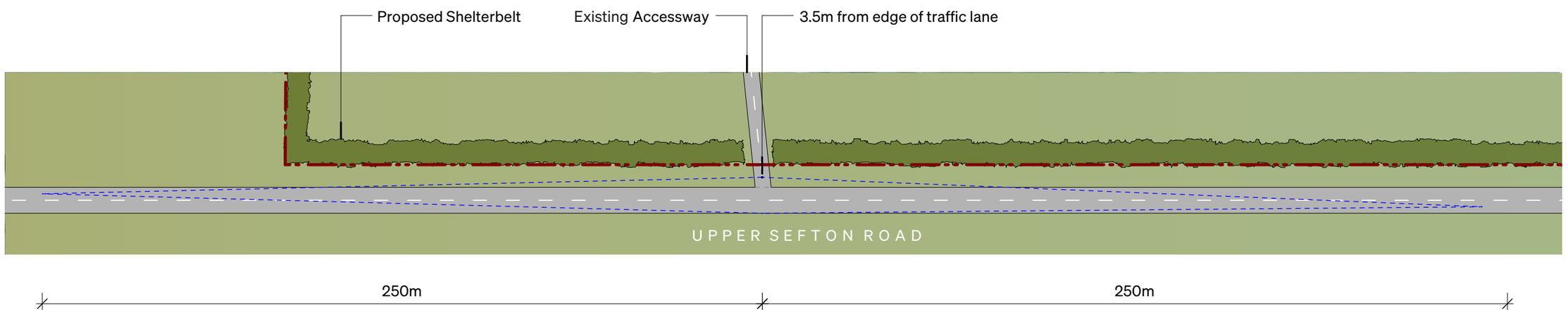
Scale 1:100 @A3

Accessway Sight Lines



Beatties Road Accessway - Sight Distances and Sight Lines for Vehicles Crossings

Scale 1:1500 @ A3



Upper Sefton Road Accessway - Sight Distances and Sight Lines for Vehicles Crossings

Scale 1:1500 @ A3

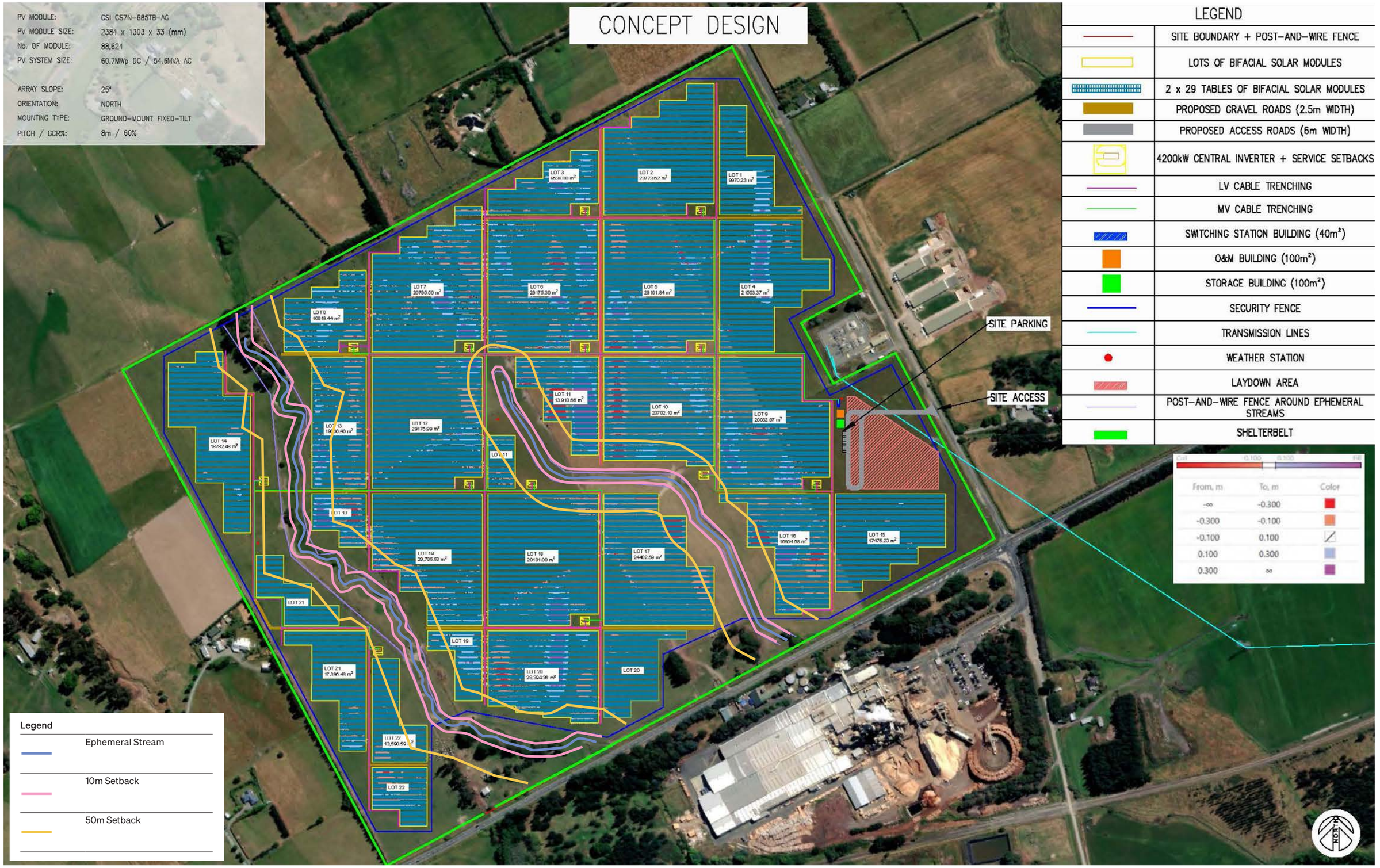
Note:
Diagrams based on Waimakariki District Plan Rule 30.6.1.25, figure 30.4.

Earthworks and Setback Plan

Note:
Solar panel layout based on the fixed solar table option.

Not to Scale - To Fit Page

Data Source: Vector Powersmart



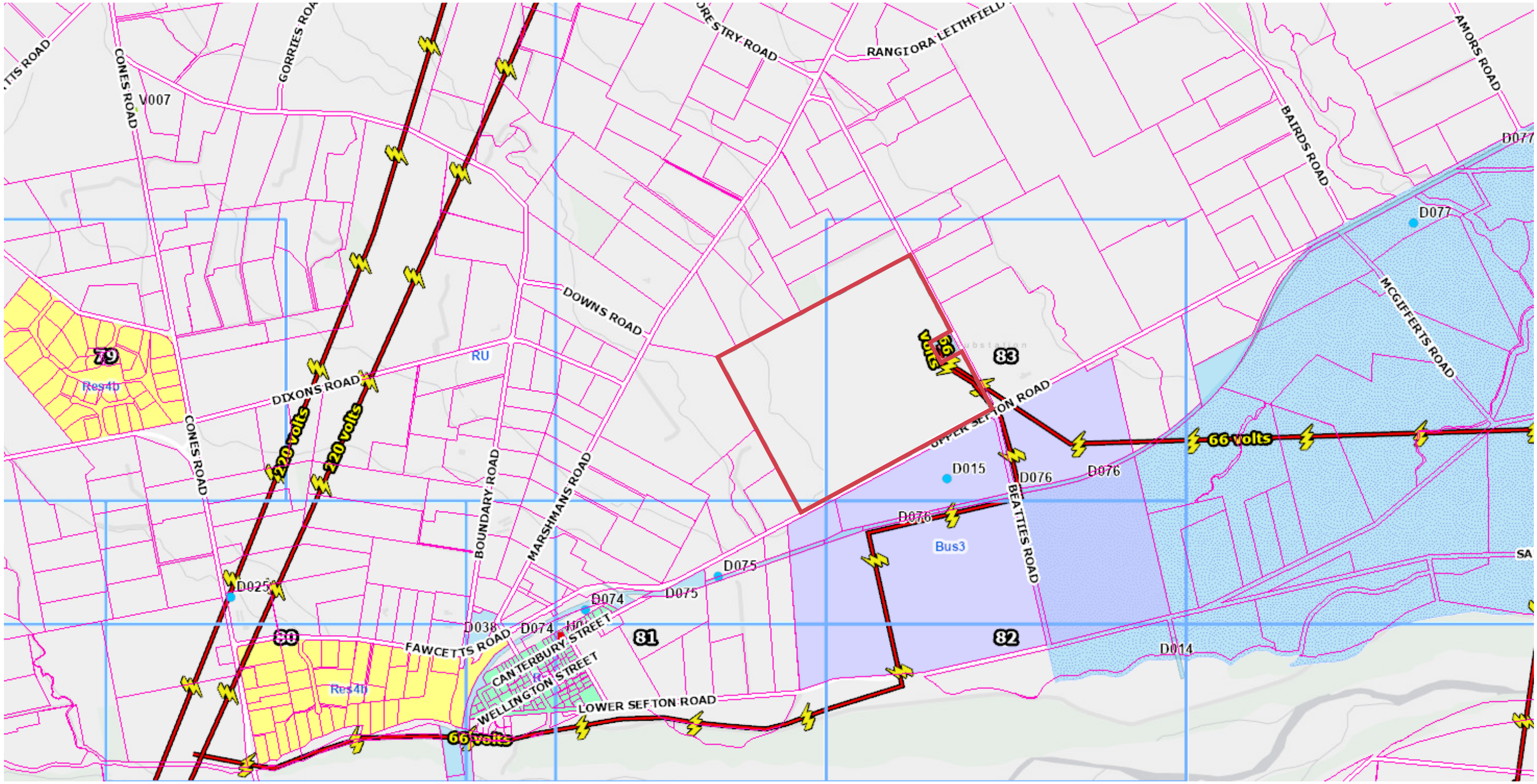
Waimakariri ODP GIS Planning Map

Legend

The Site	Business 3 Zone	D082 - Transpower NZ Ltd Electrial Substation
Rural Zone	Localised Flooding	D015 - Not listed in the District Plan
Residential 4b Zone	Residential 3 Zone	D074, 075, 076, 077 - New Zealand Railways

Not to Scale

https://waimakariri.isoplan.co.nz/eplan

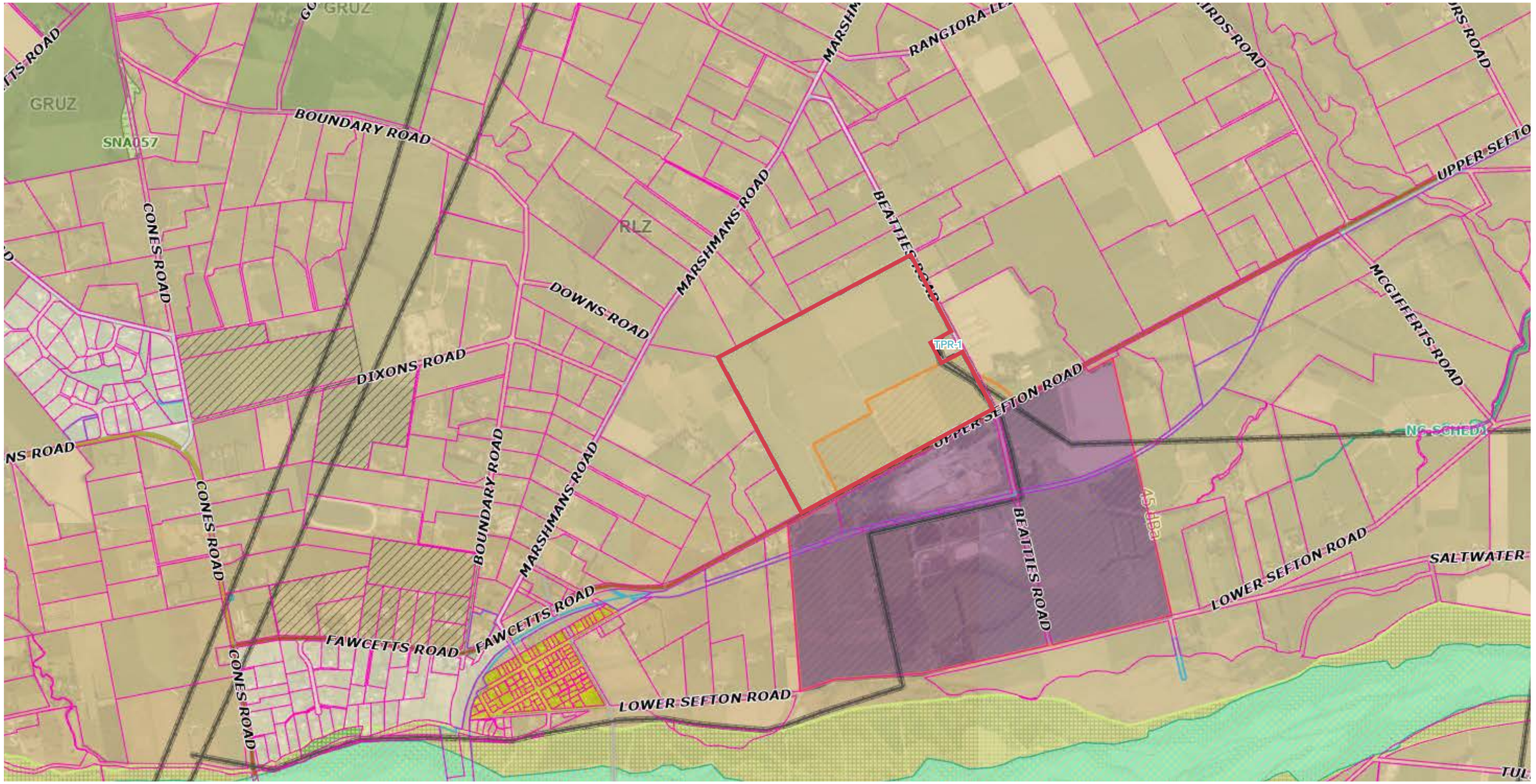


Waimakariri PDP GIS Planning Map

Legend

	The Site
	Rural Lifestyle Zone
	Heavy Industrial Zone
	General Rural Zone
	Large Lot Residential Zone
	Settlement Zone
	Noise Contour for Timber Processing Noise Level - 45 dba
	Nation Grid Transmission Lines
TPR-1	TPR-1 - Transpower NZ Ltd Electrial Substation

Not to Scale



Site Photograph Plan

Legend

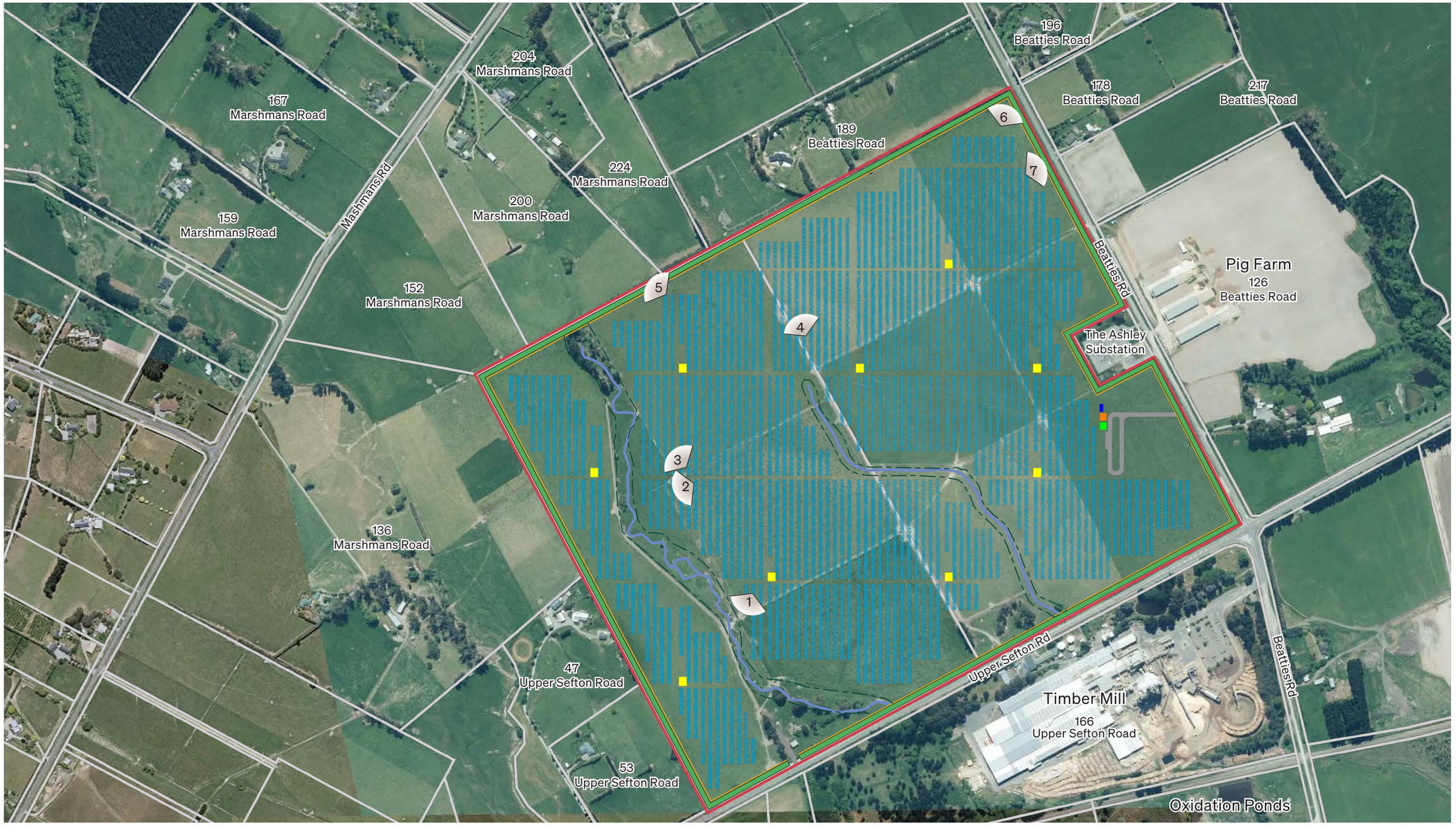
The Site

Viewpoint Locations

1

Scale 1:6,000

Data Source: canterburymaps.govtnz



Site Photographs

1 Located within the south western part of the site, east of the ephemeral watercourse. This photo illustrates the view to the south towards the shed within the site, Upper Sefton Road and a dwelling within 47 Upper Sefton Road. The dwelling within 53 Upper Sefton Road is screened by the vegetation within their property.

2 Located within the western half of the site, east of the ephemeral watercourse. This photo illustrates the view to the west towards a dwelling within 47 Upper Sefton Road and the rooflines of some distant dwellings northwest of Marshmans Road.

3 Located within the northwestern part of the site, east of the ephemeral watercourse. This photo illustrates the view to the north towards the dwelling within 200 Marshmans Road and the rooflines of some distant dwellings northwest of Marshmans Road.

1

2

3

Site Photographs

4 Located beside the water tank within the site. This photo illustrates the view to the north towards the dwelling within 189 Beatties Road.

5 Located alongside the sites northern boundary beside 200 Marshmans Road. This photo illustrates the view to the north towards the dwelling within this property.

6 Located at the sites northern corner. This photo illustrates the view to the north towards the entrance to 190 and the dwelling within 196 Beatties Road.

7 Located within the site, beside and facing east towards the dwelling within 178 Beatties Road.

4

5

6

7

Viewpoint Location Plan

Legend

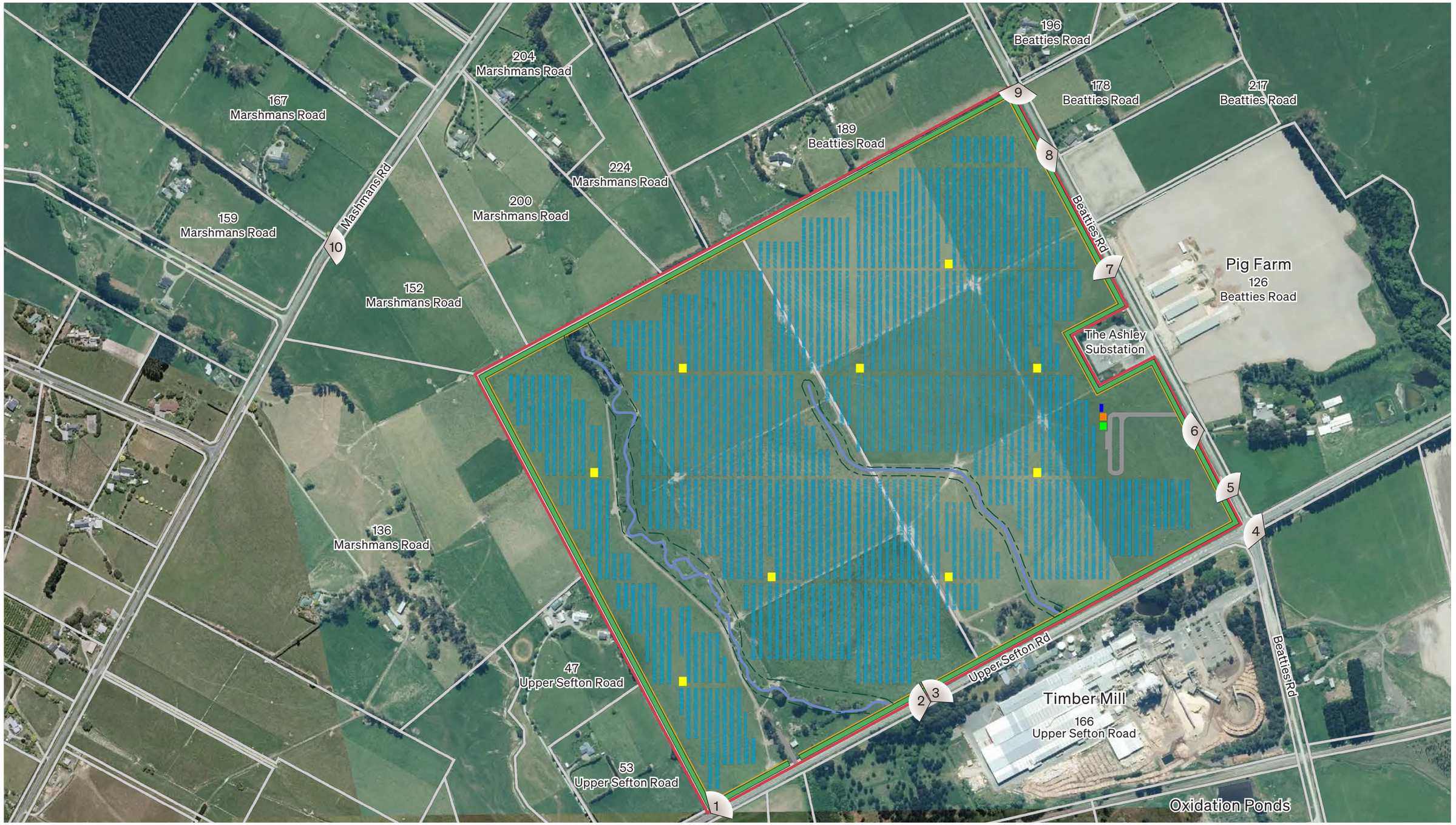
The Site

Viewpoint Locations

1

Scale 1:6,000

Data Source: canterburymaps.govtnz



Viewpoint Location Photographs

Viewpoint 1: Located along Upper Sefton Road, beside the site's boundary line with 53 Upper Seaton Road. This photo illustrates the view facing east along the road alignment, towards the site and its surrounds.

Note:
Viewpoint Photographs 1 - 9 were taken between 10:00am and 12:00noon on 9 June 2022.
Viewpoint Photograph 10 was taken at 10:15am on 13 September 2023.
Photos were captured on a Canon EOS 7D Mark II 50mm Focal Length.
Panorama photos have been created from seven or eight individual portraight photos.
Panorama photos were created in Adobe Photoshop, using the photomerge tool.

Viewpoint Location Photographs

Viewpoint 2: Located along Upper Sefton Road, east of the sheds within the site. This photo illustrates the view facing west along the road alignment and towards the site.

Viewpoint Location Photographs

Viewpoint 3: Located along Upper Sefton Road, east of the sheds within the site. This photo illustrates the view facing east along the road alignment and towards the site.

Viewpoint Location Photographs

Viewpoint 4: Located at the intersection of Upper Sefton Road and Beatties Road, near the eastern corner of the site. This photo illustrates the view facing northwest towards the site.

Viewpoint Location Photographs

Viewpoint 5: Located along Beatties Road, just north of its intersection with Upper Seften Road. This photo illustrates the view facing north along the road alignment, the Substation, the site and their surrounds.

Viewpoint Location Photographs

Viewpoint 6: Located along Beatties Road, beside the entrance to the dwelling within 126 Beatties Road. This photo illustrates the view facing west towards the site, the Substation and their surrounds.

Viewpoint Location Photographs

Viewpoint 7: Located along Beatties Road, north of the Substation. This photo illustrates the view facing north along the road alignment towards the site and its surrounds.

Viewpoint Location Photographs

Viewpoint 8: Located along Beatties Road, beside the entrance and the dwelling within 178 Beatties Road. This photo illustrates the view facing west towards the site and their surrounds.

Viewpoint Location Photographs

Viewpoint 9: Located along Beatties Road, beside the site's boundary line with 189 Beatties Road and the roadside hedge within 178 Beatties Road. This photo illustrates the view facing south along the road alignment, towards the site and its surrounds.

Viewpoint Location Photographs

Viewpoint 10: Located along Beatties Road, beside the site's boundary line with 189 Beatties Road and the roadside hedge within 178 Beatties Road. This photo illustrates the view facing south along the road alignment, towards the site and its surrounds.

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