

## Appendix G: Noise impact assessment






Wyalong Solar  
Farm  
Noise Impact  
Assessment

November 2018

## Wyalong Solar Farm:

# Noise Impact Assessment

**AE1091.0\_D2  
November 2018**

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Issued to	
Project team	
Prepared by	Approved by
Neil Wines (Principal Environmental Scientist)	  Michael Cramer (Director)
Reviewed by	
Michael Cramer (Director)	
Previous versions:	

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[www.accentenvironmental.com.au](http://www.accentenvironmental.com.au)

[info@accentenvironmental.com.au](mailto:info@accentenvironmental.com.au)

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# Abbreviations list

AC	alternating current
CEMP	Construction Environmental Management Plan
dB	decibel
dB(A)	A-weighted sound levels
dB(A) $L_{A90}$	the A-weighted sound pressure level that is exceeded for 90% of the measured time period
DC	direct current
DoP	Department of Planning (NSW) (now DPE)
DPE	Department of Planning and Environment (NSW)
EIS	environmental impact statement
Ha	hectares
ICNG	Interim Construction Noise Guideline
km	kilometre
kV	kilovolt
Lw	sound power level
m	metres
MW	megawatts
NPI	Noise Policy for Industry
NSR	nearest sensitive receiver
PSNL	project specific noise level
PCU	power conversion unit
RBL	rating background noise level
SC	synchronous condenser
SEARs	Secretary's environmental assessment requirements
SPL	sound power level

# 1 Introduction

## 1.1 Project overview

The proposed Wyalong Solar Farm (the project) is a utility scale renewable energy development with a capacity of up to 130 MW that would generate clean and renewable electricity from the power of the sun. Wyalong has been chosen due to the relatively high solar irradiance in the region, and the available capacity on the Essential Energy electricity network.

The solar farm operation would comprise up to 350,000 solar photovoltaic (PV) modules, known more commonly as 'PV Modules' or 'solar panels'. The solar panels use the same type of technology as commonly used in residential scale solar installations throughout Australia but are larger in size to those used residential applications.

The solar panels will generate direct current ('DC') electricity that will be inverted to alternating current ('AC') via Power Conversion Units (PCUs). The up-converted 132kV supply would then enter the local Essential Energy electricity network.

The proposed solar farm is located approximately:

- approximately 7.5 km north-east of the West Wyalong township
- approximately 136 km north of Wagga Wagga, NSW
- within the Bland Local Government Area.

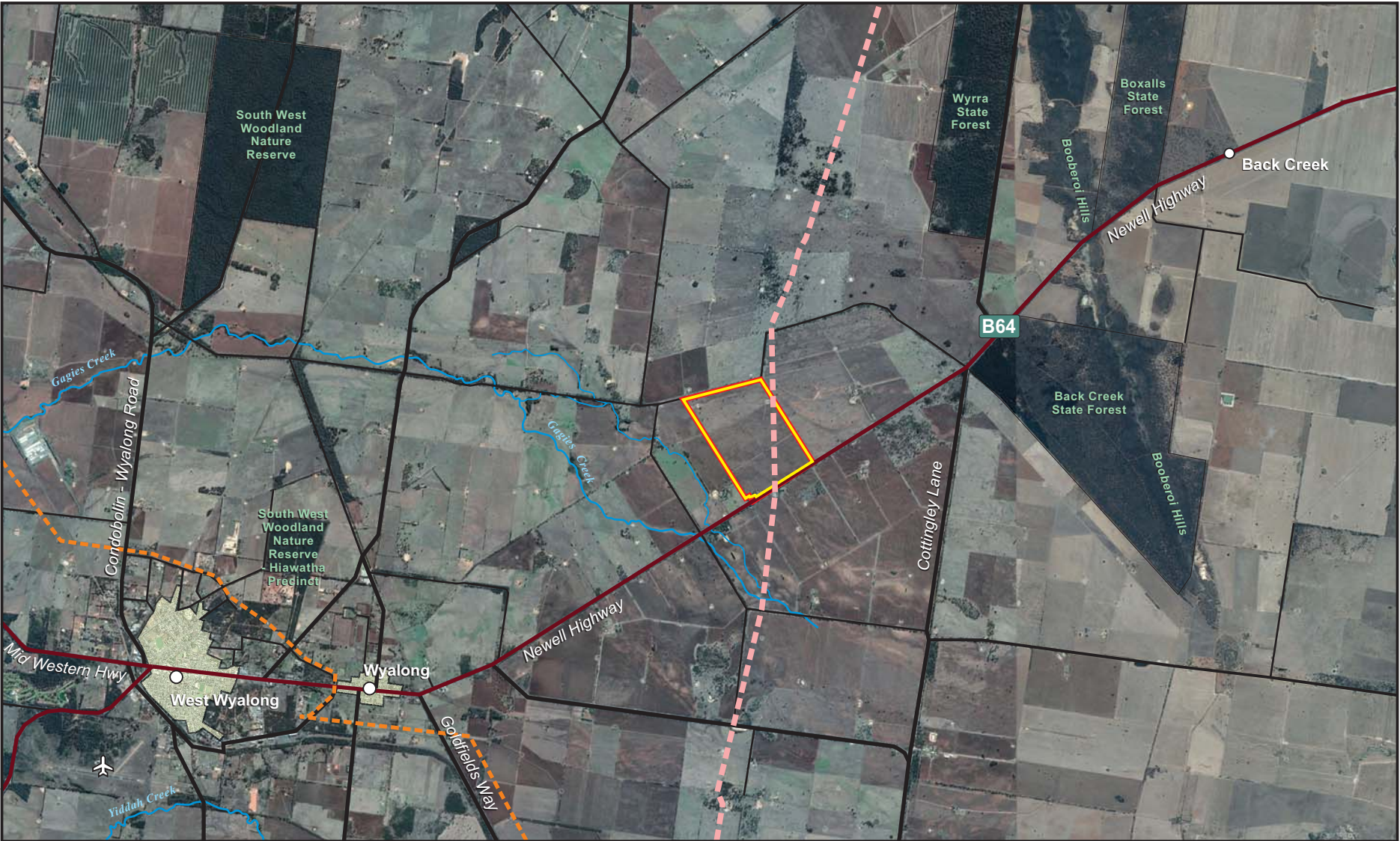
Bland Shire is located in the Riverina region of southwestern New South Wales.

## 1.2 Site details

General information about the project location and existing land use is provided in Table 1 as well as in Figure 1. .

**Table 1. Wyalong Solar Farm site details**

Component	Description
<b>Address</b>	1409 Newell Highway, Wyalong, New South Wales, 2671
<b>Proponent</b>	ESCO Pacific
<b>Council</b>	Bland Shire Council
<b>Titles</b>	Lot 160 in DP750615
<b>Development site</b>	256 ha
<b>Land Use</b>	Cropping, grazing – high level of ground disturbance
<b>Capacity</b>	Up to 100 MW (AC) or 130 MW (DC)
<b>No. of solar panels</b>	Up to 350,000
<b>Connection</b>	Essential Energy 132 kV transmission line



**Figure 1**

**Local Context**

Wyalong Solar Farm

Client: Esco Pacific  
Project No: AE1091.0

Legend	
	Development Site
	Lot Boundary
	66kV Line
	132kV Line
	Watercourse
	Highway
	Main Road
	Local Road
	Airport

N

0 2,500 metres

1:100,000 when printed @ A4

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## 2 Noise assessment

### 2.1 Project brief

An Environmental Impact Statement (EIS) is being prepared by for the Wyalong Solar Farm in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and agency comments, issued by the Department of Planning and Environment (DPE) on 18 September 2018, and outcomes of community and stakeholder consultation. This noise assessment report has been prepared in support of the EIS. The report has been prepared to address the following SEAR:

*an assessment of the construction noise impacts of the development in accordance with the Interim Construction Noise Guideline (ICNG) and operational noise impacts in accordance with the NSW Noise Policy for Industry 2017 and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria.*

### 2.2 Existing conditions

The development site, covering approximately 256 ha of rural land, is north of and adjacent to the Newell Highway which is expected to be the main external noise source. Newell Highway is the nearest major road and is used by light and heavy vehicles. There are no other roads within 400 m of the development site.

Land use in the vicinity of the development site is predominantly cropping; therefore, the operation of noise generating machinery and equipment such as harvesters, boom sprayers and tractors are a further source of external noise.

Residences in the landscape are sparse. These residences would be expected to generate low levels of noise as a result of equipment such as generators or on-site water pumps.

Noise from insects and wind through trees and vegetation would also contribute to background noise levels within and in the vicinity of the development site.

#### 2.2.1 Sensitive land uses and receivers

Sensitive land uses were identified in the area surrounding the development site in accordance with the Interim Construction Noise Guideline (ICNG) (DECC 2009). Residences have been identified as a sensitive land use potentially impacted by noise from the development site.

As shown on Figure 2. , there are five residences within 2 km of the development site including two which belong to the site landholder (R1 and R2). R1 occurs approximately 1.4 km east and R2 approximately 0.25 km west of the lot boundaries. The site landholder is part of the commercial venture of the solar farm and is therefore not considered a sensitive receiver for the purposes of this report. However, potential operational noise impacts to R1 and R2 were considered during the design of the project layout, with inverters being sited at a minimum distance of 851 m from both residences.

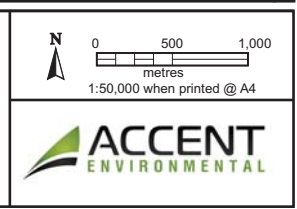


**Figure 2**

**Sensitive Receivers**

**Wyalong Solar Farm**

Client: Esco Pacific  
Project No: AE1091.0



Two dwellings (R3 and R4) are located within 1 km of the site lot boundaries, and one resident, R5, is located approximately 1 km away. As such, R3, R4 and R5 have been identified as nearest sensitive receivers (NSRs) and assessed for noise impacts. Table 2 provides details on the three NSRs.

**Table 2. Noise sensitive receptor locations**

Sensitive Receiver	Location	Direction from Project	Distance to site lot boundaries (km)	Distance from Newell Highway (km)
R3	Newell Highway (approximately 430 m west of Spauls Lane)	Southwest	0.6	0.1
R4	Newell Highway (approximately 2 km west of Spauls Lane)	Southeast	0.8	0.2
R5	Worners Lane	North	1.0	2.0

## 2.3 Construction noise

### 2.3.1 Construction activity

The project is expected to be constructed over nine-month period. The construction timeline is expected to include approximately four months of infrastructure preparation and civil works (months 1-4) equipment installation over eight months (months 2-9), and commissioning over the final three months (months 7-9).

### 2.3.2 Interim Construction Noise Guideline

The aim of the ICNG is to provide guidance on managing construction works to minimise noise (including airborne noise, ground-borne noise and blasting), with an emphasis on communication and cooperation with all involved in, or affected by, construction noise.

The steps for managing noise impacts from construction are:

- identify sensitive land uses that may be affected
- identify hours for the proposed construction works
- identify noise impacts at sensitive land uses
- select and apply the best work practices to minimise noise impacts.

#### Construction hours

The construction hours will be in accordance with the ICNG recommended standard construction hours for construction work, unless otherwise agreed with the Secretary (Department of Planning & Environment), with construction activities occurring during daytime, as follows:

- Monday to Friday, 7.00 am to 6.00 pm
- Saturday, 8:00 am to 1:00 pm
- no construction work on Sunday and public holidays.

#### Project noise management levels

The rating background noise level (RBL) is the level used in this report for noise assessment purposes. The RBL is the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (EPA 2017).

Background noise monitoring was not undertaken as part of this assessment. As a worst-case scenario, it has been assumed that background levels will be less than 30 dB(A) during all time periods, and the minimum assumed RBLs have been adopted. In accordance with the Noise Policy for Industry (NPI) (EPA 2017), where the rating background noise level is to be less than 30 dB(A) for the evening and night periods, then it is set to 30 dB(A). Where it is to be less than 35 dB(A) for the daytime period, then it is set to 35 dB(A).

For the current assessment, therefore, a value of 30 dB(A) for evening and night periods and 35 dB(A) for daytime periods has been adopted as the RBL.

Where noise from construction works is above the 'noise affected' levels presented in Table 3, the ICNG states that the proponent should apply all feasible and reasonable work practices to minimise noise.

Noise levels are to be rounded to the nearest integer (EPA 2017). The ICNG specifies the noise thresholds at NSRs for construction activities as listed in Table 3.

**Table 3. Noise management levels at dwellings**

Day time hours	Management level $L_{Aeq\ 15\ min}$	How to apply
<b>Recommended standard hours:</b>  Monday to Friday 7am to 6pm  Saturday 8am to 1pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none"> <li>Where the predicted or measured <math>L_{Aeq\ 15\ min}</math> is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</li> </ul>
No work on Sundays or public holidays	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. <ul style="list-style-type: none"> <li>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ul style="list-style-type: none"> <li>times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near dwellings)</li> <li>if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ul> </li> </ul>

Based on the adopted day time period RBL of 35 dB(A) for standard hours, the noise affected management level has a threshold of 45 dB(A) before specific management is required.

### 2.3.3 Construction noise sources

The construction activities include approximately four months of piling and installation of the mounting structures and approximately five months of installation of the PV modules and inverter assemblies.

Noise sources included in the construction noise calculation include:

- 1 x truck and dog for civil works
- D6 dozer or equivalent for levelling and road development
- 24 tonne excavator for earthworks
- grader for road development and levelling activities
- 7 tonne vibrating roller for road construction
- front end loader for the movement and loading of soil and aggregate materials
- piling rig for installing PV piles
- Franna crane for the lifting of loads, erection of steel, and movement of heavy plant
- two trenchers for the installation of underground conduits and cabling
- portable generator for temporary site power
- hand power tools and equipment.

### 2.3.4 Sound power levels

Sound power levels (Lw) data for noise sources were sourced from typical values for the listed equipment types and are listed in Table 4 along with estimated acoustic usage factors. Lw is the intrinsic noise output of a piece of plant or equipment, and does not depend on distance or orientation of the machine. The Lw values in Table 4 are conservative in nature, representing the higher end of typical ranges.

**Table 4. Sound power levels for construction noise sources**

Noise source	Sound power level (Lw) dB(A)
Truck and dog	103
D6 dozer	86
24 tonne excavator	101
Grader	106
Vibrating roller	109
Front end loader	110
Piling rig	107
Franna crane	107
Trenchers	97
Generator	73

### 2.3.5 Assessment

Consistent with the requirements of the ICNG, construction noise impacts have been quantified by:

- predicting the realistic worst-case or conservative noise levels from the identified sources
- applying them to assessment locations representing the most noise-exposed dwellings
- taking into account the construction activities in Section 2.3.4.

The assessment has assumed that one of each plant item listed in Section 2.3.4 is concurrently in operation at the nearest point to the receiver and generating the Lw values listed in Table 4. The assessment is

conservative as it does not take the usage factors into account, instead assuming continuous operation. In accordance with the ICNG, a calculation was used to estimate the magnitude of expected noise levels. The relationships between the sound power and sound pressure level enables a prediction of attenuation over distance:

$$L_p = L_w - [20 \times \log_{10}(r)] - 8 \text{ dB}$$

$L_w$  = Sound Power level (dB(A))

$L_p$  = Sound Pressure level (dB(A))

$r$  = distance (m)

The formula for combining the sound pressure levels to calculate the sum level:

$$L_p = 10 \times \log_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$$

$L_\Sigma$  = Total level and  $L_1, L_2, \dots, L_n$  = sound pressure level of the separate sources in dB SPL

### 2.3.6 Predicted construction noise levels

Table 5 shows the resultant maximum noise levels predicted at the NSRs during project construction compared with the relevant noise management levels derived in Section 2.3.2.

**Table 5. Predicted maximum construction noise levels at NSRs,  $L_{Aeq,15min}$  dB(A)**

Receiver (residence)	Noise management level dB(A)	Predicted construction noise levels $L_{Aeq, 15min}$ dB(A)	Exceed noise management level
R3	45	52	Yes +7 d(B(A))
R4	45	49	Yes +4 d(B(A))
R5	45	47	Yes +2 d(B(A))

\* Note: predicted noise levels have been rounded to the nearest integer

As shown in Table 5, the predicted maximum construction noise levels at the development site would attenuate to a level that remains above 45 dB(A) at the three nearest sensitive receptors. However, the predicted construction noise levels are based on a worst-case scenario:

- All plant and equipment are assumed to be operating together and at the closest point of the development site to each sensitive receptor. This situation would not occur on site due to the spatial and temporal separation of civil work and construction activities.
- Construction noise levels would also vary over the construction period due to the location, type and duration of construction being undertaken. Equipment utilisation would vary throughout the day and these factors would also see a reduction in the above predicted noise levels.
- The noise level predictions do not take into account the implementation of noise attenuation measures, such as barriers, use of topographical features for shielding, or possible noise control treatments on plant and equipment.

As construction noise levels at all NSRs are predicted to be substantially lower than the 'highly noise affected' level of 75 dB(A) (as defined by the ICNG and listed in Table 2.2), a strong community reaction to noise levels is therefore unlikely.

Note however, that ESCO Pacific are also proposing the use of a mulcher on site to assist with removing scattered paddock trees. Depending upon model, design and noise mitigation measures, mulchers can potentially emit sound power levels of up to 120 dB(A). At an L<sub>w</sub> of 120 dB(A), the noise calculation predicts that a distance of approximately 2.5 km is required between a sensitive receiver and the mulcher to achieve compliance with noise management levels.

The short term use of a mulcher on site is therefore likely to require management to avoid exceeding noise management levels – although the conservatism inherent in the noise level predictions, as outlined above, should be taken into consideration.

### 2.3.7 Management practices

The predicted maximum construction noise levels indicate that the noise affected level can be exceeded when all construction activities are conducted concurrently at the closest point to the NSRs.

The ICNG 2009 notes that work practices that minimise noise levels on site and provide for proper communication with the community are generally the most effective at managing noise.

ESCO Pacific has committed to preparing a noise management plan as part of the CEMP to:

- apply all feasible and reasonable work practices to meet the noise affected level
- inform all potentially impacted residents the nature of works to be carried out, expected noise levels and duration, work practices applied to minimise noise, as well as contact details.

## 2.4 Operational noise

### 2.4.1 Operational activities

The development site is a solar photovoltaic plant with a capability of generating up to 100 MW (AC) or 130 MW (DC) of renewable energy. During operations, it is expected that there will be up to four staff based at the facility to manage site activities and to support routine plant operations and maintenance.

The solar panels will be fixed to a horizontal mounting structure which slowly track the movement of the sun. The PV modules are set out in regular arrays connected by cabling to centrally located inverters. An office workshop and substation that houses the main step-up transformer will be located to the north of site.

ESCO Pacific has advised that the main operational noise generating activities on site will include:

- approximately 4000 NexTrack motors that allow the solar panels on the horizontal mounting structure to track the sun across the sky. These motors will be evenly spread across the arrays of PV modules
- approximately 30 central inverters that are located at the end of each block of PV modules
- the main step-up transformer and synchronous condenser (optional) in the switchyard.

The equipment will operate continuously during daylight hours only.

### 2.4.2 Noise Policy for Industry

Noise from the operation of the development site has been assessed in accordance with the NPI. Assessment under the NPI has two components:

- controlling intrusive noise impacts in the short term for dwellings
- maintaining noise level amenity for particular land uses for dwellings and other land uses.

The NPI defines the time of day as follows:

- day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays

- evening – the period from 6 pm to 10 pm
- night – the remaining periods.

### Intrusiveness criteria

The intrusiveness criterion for residential noise receptors as set out in the NPI is as follows:

$$L_{Aeq, 15 \text{ min}} \leq RBL \text{ (dB(A) } L_{A90}) + 5 \text{ dB(A)}$$

The applicable intrusiveness noise criteria are presented in Table 6.

**Table 6. Intrusive noise level**

Time of day	Minimum assumed RBL dB(A)	Minimum project intrusive $L_{Aeq}$ dB(A)
Day	35	40
Evening	30	35
Night	30	35

### Amenity criteria

The nearest NSRs are dwellings located in a rural area. Based on the nature of these receivers, the amenity criteria ( $L_{Aeq}$ ) for rural residential properties will be applied. The applicable amenity noise criteria are presented in Table 7.

**Table 7. Amenity noise level**

Receiver	Noise amenity area	Time of day	Amenity noise level $L_{Aeq}$ dB(A)
Residential	Rural	Day	50
		Evening	45
		Night	40

### Project specific noise levels

The intrusiveness and amenity criteria that apply for day, evening and night periods are shown in Table 8 under the NPI, the lower of the two (intrusiveness or amenity) is adopted as the project specific noise level (PSNL).

**Table 8. Project specific noise levels based on NSW NPI**

Time of day	RBL dB(A)	Intrusive criteria $L_{Aeq}$ dB(A)	Acceptable amenity criteria $L_{Aeq}$ dB(A)	Adopted PSNL $L_{Aeq}$ dB(A)
Day	35	40	50	40
Evening	30	35	45	35
Night	30	35	40	35

Table 8 shows that the intrusiveness criteria are lower than the amenity criteria for day, evening and night periods. Therefore, the intrusiveness criteria have been adopted as the PSNL.

#### **‘Modifying factor’ adjustments**

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level (EPA 2017). The NPI provides guidance on applying adjustments where the noise may be considered annoying. For each aspect an adjustment of 5 dB(A) can be added to the predicted value, up to a total of 10 dB(A) to penalise the noise for its potential increase in annoyance.

### **2.4.3 Sound power levels**

Sound power data for noise sources during operations and estimated acoustic usage factor were provided by ESCO Pacific (sourced from equipment suppliers). Sound power totals used in the noise calculations are shown in Table 9.

**Table 9. Sound power levels for operational noise sources**

Plant	Sound power (Lw) (dB(A))	Usage period
NexTracker (each)	58	Day Evening (sunlight hours only)
SC2200 Inverter (each)	95	Day Evening (sunlight hours only)
Transformer	75	Day Evening Night
Optional		
Synchronous condenser (SC)	93*	Day Evening (sunlight hours only)
SC Transformer	90	Day Evening (sunlight hours only)

\* Synchronous condenser Sound Power Level at 1 m, 82 dB(A) + Tolerance +3 dB(A)

#### 2.4.4 Assessment

Noise impacts from project operations have been quantified by:

- predicting the realistic worst-case or conservative noise levels from the identified sources
- assuming no inverter will be located within 851 m of an NSR
- assuming a maximum attenuation of 3 dB from acoustical shielding for an inverter
- applying the above assumptions to assessment locations representing the most noise-exposed NSRs.

The calculation used to estimate the magnitude of expected noise levels is the same as used for project construction (see Section 2.3.5).

#### 2.4.5 Predicted noise levels during operations

Table 10 shows the noise levels predicted at the NSRs, based on the assumptions outlined above, during project operations compared with the relevant PSNLs derived in Section 2.4.2.

**Table 10. Predicted  $L_{Aeq, 15min}$  noise levels at NSRs during operations dB(A)**

Receiver	PSNL (intrusiveness criteria) $L_{Aeq}$ dB(A)	Predicted operational noise levels $L_{Aeq, 15min}$ dB(A)		Exceed intrusive criterial
		Day	Evening	
R3	40	<30	35	No
R4	40	<30	34	No
R5	40	<30	31	No
		Night	Evening	
R3	35	<30	35	No
R4	35	<30	34	No
R5	35	<30	31	No
		Night	Night	
R3	35	<20	<20	No
R4	35	<20	<20	No
R5	35	<20	<20	No

\* Modifying factor conservatively set at maximum +10 dB(A)

The predicted noise levels at all NSRs comply with all the nominated criteria under neutral conditions and modifying factors.

It should be noted that the noise emissions during operations were predicted to comply without the implementation of noise attenuation measures under normal conditions. However, the design and layout for the project will consider measures such as setbacks, orientation, shielding or other treatments on plant and equipment in relation to the sensitive receptors.

Note however, that ESCO Pacific are proposing the option of installing a synchronous condenser with its own transformer. Depending upon the installed model, design and noise mitigation measures, the additional Sound Power Levels of these two pieces of equipment combined with an SC2200 Inverter,

NexTracker and transformer at 851 m raises the noise level to 30 dB(A) at the NSRs under neutral conditions.

Hence without any reductions for orientation, shielding or increased distance from an NSR the noise calculation predicts that noise levels will potentially exceed Evening intrusive criteria when a maximum modifying factor is applied (conservatively set at maximum +10 dB(A)).

## 2.5 Road traffic

### 2.5.1 Existing traffic activity

Road traffic data for this assessment was sourced from the traffic impact assessment for the development, prepared by Impact Traffic Engineering Pty Ltd (Impact 2018).

Traffic during construction and operations will access the development site from the south, entering and exiting from the Newell Highway.

The Newell highway is a State arterial road that generally carries in the order of 2,200 vehicles per day in the locality of the development site.

### 2.5.2 NSW Road Noise Policy

The NSW Road Noise Policy (DECCW 2011) sets out noise assessment criteria for existing dwellings affected by land use development. The policy sets different noise limits dependent upon the road category and type of project and land use.

The Newell Highway is classified as a State Arterial Road (Impact 2018).

### 2.5.3 Noise sensitive receptors

Traffic enters the site directly from the Newell Highway and onto the main internal access road within the development site. Once on the development site, the traffic does not drive past any NSRs.

### 2.5.4 Standard hours

The ICNG specifies standard construction hours that limit construction activities and traffic movement to the day period hours listed in Section 2.3.2. Operational traffic will also conform to these hours.

### 2.5.5 Construction phase

Construction traffic will comprise a combination of light and heavy vehicle movements as equipment, materials and personnel are transported to site. Expected construction traffic movements are summarised in Table 11, taken from Impact (2018).

**Table 11. Estimated construction traffic**

Type of vehicle	Total vehicle movements	Peak daily movements
Heavy vehicle (HV)	Approximately 2,320 total HV movements	Peak of 24 daily HV movements
Light vehicle (LV)	Approximately 2,970 total LV movements	Peak of 22 daily LV movements

Type of vehicle	Total vehicle movements	Peak daily movements
<b>Total</b>	<b>5,290 total movements</b>	<b>Peak of 46 daily movements</b>

‘Movements’, as shown above, correspond to ‘single trips’ to or from the site. The total traffic generation for the site, and each of the peak hours would therefore be twice that shown in the table.

As an average of 2,200 vehicles per day currently use the Newell Highway (see Section 2.5.1), the 46 additional daily movements (92 uses of the highway) during the peak construction phase comprises an increase of under 5%. Accordingly, the associated increase in traffic noise from the Newell Highway during this period is also expected to be minor.

There will be no construction traffic on local roads, so other than highway traffic no road noise-related impacts are anticipated.

## 2.5.6 Operational phase

During the operational phase, the project will continue to generate traffic on the Newell Highway.

However, as only up to four full-time and eight part-time staff will be typically based at the solar facility, operational activities are anticipated to have a negligible impact upon traffic volumes on the Newell Highway and the local road network, and a minor impact on associated noise levels.

## 2.5.7 Cumulative Impacts

Potential cumulative road noise impacts may result should project construction overlap with the construction of the proposed West Wyalong Solar Farm, located approximately 6.2 km north of the development site, or with any significant works at the Cowal Gold Mine, located approximately 30 km north of the development site. However, it is expected the magnitude of such an impact would be negligible, due to the low numbers of vehicles compared with background traffic on the Newell Highway.

Traffic generated from local events and activities may also have the potential to generate cumulative road noise impacts, should they occur during project construction, however the impacts would be minimal.

It is not expected that the operation of nearby quarries will result in cumulative road noise impacts, with the nearest being the intermittently active Blacks Pit located 1.3 km northwest of the development site. There is one continuously operational quarry Millers Quarry located 9.6 km southwest of the development site, with eight intermittently active quarries located within 20 km of the development site, and an additional 11 quarries that are not operational. Should these quarries become operational during construction, the potential cumulative noise impacts from increased traffic on Newell Highway is expected to be minimal. Potential noise impacts will be managed as per the noise management plan to be developed as part of the CEMP.

### 3 Proposed management

The noise assessment undertaken for the Wyalong Solar Farm was conservative. However, it is proposed that noise monitoring be undertaken during construction to confirm predictions and determine any need for noise management measures. In particular, the use of a mulcher on site will be subject to noise monitoring and, if noise management levels are exceeded at the three NSRs, management measures such as the following will be implemented to achieve compliance:

- locating the mulcher within the site so as to maintain a specified minimum distance to the NSRs
- operating the mulcher within designated time periods rather than in an ad hoc manner to minimise the frequency of intrusion
- positioning the mulcher to make use of any natural shielding
- application of noise shielding or noise suppression measures at the mulcher
- consultation with the landholders at R3, R4 and R5 to agree on measures.

The noise impact assessment has shown that construction noise may exceed applicable criteria at three of the nearby residences and therefore, as per DPEs requirement, a noise management plan must be prepared prior to construction.

The noise impact assessment has shown that operational noise levels do not exceed the intrusive criteria under normal conditions. However, the final design and layout of equipment will consider noise attenuation measures such as setbacks, orientation, shielding or other treatments on plant and equipment in relation to the sensitive receptors.

Should a synchronous condenser installation be confirmed, measures to reduce its potential operational noise impacts on NSRs, which may include enclosures or sound barrier screening, will be provided in the noise management plan to be developed and provided as part of the OEMP.

ESCO have committed to the preparation of noise management plan as part of the CEMP to manage construction noise.

## 4 Conclusions

A noise assessment has been undertaken for the Wyalong Solar Farm. Construction noise impacts have been assessed in accordance with the ICNG and operational noise impacts have been assessed in accordance with the NSW Noise Policy for Industry 2017. Assessment of road noise impacts has also been undertaken in accordance with the NSW Road Noise Policy.

The assessment has concluded the following:

- The nearest sensitive receivers to the development site are residences R3, R4, and R5, located 0.6 km southwest, 0.8 km southeast, and 1.0 km north of the development site.
- Provided the proposed use of a mulcher is managed effectively, noise levels during construction are predicted to comply with noise management levels even when works are conducted at the closest points within the development site to the NSRs.
- As noise levels criteria may be exceeded during construction, a noise management plan to address construction noise is required, and will be prepared as part of the CEMP for the project.
- Noise monitoring will be undertaken during construction to confirm predictions and determine any need for noise management measures.
- Noise levels during operations are predicted to comply with noise management levels under neutral conditions and when modifying factors are assumed to apply.
- Increases to traffic volumes on the Newell Highway during construction and associated increases to noise levels are expected to be minor.

## 5 References

- EPA (2017). *Noise Policy for Industry*. NSW Environment Protection Authority. October 2017.
- DECC (2009). *Interim Construction Noise Guideline*. Department of Environment and Climate Change NSW. July 2009.
- DECCW (2011). *NSW Road Noise Policy*. Department of Environment, Climate Change and Water NSW. March 2011.
- Impact (2018). Wyalong Solar Farm, Newell Highway, West Wyalong, Traffic Impact Assessment. Prepared for ESCO Pacific by Impact Traffic Engineering Pty Ltd. XX October 2018.