

Infigen Energy

Preliminary Environmental Assessment

NYNGAN SOLAR FARM



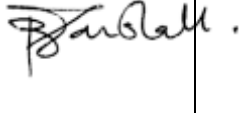
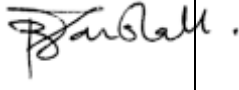
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TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	PURPOSE OF THIS DOCUMENT.....	1
1.2	PROPOSAL OUTLINE	2
2	CONTEXT OF THE PROPOSAL	3
2.1	LEGISLATIVE CONTEXT.....	3
2.2	LAND USE AND DENSITY OF SETTLEMENT.....	3
2.3	LANDFORMS AND VEGETATION	4
2.3.1	Landforms	4
2.3.2	Vegetation.....	5
3	THE PROPOSAL.....	7
3.1	PROPOSAL DESCRIPTION	7
3.2	INFRASTRUCTURE	7
3.3	CONSTRUCTION REQUIREMENTS.....	8
3.4	OPERATIONAL REQUIREMENTS.....	8
3.5	DECOMMISSIONING	8
3.6	JUSTIFICATION FOR THE PROJECT	8
4	POTENTIAL ENVIRONMENTAL IMPACTS	10
4.1	MODERATE TO HIGH PRIORITY IMPACT TYPES	11
4.1.1	Community impacts	12
4.1.2	Visual impacts	12
4.1.3	Archaeological impacts	12
4.1.4	Biodiversity impacts	13
5	CONCLUSION.....	15
6	AUTHORS	16
7	REFERENCES	17
APPENDIX A	MINISTERS OPINION OF PART 3A STATUS.....	A-1
APPENDIX B	SITE PHOTOS.....	B-1
APPENDIX C	LAYOUT AND STRUCTURAL PLANS	C-1

1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

Infigen Suntech Australia Pty Ltd ('Infigen') proposes to construct a photovoltaic solar farm across two landholdings approximately 2 kilometres from the centre of the township of Nyngan on the Western Plains of New South Wales. The location of the proposed works is shown on Figure 1-1.

nghenvironmental has been engaged to undertake a Preliminary Environmental Assessment (PEA) of the project site. This PEA report:

- Defines the environmental and legislative context of the proposal
- Describes the construction, operational and decommissioning aspects of the proposal
- Identifies potential impacts of the proposal, categorised into low, moderate and high priority issues
- Identifies strategies for the detailed assessment of moderate and high priority issues, including community, visual, archaeological and biodiversity impacts

Priority issues were identified using a preliminary review of databases and scientific literature, an initial site visit and expert advice.

The project is to be assessed as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979*. This PEA report, with the Project Application, is submitted to the Department of Planning to assist the development of Director-General's Requirements (DGRs) for the assessment of the project. Following the receipt of the DGRs, a comprehensive Environmental Assessment report would be prepared based on specialist studies and consultations.

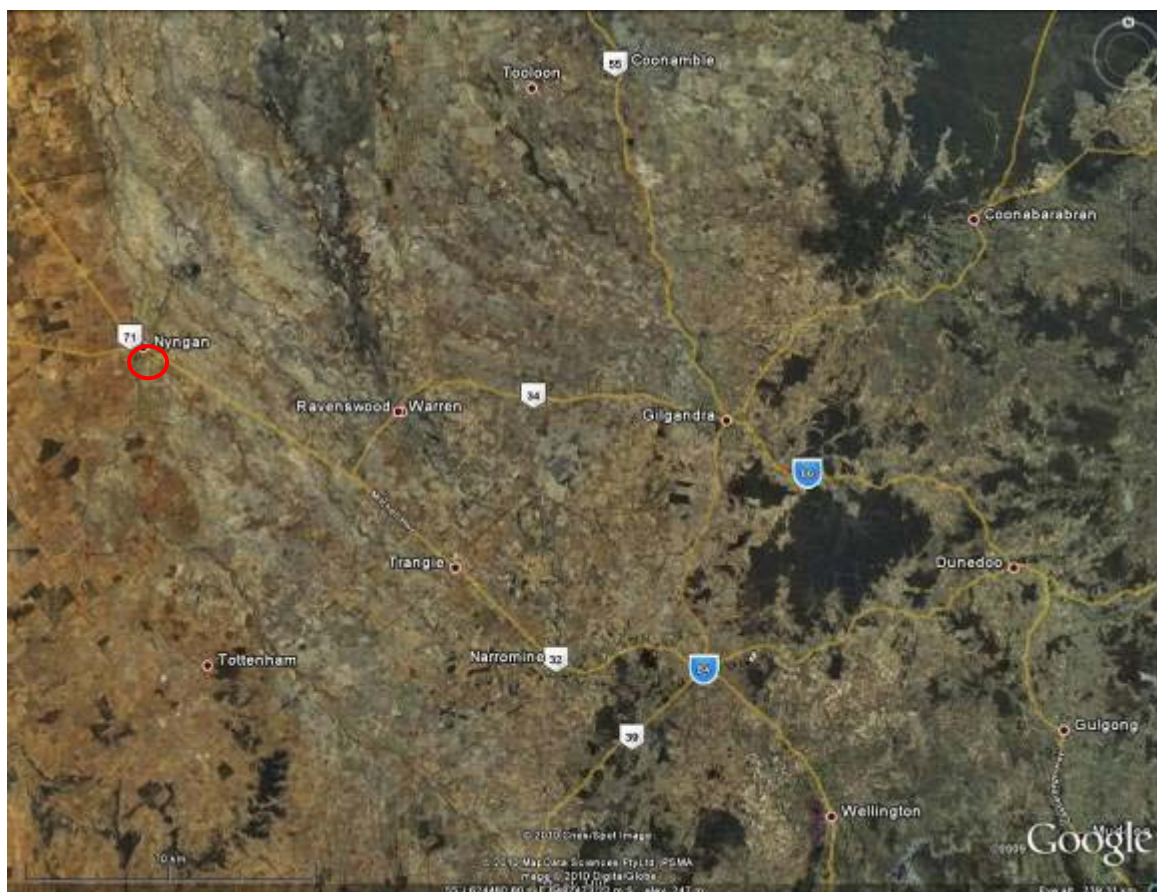


Figure 1-1: Location of the proposed Nyngan Solar Farm, circled red (Google Earth image)

1.2 PROPOSAL OUTLINE

Infigen proposes to construct a 100 Megawatt capacity solar farm on a 450 hectare site, 2 kilometres from the centre of the township of Nyngan, NSW.

The solar module array would comprise of a series of photovoltaic modules mounted on fixed frames, and would occupy approximately 200 hectares. Preliminary layout and structural plans for the proposal are provided in Appendix C and the development envelope for the proposed solar farm and transmission line is shown on Figure 2-1.

The Nyngan Solar Farm would connect to the existing Nyngan 132kV substation which is immediately adjacent to the solar farm. The solar farm would have an expected operating life of up to 50 years. The decommissioning phase would remove all above ground infrastructure from the site.

2 CONTEXT OF THE PROPOSAL

2.1 LEGISLATIVE CONTEXT

In accordance with Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the proposed solar farm development is considered to be Major Infrastructure. Clause 75B (1) of the EP&A Act, states that: [Part 3A] *applies to the carrying out of development that is declared under this section to be a project to which this Part applies:*

(a) by a State environmental planning policy, or

(b) by order of the Minister published in the Gazette (including by an order that amends such a policy).

Part 3A projects declared in the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP) include development for the purposes of solar electricity with a capital investment value greater than \$30 million. The proposed Nyngan solar farm would have a capital investment in excess of \$30 million and is therefore considered to be Major Infrastructure under Part 3A of the EP&A Act.

The proposal would be considered as 'critical infrastructure' in accordance with Clause 75C of the EP&A Act. The News Release from the Premier of New South Wales on 27th February 2009 'Doing Green Business in NSW Made Easier' included lowering the threshold for 'critical infrastructure' from 250 megawatts to 30 megawatts for renewable energy generation facilities within identified renewable energy precincts.

This document has been prepared as part of the environmental assessment process for the Minister's approval of the project. It aims to categorise the potential impacts of the proposal in terms of moderate to high and lesser priority issues and provide these to the Department of Planning for the issuing of Director-General Requirements.

2.2 LAND USE AND DENSITY OF SETTLEMENT

The site is located 2 kilometres south from Nyngan, between the junction of Tottenham Road and the Mitchell Highway Figure 2-1. Nyngan has a population of 2,368 people (2006 Census). Tottenham, which is the closest town to the geographical centre of the state of NSW is located 75 km to the south. The other nearest towns are Cobar, 130 km west of the site and Warren, 62 km to the east. The general area between towns is dominated by large rural properties that support cropping and grazing with a generally low population density.

The proposed solar farm site is located within the Bogan Local Government Area and is zoned 1(a) General Rural under the Bogan Local Environmental Plan (LEP) 1991.

The sites current use is predominately grazing with some areas being utilised for cropping and pasture improvement. Land use on surrounding lands include cattle and sheep grazing, rural subdivision, transport corridors (Mitchell Highway and Tottenham Road) and urban settlements (Bogan Shire Council 2010).



Figure 2-1: Proposed Nyngan Solar Farm development envelope – red outline (Google Earth image)

2.3 LANDFORMS AND VEGETATION

2.3.1 Landforms

Nyngan is located within the Bogan-Macquarie subregion of the Central West Catchment Management Authority. Climate varies considerably across the catchment with lower average temperatures at higher elevations in the east (0°C – 25°C) compared to higher temperatures experienced on the plains to the west (3°C – 37°C) (Central West CMA 2010). Average annual rainfall varies from 800mm in the eastern part of the catchment to 400mm in the lower west (Central West CMA 2010).

The subject site is located 1.3 kilometres east of the Bogan River which is a major tributary of the Darling River. In April 1990 major flooding of the Bogan River occurred resulting in the evacuation of the Nyngan Township (Bogan Shire Council 2010). The site is located outside of the levy bank which protects the Nyngan township and is therefore likely to be prone to flooding. No flood zone mapping was available from the Bogan Council.

Based on digital mapping by the Department of Environment, Climate Change and Water (DECCW, 2002), the majority of the site is located within the Boggy Cowal Channels and Floodplains Mitchell Landscape which consist predominately of Pleistocene fluvial sediments associated with the Boggy

Cowal distributary stream system. Sediments associated with this landscape are mainly fine sands and form structureless red-brown loamy sands. However, the majority of the site appears to be situated on heavier cracking clay soils which are more typical of the Boggy Cowal Alluvial Plains Mitchell Landscape. This landscape is mapped as occurring in the north-west section of the site. Beyond the site boundary and closer to the Bogan River are sediments associated with the Bogan Channels and Floodplains.

Elevation at the site ranges between approximately 170 metres and 180 metres AHD. Slope is flat and gently undulating over the proposed solar array site and along the proposed transmission line route between the array site and the existing substation.

2.3.2 Vegetation

The proposal site is largely cleared with some remnant patches of vegetation and scattered trees. It has been highly modified by past agricultural activities. Understorey vegetation is generally comprised of native grasses and Chenopod shrubs across the bulk of the site, excluding a paddock in the centre of the site which has been planted with exotic pasture species. Native species diversity ranges from moderate in areas where shrubs are present to low where a few grass species become more dominant. Trees are predominately scattered and sparse across the site, excluding two patches of denser woodland which occur towards the centre of the site. Overstorey species are predominately Black Box (*Eucalyptus largiflorens*), Bimble Box (*E. populnea*) and Wilga (*Geijera parviflora*) in the western and central areas of the site with Myall (*Acacia pendula*) becoming the main overstorey species in the eastern portion of the site (Figure 2-2). Hollow bearing trees were common in areas of mature Black Box in the eastern and central section of the site and extensive areas of this vegetation type were observed outside of the site boundary.

Areas of native vegetation in the western and central areas of the site are predominately derived from Black Box/Bimble Box woodland. Vegetation in the east of the site is derived from Myall woodland. Areas of the site where scattered Myall is present would qualify as moderate to good condition Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes bioregions Endangered Ecological Community (EEC), which is listed under the *Threatened Species Conservation Act 1995*, and as Weeping Myall Woodlands EEC, which is listed nationally under the *Environment Protection and Biodiversity Conservation Act 1999*.

Weed species were common across the site. Two species detected on the site, African Boxthorn and Bathurst Burr, are listed as noxious within the Bogan Shire Council control area.



Figure 2-2, Typical vegetation at the site. Scattered Black Box in grassland in the west and Myall woodland in the east.

3 THE PROPOSAL

3.1 PROPOSAL DESCRIPTION

The proposed solar farm would be located on a 450 hectare site 2 kilometres from the centre of the township of Nyngan, NSW, and would have a generating capacity of 100MW. The solar module array would comprise of a series of photovoltaic modules mounted on fixed frames, and would occupy approximately 200 hectares.

The Nyngan Solar Farm would connect to the existing Nyngan 132kV substation which is immediately adjacent to the solar farm. The solar farm would have an expected operating life of up to 50 years. The decommissioning phase would remove all above ground infrastructure from the site.

Indicative layout and structural plans for the proposal are provided in Appendix C and the development envelope for the proposed solar farm and transmission line is shown on Figure 2.1. The exact location and layout of the solar farm within the development envelope will be further refined during the subsequent development process based on heritage, biodiversity and topographic constraints.

3.2 INFRASTRUCTURE

Project infrastructure for the proposed solar farm would include

- A fixed photovoltaic solar module array, arranged in a series of rows between 1 and 3 metres above the ground, angled for maximum efficiency and supported by steel framing on steel posts fixed in the ground.
- Electrical connections between solar arrays and central inverters via underground or frame secured cabling
- A series of central inverters and kiosk transformers distributed throughout the solar array
- Electrical connection into the existing 132kV Nyngan substation via an overhead or underground transmission line, including any required switchyard and substation augmentation
- Internal access tracks and upgrades to existing roads, where required
- Fencing and landscaping around the Solar Farm
- Site office and Operations and Maintenance building
- Additional temporary construction infrastructure such as a site compound and equipment laydown area.
- Gravel pit for road materials

3.3 CONSTRUCTION REQUIREMENTS

The construction of the solar farm would require:

- Pile driving equipment to install pylons to support the solar module array
- Lay down areas for equipment and shipping containers
- Shipping container trucks, concrete trucks and heavy vehicle access
- Trenching of underground cabling
- Gravel pit for roads

3.4 OPERATIONAL REQUIREMENTS

The operation of the solar farm would require minimal personnel onsite (approximately one staff member). Security is likely to be present on site at all times and security lighting may be required. Maintenance crews would attend the site as required. Water may be required to periodically wash the solar modules.

3.5 DECOMMISSIONING

The proposal includes a commitment to decommissioning at the end of the project life. The lifetime of the project is expected to be between 30 and 50 years. Decommissioning of the solar farm infrastructure would be paid for by the proponent and would ensure that the land owner and community are not left with infrastructure that affects the use of the land or creates unwarranted visual impact.

All above ground infrastructure would be removed from the site and recycled or otherwise disposed of at approved facilities. Footings and pylons and underground cabling may be left in place. All areas of soil disturbed during decommissioning, including tracks, would be rehabilitated in consultation with the land owner, using appropriate pasture species. Access tracks that the land owner wishes to retain may be left in place.

3.6 JUSTIFICATION FOR THE PROJECT

The Manildra Solar Farm would:

1. Provide reliable energy in a market where demand will soon exceed supply
2. Reduce green house gas emissions contributing to climate change
3. Assist in meeting Federal and State policy objectives to enhance the contribution made by renewable energy sources to meeting demand
4. Contribute to the development of the utility scale renewable energy industry in NSW

In NSW, energy demand is growing. It is met by eight primary sources: coal, natural gas, hydroelectricity, bagasse, wind, wood, solar (thermal and photovoltaic), and petroleum. NSW produces and uses approximately one-third of Australia's energy, with large reserves of black coal and a substantial mining industry. Consequently, the majority of primary energy consumed is from coal to generate electricity (NSW SOE 2009).

Energy production and conversion are the main sources of greenhouse gas emissions (carbon dioxide, methane and nitrous oxide). Coal mining in particular can have significant impacts on surface and groundwater hydrology and disrupt ecosystems (NSW SOE 2009). The Intergovernmental Panel on Climate Change (IPCC 2008) recommends that a vital step to reducing CO₂ emissions is by employing renewable energy.

The Australian Government's Mandatory Renewable Energy Target (MRET) scheme and NSW State Government Renewable Energy (NSW) Bill are meant to encourage additional generation of renewable energy. The Renewable Energy Target (RET) is an expansion of the MRET and requires an additional 20% of Australia's total electricity supply to be sourced from renewable projects by 2020, assuring that national greenhouse gas emissions are reduced to meet Federal Government targets.

Photovoltaic solar farms are able to provide a regular and secure source of renewable energy. They are able to form an important contribution to meeting future electricity demand.

4 POTENTIAL ENVIRONMENTAL IMPACTS

Issues considered potentially able to generate moderate to high level impacts would be given greater priority in terms of investigation and mitigation of impacts. These are impacts which may be, for example:

- Highly contentious within the community (impact on visual values or land productivity)
- Non reversible (impact on Aboriginal heritage features)
- Have potential to cause population level impacts to threatened species (particularly ground dwelling fauna with small ranges)

Environmental issues that are able to generate moderate to high level impacts will require additional investigation/consultation and will be dealt with more fully in the **Environmental Assessment Report** in order to ensure that impacts are managed within acceptable levels.

Issues which pose environmental risks which are considered to be readily identifiable and manageable are considered of lesser priority and will be investigated by desktop based research rather than specialist reports. Liaison with relevant agencies and stakeholders would occur where appropriate.

Table 4-1 Summary of issues, impacts and risks relevant to the proposal

Issues, impacts and risks relevant to the proposal		
Issue	Sources of impact	Risk
Community	• Loss of land for agricultural use • Visual impact (see below) • Construction impacts (traffic, noise, air quality)	• Moderate • Community consultation required, detailed in Section 4.1.
Visual	• Loss of landscape amenity • Impact on scenic character of the locality (for residents and motorists) • Visual impacts for motorists on Tottenham Road and the Mitchell Highway	• Moderate-high • Specialist assessment required, detailed in Section 4.1.
Archaeology	• Potential impacts to Aboriginal heritage	• Moderate • Specialist assessment required, detailed in Section 4.1.
Historic heritage	• Potential impacts to sites or landscapes of heritage significance	• Low • Desktop investigation of local, state and Commonwealth databases.

Issues, impacts and risks relevant to the proposal

Issue	Sources of impact	Risk
Biodiversity	- Potential impacts to vegetation from direct clearing and shade effects - Impact to threatened species and communities - Potential indirect impacts to aquatic and riparian habitats - Potential to spread noxious and environmental weeds	- Moderate - Specialist assessment required, detailed in Section 4.1. - Significant impacts are unlikely.
Traffic and roads	- Increased traffic during construction - Traffic for operational access	- Low - Desktop investigation and liaison as required.
Noise	Construction noise impacts to local residents	- Low-Moderate - Closest residences are immediately adjacent to the site. Construction impacts would be short term - Desktop investigation and liaison as required.
Hydrology and water quality	- Potential to alter natural drainage patterns - Spills	- Low - The subject site is located approximately 1.3 km east of the Bogan River and risks to water values are unlikely. - Desktop investigation and liaison as required.
Soils and landforms	Erosion/deposition of soils due to earthworks, clearing and vegetation impacts	- Low - Risks to soils are manageable using best practice.
Air quality	Construction impacts from vehicle movement and excavation for panel installation	- Low - Desktop investigation and liaison as required.

4.1 MODERATE TO HIGH PRIORITY IMPACT TYPES

Further investigation is proposed to include specialist reports for a number of priority issues. These include community, visual, archaeology and biodiversity impacts. A summary of the proposed approach to each of these areas is provided below.

4.1.1 Community impacts

Infigen's project team has developed a Community Consultation Plan (CCP) for the Solar Flagships Program, and the project team will be directly responsible for conducting the community consultation processes throughout the development, construction and operations stage of the project.

Consultation efforts will focus on establishing dialogue and ongoing relationships with key stakeholder groups such as landowners, neighbours and the wider community. This will be done via a series of activities and mechanisms including community information days, direct contact with immediate neighbours to the project, and a website with regular project updates and a feedback/question tool for users. Feedback from stakeholders will be closely monitored throughout the project, with the aim of keeping the CCP relevant and responsive to the needs of stakeholder groups throughout.

4.1.2 Visual impacts

A visual and landscape assessment report would be prepared and documented as a stand-alone report. It would incorporate:

- A desktop analysis to determine the likely extent of visibility of the proposed solar farm and associated infrastructure within defined landscape units
- Detailed site investigations to confirm the boundaries of the landscape units and review and confirm the visual catchment of the proposal
- Landscape and Visual Impact Assessment to classify the potential view locations and viewers in terms of view context, view distance, number of potential viewers, and period of view
- An assessment of the likely magnitude of visibility of the development from the view locations, and the level of sensitivity of the various categories of viewers to change that would result from the development
- Potential mitigation options to be considered as part of a strategy to minimise visual impacts
- A range of illustrative material, including figures and photographs, to illustrate the results of fieldwork and to demonstrate issues of distance and relative scale between selected view locations and the solar farm site
- A series of visual simulations to illustrate the impact of the solar farm from a number of selected view locations

4.1.3 Archaeological impacts

The Aboriginal Heritage Assessment would be undertaken and documented as a stand-alone report. It would be conducted in accordance with the requirements of the DECCW *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NPWS draft 1997). In addition the study would observe the Community Consultation – Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants. Accordingly, the study would include:

- Consultation requirements including Notification and Registration of Interests and Preparation of Assessment
- Construction of a methodology appropriate to the proposed impacts and scope of the study
- Consultation with relevant Aboriginal organisations/groups
- A review of heritage listings and relevant literature
- A synthesis of local and regional archaeology
- The construction of a predictive model of Aboriginal site location
- A comprehensive field survey of the zones of the proposal area which will aim to locate Aboriginal archaeological sites and heritage items and make an assessment of the archaeological sensitivity of the land
- An analysis of the survey and results
- A significance assessment of cultural heritage sites located within the study area
- Recommendations for the mitigation and management of cultural heritage based on the results of the investigation, significance assessment and a consideration of the impacts of the proposed activities
- Recommendations in regard to whether or not further archaeological investigation such as subsurface test excavation is warranted
- Provision of a draft document to registered Aboriginal stakeholders
- Compilation of a heritage report in accordance with the relevant standards and guidelines

4.1.4 Biodiversity impacts

The biodiversity assessment would be undertaken and documented as a stand-alone report. It would involve the identification of species and communities present at the site and a comprehensive review of the potential for threatened species and communities to be impacted by the proposal. The Biodiversity Assessment report would include:

- A review of research literature, online databases and other sources to determine regional and local biodiversity values. Key resources would include the Commonwealth Reporting Tool, the NSW DECCW Wildlife Atlas, the PlantNET database of the Royal Botanical Gardens Herbarium and the NSW DECCW Threatened Species Database
- The methods and results of field investigations. Fauna would be surveyed using passive techniques, active searches and habitat assessment. Flora would be surveyed using traverse (such as 'random meanders') and limited quadrat techniques, targeted searches for threatened species, an assessment of vegetation condition, conservation status (including reservation and Biometric status) and significance, and vegetation community classification and mapping
- Consideration of likely constraints and risks related to biodiversity
- An evaluation of the likelihood of threatened species, populations and communities to occur within the study area and their potential to be impacted by the proposal

- Identification and mapping of regionally rare or declining species, and noxious weeds at the site
- Measures to reduce the risks and identified impacts, including avoidance and mitigation

The majority of the site has been highly modified by agricultural practices including clearing of native vegetation and soil disturbance through cultivation. If infrastructure can be located in the more degraded areas, the biodiversity values of the site are likely to pose low constraints to the proposed development.

Preliminary assessments will focus on constraints mapping and consideration of the need for any further targeted surveys to be undertaken.

5 CONCLUSION

This Preliminary Environmental Assessment summarises the scope and receiving environment of the Nyngan Solar Farm proposal, as of 26 July 2010. This proposal would be assessed under Part 3A (Major Projects) of the *Environmental Planning and Assessment Act 1979*.

This document is intended to give a preliminary prioritisation of potential impacts, in order to guide the full investigation of issues in the Environmental Assessment. Infigen now seeks the Director General's Requirements, identifying the key issues and any required methods of inquiry in order to complete the Environmental Assessment for this proposal.

6 AUTHORS

Authors

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7 REFERENCES

Bogan Local Environmental Plan (1991) Bogan Shire Council, Nyngan.

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Appendix A MINISTERS OPINION OF PART 3A STATUS



Planning

Contact: Neville Osborne
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Email: neville.osborne@planning.nsw.gov.au
Our Ref: 10/13949

Mr Chris McGrath
Development Manager
Infigen Energy Limited
Level 22
56 Pitt Street
SYDNEY NSW 2000

Dear Mr McGrath

Proposed Nyngan Solar Farm, Bogan Local Government Area

Please be advised that on 5th July, 2010, the Director, Infrastructure Projects branch of the Department of Planning, under delegation from the Minister for Planning, formed the opinion under clause 6 of the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP) that the abovementioned project is development of a kind that is described in Schedule 1 of the Major Development SEPP.

The project is therefore declared to be a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979* and will be subject to determination by the Minister for Planning. I have enclosed a copy of the record of the Minister's opinion for your information and reference.

Please do not hesitate to contact me on the above details should you wish to discuss or clarify this matter.

Yours sincerely

Neville Osborne 5/7/10
Manager, Water and Energy
Infrastructure Projects

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Planning

**Record of Minister's opinion for the purposes of Clause 6(1) of the
State Environmental Planning Policy (Major Development) 2005**

I, the Director, Infrastructure Projects branch of the Department of Planning, as delegate of the Minister for Planning under delegation executed on 25 January, 2010, have formed the opinion that the development described in the Schedule below, is development of a kind that is described in Schedule 1, Group 8, clause 24 of *State Environmental Planning Policy (Major Development) 2005* namely development for the purpose of a solar electricity generation facility that has a capital investment value of more than \$30 million. It is therefore declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies for the purpose of section 75B of that Act.

Schedule

A proposal by Infigen Energy Limited for the Nyngan Solar Farm, a solar electricity generating facility and associated infrastructure located within the Bogan local government area, comprising 150 megawatts of fixed solar photovoltaic generating equipment, as generally described in the letter by Infigen Energy Limited to the Department of Planning dated 30th June, 2010.

A handwritten signature in black ink, appearing to read 'Daniel Keary'.

Daniel Keary
Director, Infrastructure Projects
Department of Planning

Date: 5/7/10

Appendix B SITE PHOTOS



Photograph 1. Black Box woodland to the west of the site (off site).



Photograph 2. Grazed native/exotic pasture in the west of the site south of the sub station.



Photograph 3. Grazed native/exotic pasture in the far west of the site, looking east. Wetter area in foreground.



Photograph 4. Scattered African Boxthorn (declared noxious weed) in western section of the site.



Photograph 5. Isolated Leopardwood tree, western section of site.



Photograph 6. Disturbance by stock in wetter areas, western section of site.



Photograph 7. Small area of Myall woodland, north-west of site.



Photograph 8. Scattered Black Box trees adjacent to dam, western section of site.



Photograph 9. Grazed native/exotic pasture adjoining area of Black Box woodland south west of site (woodland avoided by proposal)



Photograph 10. Small area of Black Box woodland within the site boundary, south-west section of site



Photograph 11. Planted exotic pasture, central section of site.



Photograph 12. Disturbance by stock, central section of site.



Photograph 13. Heavily grazed native/exotic pasture, central section of site.



Photograph 14. Bathurst Burr (declared noxious weed), centre section of site.



Photograph 15. Planted paddock, southern section of central area.



Photograph 16. Cropped area in south-west corner of eastern section.



Photograph 17. Myall regeneration in eastern section of site.



Photograph 18. Isolated Black Box, far south-east of the site looking toward the south-east corner.



Photograph 19. Scattered Myall trees, east of site.



Photograph 20. Large expanses of native grassland, east of site.



Photograph 21. Stands of Myall in centre portion of the eastern section of the site.



Photograph 22. Dam in north-east corner of site.



Photograph 23. Grey-crowned Babblers (threatened) in woodland patch in centre of site.



Photograph 24. Remaining Black Box woodland, centre of site.



Photograph 25 Black Box woodland community, centre of site.



Photograph 26. Nyngan sub-station, south side.



Photograph 27. View from sub-station to proposed solar farm site (looking south).



Photograph 28. Western side of sub-station.



Photograph 29. Northern side of the sub-station with planted vegetation.



Photograph 30. Eastern side of sub-station.

Appendix C LAYOUT AND STRUCTURAL PLANS

