



Metz Solar Farm - Consideration of Potential Future Building Sites identified by Mr and Mrs Stewart

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Infinergy Pacific Limited

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Abbreviations

Abbreviation	Description
DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
GIS	Geographic Information System
Ha	Hectares
kV	kilovolt
LGA	Local Government Area
MW	Megawatt
PV	Photovoltaic
ZTV	Zone of Theoretical Visibility

1 Introduction

Eco Logical Pty Ltd has produced this report on behalf of Infinergy Pacific in response to a submission received from neighbouring landholders Mr and Mrs Stewart raising concerns regarding potential impacts associated with the Proposed Development on sites they consider to be potential future home sites.

The sites are located on land identified as owned by the Stewart family, to the south and the east of the Proposed Development. The sites were discussed at length with the Stewarts during on site investigations to support the existing Visual Impact Assessment (ELA 2017a) for the proposed Metz Solar Farm, however, these sites were not included within the visual impact assessment as they have no basis in statutory planning.

Each potential future home site is located on RU1 zoned agricultural land (Armidale Dumaresq LEP 2012) and in each case the land parcel is smaller than the minimum permitted 200 ha subdivision. The objectives of land in the RU1 Primary Production zone are to ensure ongoing viability of agricultural land, namely:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To allow for non-agricultural land uses that will not restrict the use of other land in the locality for agricultural purposes.

Dwelling houses are permitted with the consent of Armidale Regional Council. Consultation with Armidale Regional Council indicates that no development applications have been submitted in regard to the identified potential future home sites.

On this basis, the current report provides consideration of potential visual impacts at these sites using the same methodology adopted in the existing Visual Impact Assessment (ELA 2017a) for the proposed Metz Solar Farm. However, it is emphasised that no such dwellings exist at each these locations and that the assessments are to assist the Stewarts to better understand potential effects of the proposed Metz Solar Farm at these sites and to identify potential mitigation measures that could be implemented at each site by the Stewarts to further reduce the effect of any identified impacts.

1.1 Project overview

Infinergy Pacific Pty Ltd (Infinergy) propose to develop a utility-scale photovoltaic (PV) solar farm at Metz, 18 km east of Armidale, NSW (Figure 1, the Proposed Development). The Proposed Development would have an electricity generation capacity of approximately 100 Megawatts (MW), and would produce enough energy to power the equivalent of 40,000 average NSW households each year.

A thirty year land access lease has been negotiated for the life of the Proposed Development. At the conclusion of the operational period, the Site will be decommissioned and returned to a suitable condition to allow the resumption of agricultural activities. A full description of the Proposed Development is provided in the EIS prepared for the project (ELA 2017b).

The Proposed Development covers an area of 507 ha and is located in a sparsely populated rural setting approximately 4.5 km north west of the village of Hillgrove. This assessment is based on the development footprint shown in Figure 2.

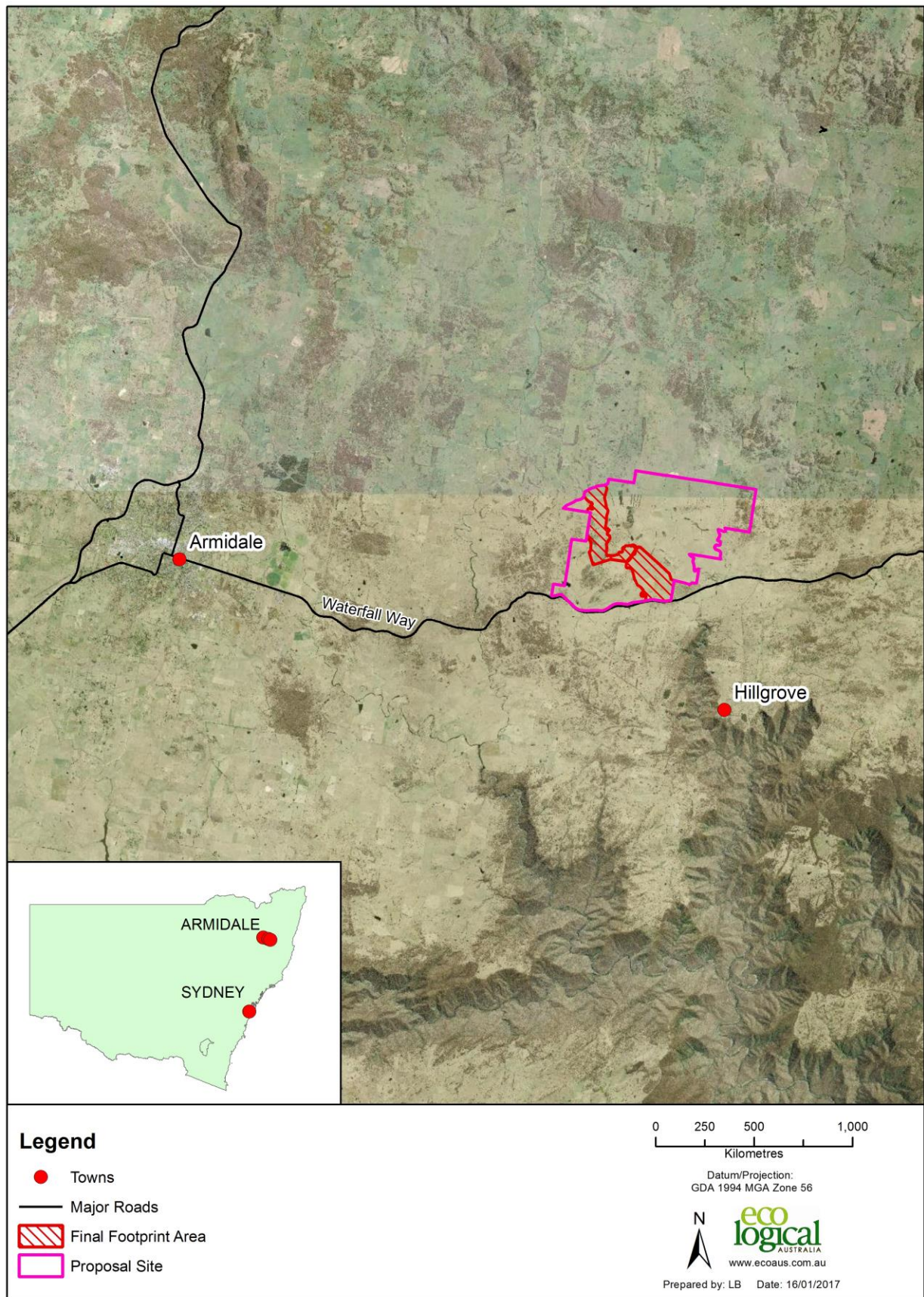


Figure 1: Location of the Proposed Development.

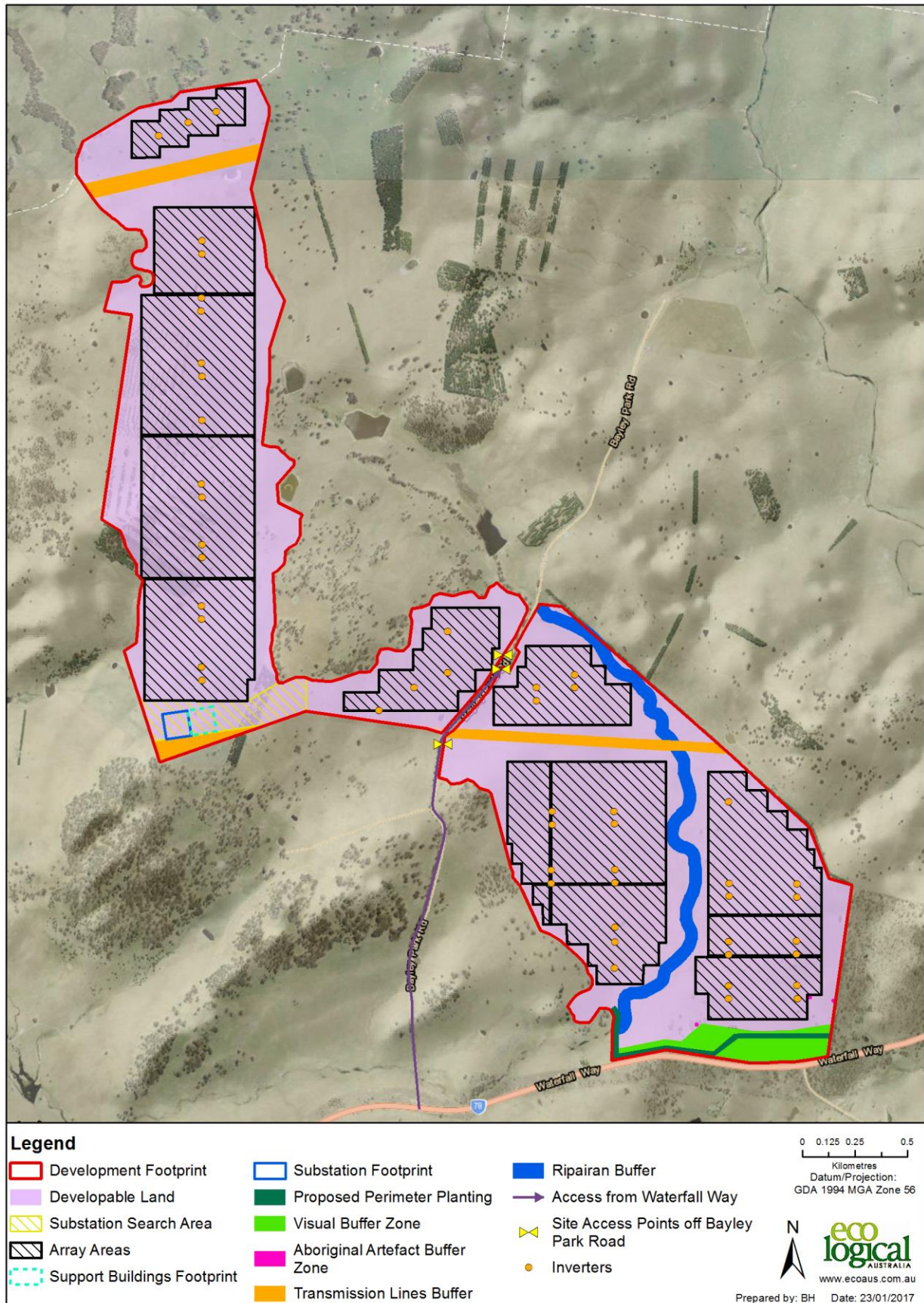


Figure 2: Indicative concept design and Development Footprint.

2 Assessment Methodology

2.1 Development Visibility

Although the potential future home sites remain conceptual, this desktop assessment uses the same methodology as previously used to assess visual impacts for the construction, operational and post decommissioning phases of the Proposed Development (ELA 2017a). This allows Mr and Mrs Stewart to interpret their potential building sites in light of the Proposed Development and the results provided in the formal visual assessment produced for the Environmental Impact Statement (ELA, 2017b).

Digital terrain modelling was used to generate zone of theoretical visibility (ZTV) maps to determine:

- whether the Proposed Development would be visible from each proposed potential future residence site; and
- identification of which parts of the Proposed Development would be visible from these viewpoints.

2.2 Impact Assessment Methodology

The following assessment approach for each viewpoint was adopted:

- An assessment of the visual sensitivity for each potential future home site;
- Consideration of the magnitude of visual change associated with the Proposed Development;
- An assessment of the unmitigated impact at each potential future home site;
- The identification and assessment of agreed mitigation measures that reduce the visual impact identified; and
- An assessment of site-specific mitigation strategies to minimise potential residual effects at each potential future home site.

Visual Sensitivity Criteria

The sensitivity in relation to visual amenity is dependent on a combination of the location, context and the importance of the viewer. The sensitivity level attributed to Visual Amenity is determined by considering the distance of a sensitive receptor from the development, the potential for views, and whether it is a public or private viewpoint. Residential viewpoints are considered more sensitive than public viewpoints. The sensitivity of visual amenity receptors are evaluated according to the five point scale provided in Table 1.

Table 1: Visual sensitivity criteria used for Visual Amenity*

Visual Sensitivity levels	Visual Amenity
Insignificant	Residential viewpoints within 5 km with no, or very limited potential views; or Public viewpoints within 2 km with limited potential views and a low number of viewers.
Low	Residential viewpoints over 2 km away with the potential for some views; or Public viewpoints over 3 km viewed by a high number of viewers; or Public viewpoints within 1 km viewed by a low number of viewers, or by transient viewers (such as road users).
Moderate	Residential viewpoints within 1-2 km with potential for some views of the project; or Public viewpoints between 1-3 km viewed by a high number of viewers; or

Visual Sensitivity levels	Visual Amenity
	Public viewpoints within 1 km viewed by moderate number of viewers with potential extensive views of the Proposed Development; or by transient viewers (such as road users).
High	Residential viewpoints less than 1 km away with some views of the Proposed Development. Public viewpoints within 1 km viewed by a high number of viewers with views of the Proposed Development.
Very High	Residential viewpoints within 1 km with extensive or intrusive views of the Proposed Development; or Public viewpoints within 1 km, viewed by a high number of viewers with extensive views of the Proposed Development.

Criteria adapted from the Clarks Gully EIA (Envisage, 2015).

Magnitude of Change Criteria

The magnitude of visual change for visual amenity considers the degree of change, particularly with respect to changes from characteristically 'rural' views to those which contain infrastructure. The magnitude of visual change for each viewpoint is evaluated according to the five point scale provided in Table 2.

Table 2: Magnitude of visual change definitions used for Landscape Character and Visual Amenity*

Magnitude of Visual Change	Visual Amenity
Insignificant	Minor scale of change, not significantly different in scale or type to existing views and/or landscape character.
Low	Low to moderate scale change, not significantly different in scale or type to existing views and/or landscape character.
Moderate	Moderate visual change to views as a result of landscape change and construction of infrastructure where it was previously a rural landscape.
High	High visual change to views as a result of landscape change and construction of infrastructure where it was previously a rural landscape
Very High	Significant visual change to views as a result of substantial landscape change within close proximity.

*Criteria adapted from the Clarks Gully EIA (Envisage, 2015).

The visual impact is assessed by combining the visual sensitivity of the potential future home site and the magnitude of visual change attributed to the Proposed Development in accordance with the visual impact assessment matrix provided in Table 3.

Table 3: Visual impact assessment matrix (adopted from Envisage, 2015)

Potential level		Magnitude of change			
		Very High	High	Moderate	Low or insignificant
Visual sensitivity	Very High	Very High Impact	High Impact	High Impact	Moderate Impact
	High	High Impact	High Impact	Moderate Impact	Low Impact
	Moderate	Moderate Impact	Moderate Impact	Moderate Impact	Low Impact
	Low	Moderate Impact	Low Impact	Low Impact	Low or Insignificant Impact

3 Visual Impact Assessment

3.1 Potential future home sites

In the absence of any formal statutory planning process or development application, this assessment is undertaken in good faith based on the advice and a set of coordinates provided by Mr and Mrs Stewart. Three potential future home sites have been proposed (Table 4).

Table 4: Proposed potential future home sites

Site	Address	Lot/DP	Direction from Proposed Development	Distance from Proposed Development
Site - 1	Grafton Road Metz	Lot 6 /DP 606050	South	710 m
Site - 2	Metz Road Metz	Lot 4 / DP 598741	South	3.7 km
Site - 3	Thorpleigh Road Hillgrove	Lot 2 DP 900571	East	6 km

At more than 6 km from the Proposed Development, the visual sensitivity of future home site 3 is considered to be insignificant (Table 1). From this distance design elements associated with the Proposed Development will be hard to distinguish and have very little impact on the viewpoint.

3.2 Viewshed analysis

ZTV maps have been generated to understand the potential extent of the visibility of the Proposed Development and its impact on adjoining sites. The ZTVs for the development site and the substation and support buildings are presented in Figure 3 and Figure 4 respectively. The ZTV for the Development Footprint indicates that the proposed solar array development is potentially visible from each of Mr and Mrs Stewart's potential future home sites, but also indicates that with small changes to the proposed location of each of the potential future homes (micro-siting), views of the Proposed Development can be prevented entirely if desired.

The extent of potential views of the Proposed Development were modelled using a GIS viewpoint model (Figure 5, Figure 6 and Figure 7). This provides an indication of the extent of theoretical views of the Proposed Development from each potential future home site and is a useful tool for developing and assessing potential mitigation strategies. From each of the assessed viewpoints, only parts of the Development Footprint would be visible and, in most cases, this would be a relatively small proportion of the total development area. It should be noted that these models are based purely on terrain features and do not consider the effect of distance as a mitigating factor. Accordingly, although the models indicate potential visibility over long distances (e.g. > 5 km) in practice this potential visibility is not significant or relevant.

Mr and Mrs Stewart's potential future home site 1 has disrupted views across the southern portion of the Proposed Development site, however, the viewpoint analysis (Figure 5) indicates that this reflects a relatively narrow range of view and that the majority of views from the site looks to the south and east. Mr and Mrs Stewart's potential future home site 2 has similar views of the development area (Figure 6), but these are further away and likely better screened by existing vegetation and distance.

Potential future home site 3 has a differing view with potential distant glimpses of the northern part of the development (Figure 7). However, as described above, at more than 6 km from the site, this assessment over represents actual visibility.

In all cases, it is noted that the viewpoint model does not allow for existing vegetation screening, would further significantly mitigate the potential impacts from each viewpoint.

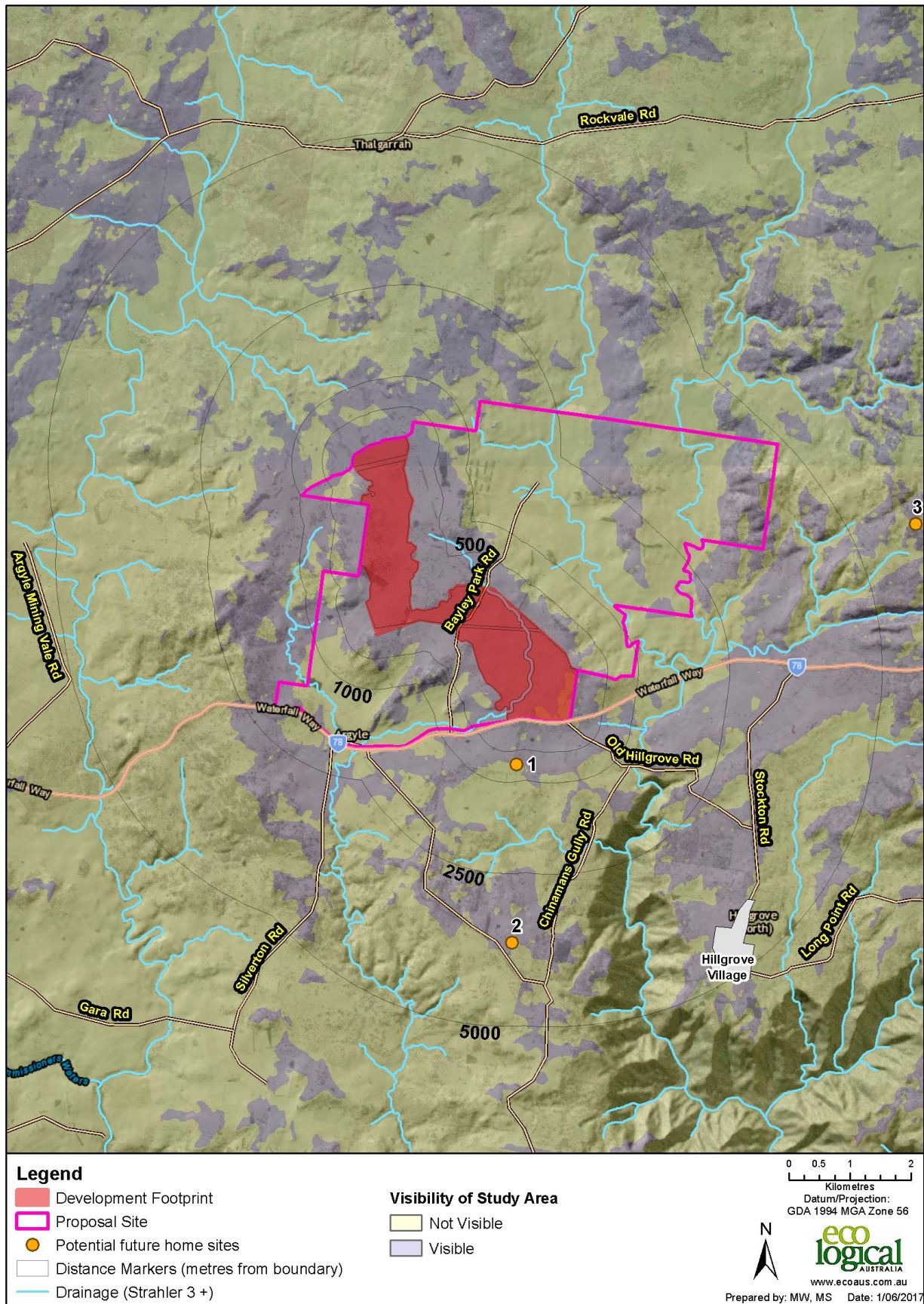


Figure 3: ZTV model indicating Development Footprint visibility and Mr and Mrs Stewart's potential future home sites.

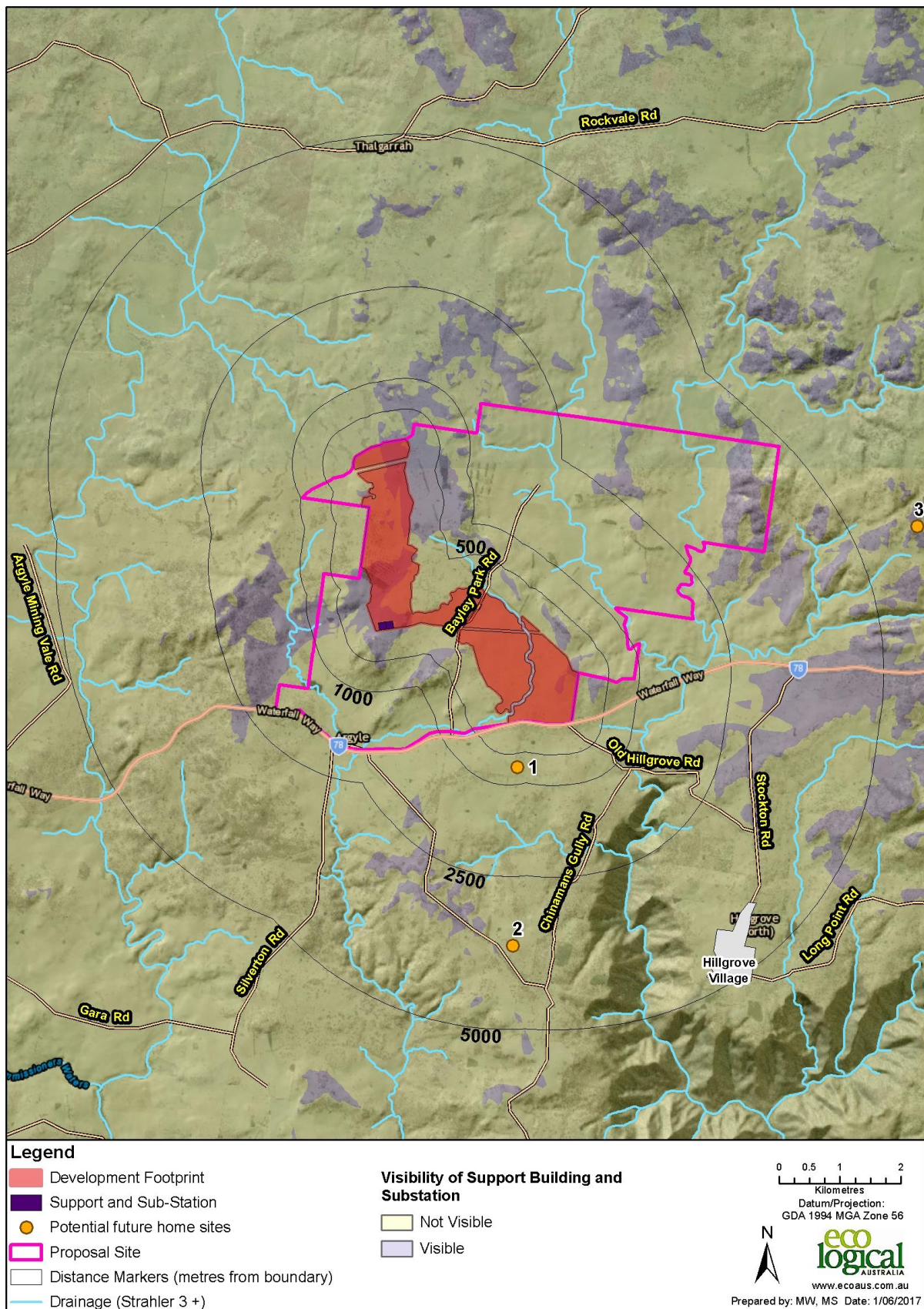


Figure 4: ZTV results illustrating substation and support building visibility and Mr and Mrs Stewart's potential future home sites.

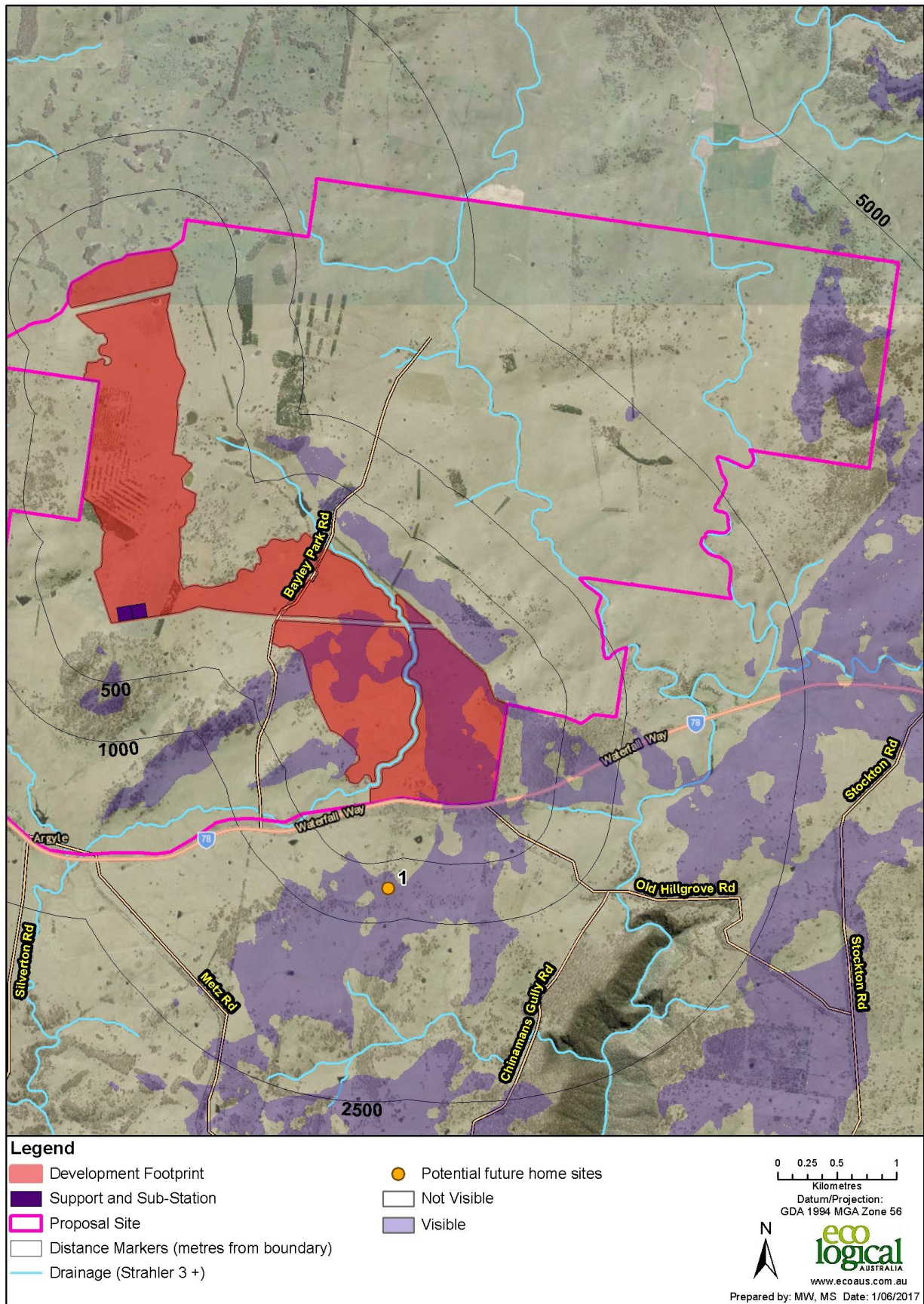


Figure 5: Viewpoint analysis for Mr and Mrs Stewart's potential future home site - 1.

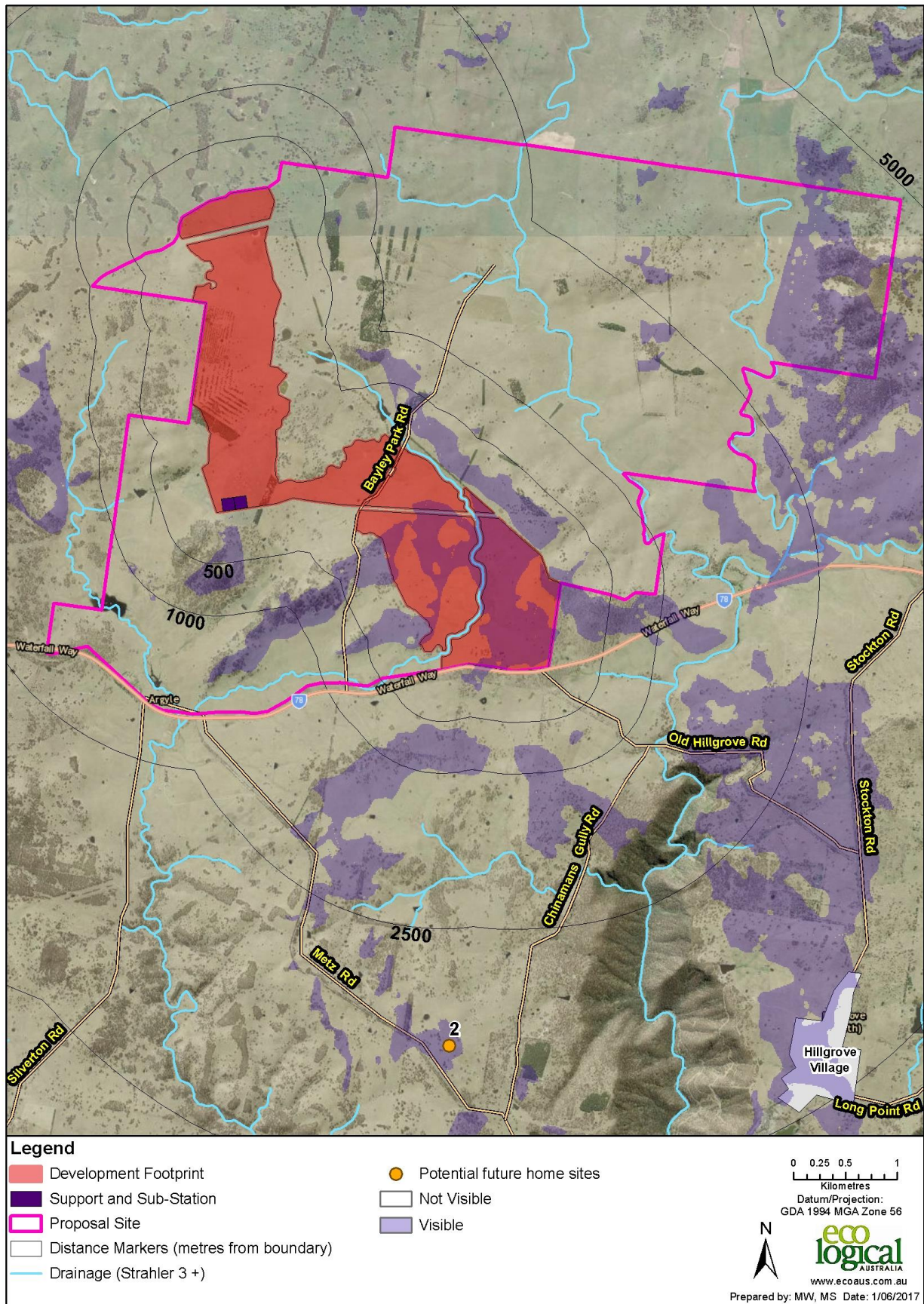


Figure 6: Viewpoint analysis for Mr and Mrs Stewart's potential future home site - 2.

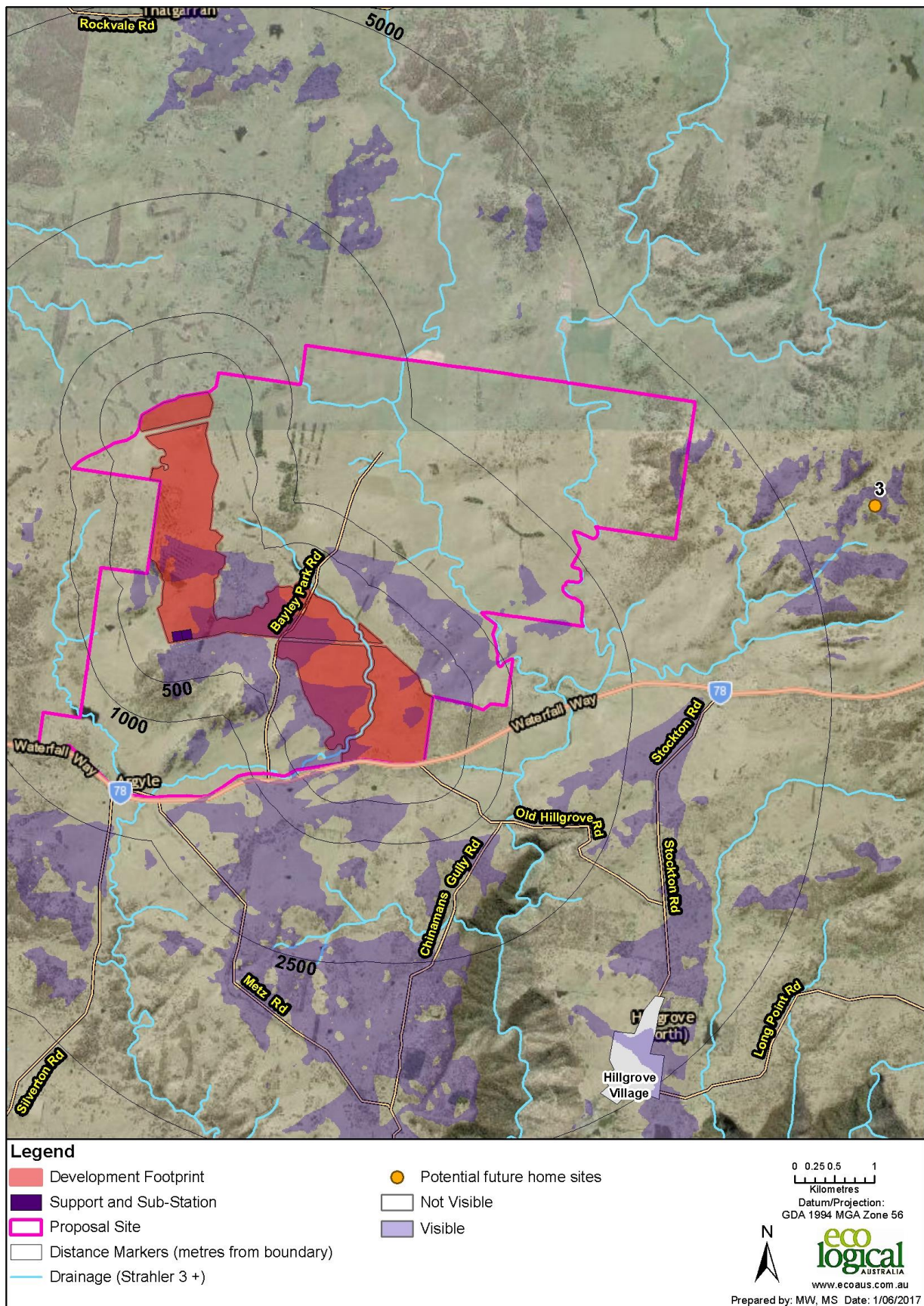


Figure 7: Viewpoint analysis for Mr and Mrs Stewart's potential future home site - 3.

3.3 Visual Impact Assessment

Table 5 below, describes the viewpoints selected for assessment and the potential visibility of the Proposed Development from each viewpoint. This informs the assessed visual sensitivity, magnitude of change and visual impact of the Proposed Development (Table 5).

Table 5: Visual impact assessment for selected for viewpoints

Viewpoint	Approximate distance from the Development Footprint boundary	Viewpoint description and potential visibility of the Proposed Development	Viewpoint sensitivity	Magnitude of change	Visual Impact
Stewarts Potential Future Home Site – 1	710 m	This site is located 710 m south of the southern boundary of the Proposed Development and is at approximately the same height (AHD) as the proposed solar farm development. Views are predominantly to the south and east with limited, more local, views over part of the south eastern portion of the Proposed Development. The proposed home site is located at the most northern edge of the lot. Development site visibility is partially obscured due to topography and existing native vegetation cover. Vegetation screenings have been planted by the landholder to the east of proposed future home site, looking towards Clarks Gully.	The local topography and existing vegetation limit views of the Proposed Development. The proximity to the Proposed Development would result in a High visual sensitivity assessment if a residence was constructed at this site in an unmitigated manner.	The Proposed Development would be visible filtered through current vegetation in mid-ground views. This, coupled with its proximity to the Site results in a magnitude of visual change that is Moderate.	Moderate
Stewarts Potential Future Home Site – 2	3.7 km	This site is located approximately 3.7 km south of the southern boundary of the development area. The site is at a similar elevation to the Proposed	Due to potential views being limited through distance and the existing landscape, the visual sensitivity	Due to the distance of the site from the Proposed Development and the limited potential views,	Low

Viewpoint	Approximate distance from the Development Footprint boundary	Viewpoint description and potential visibility of the Proposed Development	Viewpoint sensitivity	Magnitude of change	Visual Impact
		Development area and has extensive views to the north east. From this location the Proposed Development occupies a reasonably small portion of the mid to distant view. Natural topography and vegetation significantly reduces visibility of the development footprint from the site.	ranking of an unmitigated residence at this site is considered to be Low .	the magnitude of visual change is considered Low .	
Stewarts Potential Future Home Site – 3	6 km	This site is located 6 km east of the Proposed Development at approximately the same elevation of the Proposed Development. A significant ridgeline located immediately to the east of the Proposed Development further limits site visibility.	Due to potential views being limited through distance and the existing landscape, the visual sensitivity ranking of an unmitigated residence at this site is considered to be Insignificant.	Based on the distance and the small portions of the view impacted by the Proposed Development, the magnitude of visual change is considered Low.	Insignificant

4 Mitigation Measures for the Proposed Development

The following visual impact mitigation measures have been identified within the EIS and will be implemented over the life of the project:

- Establish an infrastructure free Visual Buffer Zone that will, as far as practical, maximise infrastructure setbacks from areas along Waterfall Way that can be viewed by the public as well as the establishment of minimum setback distances to the nearest residence (East Kiama)_as given by figure by Figure 6.23 in the EIS;
- Establish a vegetation buffer within the Visual Buffer Zone where Waterfall Way borders the southern boundary of the Proposed Development;
- Establish vegetation buffers within the Site boundary to further screen views from Kiama and East Kiama;
- Ensure the establishment of the vegetation buffers are commissioned as one of the first activities of site construction;
- Continue to consult with neighbouring landholders to identify, where possible, the location of mutually agreeable vegetation screening both pre and post construction. Ensure actual screening meets mitigation expectations and broaden planting if it does not;
- Promote management of road corridor vegetation to allow natural regeneration of native plant species;
- Use muted, low contrast colours for infrastructure, so that they blend into the landscape as far as possible;
- Select infrastructure to minimise potential for reflectivity and glare;
- Locate substation, support buildings, construction site compound and lay down areas away from visual receptors and apply visual screening if necessary;
- Minimise night lighting at the substation and associated support buildings; and
- Minimise vegetation clearing and earthworks and rehabilitate progressively.

Implementation of these mitigation measures would further reduce impacts at Mr and Mrs Stewarts potential future home sites. Predicted residual impacts following the introduction of mitigation measures discussed above are outlined in Table 6.

Table 6: Summary of residual effects to Mr and Mrs Stewarts Potential Future Home Sites

Assessment area	Impact Assessment	Anticipated residual effect following mitigation
Potential Future Home Site – 1	Moderate	Further reducing to Low over time as vegetation buffer will almost entirely shield development.
Potential Future Home Site – 2	Low	Further reducing to Insignificant over time as vegetation buffer will almost entirely shield development.
Potential Future Home Site – 3	Insignificant	Insignificant

Residual impacts at each of the potential future home sites identified by Mr and Mrs Stewart may be further reduced using the following on-site mitigation strategies during the planning and development of the proposed potential future homes:

- Revising the location of the potential future home site to minimise visibility of the Proposed Development;
- Micro-siting the potential future home to further reduce visual impacts;
- Incorporating elements into the potential future home design to minimise visibility of the Proposed Development; and
- Establishing vegetative buffers between the potential future home and the Proposed Development. These will be most effective if located close to the potential future home site.

Implemented effectively, these strategies will further reduce visual impacts at each of Mr and Mrs Stewart's potential future home sites to **low** or **insignificant**.

5 Conclusion

This visual impact assessment assesses how the Proposed Development would impact visual amenity of three potential future homes sites identified by Mr and Mrs Stewart.

Despite its large scale, the majority of the Proposed Development would not be visible from the potential future home sites. This is largely due to its distance from the proposed future home sites and the undulating topography that characterises the landscape within which it sits. The southern section of the Proposed Development is generally more visible than the northern section.

The proponent has adopted a mitigation strategy aimed at minimising potential visual impacts of the Proposed Development. This includes a commitment to significant setbacks from Waterfall Way and the development of a range of visual screening options aimed at minimising visibility. Properly designed, installed and managed a vegetation buffer zone that enhances natural topographic screening, in conjunction with infrastructure setbacks would provide an effective visual mitigation strategy, as well as providing positive biodiversity outcomes.

These strategies, combined with the opportunity for pro-active design and landscaping decision-making should the potential future home sites be developed, results in low or insignificant visual impacts at all three identified potential future home sites.

References

Eco Logical Australia 2017a. Metz Solar Farm Visual Impact Assessment. Prepared for Infinergy Pacific Limited.

Eco Logical Australia 2017b. *Metz solar farm Environmental Impact Statement*. Prepared for Infinergy Pacific Ltd.

Envisage Consulting Pty Ltd, 2015. *Clarks Gully Mine – Visual Amenity Assessment*. Prepared for Eco Logical Australia.



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