

APPENDIX H VISUAL IMPACT ASSESSMENT

6.0 Photomontages

6.1 Photomontage Development

Photomontages of the proposed solar plant were prepared to assist in the impact assessment of the proposal, conveying the final visual image from typical vantage points.

The photomontages are based on worst case scenario, without the inclusion of the proposed mitigation methods.

6.1.1 Photomontage Selection Process.

Photomontages of the proposed solar plant within the existing context were selected as key views and as a good indicator of general visibility of the Study site from the road. A total of 4 viewpoints were selected for the production of photomontages (refer to **Table 3**) which are generally those viewpoints determined to have the greatest potential for visual impact and best represent a range of distances as well as locations with differing views. Locations of the photomontages are shown on **Figure 7**. The photomontages are based on a worst case scenario of a maximum height without the inclusion of the proposed mitigation methods. Zoomed and

cropped photomontages have been included in the report to provide clarity.

6.1.2 Photomontage Development Process.

Photomontages are representations of the solar farm that are superimposed onto a photograph of the Site. The process for generating these images involves solar plant. The photo simulations based on photography from typical sensitive viewpoints are included within the following analysis section. Photomontages have been prepared using current best practices.



Computer generated display of solar plant



Wire frame perspective view over photograph



Resulting Photomontage



PROPOSED PHOTOMONTAGE ANGLES

FIGURE 7: Photomontage Assessment Locations (Source: Sixmaps)

6.0 Photomontages (cont'd.)



PHOTOMONTAGE 01A Existing view from Goolma Road (Viewpoint 05)



PHOTOMONTAGE 01B Indicative view of the Proposal from Goolma Road (Viewpoint 05)

6.0 Photomontages (cont'd.)



PHOTOMONTAGE 02A Existing view from Goolma Road (Viewpoint 07)



PHOTOMONTAGE 02B Indicative view of the Proposal from Goolma Road (Viewpoint 07)

6.0 Photomontages (cont'd.)



PHOTOMONTAGE 03A Existing view from Cobbora Road (Viewpoint 12)



PHOTOMONTAGE 03B Indicative view of the Proposal from Cobbora Road (Viewpoint 12)

6.0 Photomontages (cont'd.)



PHOTOMONTAGE 04A Existing view from Cobbora Road (Viewpoint 13)



PHOTOMONTAGE 04B Indicative view of the Proposal from Cobbora Road (Viewpoint 13)

7.0 Visual Impact Assessment

7.1 Visual Impacts

7.1.1 Visual Impact on Surrounding Landscape Character

The nature and scale of the project will create a new landscape and visual environment. This part of the report will assess the source and magnitude of development effects on the existing landscape elements, character and quality in the context of the site and its environs.

Overall the proposed Wellington North Solar Plant will result in impacts on the existing surrounding environment in terms of landscape and scenic values. The visual impacts associated with the proposal will vary depending on the viewing location.

The solar panel arrays are relatively low lying, reaching a height of approximately 4 metres above the existing ground level. The solar plant is to be constructed as one of the two following options;

1. Fixed configuration, an array of panels placed on fixed frames running in an east-west direction and tilted to the north. The highest visual effect of the PV panels is likely to be seen from the north and south, where the most surface area is visible. Visibility of the solar farm from the east and west will be significantly lower.
2. Tracking configuration, an array of panels arranged in an north-south direction, tracking east to west on a single axis. The highest visual effect of the PV panels is likely to be seen from the east and west, where the most surface area is visible. Visibility of the solar farm from the north and south will be significantly lower.

For both of these options, the visual impact is mostly likely to be at its highest during the construction phase.

Although the construction of the solar plant will add a new element to the existing landscape, the surrounding area has undergone significant transformation over recent decades due to the; construction and recent expansion of the Wellington Correctional Facility, new Electrical Substation and associated infrastructure and the Bodangora Wind Farm which is currently nearing completion. The site is also relatively close to the outskirts of Wellington and could be considered a transition zone between the density of the town and the broader rural landscape beyond.

The proposed development is situated between Goolma Road to the East, which is a main road connecting Wellington with Mudgee and Gulgong, and Cobbobra Road to the West, which is a main road connecting Wellington with Dunnedoo. There are clear and close views to the Site from these main transport corridors and it is from these roads that the development will effect the most significant change in character from the public domain. Visual impact in close proximity is generally brief and, due to the low nature of the development, easily mitigated with screen planting along the boundary line. Due to the undulating nature of the topography, distant views to the site are largely contained and where available it is likely the solar panels would appear as grey/black lines within open paddocks. Additionally, the pattern layout of the solar panels is varied and therefore breaks between existing vegetation and localised topographical variations that will reduce the overall impact.

A separate Solar Plant is proposed on land directly to the South of the site with an application for approval submitted to the DP&E. This is addressed in the following Section.

There are a number of rural properties located within close proximity of the proposed development. AGL have been directly consulting with these neighbours and the outcomes of this engagement is the subject of a separate report.

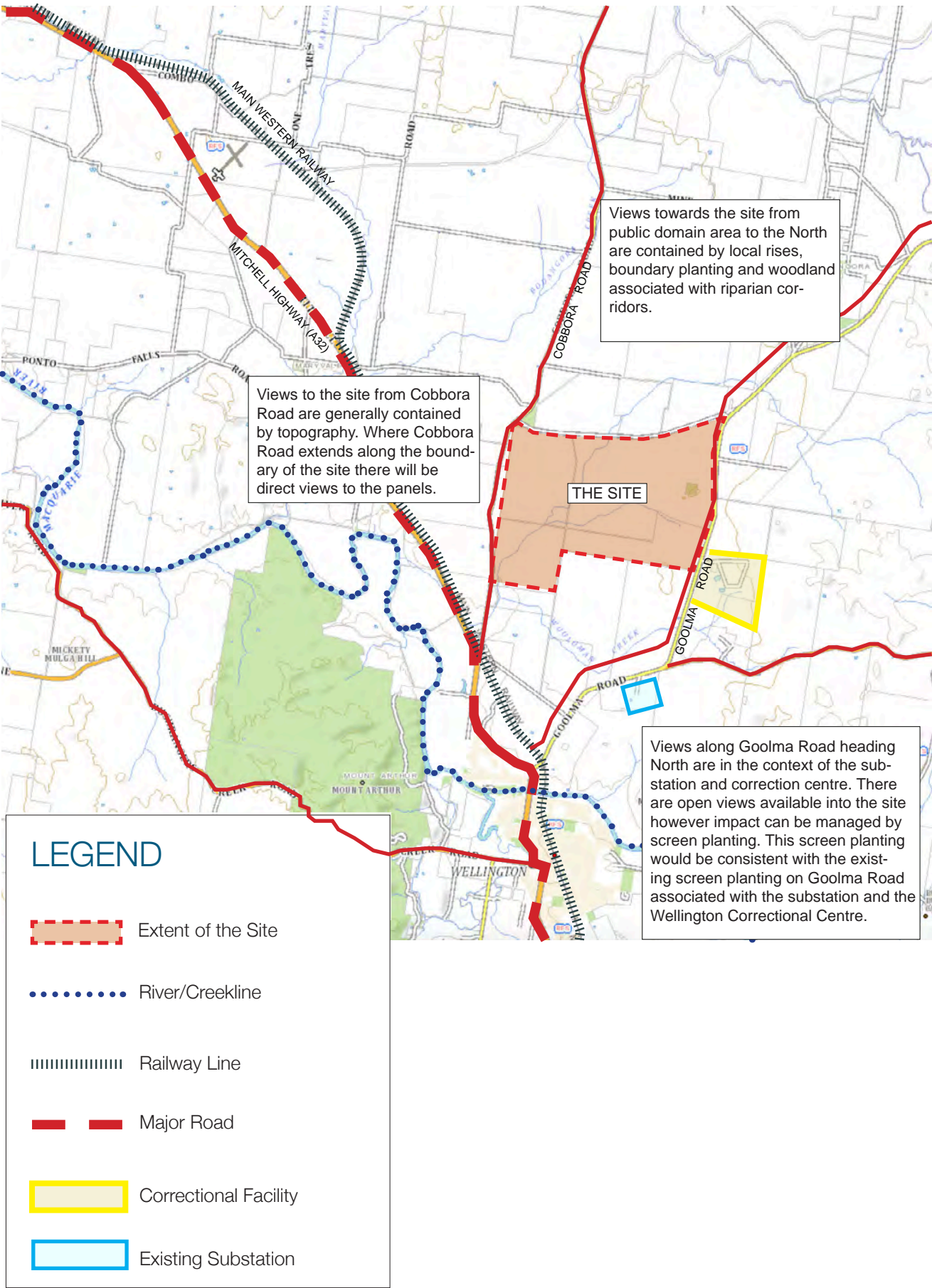


FIGURE 8: Visual Impact (Source: Sixmaps)

7.0 Visual Impact Assessment (cont'd.)

7.2 Cumulative Impacts

Currently there are no existing Solar Plants in the immediate vicinity of the site with the nearest being the South Dubbo Solar Farm which is approximately 45km away by road.

On a 450ha parcel directly to the South of the site a 174MW solar plant has recently been approved by the NSW DP&E. Visually the proposal is similar in scale to the North Wellington proposal.

If both proposals are approved and constructed this will establish solar arrays as a significant character element along Goolma Road at the gateway to the town of Wellington.

As the two proposals are directly adjacent to each other it is likely that they will be viewed as a single development. However, due to the undulating nature of the surrounding landscape there are no opportunities to view either development in their entirety let alone the two together. At the boundary where the two sites meet there is a ridgeline that extends east to west, this ridgeline contains views between the two developments.

The greatest cumulative impact is likely to be experienced by motorists travelling North along Goolma Road as solar arrays will be situated along the road boundary for approximately 6km. However, Goolma Road does extend for over 70km before terminating at Guntawang Road and both proposals sit at the very start of the journey close to Wellington and immediately adjacent to the other contrasting character elements being the correctional centre and the substation.

Although forming a significant mass of solar arrays on plan, it is likely that due to the areas topography and existing established vegetation that the potential cumulative impacts are acceptable. It is intended that the screen planting along Goolma Road for Wellington North Solar Plant will be in keeping within the adjoining screen planting associated with the Wellington Solar Farm to maintain a consistent character along Goolma Rd.

7.3 Night Lighting

CCTV security cameras and security lighting would be provided around the site substation, maintenance building and operational offices.

The use of night security lighting would be minimised and designed to ensure reduced disturbance to neighbouring properties. There would be no permanent night lighting installed within the array, but lighting may be included in each PCS for conducting night maintenance when the solar plant is de-energised.

Any lighting installed should be in accordance with AS4228-1997 - *Control of Obtrusive Effects of Outdoor Lighting*.

Future lighting design should be undertaken in accordance with the NSW DP&E **Dark Sky Planning Guideline - Protecting The Observing Conditions at Siding Spring**.

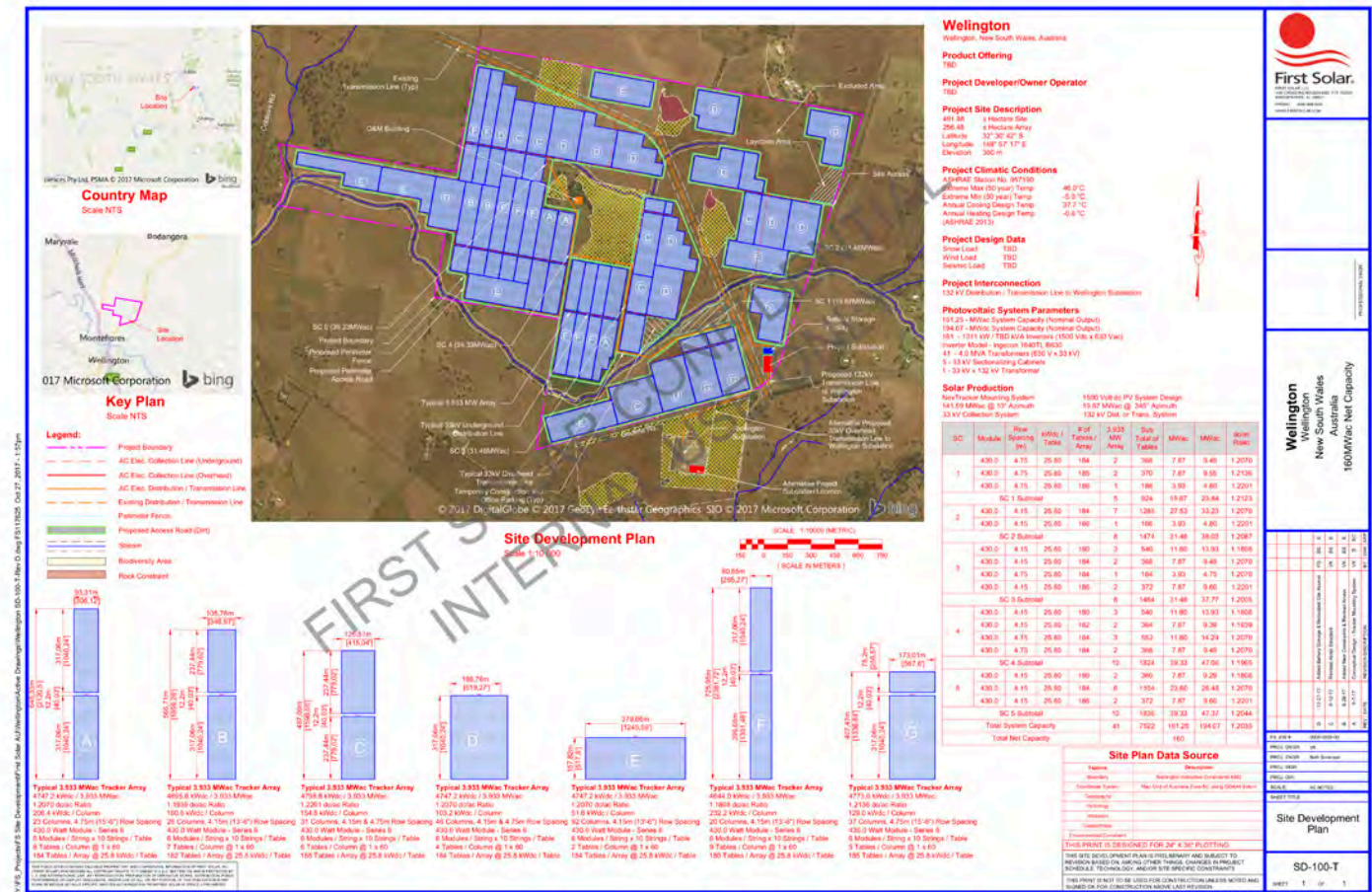


Figure 9: Proposed Wellington Solar Farm. Source: <http://www.majorprojects.planning.nsw.gov.au>

7.4 Transmission Lines

At the time of writing this report there are two transmission line corridor options proposed. The type and scale of the transmission towers is yet to be confirmed. Until this information is available we are unable to undertake a full assessment of the potential visual impact of each corridor however we can make some assumptions about the potential for impact.

The first corridor is situated to the West of the site and extends south along Cobbora Road before joining the existing transmission easement that travels west to east linking with the Wellington Substation. The options are to be either overhead or underground with a 60m easement. This proposal is likely to have little impact on views from the public domain. The key area of concern for this option is the view from residences to the South of the existing easement. Although there is currently an easement and transmission lines within these viewsheds the addition of larger transmission structures within the easement may increase the dominance of this element within the view.

The second transmission option proposes to extend transmission lines along the eastern side of Goolma Road running north to south linking with the substation. This would be overhead with a 60m easement within the solar plant site, then be underground with a 15m easement from the solar plant site to the substation. It is unlikely that this proposal will result in any significant visual impact as this view is already dominated by the presence of the Wellington Correction Facility and the Wellington substation. The addition of the transmission line along this corridor would not modify the character of views to the east along Goolma Road.

7.0 Visual Impact Assessment (cont'd.)

7.5 Reflectivity

Due to the materials used in the construction of PV panels being primarily glass and steel there is a perceived issue of glint and glare surrounding the reflectivity solar panels.

As a result of the perceived reflection levels, there is a concern of possible distractions to motorists, aircraft (particularly with the close proximity to Bodangora Airfield) and the hazard of eye damage.

Solar panels are designed to absorb the Sun's energy and directly convert it to electricity. Current PV modules absorb approximately 93.5% of the light received. The Solar Panels are designed using anti-reflective solar glass effectively reducing reflectivity. Thin slivers of metal stripping on the face of the panels further reduce any potential glare issues that may occur.

The level of glare and reflectance from the PV solar panels are considerably lower than the level of glare and reflectance of common surfaces, particularly those surrounding the proposed Solar Plant. The PV panels would reflect approximately 6.5% of energy which is less than typical rural environments which have a reflectivity of approximately 15-30%. Figure 12 compares the percentage of reflected energy from common reflective surfaces to that of a PV Solar Panel.

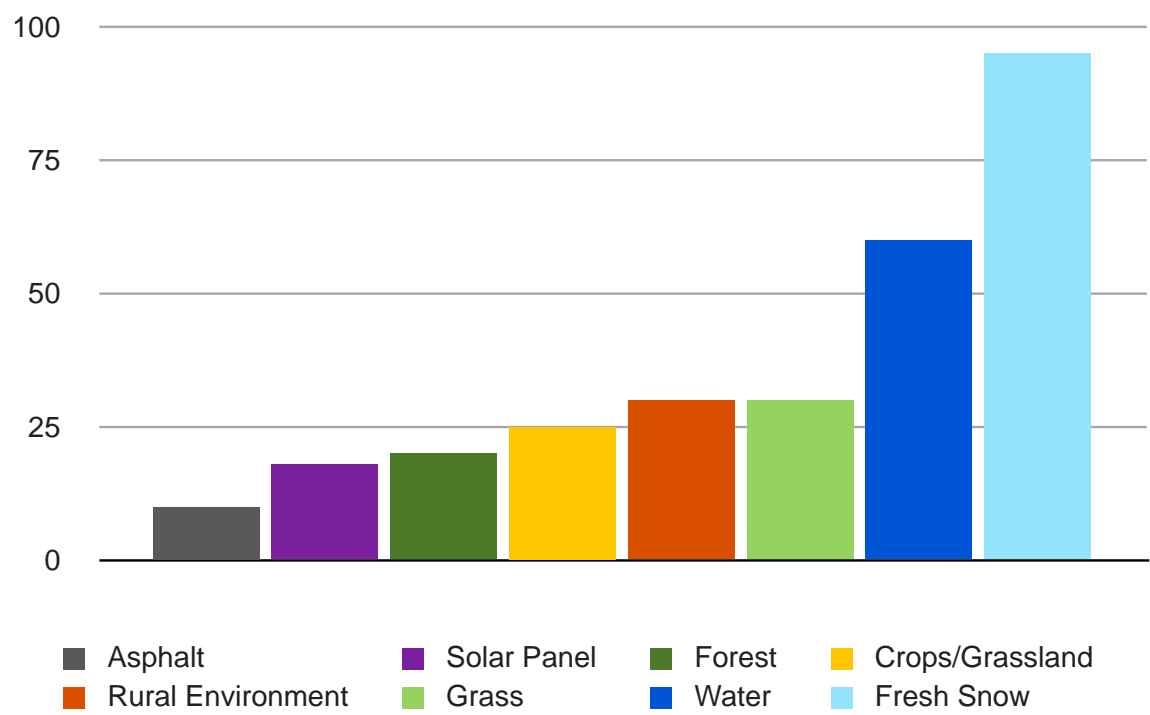


Figure 11: Comparative reflection analysis.



Figure 10: Panels at Manildra Solar Farm - Installed 2018.

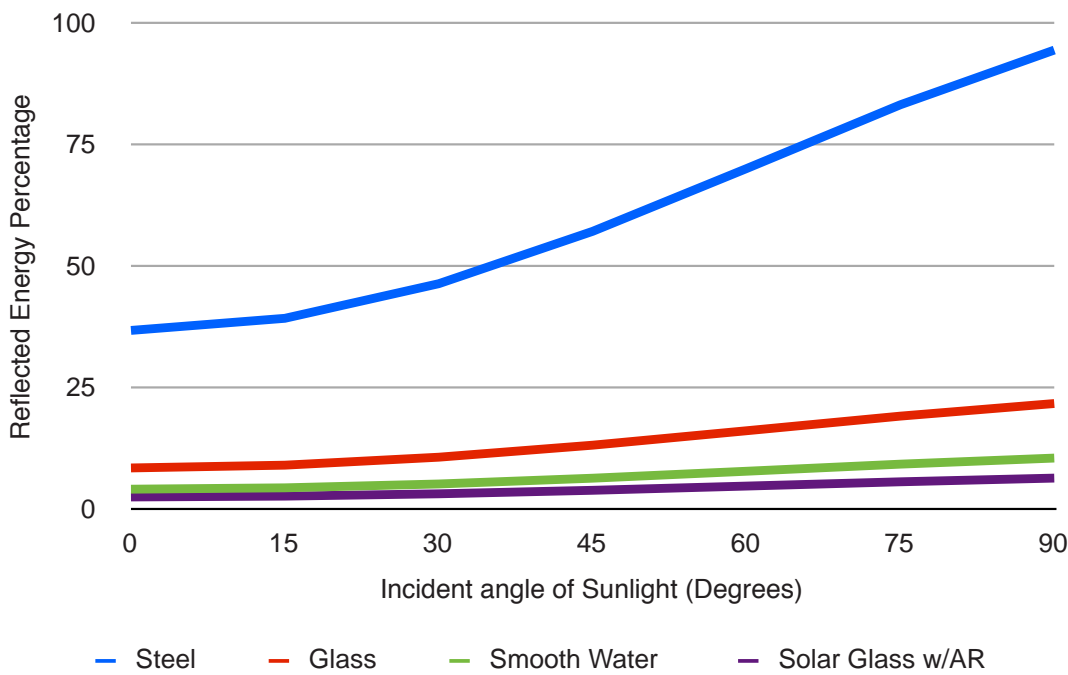


Figure 12: Analysis of typical material reflectivity.

7.0 Visual Impact Assessment (cont'd.)

7.6 Mitigation Recommendations

It has been identified that the most significant visual impact when viewed from the public domain is from locations along Goolma Road and Cobbora Road where the proposal is in close proximity to the boundary and where there is no existing vegetation of a sufficient scale to screen or fragment views.

As solar arrays are generally 4 metres or below in height (fixed or tracking) the visual impact can generally be softened by relatively narrow sections of vegetation if the vegetation consists of a mix of tree and mid level shrub species.

In the case of the Wellington North Solar Plant it is our recommendation that a band of screen planting of varying height is positioned between the property boundary and the solar arrays in the locations indicated in Figure 13. These locations are primarily along Goolma Road and Cobbora Road where there is no existing vegetation and where the arrays are immediately adjacent to the boundary. Additionally, intermittent screen planting should also be located along the Campbells Lane boundary to mitigate impacts on properties on the northern side of Campbells Lane.

To ensure that the screen planting integrates into the existing landscape character, the bands should be planted with a mix of endemic tree and shrub species to ensure a naturalistic effect whilst also providing habitat and movement corridors for native fauna.

To ensure that mitigation planting is successful all landscape works should be maintained regularly for a period of 24 months. Maintenance should generally include the removal of weeds and replacement of dead or non-performing plants.

Screen planting should be considered for locations surrounding buildings associated with the proposal where located in close proximity to Goolma Road or Cobbora Road where there is no existing vegetation of a sufficient scale to screen or fragment views.

Materials and colours utilised in the construction of site sheds, battery storage and associated infrastructure should also be considered to ensure that visual impacts are minimised. In general materials should be non-reflective and should be painted in neutral colours that are sensitive to the surrounding landscape.

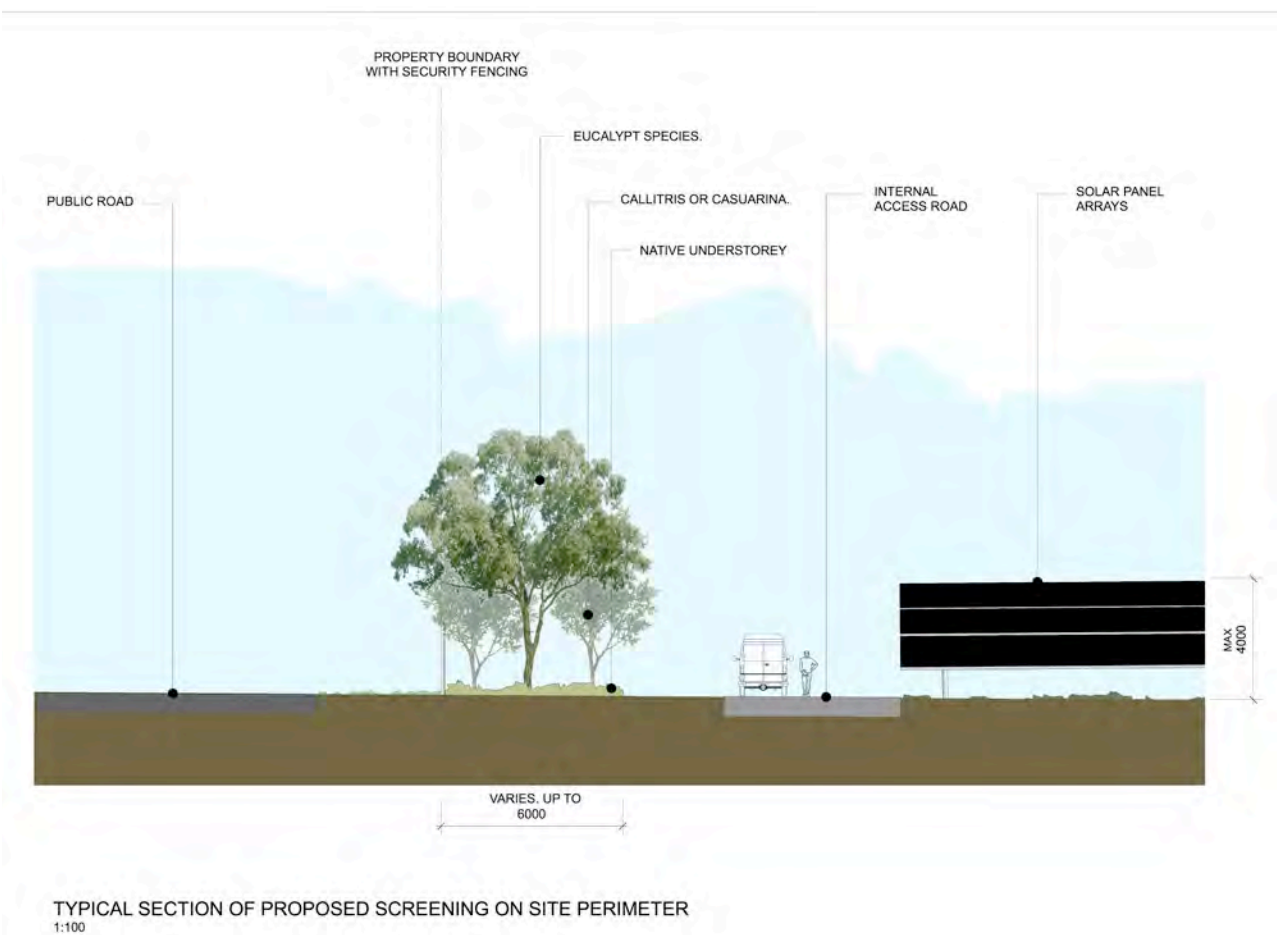


Figure 14: Impact mitigation through screening



8.0 Mitigation Recommendations

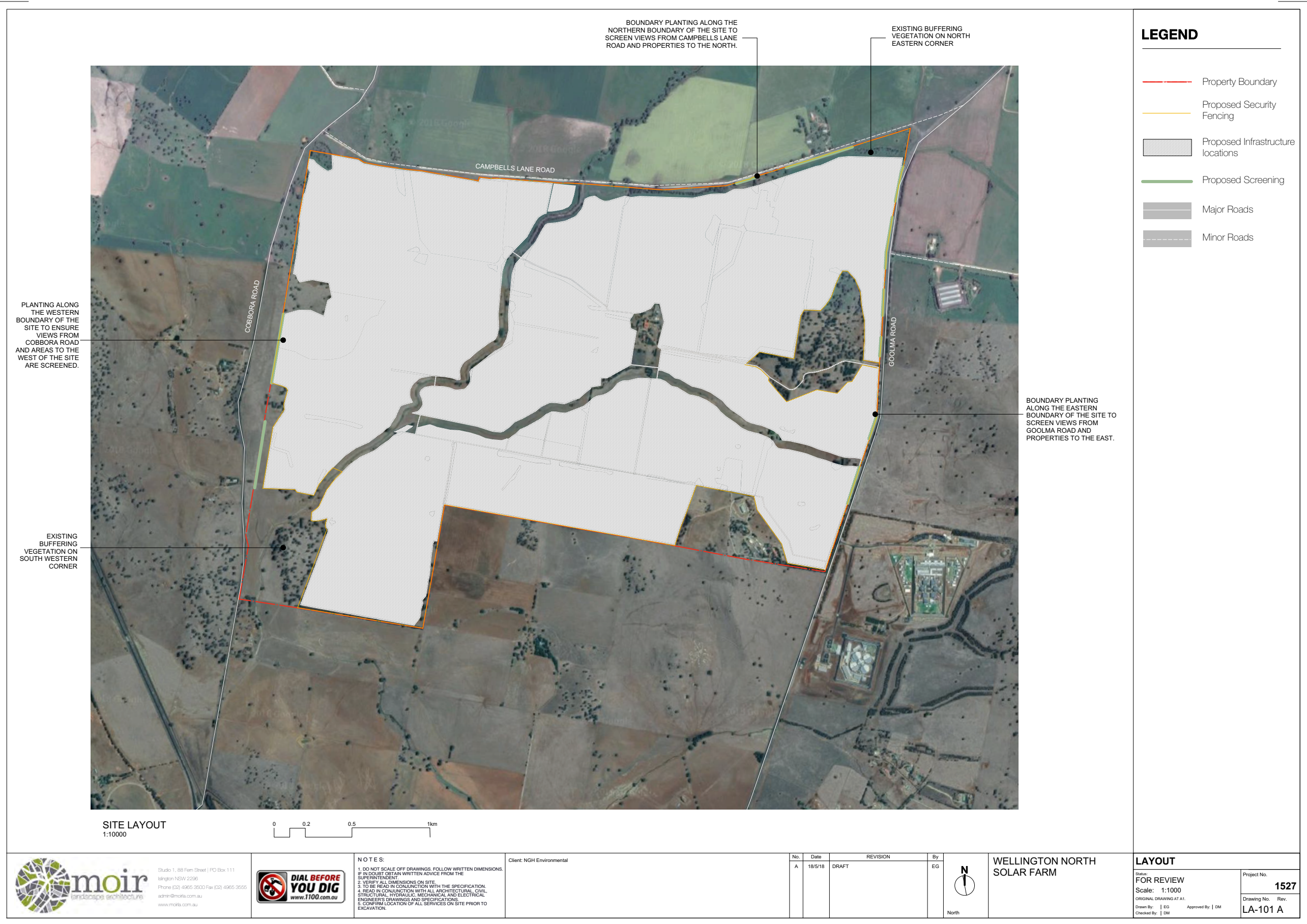


Figure 13: 1:2000 Visual Impact Mitigation Principles

9.0 Summary

With all Visual Impact Assessments the objective is not to determine whether the proposal is visible or not visible, it is to determine how the proposal will impact on existing visual amenity, landscape character and scenic quality of the site and its surrounds. If there is a potential for a negative impact on these factors it must then be investigated if and how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

Key elements of the existing landscape character are the distant vegetated ridgelines and immediate undulating pastoral landscape typical of the Wellington area. The existing landscape character is predominantly rural however, there are some key features in the landscape that contrast with the rural character including the electrical substation and its associated infrastructure and the recently expanded correctional facility.

The site is also located close to the township of Wellington and is situated in what could be considered a transition area between the urban fringe and the surrounding agricultural land.

The assessment determined that the majority of the views to the proposal from public domain were contained or fragmented by vegetation and topography, however, there were several locations along Goolma and Cobbora Roads where the Visual Effect and subsequent Visual Impact of the development would be considered to be high.

It is our opinion that the impacts in these locations can be successfully mitigated through intermittent boundary screen planting accommodated in appropriate setbacks.

It is our opinion that if implemented with appropriate environmental management and employment of the recommended mitigation measures, the proposed development could be undertaken whilst maintaining the core landscape character of the area with a acceptable Visual Impact on the surrounding character.

10.0 References and Bibliography

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MAPS

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