The aim of the Draft Large–Scale Solar Energy Guideline is to provide the community, industry, and regulators with guidance on the planning framework for the assessment and approval of large–scale solar energy development proposals under the Environmental Planning and Assessment Act 1979 (EP&A Act).

The NSW Government supports the sustainable development of a solar industry and is establishing greater consistency and transparency in regulation and assessment of solar developments

Your feedback can play a vital role in helping to plan for the future of your local area. (1)
***NSW Renewable Energy Action Plan** Goal 2 – build community support*

To

The Department of Planning

We are the adjoining property to the proposed project frequently mentioned, as R1, due to our close proximity to the proposed Orange Grove Solar farm. We formally object to the proposed solar farm for the reasons set out in this letter.

This land has taken part of 6 generations contributing to local agriculture and taxes. It has contributed through crops of cotton, wheat, broad beans, sorghum and livestock. Our house, (extended garden not included) is 141 meters from the boundary of proposed solar infrastructure, our mailbox is 11m from the solar panels and existing driveway of almost 1k, a couple of meters from the proposal. Our livestock roam along the 3.19km length of boundary of which runs along where this will be built.

If both Gunnedah Solar and Orange Grove Solar are developed this land will be affected immediately as it is within the 2.4km distance between both. If the purpose of solar is to address environmental crisis and climate changing conditions, then it is undeniable that land between two large scale solar farms and their affects from changing landscape conditions will create altered conditions to our home, for us and our livestock, risks of microclimate and social inequity. There will be cumulative affects environmentally and socially.

This submission of objection has information based on sources such as World Health Organisation, CSIRO, government guidelines, international energy meetings, industry policies, and scientific reports .It also features the exchange and knowledge from it's inhabitants which is encouraged throughout the Sustainable Development Goals and is obviously dismissed by this proposed development As an untrained submission expert, the excerpts and factual information is put as a thorough argument to the best of capabilities, considering the project was in motion, for almost a year to explore the procedures and location and our notification was in February with a lamington - after being publicised on the news.

The following are the various guidelines required and objectives to create a solar development, and the misleading information given within the EIS, including the disingenuous consultation, given proximity concerns and consequences, including pollution, both noise and dust, to our health and our livestock and what that means for an existing business, soil impacts not addressed to soil drainage, adjoining land affects and infrastructure hazards.

Required **consultation** from guidelines below:

Consultation	During the preparation of the EIS, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence holders, quarry operators and mineral title holders (including the Australian Coalbed Methane Pty Ltd and Santos QNT Pty Ltd) In particular, you must undertake detailed consultation with Gunnedah Solar Farm and affected landowners surrounding the development. The EIS must describe the consultation that was carried out, identify the issues raised during this consultation, and explain how these issues have been addressed in the EIS.

(2)

Consultation process

The lack of consultation with myself and adjoining landowners experienced which is referenced as a priority in the guidelines to follow, for this proposed solar farm and the companies demonstrated disinterest in adjoining land owners existing businesses, concerns and lack of attempt to exchange local knowledge demonstrates Overlands resistance to create shared values in creating a development in favour of their agenda and only fostered a win-lose argument throughout the consultation period. The amount of the 'highly unlikely / shouldn't / not anticipated/generally/approximately/not significantly/not expected' adjectives throughout this EIS, confirms an ongoing disrespect, distrust and uncertainty, of the diligence from Overland and future interactions of this project and effective scientific support.

The consultation with R1 may have been initiated by a phone call to join land for the project on 1st August 2017 and followed with lack of respect and demoralisation (admitted within the EIS showing the next consultation or contact), only taken place on the 15th of February 2018 after other adjoining neighbours had seen the proposal on the news and initiated a meeting themselves, six months afterwards. Within the initial meeting of other adjoining neighbours, asked if the representative had contacted us, being the closest, he replied "not yet". This is evident within the dates given. Considering the proximity of the project to our house and further impact, to make contact for a deal but not contact to say it would be constructed on our boundary is not consistent or transparent communication.

A copy of the factsheet is provided in Appendix B. The Namoi Valley Independent also published details about the project on 2 February 2018.

The local newspaper was contacted also before the affected adjoining landholder on the 15th of February about the project.

The Overland consultation process indicated an effort of a one-way communication, which continues throughout the process, despite the misleading but positive supportive publicity and guidelines for this development, which clearly have not been followed. The evidence of distress from the local community due to solar farm consultation and floods issues has been established in local press already. Below the governments suggestion for all solar developments to follow.

- *Effective community engagement*
- *Listen rather than promote and engage with issues that are important to the community rather than what the project owner thinks should be important to the community.*
- *It is critically important that actual facts about a project are available to the community and that misinformation is not allowed to be disseminated within the community uncontested. This is best achieved via a transparent engagement with the community in a timely manner.* (3)

The EIS, and its interpretations below is clarification of communication.

13th March the relative declined OVERLAND's offer to meet.

Relative did not decline to meet. Relative said they would respond later.

10th April. Message left from Overland was to "touch base with you quickly".

Is this preparation for consultation over property and community concerns?

Landholder's relative emailed a list of questions about the project and requested a copy of the draft EIS.

No request was made for the EIS prematurely but to communicate concerns and see any visual design with panels, after the community meeting and alienation pedantic and general mistrust and skepticism had already been created with the lack of the transparency. With location differences, an email is an acceptable and normal method of communication. It was also suggested to email Overland by their representatives several times throughout the community meeting. Here is the email sent.

Dear (reps of Overland)
I understand you have a draft to show of the proposed development, please email it through. Pointing at a piece of paper isn't enough information nor an effective consultation at this stage as I watch the Trans Grid vehicles and bobcats already roll past our property but considering you originally only notified us, the closest away due to the insistence of our neighbours asking you, after discovering overlands proposal on the news, could your consultation be more transparent by an email with updated information?
Has there been any measures reconsidered with the proposed infrastructure after our concerns at the meeting?
What modifications are in place for the proximity of (R1's) main entrance and driveway being within a couple of meters?
The glare factor is not only panels but also other structures as fencing, lines, buildings, what has been considered to minimize these?
Where are the proposed substations and what do they consist of? Can you show the main entrance and roads, where the night lighting will be?
What traffic will our gravel road bear and would that be asphalted?
If the proposed panels and amount of panels are the sizes mentioned can they fit into the footprint you shown?
From your answer for the weed control of undergrowth being mown and the dust watered - is there a guarantee no chemicals or what type are involved?
And how is the overspill of water management chemical or other, designed not to affect us in a medium to high flood zone?
Your lack of consideration or disinterest of identifying our proximity as adjoining neighbour, apart from admittance of distance, as a speck on your map is felt and as neither Trans grid nor solar farming developers have given any open communication or indication of both being developed on either side, land in the middle, including our property, with Overlands proximity will be more exposed to both. The cumulative impact takes our concern to a higher level of environmental and social concern,
but as you said at the meeting you get it through anyway so I feel I may have to wait for the eis for any written information after meeting you

Based on the results of stakeholder engagement activities, overall there is a positive attitude and community support for the project. EIS

This email was not responded by email or phone call - at all.

Community consultation meeting.

The sessions provided an opportunity for the community to engage directly with representatives from OVERLAND about the project. Information boards were presented, which contained information about OVERLAND, solar farms and renewable energy generation, in general, as well as specific details about the project and the approval process (refer to Appendix B). EIS

The information sheet was the same left in letterboxes. No photomontage of consequential visual effects on the landscape with panels on proposed sight or information on substations or their location. The information at the community meeting with a picture to demonstrate solar was Moree Solar farm, not an overview diagram but close up of panels.

According to the EIS and Overland:

The first session was held over two hours with 20 people registering their attendance. In addition, a further 20-30 other residents also attended but chose not to record their attendance. Due to the staggered arrival of attendees throughout the two-hour period, one-on-one through to small group briefings were provided by OVERLAND representatives with a variety of questions being raised and answered. EIS

Would the venue be able to provide security footage of up to 50 people attending this meeting? How exactly is this figure derived? Does the government require an adjoining landholder to go to that length as a result of inaccurate information? As one of the first to arrive and the last to leave there was not 50 people as stated. What kind of company needs to write that the missing 30 people chose not to write their attendance? If this is another example of misinformation Overland creates for the consultation period, how can there be any trust for information concerning the design and infrastructure process or failure to process this project under false preparation.

Here are notes from our experience of the community meeting.

Attending meeting on Thursday 15th March 2018, Baxter's room, RSL Gunnedah 5.30pm.

Chairs in room backed on perimeter around room, display of information the same as delivered in mailboxes and NSW solar pamphlets.
In corner of room sit adjoining neighbours. On opposite room family of four and possibly another 6-8 on chairs. Many attempts were made to be addressed as a community without division of chairs, tables and a board subdividing each section of the room.

R1 relative- can't we organise the chairs so everyone can talk at a community meeting?
Overland rep - peoples concerns are different I wanted to speak to people individually.
R2 - the first I heard about this was on the news - I had to make phone calls.....
Overland rep - I didn't have your number
R2- I want to know where the panels are going and what they look like?

Overland rep - we don't know yet
R1 - where are the panels made?
Overland rep - silent
R1 - aren't they made overseas? What are they made from?
Overland rep - glass
R1 - they're not just made from glass though. Is there information about deterioration of the panels over 30 years? What about any emissions given off?
Overland rep - they're made of glass. Are you worried about emissions given off your kitchen windows?
R2 -asks about the tracks of panels and do they know if it's fast track
Overland rep - we don't know yet, probably
R2- shows Overland rep a page of photos he took of solar panels in proposed sun farm area and asks about glare. Overland rep looks at page and eye rolls, " that's not the panels we will be using "
R1- asks is that the level of glare? Overland rep calls over other Overland representative to look at the photos.
R8- asks about previous sun farms and how many, says for people given short notice it's a lot to look up and how do we get the information. Overland rep says there's a lot we can find online .R8 says it's difficult to do in short time frame. Eis is discussed. R8 asks for extension. Overland rep says it's standard. R8 asks if it can be extended. Overland rep replies it's standard to have 30 days. R8 responds that it's difficult if we have to research something we don't know in short time frame.
Overland rep is now raising his voice and his pen and iPad put on table beside him.
R8- asks what other projects Overland has done. Overland rep lists Overland projects
R1 - and are they 100 steps away from someone living in the house?
Overland rep - actually we had one with someone 80 meters.
R1 - and the noise and dust?
Overland rep -The dust will be settled by spraying water
R1 - and will the water bores you use affect us? And how will you maintain burs under the panel? Will there be herbicides or pesticides used? Will that affect our land or our grass?
Overland rep - we will mow
R1- where is the substation then? Are you driving adjacent to our road?
Overland rep (he points on map)
This is the substation
R1 - and lighting and roads?
Overland rep - the substation will have lighting for security, parking and amenities shed. Lighting will be there for security.
R1- and roads?
Overland rep - there will be a boundary road.
R1 - so how close are the panels to our boundary.
Overland rep - roughly 10 meters. There will be the plants, a security fence and road for one vehicle.
R2- who waters the plants?
Overland rep - we will
R2- what type of plants
Overland rep - we're unsure yet
R8 - so are you talking about seedlings?
Overland rep - small plants
R1 - so by the time the plants are big enough my mother will be dead.
R8 - so the panels are this high and on rotation are 4 meters high
Overland rep - yes
R8 - so the plants can't stop the glare until fully established
Overland rep - they need to be watered. All I'm saying is we don't need to plant anything; I'm just saying other solar farms don't plant anything.
We groan
Overland rep - asks other concerns?
R2- you can't answer our concerns now
R1 - so can we get information on the tracking systems to hear the noise?

Overland rep - we don't know the tracking system yet
R2 - so when will you know, when will you get the information? When will we know what it will look like? Can you give us a guarantee these panels are ok?
Overland rep - eye rolls
Overland rep is now raising his voice
R1 - wooah , ok this is a feedback community meeting that's what we're here for
R8 - this is primary producers agricultural land it's vital we ask questions
R1- I'm worried about my mother living so close and no information about impacts
Overland rep - a lot of this you can find online
R1- this is already a part time job
R8 - so we have to Google this ourselves?
Overland rep - if you send me an email I'll do my best to answer you (voice raised)

Various questions raised

Overland rep addresses us individually
Overland rep - so you all don't want this to happen. You're opposed. We all nod and say yes.
Overland rep - so you don't mind if it happens down the road?
R2 - I would t wish this upon anyone
Overland rep - what's your biggest concerns
R1i - you haven't mentioned devaluation
Overland rep - silence
R1 - Bathurst report 40 precent devaluation
Overland rep - it's never been brought up before
R1 laughs
Overland rep - it's never been a problem
Overland rep - what are your other thoughts?
R1- I don't feel we've been given enough information to understand what's happening to truly understand and now you're suggesting we Google it ourselves
Overland rep - you can shoot me an email with concerns
R1 - we've just asked you questions you can't answer

Overland rep - so you all don't want this to go ahead
R2 - that's right
Overland rep addresses us individually
Overland rep to R8 - you?
R8 - no
Overland rep to R2 - and you?
R2 - no, I don't want it to happen
Overland rep looks atR2
R2- opposed
Overland rep looks at R1 - Overland rep - you?
R1 - resolutely opposed
Overland rep looks at relative R1
R1 - no I don't want it to happen either
Overland rep no 2. - We'll need to discuss your concerns; obviously we are sitting on different sides
R2 - what do you want us to discuss when we're telling you we don't want it to happen and discussing concerns now?
Overland rep no.2 - well it is likely it will happen anyway

Consultation objectives -Introduce the project, including the project infrastructure layout and project timeline. EIS

Overland did not introduce project or design until after it was on local news and adjoining neighbors made contact.

Where relevant, request information about on-site agricultural operations, aerial spraying, weed and pest management practices and bushfire protection management measures implemented on adjoining land.

Listen to and document any concerns raised about the project. Seek to address concerns with the project design consistent with planning, economic and environmental considerations. Discuss the approval process. EIS

Overland withheld design information as requested from adjoining landholders and eye rolling and sighing at concerns is not a discussion. Most mitigation concerns were addressed back to the seedlings throughout the community meeting.

Present the findings of the visual impact assessment and discuss potential mitigation/management measures to address impacts (if required). EIS

Issues raised at the meeting included, flooding, dust, noise and livestock welfare were ignored or vague but we were told we would be "lucky" for them to barrier sections with seedlings was the basis of management measures to address impacts.

Provide an opportunity for stakeholders to raise any concerns about the visual impact of the project.

Not enough information was provided. Emails not answered.

Community consultation has been completed during the preparation of the EIS, and OVERLAND has actively sought to involve the community in the planning and assessment process (refer to Chapter 5). EIS

How can the following requirements be implemented properly when cumulative impacts were never discussed and sun farms don't have emissions according to our meeting?

- *the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; and*

- *paying particular attention to cumulative impacts and compatibility of the development including a draft landscaping plan for on- site perimeter planting, with evidence it has been developed in consultation with affected landowners; (4)*

Consultation with surrounding landholders and the local community has been undertaken to minimise the impacts of construction on agricultural operations adjacent to the development footprint (refer to Section 5.4).

There was no communication about construction; only water would be a suppressant. How is it possible to minimize football field size, of construction period that could be a year long next to a home, along a boundary and at our financial expense of income from health impacts of livestock through noise and dust?

This is the experience of a company coming under the banner of Socially Responsible Solar.

No emissions, no herbicides, no devaluation and "we got one in 80 meters away " when responding to a list of concerns of proximity, answers of "look it up" and or "we don't know yet", eye rolling, no photo montages of any design and the division of community concerns as an exchange of knowledge by instantly dismissing a direct request to address the room as a community and yet the EIS report Overland states

Based on the results of stakeholder engagement activities, overall there is a positive attitude and community

support for the project and again *Based on the results of stakeholder engagement (refer to Section 5.4), there is a positive attitude and broad community support for the Orange Grove Sun Farm* and OVERLAND's personnel have successfully led benchmark renewable energy and infrastructure projects from start to finish and have a sound record that traverses early stage site identification, working with landowners and communities, *EIS*

This behaviour and misinterpretation of consultation clearly opposed and unanswered concerns is "to build community support"?

NSW Renewable Energy Action Plan

Adjoining landholders (including the Naomi Pistol Club)

Consultation objectives

Introduce the project, including the project infrastructure layout and project timeline.

Questions were raised about traffic impacts and site access, in particular vehicle movements during peak periods and along school bus routes and dust management along the unsealed section of Orange Grove Road. EIS

Neighbours along Orange Grove Road have informed us Overland had visited and told them when asked if the gravel road will be sealed –Overland responded yes, when we asked - no it wouldn't. The EIS confirms they will not seal the road.

They were also told Overland would not be building a substation when asked. EIS confirms they will.

The EIS has assessed the potential impacts of the project and it is not predicted to generate any significant environmental impacts to nearby residences.EIS

If Overland's assessment is formed by nearby residents including a property with the infrastructure on a boundary of over 3 kilometers and 141m from a permanent residence housing, existing driveway under a meter in distance from the fence line is not possible for significant impacts to be assessed but there will be impacts discussed below.

The engagement activities undertaken included community information sessions, phone calls, meetings and informal discussions, thus providing opportunity for public involvement and participation in environmental planning and assessment. EIS

If solar farming requirements are to generate a sustainable future through collaboration how can it be promoted through poor consultation? Why are there guidelines if not followed?

The original vision for global sustainability from world Health Organization was not made for a company that demonstrates lack of consulting and dismissive treatment.

'Public Participation in Decision-making and Access to Justice in Environmental Matters and its protocol (184), which empowers people to gain easy access to information and to participate effectively in decision-making in environmental matters.'

'The complex tasks required to manage increasingly scarce resources, provide webs of infrastructure and shape the human habitat while securing sustainable growth and promoting the health and well-being of local residents have equipped local and regional decision-makers with a wealth of technical skills in complex environments as well as direct knowledge of the needs, priorities, strengths and vulnerabilities of their communities.'

Nor was the implementation of renewables designed for creating food scarcity placed on agricultural land or microclimate cumulative impacts from two solar farms, which R1 will not be compensated, and seemingly have no means to protect a main asset or income with agricultural land, health or livestock.

'Concerns have increased recently that economic growth has been achieved at the expense of the environment, human well-being and social equity. National and city-level desire for economic growth is a major driver for change …Unless consideration is given to the subject of the environment and health, there is a risk that such developments will have a negative impact on both.' (5) WHO

Much of the development and decisions of project would be left at this company's discretion. If this objection is ignored and the very recent re evaluations of mismanagement of renewables, such as Linc Energy and Origin Energy fined by the Federal Government for misleading data, the development process and community active involvement will obviously be unimportant. Community consultation, complaints are concerns are valuable and important experiences.

The commissioner recently received about 163 complaints relating to noise, potential health impacts, amenity, and lack of community consultation, economic loss and flickering shadows from renewables. Some 52 complaints were closed because the complainant did not pursue it. A further 84 complaints were resolved by the commissioner providing information to the complainant. In some cases, one person made multiple complaints.

'The commissioner's scope should be expanded, with a "modest" increase in funding, to include large-scale solar and storage such as large-scale batteries, "given their potential to cause community concerns".
The review recommended changes to make the complaints-handling process more transparent and accessible, and to broaden public awareness of the role.' (6)

A companies representatives reluctant to answer questions or disclose information inconsistently in this early stage of process demonstrates lack of responsibility and distrust to follow undecided protocols left to their own judgement, such as the following examples of undecided factors or variants within the EIS:

the timing of construction and the location/design of temporary access routes will be positioned to minimise impacts on neighbouring agricultural operations;

The number of inverters required will be dependent on the final detailed design,

The rated capacity of future battery and energy storage devices has not been determined at this stage of project development

establish procedures for handling of complaints, disputes, non-compliances and emergency response.

a site access protocol will be developed that lists the relevant landholder's contact details and includes measures to minimise adverse impacts, such as driving carefully to minimise disturbance to livestock, crops and pastures

a complaint resolution and disciplinary procedure,

community consultation measures for peak haulage periods

any impacts to the operation and sustainability of neighbouring agricultural activities

final number of PV solar panels within the development footprint will be dependent on detailed design and network requirements, availability and commercial considerations at the time of construction.

A provision of land area within the development footprint for possible future energy storage and network support devices.. modification to the consent would be sought to permit installation of this infrastructure within the development footprint in the future

install erosion and sediment controls (if required)

implementation of the recommended mitigation measures will ensure that the project will not generate significant air quality impacts during construction, operation or decommissioning.

dimensions of the electrical switchyard and on-site substation will be determined during detailed design

a commitment by the proponent to restore the gravel road surface to its pre- construction condition, at the completion of the project's construction; traffic volumes generated by the project are therefore anticipated to have minimal effects on the future traffic operations

minimise land use conflicts with landholders – the parcels of land that comprise the development footprint, the placement of infrastructure including solar panels, inverters and electrical collection system, switchyard and connection infrastructure have been identified through detailed consultation with the landholders, to minimise land use conflicts and enable agricultural production and land management practices to continue on surrounding land.

the proposed construction works is highly unlikely to generate impacts at the nearest vibration-sensitive receivers

The closest receptor, R1, is approximately 150 m west of the western boundary of the development footprint and will not be exposed to a higher level of EMFs due to the construction and operation of the project. Landholders accessing agricultural land in close proximity to the project infrastructure will not be exposed to EMFs generated by the project infrastructure for extended periods of time.

Or any safety in noise levels would be monitored for permanent residences *noise from the inverters with integrated transformers can be tonal in nature and therefore a 5 dB penalty has been applied to the predicted noise contributions from this source in accordance with the NPfI (EPA 2017).*

Closer proximity with residential areas is leading to increased calls for zoning and planning codes for larger PV installations and PVHI-based concerns over potential reductions in real estate value or health issues tied to Human Thermal Comfort.

Noise

potential noise-generating infrastructure (including inverters and the switchyard / on-site substation), which will be required throughout the project's operations has been positioned as far from the closest sensitive residences as possible. The number of inverters required will be dependent on the final detailed design, however, it is anticipated that up to 40 inverters will be required.EIS

Grassland may also be managed through the use of mechanised mowing equipment. EIS

The EIS map shows only 17 inverters on figure 3.1.

'Vulnerable groups include the elderly, those suffering from chronic illness, pregnant women, infants and small children, as well as people who are electro-hypersensitive (EHS)'. (8)

'The main problem is the inverter, which is a device that takes the electricity from the solar panels and turns it into alternating current (AC) and puts it out on the electrical grid. The inverter generates radio frequency radiation.' (9)

I do not believe this company would consider a permanent residents health or the property owners individual status as an older person or their daily living a concern if it was left for them to decide the appropriate distance of the missing 23 inverters and their proximity to our home. Which lies centrally in line with this infrastructure when already there is not an indication of the closest inverter within the EIS. An assessment of the inverters impact on our residence is required to ensure compliance with impact assessment guidelines.

'Solar inverters do make a distinctive though steady noise, and they also have fan cooling that can also make noise.
More recently, for Approval of renewable energy projects,. … a provision to exclude infrequent activities of a stationary source from the "predictable worst case scenario" considered in an Acoustic Assessment. An activity is defined as frequent and must be included in the predictable worst case scenario if it occurs at least twice per month and emits sound for at least one half hour per occasion.' (10)

To create compatible land uses and avoid potential adverse effects due to noise, the selection, design and location is not based on any principle of noise impact for residents, livestock and existing income. It is clear from the design that the dwelling and location is not excluded from a potential point of reception to impact or design unsuitable.

The louder and longer your exposure, whether at work, at home, or during recreation, the more likely your hearing will be damaged

40 - 50 quiet to normal office sounds
50 - 60 normal conversation
70 - 90 heavy machinery, electric motors, garbage disposal, city traffic
100 - 120 jack hammer, power saw, motorcycle, lawn mower, rock music (11)

If our levels are explained in the EIS as 45dB, how has this information been taken? When there is a 2 dB difference in many readings (There is evidence of a systematic difference of up to 2 dB between readings obtained using dosimeters and integrating sound level meters.)

In the predicted noise levels during construction (in EIS) R1, although 141m from the site, is no longer referred to' approximately 150m' away but 200m. (12)

The WHO guidelines for night noise recommend less than 40 dB (A) of annual average (Lnight) outside of bedrooms to prevent adverse health effects from night noise. The WHO guidelines for community noise recommend less than 30 A-weighted decibels (dB (A)) in bedrooms during the night for a sleep of good quality and less than 35 dB (A) in classrooms to allow good teaching and learning conditions.

At a possible level of 47dB, just under a comfortable requirement with an incorrect distance - is it to be expected not to leave the house if this is based on being inside? Is it based on urban offices or agricultural land and outdoor activities? Due to the design and length of impact and proximity, impacts of livestock have not been considered as they have a different hearing range.

Livestock and noise and the impacts of an existing business

This EIS is not considering the 50 metres of noise for animal safety on an existing location of cattle property and the amount of area the project borders of over 3.19 km in boundary. The area left unused creating a loss of income and productivity within our property during construction over the “estimated” 9 months or more due to noise levels.

"We need to do that in different ways certainly around looking at animal wellbeing and looking for better outcomes, looking at ways to be more transparent."

OBE Beef managing director Dalene Wray

From small hydraulic hammers at a distance of ..for human comfort levels to 100 m for vibrartory rollers for comfort level how much land would be unable to have livestock.. EIS

Cattle are sensitive to high frequency sounds, which people cannot hear. These high frequency sounds can increase arousal and low tones are more relaxing for them. (13)

The CSIRO explains.cattle have an inherent fear of unfamiliar objects, situations, ..sudden movements and noises. A cow will be in a compromised well fare state if it feels frustrated not to be able to behave naturally… *Intermittenant sounds can be particularly stressful especially if they are sudden and at a loud volume. (14)*

Cattle are very sensitive to high-frequency sounds and have a wider range of hearing than humans.

- Cows are sensitive to 23 Hz and can hear up to 35,000 Hz – humans can hear a range of 64 Hz to 23 ,000 Hz.
- If things are constantly changing a cow is not able to learn to become familiar with moderately fearful features. This heightens the cow’s sensitivity to fearful experiences and can make the cow overly fearful of people, or a particular location or physical structure.
- Community expectations and attitudes increasingly require best practice in this area.
- Stress responses in fearful animals is ethically unacceptable.
- International markets are taking an interest in cow welfare as a trade (15)

Adopting strategies to behave positively towards cows is the key to reducing fear of humans in cows. This can be achieved by developing good handling practices and routines. Some examples include:

- Use slow and deliberate movement and talking.
- Reduce excessive noise.

‘Recent research suggests environmental sound has considerable influence on the behaviour and physiological response of beef cattle.
Cattle are able to hear a much wider range of sound frequencies than humans. Most young adult humans can hear sound in the range of 20 to 20,000 Hertz (Hz). In middle age, the upper frequency we can hear normally declines to 12,000-15,000 Hz.
For comparison, the strings of a piano produce musical notes from 27.5 Hz to 4,186 Hz. A “silent” dog whistle produces sounds between 5,400 and 12,800 Hz; the upper value would be barely audible to many people.’ The frequency hearing range of a cow, however, is from around 16 to 40,000 Hz. Jon M. Watts is an animal behaviour research associate in the University of Saskatchewan's Western College of Veterinary Medicine, Saskatoon

Additional noise management and mitigation measures are not considered to be required to achieve the relevant operational or construction noise criteria. EIS

Concern over noise pollution from EPA is more practically addressed *Noise from a standard beeper, or pulsed tonal alarm, can lead to considerable annoyance in the surrounding community* than attempted mitigation from Overland. (16)

Noise levels based on calm conditions

Accordingly, only calm meteorological conditions were adopted for the construction noise modelling. EIS

Noise propagation over distance can be affected by the prevailing weather conditions.

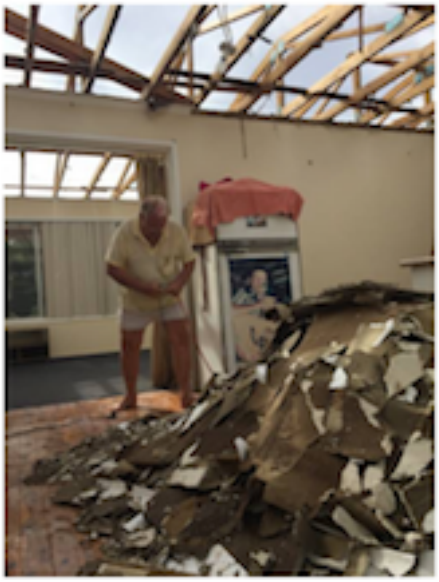
Of most interest are source to receiver winds as these conditions can enhance received noise levels. EIS

Here are some examples of storms that have caused damage over the past few years on our property being next to the proposed site and others, within proximity and immediate area despite the EIS using noise levels based over a “calm” period.

Namoi SES Controller Andrew Galvin said the service had received about 89 calls for assistance after strong winds and heavy rain played havoc on homes. Calls were still coming in on Saturday morning."The worst hit was Gunnedah," he said."We ended up having about 27 jobs out there. One house lost its roof,a couple of trees were down on homes.

"We had wind gusts over there about 95km/h or stornger than that."

Toney Baldwin’s house was a disaster zone following Friday afternoon’s storm in Gunnedah.Water-logged, wrecked and roofless, the Wandobah Road property was ripped to pieces by high winds which locals believed far exceeded the official 95km/h wind gust recorded by the Bureau of Meteorology.



Gunnedah's Toney Baldwin cleans up what is left of his Wandobah Road home.

example of local storm affects

“I’ve been burnt out, flooded out and now this,” remarked a despondent 73-year-old Mr Baldwin. “I was getting out of my car in the driveway and the whole roof blew off.”His entire house was flooded by rainwater and nearly every room suffered damage.

Local SES crews were kept busy late Friday responding to more than 50 call-outs in the area.

Power had been restored to most properties except about 50 customers north of Gunnedah and another 50 in the Lake Keepit area. (17)

The Bureau of Meteorology (BOM) warned "giant hail and destructive winds" were possible with thunderstorms on Monday over the North West Slopes and Plains, parts of the Upper Hunter and inland parts of the Mid-North Coast. Reported ABC (18)


insurance claimed photo from storm damage in January 2013 here at R1.

UPDATED: A FEROCIOUS storm has lashed the Gunnedah Shire, bringing wild winds, hail and lightning that left a trail of destruction in its wake.Winds of up to 106km/hr yesterday afternoon brought down dozens of trees which cut the Kamilaroi Highway south of Curlewis, along with many roads and the rail line at Gunnedah. Namoi Independent (19)


roof blown at R1 storm 2013

Storms hit the district about 6pm after the bureau of meteorology issued a severe thunderstorm warning for the North West Slopes and Plains.Gunnedah was one of the areas hardest hit by the rolling storms with power outages reported on Saturday night. Northern Daily Leader (20)

The Bureau of Meteorology (BoM) warned that damaging winds were likely to hit the Mid North Coast, Illawarra, Central Tablelands, Hunter and Northern Tablelands this evening, with winds averaging 50 to 70 kilometres per hour, and gusts up to 90kph predicted. (21)

Cumulative noise impacts

If both solar farms are developed with wind impact or without, there will be cumulative noise as this property lies between. Within metres on our east being Overland, and west being Photon with a 3 kilometers distance between which we are placed within. *The predictions assume plant and equipment are operating simultaneously and at the nearest locations to relevant assessment locations, hence it is likely that actual noise levels from the proposed construction works will be lower than predicted. EIS*

Animal welfare is not considered or is plainly ignored with regarding noise impacts (based on calm conditions only) Overland on the boundary towards the south of our property, is over 12.8 hectares of land with the 50 meter recommended by vets and welfare for livestock, (generously estimated for the animal) and human comfort based on test predictions comparative to the unknown, the back of this property will have noise with Gunnedah Solar. Cumulative noise levels and restriction of movement for livestock to escape from both projects thanks to their cumulative surrounding design vicinities will not be healthy for any livestock and create a loss of income for up to a year over the construction period.

- The assessment should not only consider the environmental impacts on a site, but whether or not off-site effects are possible
- Identify, assess and rank risks to all segments of the environment, human beings, nuisance and loss of amenity from plans of the proposed development.
- Environmental Guidelines for Major Construction Sites - EPA Victoria

cumulative noise from the project and the Gunnedah Solar Farm is not anticipated to cause an impact at nearby identified assessment locations. EIS

emissions and impacts to:

- soil conditions and health

- livestock

- loss of land use over construction period

'In heavily contaminated areas, re-suspension of dust can cause a substantial proportion of crop contamination and human exposure via inhalation and ingestion' (WHO/UNECE, 2006).

Besides car exhausts, industrial emissions are important sources of exposure to lead.

Emissions to the atmosphere from the project during construction will be temporary, and restricted to dust caused by land disturbance, and vehicle, plant and equipment exhaust emissions EIS

Lead in the environment has multiple sources, including petrol, industrial processes, paint, solder in canned foods and water pipes. It can affect human health via a number of pathways, including air, household dust, street dirt, soil, water and food.

‘Industrial emissions are also important sources of lead contamination of the soil and ambient air, and lead may also be ingested from atmospheric air or baked paint that has been deposited in soil and dust, raising blood lead levels. In addition, food and water may also be important media of baseline exposure to lead’. (Tong et al, 2000).

Dusts impact weather as well as global and regional climate. Dust particles, especially if coated by pollution, act as condensation nuclei for warm cloud formation and as efficient ice nuclei agents for cold cloud generation of potential hazard to human health. Particles larger than 10 μm are not breathable, thus can only damage external organs – mostly causing skin and eye irritations, conjunctivitis and enhanced susceptibility to ocular infection.

The ability of dust particles to serve as such depends on their size, shape and composition, which in turn depend on the nature of parent soils, emissions and transport processes. Airborne dust presents serious risks for human health. (22)

Emissions are not just held within atmosphere but will be held within dust particles. This also affects soil, plant life, rainwater and us.

‘Solar panels and mirrors need to be cleaned almost daily if efficiencies are to stay where they need to be. Dust is not transparent, so even just one gram of dust per square meter of solar panel area can reduce efficiency by around 40 percent. developers had to add substantially more mirrors to the plant than planned due to dust in the atmosphere. . GTM Research who focuses on the region, said the plant probably ended up costing three times the initial estimate, thanks in part to dealing with that dust. And now that it is built, Shams 1 sends a series of trucks up and down the lines of 250,000 mirrors every day, using robot arms to spray that precious water and clean away the dust.’ (23)

Recent investigations revealed that the chance of lung cancer is increased due to dust pollution because it directly impact lungs function and turn causing cardiovascular disease and chronic abnormalities in respiratory system. Moreover, it is not only dangerous for public health but also effects on plant and animal life. In fact, dust is a mixture of organic and inorganic particles that, under natural conditions, should incorporate into the soil. The size and composition of dust particles is of main concern in determining potential health impacts. (24.)

‘Large-scale solar installations already exist in Australia, the United States, Europe, the Middle East and India. Mazumder says such installations are often built in sun-soaked desert areas where dry weather and winds deposit dust on the solar panel surfaces.

"A dust layer of 4 grams per square metre decreases solar power conversion by 40%," he says.

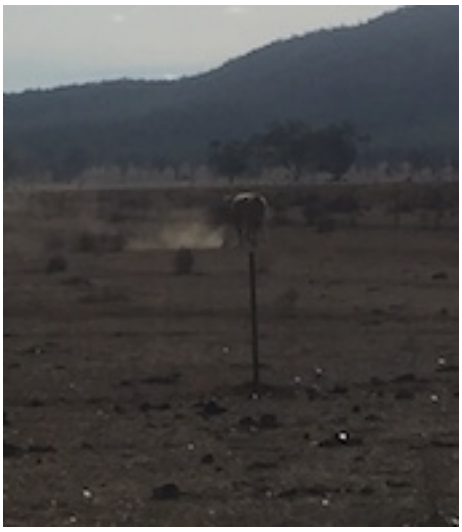
"In Arizona, dust is deposited each month at over 4 times that amount. Deposition rates are even higher in Australia, the Middle East, and India." (25)

"We have to clean our sheets constantly. It's really gross. We're constantly wiping down the living room, the windows, the screens ... caked. We have to shoot the dust down (off exterior walls with a hose) all the time," said Waianae resident Dynasty Tupulua near Waianae Solar.’ (26)

‘Some 40% of aerosols in the troposphere (the lowest layer of Earth’s atmosphere) are dust particles from wind erosion. Global estimates of dust emissions, vary between one and three Gigatons per year.’ (27)

Dust impacts on our livestock

Excessive dust is detrimental to animal health and performance - dust may irritate eyes and increase the susceptibility to diseases such as pinkeye (blight) and respiratory disorders as well as creating general stress. (28)



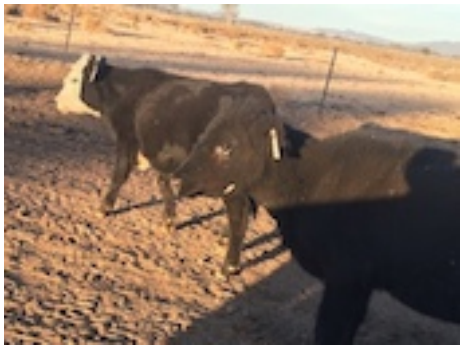
dust from 1 beast

Cattle may develop electrolyte imbalances because important electrolytes (chlorine and potassium) pool in the abomasum and cannot be pulled back into circulation by the small intestine. Ultimately, the cattle will perform poorly and lose weight. Cows suffering can have one or more of the following signs:

- Off feed (anorexia).
- A non-responsive or “depressed” attitude.
- Decreased amounts of manure that is stiff and contains mucus.
- “Downers” that are unable to rise due to weakness, electrolyte imbalances, starvation.
- Normal or increased respiratory rate with some ‘grunting’. (29)

The bacterium responsible, *Moraxella bovis*, is spread by dust and flies. Any eye damage will predispose to infection says Department of Industry NSW. (30)

We do not have a feedlot. It is winter and we do not have flies. This is resulting from 200 m of dust near troughs during a long drought, dust from the 3.19 km boundary to sizable solar construction will affect livestock.



example of dust affects on eye

‘Water sprays have long been used in an attempt to control dust. However, many dusts – particularly those that are very finely divided – are extremely resistant to wetting by water.’ (31)

the proponent will treat the road surface of the unsealed section of Orange Grove Road to reduce potential dust generation EIS

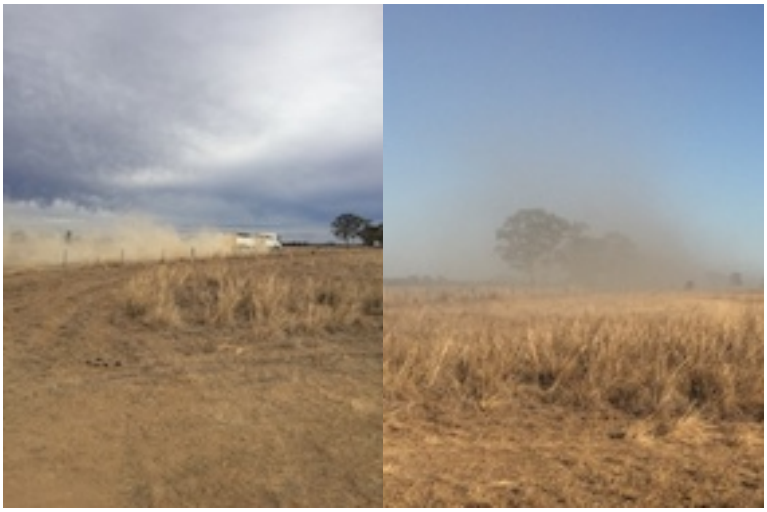
If water will not suppress dust the company, again without limitations they would use a chemical suppressants. United Nations has already called for a global ban on hexabromocyclododecane - commonly known as HBCD - labelling it among "the world's most dangerous toxic chemicals." Already the EPA is aware of dangers with suppresents, (fire extinguishing chemical suppresents included and Australia is a signatory to the convention, which has banned more than 20 chemicals that pose a high risk to human health and the environment.) and also in America

‘More than 150 products are commercially available for dust control, and tens of millions of gallons of these products are applied every year in the U.S. However, few studies have investigated potential environmental impacts of dust suppressant application.’ (32)

What type of chemicals would also affect environmental and animal conditions?

Cumulative affects of dust from both solar projects

The proposed Orange Grove Solar on our immediate boundary with roaming cattle potentially means the loss of productivity and land available for well over a hundred cattle due to 128 hectares loss of land use.



above: dust from truck and dust/ pollution afterwards, taken at property entrance. June18

‘Adopting strategies to behave positively towards cows is the key to reducing fear of humans in cows. This can be achieved by developing good handling practices and routines. Animal welfare standards – the state of an animal and how well it is coping within the conditions in which it lives - include environments, which are NOT noisy, dusty or uncomfortable.’ (33)

Hasselt University researcher has found that more cows die when there are higher amounts of ozone, nitrogen dioxide and fine dust in the air. The findings confirm several relevant terms are used to describe the particles suspended in air.

Factor	Effect on the animal
High dust levels	Mechanical irritation: overloading of lung clearance, lessons of the mucous membranes
Specific microorganisms	Infectious effect :Infection by pathogens
Dust, microorganisms, and gases	Non-specific effect: defence mechanisms stressed, reduced resistance
Microorganisms and dust	Allergic effect: over-sensitivity react on
Microorganisms and dust	Toxic effects: intoxication by bacterial/fungal toxins

'Dusts' are dispersed particles of solid matter in gases, which are during mechanical processes or have been stirred up. They belong to the aerosols together with smoke and fog (Henschler D. 1990). Dust may cover a wide range of sizes and can be airborne or settled (De Boer S. and Morr son W. D. 1988). It must be seen as a significant atmospheric contaminant and should no longer be perceived as a mere nuisance.' (Honey L. F. and McQuitty J. B. 1976). *(34)*

left: dust from one small bobcat

'Freedom from fear and distress: by ensuring conditions and treatment, which avoid mental suffering.
Freedom from discomfort.' (Animal protection board RSPCA). *(35)*

There is potential for approximately nine months of concurrent construction activities, the RNP criteria to construction projects is highly conservative given the RNP is designed for permanent scenarios and not temporary impacts possible from construction activities. EIS

'Socially responsible' solar of estimated capital investment for the project is $94 million. EIS and state supported project.. and under 4 kilometres of unsealed road with 130.3% traffic increase

Overall these traffic increases would not have any significant long-term effect on the future traffic capacity, levels of service or traffic safety for these roads, provided that a road maintenance program is undertaken for the unsealed section of Orange Grove Road (refer to Section 6.8.3).

The predicted traffic increases would move the unsealed segment of Orange Grove Road into a higher band in the Austroads rural daily traffic volume classification system (from 1–150 to 150–500).

Refer to dust after one truck, water and suppressant and no drainage, and adjoining land. Another dust concern for the front of the property by 519 m affecting livestock and soil contamination leading into the land.

This company is not interested in community benefits not to even budget asphalting a road for their construction safety or ours.

Attempting to minimize objection by lying to other landholders saying they would seal it for their construction interest or safety or ours. Its example of local community disinterest.

a road maintenance program will be implemented for the 5 km unsealed section of Orange Grove Road, west of the development footprint, The results in Table 6.24 show the highest potential daily traffic increases from the concurrent construction of the two projects will be on Orange Grove Road (+120.5% and +130.3% for the sealed and unsealed sections, respectively)EIS

The completion of the proposed works, no further upgrades would be required for the maximum cumulative construction traffic of the project and the Gunnedah Solar Farm The completion of the proposed works, no further upgrades would be required for the maximum cumulative construction traffic of the project and the Gunnedah Solar Farm

During consultation with GSC, it was noted that WaterNSW and the NSW Government are currently in the process of upgrading infrastructure at Keepit Dam, approximately 13 km north-east of the site (refer Figure 1.1). The purpose of these upgrades is to strengthen the dam wall and it is anticipated that these upgrades will continue in to 2019.EIS

'Installation of weather-proof access roads to be prioritised at the project start in order to avoid delayed or out of sequence delivery of equipment and materials, and potential for civils re-work due to local rains. This lesson was learned at Nyngan and implemented at Broken Hill. Upfront design work on mounting structures and layout to consider the local topography of the site can result in significant cost savings associated with civil works.' (36)

Waste Water

The solution for all dust problems is water when waste, water and contamination are also part of the sustainable development goals alongside energy.

15 ML for the nine month duration of construction.

The project may require access to GW902401, which has a current water access licence with an entitlement of 10 ML of water from the Upper Namoi Zone 4 Namoi Valley

use of a water truck(s) during construction for dust suppression along internal, unsealed access roads and disturbed areas; dust suppression requirements during construction will take into consideration weather and the likelihood of extended dry periods which could exacerbate impacts. all vehicles, plant and equipment will be cleaned and washed regularly; EIS

Water trucks

Advantages:

- lower capital cost for Overland
- more flexible and quick fix as mitigation with obvious dust and proximity concerns

Disadvantages:

- high labour and operating costs
- difficulty in satisfying demand during peak periods
- need to enter site and disrupt road traffic to apply water
- risk of breakdowns
- time delays in refilling tank
- waste of water

The water needs of the project during construction are expected to be in the order of 15 ML for the nine month duration of construction. Water demands will be met via a combination of potable water trucked to the development footprint and/or extraction from the Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin's Leap) It is estimated that annual water requirements during operations will be in the order of 3 ML primarily for the cleaning of the PV solar panels EIS

'Scott Burger, an analyst at Greentech Media's GTM Research who focuses on the region, said the plant probably ended up costing three times the initial estimate, thanks in part to dealing with that dust. And now that it is built, Shams 1 sends a series of trucks up and down the lines of 250,000 mirrors every day, using robot arms to spray that precious water and clean away the dust.' (37)

The results in Table 6.24 show the highest potential daily traffic increases from the concurrent construction of the two projects will be on Orange Grove Road (+120.5% and +130.3% for the sealed and unsealed sections, respectively)EIS

Glint and glare

As a result of its proximity to the western boundary of the development footprint, R1 will be exposed to views of project infrastructure ..

.. receptors west of the development footprint will only have potential to be impacted by glint and glare during the afternoon tracking period EIS

This is not considering the kilometers that the livestock travel without the landscaping and seedling mitigation. Internal roads up to 5m in width, and fence and fire break - this is one row of trees, which will take mulching and care to be firmly established and according to Landcare is not the three rows recommended for reasonable coverage. (38)

The project design, development footprint and placement of infrastructure have progressively evolved to minimise or avoid visual impacts, where possible

The proposed limited area of seedlings will do nothing for the health of the livestock without coverage and contributes again to their lack of assessment in evaluation of the project and effects of longevity or proximately.

'The reflective properties of solar PV panels vary from different manufacturers. Whilst solar panels vary in their reflectivity with some claiming 'anti-glare' properties, no solar panel absorbs 100% of the incoming light. Therefore, any solar PV panel has the potential to produce a solar reflection. The relative absorptive properties of a solar panel should be considered on a case- by-case basis.' (39)

Due to the anti-reflective properties of the PV solar panels, they are not expected to cause a distraction to motorists .EIS

The amount of glint and glare produced by a PV solar panel is variable and is dependent on the angle of the PV solar panels, with lower angles producing less glint and glare (Morelli 2014).

'Local residents are a key within the local environment when proposing a solar PV development. This is because residents will be living in close proximity to the solar PV development whilst also potentially having views of the solar panels for its lifetime. Where a view of the solar panel exists, a solar reflection may be possible, which may impact upon residential amenity'. (40)

Major	A solar reflection is geometrically possible and visible under conditions that will produce a significant impact. Mitigation and consultation is recommended.	Mitigation will be required if the proposed solar PV development is to proceed.

'There is no technical limit (distance) within which a solar reflections is possible for a surrounding dwelling receptor however, the significance of a reflection decreases with distance. This is because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases.' (41)

The main driveway of this existing business is within meters of unestablished, less than recommended shrub coverage. Our land has 2.19 kilometres, unprotected from solar panels and it's lighting directly facing upon the land. As long term impacts are not considered by Overland, inclusive of cumulative affects, no thorough landscaping plan is designed or attempted to ensure that the works do not unreasonably impact our property and lifestyle.

'Very bright light and sparkling reflections will distract or slow down cattle investigating their surroundings and again, a cow will be in a compromised well fare state if it feels frustrated not to behave naturally.' (CSRIO) (42)

Cattle have evolved with wide-angle (almost 360^{o}) panoramic vision. Their vision has dominance over hearing.

- Shadows and sparkling reflections will cause baulking. Races, particularly elevated races, should not directly face the sun.
- Stress responses in fearful animals is ethically unacceptable.
- International markets are taking an interest in cow welfare as a trade issue. (43)

The potential impacts of reflectivity on receptors, primarily dwellings within close proximity of the development footprint and motorists travelling along Orange Grove Road, are glint and glare EIS

Cumulative Glint and Glare

This is glint and glare in the afternoon from east, Overland sun farm affecting the south end of the property for a third of our land , definitely in the later part of day and the glint and glare reflecting from Gunnedah solar for over half our land for the morning as this land sits directly in between the east to west panel tractions**.**

Solar Panel Glare occurs even though it is not expected because solar panels are designed to absorb sunlight, rather than reflect it. Solar Panel Glare is greater than expected because panels are good at absorbing light perpendicular to them but much less effective when the light is at a low angle. Whilst it is often claimed that anti-reflective coatings prevent harmful glare in reality they reduce glare levels – but often not when the sun is at a low angle when direct solar reflections are most likely. Solar panel glare is a common occurrence, which is not fully mitigated by anti-reflective coatings.

"Whilst the impact of Solar Photovoltaic (PV) developments to their surrounding environment might be small or negligible, the combined or cumulative effects of multiple developments may have a greater impact.
Worldwide Solar PV developments are rapidly increasing both in numbers and capacity. Environmental concerns due to cumulative impacts, as in the case of Glint and Glare, are expected to grow. In the UK during the past year we have already witnessed concerns being raised for radio and radar interference on a few occasions with specific reference to cumulative concerns". *(44)*

Devaluation from glint and glare exposure and visual impact

Some visual impacts have been identified at the nearest residences (R1 and R2) and the proponent is committed to undertaking landscaping to minimise impacts to these two receptors (refer to Section 6.6.4 (i)). The residual impacts associated with the project are predicted to be minimal and considered unlikely to result in any discernible impact on property values.

The glint and glare contribute to animal behavior and no escape only a third of the projects boundary for 5 years until established trees grow - this contributes to devaluation of an existing business and its productivity. The cumulative affects of land exposed still being researched but some research is available. Disregarding the desirable quality of moving to rural areas for open and natural views of environment, particularly on Orange Grove Road. There will be no available land to escape both views from this properties position. To build at our own expense if this is approved, at the back of the property will then have exposure visually to just fewer than one million solar panels collectively from this property. Hence, when taking into consideration the surrounding residence, we suggest that this is not a suitable development for this area,

The northern portion of the development footprint will be fenced off by a chain mesh fence, which will be approximately 1.8–2.4 m high.EIS

What is the appeal of a 2.4 metre mesh fence for kilometers on a country boundary, if not to alert you of potential risk and danger constantly and flood hazard potential.

The visual impact assessment has led to further refinement of the project to reduce visual impacts through consultation with surrounding landholders.EIS

This is incorrect. Please refer to the community consultation of what type of plants and size

and response “I don’t know yet” and we “don’t have to offer seedlings”.

Devaluation from noise

In addition, views of the northern portion of the development f As a result of its proximity to the western boundary of the development footprint, R1 will be exposed to views of project infrastructure.EIS

How could a house within the distance forced by design from Overland be comfortable proximity for daily life and pastoral peace with internal roads directed towards a house and inverter stations with noise. This 1902 house could also be damaged from construction vibration. Who would like to pay true market price during a state construction the size of football fields 8 meters away? This is the imposition put upon us.

Livestock productivity and devaluation

Livestock cannot continue with normal behavior and healthy productivity between dust and noise within the construction period, then glint and glare after construction for a 30-year period with the information from Department of Industry and CSIRO given within this objection notice. And certainly considering of amount of land adjoining the proposed solar farm.

Localised night lighting may be required during general maintenance activities conducted during the operation stage of the project. If required, lighting will be motion-activated and will be linked with security cameras, which will be positioned in strategic locations around the perimeter of the development footprint. EIS

Research is also continuing in behaviour of large mammals in magnetic fields and near power lines

‘In 2008, a paper was published on the orientation of cows used Google Earth aerial photographs and some direct observations to look at whether cows and deer had a preferred orientation. Because wind and light conditions could be excluded as a common denominator determining the body axis orientation, magnetic alignment is the most parsimonious explanation this study reveals the magnetic alignment in large mammals based on statistically sufficient sample sizes. Findings open horizons for the study of magnetoreception in general and are of potential significance for applied ethology (husbandry, animal welfare). They challenge neuroscientists and biophysics to explain the proximate mechanisms. We show that extremely low-frequency magnetic fields (ELFMFs) generated by high-voltage power lines disrupt alignment of the bodies of these animals with the geomagnetic field.’ (45)

Devaluation of property with health concerns

“Across the state, evaluations are occurring to provide some insight into the potential impact of solar farms on wildlife. Loss of farmland, foods and shelter from farmlands will have an impact upon the environment. Whether or not the long-term impact is positive or negative is yet to be determined. What will the solar farm do to neighbouring land values? Law suits alleging decline in value of homes or businesses due to construction of businesses or farms (swine operations, as example) are numerous. Currently, law protects the original landowner but no law currently addresses the specific glare, frequencies or unfavourable view of a functioning or non-functioning solar farms.” (46)(47)

OVERLAND has leveraged off its experience leading benchmark renewable energy and infrastructure projects to

implement a robust site selection and design process to minimise potential environmental impacts

The project will not pose a significant risk to or have a significant adverse impact on human health, life, property or the biophysical environment .EIS

"High voltage power lines or tiny street power lines, electromagnetic fields should be taken seriously when considering committing to a property. Homes are plagued by electric fields and radio frequency radiation as well. Many people would wonder, when looking at homes near high voltage power lines, if those can be bad for you, or even cause cancer. Properties near transmission lines don't sell well, sell cheaper and often come back on the market.

Magnetic fields can be larger than you think.

This electromagnetic radiation (EMR) cannot practically be shielded against. This type of electronic pollution is a very important one to investigate before committing to ANY property regardless if it is positioned near high voltage power lines or the 'everyday' street power lines running up and down most streets

The problem is that the allowable exposure standards set by most governments are set way to high. According to their yardstick your exposure is likely perfectly acceptable and no cause for concern. Any research showing the opposite would be simply disregarded as being inconclusive or somehow not applicable."

Patrick van der Burght

'Awareness of the potential EMF hazard from substations appears to be increasing in the UK, to judge by the number of EMF survey requests we receive from property buyers and sellers.

Nearby substations tend to put off some potential buyers. This reduces the demand for the property, and may have an unfavourable effect on its market price.

If you are selling a property near a substation, you can expect that MOST buyers these days WILL notice the substation, at some stage during the buying process – or have it drawn to their attention in a survey report'. (48)

Social determinants of health have a strong influence on a wide diversity of health endpoints. The same is valid for the field of environmental health, as the exposure to environmental risk factors is also unequally distributed, and this unequal distribution would be forced upon us by this project and design and more so if both solar are approved either side, as one of the oldest properties in the area.

The site is in a semi-rural setting EIS

This is agricultural land.

Health concerns with proximity

Landholders accessing agricultural land in close proximity to the project infrastructure will not be exposed to EMFs generated by the project infrastructure for extended periods of time.

The closest receptor, R1, is approximately 150 m west of the western boundary of the development footprint and will not be exposed to a higher level of EMFs due to the construction and operation of the project.

"When electricity flows an electromagnetic field is created that kind of swirls around the source of the radiation like a whirl wind. Its strength depends on a number of factors, but how

much and how strong the electricity is that flows through is significant. As you move further away from the source, the strength of the magnetic field would normally reduce. This electromagnetic radiation (EMR) cannot practically be shielded against. The problem is that maximum exposure standards set or accepted by governments are typically based on outdated research. What is considered 'legally safe exposure' has been showing for years that there are clear links to health issues, fertility problems and cancer". (49)

Consultation with surrounding landholders and the local community has been undertaken to minimise the impacts of construction on agricultural operations adjacent to the development footprint EIS

This did not happen with the most affected- R1.

"the evidence we have is inconclusive and does not allow health authorities to decide whether there is a specific magnetic field level above which chronic exposure is dangerous or compromises human health". (50)

Once operational, the project infrastructure will be capable of generating electric and magnetic fields (EMFs). The degree of exposure to EMFs within the development footprint during construction, operations and decommissioning will vary depending on proximity to specific components of project infrastructure. The combination of low exposure rates and the intermittent exposure of staff to elements of the project infrastructure capable of generating EMFs indicate that adverse impacts from EMFs are unlikely as a result of the project.EIS

"EMF contain both electric and magnetic field at 90 deg of phase difference and oscillating at angle of 180 deg.The electric field traverses the air and starts oscillating human cells at high frequency, causing them to heat up. Thus high-power EMF can damage body cells. Similarly the varying magnetic field induces an electric current in human cells and tissues. Since skin is directly exposed to these radiations, it can be badly damaged."
https://www.brighthubengineering.com/power-generation-distribution/80636-what-are-the-health-risks-of-living-near-an-electric-substation/

…includes the installation of electrical infrastructure within the development footprint including cabling, inverters, switchgear and the on-site substation, as well as, connection infrastructure to connect the project to TransGrid's 132 kV transmission line and the installation of a large number of PV solar panels. As this infrastructure will be involved in the generation, transmission and distribution of electricity, EMFs will be produced. EIS

"The general public, on the other hand, includes individuals of all ages and in all states of health, who will not normally be aware of the exposure they are receiving. They can be exposed for twenty-four hours per day, and over a whole lifetime, and should not be expected to accept effects such as annoyance or pain due to small shocks and discharges". WHO (52)

The EMFs produced will be strongest closest to their respective sources. EIS

1000 mG	Many governments safe maximum
2 mG to 12 mG	Shown to block the hormone melatonin in its anti-cancer action (abstract)

1000 mG	Many governments safe maximum
4 mG	Consistently mentioned by various research to increase likelihood of childhood leukaemia (abstract)
1.6 mG	Double the chances of sperm abnormalities (abstract)
1 to 2 mG	Mortality rate in children with leukaemia shown to be up to 370% higher than children with leukaemia that are not exposed to 1 to 2 mG (abstract)

cabling will be installed between the PV solar panels and the collection circuit (this cabling will carry power throughout the development footprint, between the inverters and central electrical switchyard)EIS

Cables into and out from the substation are generally routed along the pavements. They may be overhead or underground.

"Solar green a supportive solar company suggests: these cables can also give rise to a magnetic field, which may affect nearby properties, perhaps a small portion of the garden, or sometimes part of a room within the house. We consider a property to be EMF-safe if the maximum magnetic field measurement in any location where someone may spend several hours a day, does not exceed 0.5 milligauss (o.05 microtesla). High voltage lines (overhead and underground), which are carrying current ..EMF is specifically causing cancer in children and in older adults and may be triggering countless other immune deficiency and psychological diseases and disorders in anyone in close proximity. Make no mistake about it: electric fields are bad news for your health and can be killers. The government of Sweden funded an official, massive study of the effects of electric fields from overhead power lines on 500,000 people over a period of 25 years and found overwhelming evidence that electric fields generated cancer in children at 4 times the normal rate and tripled the rate in adults. Sweden lists electromagnetic fields (EMF) as Class 2 Carcinogens, right along with tobacco https://www.solargreen.net.au/blog/the-harmfull-effects-of-emfHuman beings are, in reality, bio-electric machines usually operating at between 2 and 12 hz. Normal household current is 50-60hz and is completely incompatible and disruptive to the body's natural electric frequency range, neural transmission system, and its sensitive neuro-chemical equilibrium. 50-60hz electromagnetic radiation can penetrate the entire body and brain."

'The current epidemic of numerous degenerative diseases including cancer and leukemia and other immune dysfunctions is not purely coincidental and often relates directly to the catastrophic effects of uncontrolled electromagnetic radiation in our ever-declining environment.' (53)

Subsequently, power lines, substations, transformers and other electrical sources all emit ELF EMFs (ARPANSA 2015).EIS

"Power lines give rise to electric and magnetic fields which fall off with distance. Burying power lines underground effectively shields the electric fields but less so the magnetic. And it is the latter that have given rise to most health concerns. Epidemiological studies have suggested that higher than normal exposure to magnetic fields could double the relative risk

of contracting childhood leukaemia. However, a plausible biological mechanism has not been established. There are sometimes good aesthetic and practical reasons for replacing overhead power lines by underground ones. However, undergrounding power lines in response to health concerns would essentially be a precautionary measure. The Department for Energy and Climate Change (DECC) set out planning policy for energy infrastructure during 2011, in a series of National Policy Statements for Energy The National Policy Statement for Electricity Networks Infrastructure (EN-5) is the most relevant to power lines. It outlines why, for instance, applying the presumption of undergrounding to particular types of designated landscape was rejected. The Library Research Paper on the Growth and Infrastructure Bill outlines recent and intended changes to the planning process for national infrastructure projects." (54)

"Undergrounding of a line would reduce the level of EMFs experienced, but high magnetic field levels may still occur immediately above the cable. It is not the Government's policy that power lines should be undergrounded solely for the purpose of reducing exposure to EMFs. Although there may be circumstances where the costs of undergrounding are justified for a particular development, this is unlikely to be on the basis of EMF exposure alone, for which there are likely to be more cost-efficient mitigation measures". (55)

Underground cables will be buried at a depth of approximately 600 millimetres .EIS

With underground cables the individual conductors, being insulated, can be closer together, leading to greater cancellation and lower fields. However, unless they are buried very deeply, they can also be approached more closely, leading to higher fields. Overall, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line, but can actually be higher at small distances from the cable.

The largest magnetic fields round the perimeter of a substation almost always come from the overhead lines and underground cables entering it. There are often several such lines and it can be difficult distinguishing the field from the substation itself from the fields produced by these lines and its not clear how close to the kilometres of boundary land these cables with EMF's be to our daily activities or to livestock movement.

Table 4 . 2 – Biological Effects Due to Magnetic Fields of Frequency less than 100 kHz (56)

Magnetic Flux	**Biological Effect**
0.5 – 5 mT	Minor biological effects have been reported
5 – 50 m T	there are some well - established effects, including visual and nervous system effects

Vibrational impacts on adjoining land

Vibration associated with the proposed construction works is unlikely to generate impacts at the nearest vibration-sensitive receivers. Additional noise management and mitigation measures are not considered to be required to achieve the relevant operational or construction noise criteria.

Vibration associated with the proposed construction works is highly unlikely to generate impacts at the nearest vibration-sensitive receivers for the duration of the construction stage of the project. The noise and vibration impact assessment predicts that impacts are not likely to be significant during construction

There is no Australian Standard currently for assessment of building damage caused by vibrational energy. However, the British Standard 7385:

shows that the "***highest levels of vibration are generated by compactors, vibratory rollers and pile driving.***

minimisation of piling energy (i.e. reduced hammer drop distance) as necessary depending upon receptor distance"

The vibration resulting from some construction activities (such as pile driving, excavation by hammering or ripping, dynamic compaction or demolition of structures) may cause damage to nearby public utilities, structures, buildings and their contents. If these are located in the vicinity of the construction activity as specified in Table 15.3, a building condition inspection may be undertaken before construction. The outcome of the building condition inspection will be a Dilapidation Report. EPA (57)

Construction activities such as pile-driving, dynamic compaction of loose soils, and the operation of heavy construction equipment induce ground and structure vibrations. Their effects range from a nuisance to the local population and the disturbance of working conditions for sensitive devices, to the diminution of structure serviceability and durability. Furthermore, the implementation of construction projects in areas adjacent to existing structures creates additional difficulties.

Substantial structure damage may also occur at long distances from the sources on account of the dynamic effect of low- frequency ground vibrations.

"Ground vibrations can produce direct vibration effects on structures and trigger resonant structural vibrations on adjacent and remote structures. Moreover, vibratory pile driving may trigger resonant soil layer vibrations. Assessment of construction vibrations on structures is a complicated problem. There are a considerable diversity of buildings and underground facilities."

The main water supplied from the bore to our house and central bore to livestock water is 125m away from the infrastructure.

"Ground vibrations from pile driving may affect adjacent and remote structures in several different ways as follows…Resonant effects may occur at any point within a layered soil profile. It is possible to consider two locations with the same soil within the same site excited by the same dynamic source, and these locations could respond quite differently because of the nature and dimensions of surrounding soil layers" (Davis and Berrill, 1998).

Our homestead built by our family, in 1902.

The condition survey should be selectively performed at the areas with a radius of 1300 ft for historic buildings (396.24m) according to OHL School of Construction Professor Mehmet Emre Bayraktar Ph.D. So why isn't there regulation in ensuring buffer zones for each existing business, residence, existing water supplies and location as there would be in urban areas?

The minimal ground disturbance required within the development footprint is unlikely to result in significant impacts to the future viability of the development footprint for agricultural production.EIS

'Much of the scientific and technical literature on vibration damage, and many of the vibration standards, are based on studies of damage due to vibrations ***from surface mine and quarry*** *blasting. Although blasting vibration standards are inappropriately employed for evaluating construction vibrations, even those lenient standards can be violated by some construction operations. In particular, hammer-type pile drivers are known to produce vibrations in excess of the OSM blasting standard .Vibratory compactors, often exceed some or all of the construction standards. Indeed, the FTA specifically advises against their use, "Avoid vibratory rollers and packers near sensitive areas".*
http://vibrationdamage.com/is_damage_possible.htm
The scientific literature of vibration damage rarely uses these two classifications. Instead, the terms "threshold", "minor" and "major" are commonly used there to classify damage. Unfortunately, even these terms are not used in the same way in all studies nor is there any accepted set of rules for applying them. This lack of consistent definition, precision, and coverage of all damage types means that it can be difficult to compare results from different studies due to different applications of these descriptions. It is important to note that the use of these terms is almost entirely based on visible condition observations, rather than on any measurable quantity, which can be related clearly and directly to damage severity.' (58)

It is important that, as far as possible, the vibration assessment quantify any remaining or residual impacts that exceed the criteria. The acceptability of the ***residual vibration impacts should be evaluated by taking into consideration factors such as characteristics of the areas and receivers likely to be affecte****d, characteristics of the proposal and its noise and vibrations, the feasibility of* ***additional mitigation*** *or The EPA regulates noise from licensed industrial premises under Schedule 1 of the* ***Protection of the Environment Operations Act 1997 (POEO Act)****.*

Vibration associated with the proposed construction works is highly unlikely to generate impacts at the nearest vibration-sensitive receivers for the duration of the construction stage of the project.

The project is not likely to impact groundwater during construction, operation and decommissioning due to the estimated depth to groundwater within the site boundary and the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure.

Soil conditions – limitations not addressed

-Complex terrain

-Dry-land salinity

The site is mapped in its entirety as Vertosols. Vertosols are clay soils that shrink and swell, and crack as the soil dries. Vertosols occur in the arid and semi-arid interior of Australia and are predominantly used for grazing, extensive dry-land agriculture (where rainfall is adequate) and irrigated agriculture (CSIRO 2017).

The site is mapped in its entirety as moderate inherent soil fertility.

The site is mapped in its entirety as LSC Class 2 (very high capability land). Land identified under this classification has slight limitations, which can be managed by readily available, easily implemented management practices (OEH 2012). LSC Class 2 land is capable of most land uses and land management practices (OEH 2012).

The majority of information is desktop based on 4 soil samples. **This results in a broad claim of vertosol soil particularly when the hand notes themselves are riddled with question marks such as "possible vertosol? ".**

Eg. *, the site is mapped in its entirety as BSAL. (NSW Government 2018).* and *State-wide mapping identifies that the development footprint falls under the order of Vertosols* and *An older soil classification system that provides additional information on soil properties is the Great Soil Groups classification (OEH 2018), which corresponds closely at this location with the Australian Soil Classification* and *The eSPADE soil profile data base (OEH 2018) has been used to find soil profiles surveyed in the region*

Living within metres of the proposed site and shown in EIS photographs provided it is clear the majority of infrastructure which would be a high engineering hazard, and contribute to soil and wind erosion and with a claim for enhanced environmental equity can be based on a desk top search for data. Vertosol soil is claimed as one of Australia's most versatile soils.

This EIS, prepared by experts in their respective fields, has identified and assessed the potential environmental impacts, and appropriate mitigation and management .. it is considered that there will be no threat of serious or Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations, while intra- generational equity is applied within the same generation. ..

Vertosol soil are clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular structural aggregates. Although many soils exhibit gilgai microrelief, this feature is not used in their definition. Australia has the greatest area and diversity of cracking clay soils of any country in the world.

The broad analysis is suitable for the company particularly when their infrastructure is not being developed as it would normally with urban areas. Which it should. If the soils have not been examined by CPSS accredited surveyor for the purpose of the project, generally naming a suitable soil from a desktop search over a region is not appropriate when: posts *will be placed into the ground to provide support for the mounting framework required for the PV solar panels;* As it would be put into foundations in suburban development but if convenient can apply an urban management such as *Managing Urban Stormwater: Soils & Construction (Landcom 2004).* They do not have secure footings.

The site boundary encompasses an area of approximately 817 ha, representing approximately 0.16% of the Gunnedah Shire LGA, whilst the development footprint encompasses an area of 253 ha (approximately 0.05%). EIS

Slow permeability and salinity not addressed

'In some clay soils it may be difficult to decide if sufficient cracks are present, or at the time of inspection the soil may be too moist to exhibit cracking. Also, in arid zone clay soils which commonly have high salt contents, the soil structure may be so fine and strong granular, or 'puffy', that it is difficult to decide if cracks are present or not. In such soils it is also obviously difficult to discern slickensides or lenticular peds. In yet other clay soils (up to 50% clay or more) cracks may develop but slickensides and lenticular peds are apparently not present. CSIRO (58) Texture in duplex soils is highly variable, with the topsoils ranging from coarse

sand to clay loam and the subsoils from light to heavy clay. Some duplex soils are distinguished by the presence of an A2 bleached horizon, a character also used as a diagnostic key for the distinction between these types of soils. diagnostic properties used by Northcote for the definition of duplex soils consider only the soil texture (texture contrast and type of boundary between horizons A and B) and the colour is used for their differentiation (i.e. brown, red and yellow duplex soils). Under the Australian Soil Classification ' they can be included in different orders such as Podosols, Sodosol, Chromosols or Kurosols.'

Hard setting surfaces not addressed for high cost engineering and erosion '*Surface soil textures and depth vary considerably and have significant implications for management; affecting soil workability, permeability, crop establishment, moisture availability and erodibility. The subsoils are sodic and the yellow, grey and brown Suborders in particular, are generally quite dense and coarsely structured, characterised by coarse prismatic, columnar or blocky peds.*

Sodosols (in association with Vertosols) are common on the older alluvial plains of the region. These plains were often traversed by prior streams'. (60)

Written in 2 notes of EIS soil survey data sheet to question "presence of sodosol ? **- No?" Has this soil testing met the accredited requirements for the Department of Planning?**

Sodosols have an abrupt clay increase down the profile and high sodium content, which may lead to clay dispersion and instability. Seasonally perched watertables are common because of the structure of the subsoil. These soils are usually associated with a dry climate and they are widely distributed in the eastern half of Australia and the western portions of WA, where they are used extensively for grain crops. These soils are usually very hard when dry, are prone to crust formation and have subsoil constraints to root growth. The dispersive subsoil makes them prone to tunnel and gully erosion.

Which would then lead to

-Irrigation salinity not addressed

Sodosols ..Abrupt clay increase down the profile and high sodium content, which may lead to soil dispersion and instability. ..common land uses include grazing of native or improved pastures for both dryland and irrigated agriculture, and forestry.

Agricultural activities have occurred on and in the vicinity of the development footprint. Therefore, agriculturally derived contaminants could be present within the development footprint. However, as noted in Section 3.5, construction of the project will require limited site preparation and civil works. EIS

High erodibility and soil erosion

Kinetic energy from the flow that drains from these panels is found to be greater than that of the rainfall, which would cause erosion. Erosion removes the soil richest in organic matter and nutrients and causes permanent damage the land which makes it difficult to farm in future.

the project may result in increased levels of soil erosion. The susceptibility of soils to erosive forces is dependent on their inherent properties, namely texture, structure and dispersibility (Charman 1978). As noted in Table 6.5, the site is mapped in its entirety as Vertosols. Vertosols have high agricultural potential with high chemical fertility and water-holding capacity, however significant rainfall is required to make water available to plants (Australian Soil Club n.d.). EIS

Problems of water entry and adverse soil physical conditions if this is based in its entirety on

vertosol soil. *. Soils within the development footprint ..would be considered relatively stable and soil erodibility was found to be low to moderate overall. .. , the project may result in increased levels of soil erosion… the site is mapped in its entirety as Vertosols .. The results of the soil erosion assessment (Appendix E) generally supported this mapping, however, minor variations in the soils were evident in each test location. The site is mapped in its entirety as moderate inherent soil fertility.EIS*

"Nitrogen (N) and phosphorus (P) are essential for plant and animal growth. However, when elevated concentrations of these nutrients get into surface water bodies, they can cause adverse environmental impacts such as hypoxia and harmful algal blooms. The run off from the panels discussed below would also encourage the algal blooms with the soil erosion. Consequently, these outcomes cause societal, ecological, and economic concerns. Therefore, it is important to understand the extent of nutrient pollution transport from various sources, so best management practices can be effectively targeted at their source."

soil resources will be managed to ensure the future viability of the development footprint for agricultural production

"Pollution of agricultural drainage water and stormwater runoff has been well documented in separate studies around the world. However, the extent of nutrient transport from these non-point sources has rarely been investigated over the long term within the same watershed." (61)

Localised run offs unaddressed

The area of impervious ground surface will not increase significantly; therefore there is not expected to be an increase in runoff generated from the development footprint.

The average annual rainfall if 650mm in Gunnedah (rainfall data) and if the development area is covered by panels or road surfaces it can be called interception surface. That becomes approximately megalitres of run off annually.

The development footprint has a relatively homogenous soil type, constant grade and is also well drained, which would limit runoff water velocity during heavy rainfall events and thus mitigate erosion potential. The project should not impact on the relevant large design flood, and the proximity of the regional road network enables efficient delivery of the infrastructure required for the project. EIS

It would be unsound to assume that rain falling on each row of solar panels would flow evenly into the rain-shadow of the row below, so as to mobilise the same percentage of the ground for infiltration as was available before the panels were installed. Rather, because the panels would be set at a downward slope and aligned to follow the contours of the land, rain-water would be likely to fall in a column from the lowest corner of each panel, and could then form rivulets flowing down through the rain-shadows of the rows below without utilising their whole area for infiltration, thus increasing the amount of water run-off from the site. If all land is leveled off the water will become a flow.

'Questions have been raised recently regarding the role of tile drainage in flooding. On one side of the issue, tile drainage is viewed as a major cause of flooding because the tiles accelerate subsurface water delivery to rivers.' (62)

Erosion and sedimentation of areas include:

- Areas cleared of vegetation/ground cover
- Exposed subsoils Infrastructure
- Access roads and tracks

No interception of runoff is planned by project infrastructure (refer Section 2.1) and therefore there should be no net reduction in runoff from the development area.EIS

General erosion and sediment control measures include :

- *divert run-off from undisturbed areas away from operations;* - all areas will be disturbed during construction.
- minimise the length of time that subsoil is exposed; - exposed 30 years
- *direct run-off from cleared areas to ESCs such as sediment basins.*
- provide protection in drains – company does not think drains necessary
- *potential for water velocity to cause scouring;*- company do believe will scour based on soil data
- *confine traffic to maintained tracks and roads;* - roads exposed and unsealed *The internal roads within the development footprint will generally be unsealed.*
- *install sediment traps,*- company do not believe will have run offs
- *optimise surface drainage and stabilise drainage lines*. – company do not believe need run off drainage or mention tile drainage in report.
- *vegetation debris along the contour;*- weeds treated with herbicides ,less light under panels - refer to references below

With this project comes soil changes and lack of plant life, there is already evidence of soil conditioned changing with lack oxygen and light from infrastructure and soil change temperature. With lack of plant life, internal tracks and roads, run offs and erodibility increase, certainly without a natural run off, will increase from almost none to a considerable amount of run off, which could impact anyone, including a public road and local water logging.

Compacted stubble		Chisel ploughed stubble	
Runoff		Runoff	
m3/ha	% of rainfall	M3/ha	% of rainfall
433.5 m3/ha	20%	5.8 m3/ha	0.5%

Runoff from grassland (NSRI Cranfield 2007)

Grass – poor soil structure		Grass – good soil structure	
Runoff		Runoff	
m3/ha	% of rainfall	m3/ha	% of rainfall
	~60%		~2%

agricultural example of run off

'Activities such as levelling and grading during construction have the potential to increase the sedimentation of rivers and tributaries in the area. This impact will be compounded if more than one facility were to be constructed and operated within close proximity, leading to increased run-off of soil and other particles into the same catchment areas.' (63)

'PV panels also allow some light energy to pass, which, again, in unvegetated soils will lead to greater heat absorption. This increased absorption could lead to greater sensible heat efflux from the soil that may be trapped under the PV panels. A PVHI effect would be the result of a detectable increase in sensible heat flux (atmospheric warming) resulting from an alteration in the balance of incoming and outgoing energy fluxes due to landscape transformation.. Transitions to PV plants alter the way that incoming energy is reflected back to the atmosphere or absorbed, stored, and reradiated because PV plants change the albedo, vegetation, and structure of the terrain.

Energy absorbed by vegetation and surface soils can be released as latent heat in the transition of liquid water to water vapor to the atmosphere through evapotranspiration – the combined water loss from soils (evaporation) and vegetation (transpiration). This heat-dissipating latent energy exchange is dramatically reduced in a typical PV installation (Fig. 1transition from A-to-B), potentially leading to greater heat absorption by soils in PV installations. This increased absorption, in turn, could increase soil temperatures and lead to greater sensible heat efflux from the soil in the form of radiation and convection.' (64)

The North West Strategic Weed Management Plan (LLS North West 2017) outlines how government, industry, and the community will share responsibility and work together to identify, minimise, respond to and manage weeds. EIS

If evidence shows new plant life, erosion and weeds and no run offs, is the community (us) meant to control the dispersal of their weeds as well?

'Direct effects include the influence of temperature, soil moisture and radiation on plant community composition and productivity, and on soil microbial activity. Indirect effects result from changes in the soil microbial community caused by alteration of soil physico-chemical conditions and C inputs to the soil, mediated through changes in plant community composition and productivity.

However, ***solar parks will affect the local distribution of precipitation: the areas under the footprint of the panels will receive less, and areas at the edges of the panel will receive more through drainage from the panels***

we hypothesize solar parks will have substantial effects on the amount of PAR received through interception of a large proportion of the incoming direct and diffuse radiation and that the ratio of diffuse to direct radiation will increase (Fig. 1).

Given the measured and anticipated changes in microclimate we expect, in the longer term, over the 20–25 year lifespan typical of a LBR installation, changes in the vegetation community composition will occur' (Euskirchen et al., 2009).

Given the variability in C cycling between different plant functional types, GHG fluxes and ultimately C sequestration may be altered (De Deyn et al., 2008). Indeed, the importance of plant functional type on C cycling has been demonstrated to be greater than climatic effects: litter decomposition rates in one climatic zone were found to vary 18.4-fold, whereas decomposition of the same litter in different climatic zones varied 5.5-fold (Parton et al., 2007; Cornwell et al., 2008). Change in plant community composition may also lead to other ecological feedbacks that will affect environmental conditions and subsequently soil C cycling. For example, different albedos (Chapin et al., 2005) and transpiration rates (Chapin, 2003) are associated with different plant functional types and may affect soil moisture which is a strong C cycle control.

And micro climate concerns from the scientific community which gives valid concerns for our property and its potential to be placed in between two solar farms with heat temperatures and compromised plants from thermal effects within the run offs and future contamination.

'… plant and soil communities may affect near-surface CO_2 concentrations, that feedback and alter plant–soil C cycling rates. LBRs may also affect CO_2 concentrations directly, through

altering mixing and turbulent exchange of near-surface air with the bulk air mass, but we postulate plant–soil effects will dominate.
we call for an increase in research effort in this emerging field and propose specific research priorities should be (i) field assessment of the effects of LBR on the local climate, especially solar parks for which there is no evidence, with potential for remote sensing to provide data at a larger scale; effects of LBR-induced microclimates on C cycling and greenhouse gas emissions across the globe. Given the dominance of temperature on plant–soil C cycling, it is crucial that new experiments and models examine LBR effects on this parameter. However, the effects of other abiotic and biotic factors that are affected by LBR, and their interactions, also need to be resolved, across the full range of hosting systems.
We urge the scientific community to embrace this research area and work across disciplines, including plant–soil ecology, terrestrial biogeochemistry and atmospheric science, to ensure we are on the path to truly sustainable energy provision.'
Dr Alona Armstrong is a faculty fellow in energy at Lancaster Environment Centre, Lancaster University

Water Contamination with no runoffs

Accidental spills within the development footprint could result in transient impacts to water quality if they were to coincide with a period of rainfall.

refuelling will be undertaken in designated refuelling bays (there will not be any vegetation in these areas), especially when the fire danger rating is very high or above;

spill response kits will be available should there be a spill of flammable substances;

Thirteen rural dwellings have been identified within an approximate 3 km radius of the site, identified as receptors R1-R13 (Figure 2.1). The nearest receptor, R1, is approximately 150 m west of the western boundary of the northern portion of the development footprint. EIS

Waste streams likely to be generated during the construction and ongoing operation of the project will include, general waste, scrap metal, comingled recycling, waste oil, pallets/timber recycling, oily rags, oil filters, oil drums, waste batteries.

Low energy photons lie below the band gap on a PV farm, as well as the majority of photons outside the photosynthetic range on a farmland, all go unused. Furthermore, solar energy is only passively used via the traditional water cycle (i.e. evaporation, condensation, rain) and not directly used to treat water locally at agricultural and urban centres for water management, purification, and recycling. Land availability will only be increasingly constrained as earth's population increases, especially when urban and agriculture centres are co-located.

WE ALL LIVE DOWNSTREAM

Consultation with the landholders, affected landholders surrounding the site boundary

No. Not with R1, where the boundary and proximity are obviously concerning and have immediate impact and certainly not about flood measures.

A desktop assessment of the site was undertaken

No water quality data are available for runoff from the site itself. Runoff would contribute to flow in the Namoi

River downstream. EIS

Seasonal Waterlogging

- Discharge area

No water quality data are available for runoff from the site itself however an analysis of water quality data collected from regional streamflow ..

Construction activities have the potential to generate turbid or sediment-laden runoff to downslope areas.

A variety of sediment and associated pollutants are transported in runoff events and reach rivers through stormwater outfalls. Heavy metal pollutants have been found to preferentially adsorb to sediment. *'..techniques to negate impacts of climate change. …a broad collection of measures and activities that reduce flood risk (Parliamentary Offices, 2011; Thorne, 2014) from changes in land-use through to the construction of features that intercept and manage overland flow, for example wetlands and swales.'*

The site itself slopes gently from east to west with elevations ranging from. survey topographic contours (0.1 m interval) for the development area are shown on Figure 2. These show a broad swale in the north-east of the development area approximately 1 m maximum depth and approximately 250 m in width, with a fall towards the northwest. This is mapped as a first order stream on NSW topographic The site itself slopes gently from east to west with elevations ranging from approximately 275.6 m AHD[1] in the north-east to 272.5 m AHD in the south-west. The typical east to west longitudinal surface gradient across the site is approximately 0.15%.

'Elevated levels of sediment, occurring through urbanization and the associated sediment laden stormwater runoff, impact several aspects of river quality including physical (e.g. increased flood risk and turbidity), ecological (e.g. changes to habitat structure and dynamics; Theurer, 1998; Soulsby et al., 2001; Owens and Batalla, 2005), and water chemistry.' (e.g. fine sediment acts as a transport vector for pollutants; Characklis and Wiesner, 1997)..

As indicated on Figure 2 and described in Section 3.2, a broad swale is present in the north- east of the development area, with a fall towards the northwest. This is mapped as a first order stream[6]. It is not evident from available topographic mapping whether this swale represents a breakout channel from the north side of the Namoi River or whether it is a channel conveying runoff from the hills to its north. EIS

The North West of the swale and unmitigated run off and desktop regional data of water and rain from the project and design therefore would potentially waterlog our property. Infrastructure will break natural run off and sediment dispersal. Swale, or filter strip is a form of water treatment, which reduces the delivery of pollutants to the channel. Swales and wetlands are often used unlike direct outfalls that discharge directly into the main channel, setback outfalls discharge into a wetland or swale prior to reaching the main channel.

'A key consideration when implementing flood management measures is the capacity to cope with climate change, and projected changes in both flood magnitude and frequency.' (66)

Ground water pollution hazard

- Aquifer vulnerability not addressed

project is not likely to impact groundwater during construction EIS

During the construction phase, operations such as clearing vegetation, removing topsoil, chemical suppressants for dust, emissions from vehicles and equipment and "possible oil spills", landscaping, road construction and installing other infrastructure lead to the greatest

risk of soil erosion. Unsealed roadside drains can also be a significant problem. Rain hitting impervious surfaces such as roofs, runs off occur much more rapidly, so why not solar panels.

Algal blooms also assists the growth of weeds and this can have a wide range of social, economic and environmental impacts on water supplies, human health, agriculture (livestock), fish, wildlife, recreation and tourism. A major bore water supply to the township is also on Orange Grove Road.

Consideration of ground cover beneath the PV solar panels will be included in the EMP to manage erosion, weed infestation and surface water runoff. The project is unlikely to have a significant impact on local or regional flooding, surface water and groundwater

'The increased levels of chemical contamination occurring in rivers and water bodies in Australia can be attributed to poor handling and use of manufactured organic and inorganic compounds. Chemical contamination can make water unfit for both human and animal consumption and occupation by aquatic organisms. Removing or neutralising these chemical compounds can be costly. Chemicals that can degrade water quality include:

/l organic compounds, emanating from industry, agriculture and domestic sources, for example solvents, lubricants and pesticides; and

/l inorganic compounds, mainly heavy metals originating from fertilisers, domestic sewerage systems, rural intensive processing, biosolid (sewage sludge) disposal/reuse on agricultural soils and extractive industries.'

Water bodies are managed for a range of uses including extraction for domestic, agricultural and industrial purposes and electricity generation. These uses alter the flow rate of rivers and streams, affecting water quality in several ways. Increased flow rates may dilute the concentration of pollutants, which while positive, does not alter the total pollutant load. Reduced flows may increase pollutant concentration.

Groundwater pollution is the modification of the physical, chemical and biological properties of groundwater through infiltration by microbiological organisms such as viruses and bacteria and organic and inorganic compounds, including salts, nutrients and agricultural chemicals. The presence in groundwater of these pollutants, at high concentrations, can restrict or prevent its use.

Groundwaters occur in a different physical and chemical environment to surface waters. **Recharge occurs through the soil,** streambed, or ponded areas and moves very slowly once the water table is reached. Thus their sources and paths are difficult to determine, especially in alluvial aquifers, which are often sinuous lenses of sands and gravel surrounded by clay sediment .

Pressure and exclusion from atmosphere oxygen can make the water more chemically active and therefore more prone to dissolve toxic elements. Nitrates and some pesticides are more likely to survive if excluded from light, oxygen and biological activity. The soil layer protects the groundwater by binding many organics, nutrients and metals. (66)

- Wind erosion risk

the soil erosion assessment, as part of the desktop assessment,

A total of 2.8 million ha of BSAL has been identified and mapped at a regional scale across NSW, The site is mapped in its entirety as BSAL *EIS*

Wind erosion means wind blowing away soil, sand or any substance that is light enough for the wind to carry it and deposit it at a different location. From a human perspective, wind physically removes the less dense, lighter soil constituents such as organic matter, clays, and silts thereby removing the most fertile part of the soil. This reduces the soil productivity and thus decreases potential soil productivity and increases economic costs.
The effect of plant residues, plant canopy and non-erodible soil aggregates on wind erosion has been mostly evaluated under controlled wind tunnel conditions.

'Soil erosion by wind is, to a certain extent, a natural process that has always played a role in shaping the land. However, human activities which affect soil are accelerating wind erosion, particularly some agricultural practices, such as overgrazing of pasture or leaving cultivated land to lie fallow for extended periods. There are primarily two types of wind erosion - Sweeping drift and Active drift. Sweeping drift is relatively gentle and causes loose, fine soil to go into suspension but with minimal development of drift banks. The ecosystem allows for a certain quantum of erosion; however, loss of soil in large quantities takes a long time to get replaced and causes damage to the delicate balance of nature.'

soil resources will be managed to ensure the future viability of the development footprint for agricultural production. EIS

'Detached and airborne soil particles break soil aggregate and lower infiltration rate. This results in surface runoff.

Construction of roads and buildings and wanton deforestation increased the rate of wind erosion. The wind is able to easily blow away the sediments and ground cover that has come loose due to human action. These actions also impact drainage patterns, embankments and soil compaction, leading to exposure of mineral soil.' (68)

Wind erosion is largely the result of many superimposed, interactive processes.

Flood hazards unaddressed

The project should not impact on the relevant large design flood, and the proximity of the regional road network enables efficient delivery of the infrastructure required for the project the site is within the Brigalow Belt South bioregion, and is part of an extensive floodplain of the Namoi River. This management zone is described as 'flood storage and secondary flood discharge areas'.

A small farm dam exists within the development footprint, however, this would be removed as part of site establishment activities by backfilling with adjacent material and levelling.

within the development footprint is situated above the level of the relevant large design flood considered in the Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain (DPI Water 2016) and therefore should not affect flood levels. In consideration of the historical flood events considered by SMEC (2003)

The EIS claims are based on a 2003 flood study and predicted that the infrastructure above this flood level basis. It admits to sloping and by any map is a Flood Zone and has storage for a reason. The minimum concern of swale channels and waterlogging with minimum flood study is not comprehensive for what is clearly a flood management zone (on any mapping) and local knowledge and with recent publicity from the Orange Grove Road community who have had experience. We live here, we are witness.

The project should not impact on the relevant large design flood..EIS

After generations, we are witness to the floods and our house is designed with sheet metal at the front and elevation of the home for those times. As Australia has one of the eight-migratory bird flight paths in the world, many migratory birds have been witnessed in wet times here. Snakes perched on the top of fence lines and the carp swimming on the Orange Grove Road and within the property (and have caught in floods),has been over a metre deep. Paneling, hazardous infrastructure and close proximity with a large mesh fence bordering, will not mitigate the affects from this project if there is heavy rain or floods.

A considerable portion of the flood flow in the Namoi River would flow into the Mooki River via this path, flowing away from the development area. There is no data available that indicates a similar significant breakout to the north towards the development area.

Media reports:

As a result of the flooding in Gunnedah the Oxley Highway between Gunnedah and Tamworth being closed and likely to remain closed for several hours.
The Kelvin Road is closed at Cohen's Bridge and the "pig hole". Low-lying areas in the Kelvin, Bluevale, Wean and Orange Grove Road areas have experienced flooding of roads.
http://www.abc.net.au/local/stories/2011/11/28/3378141.htm

Several local roads have been closed or are open with caution due to the rainfall. Heavy rain, strong winds and reduced visibility continues to be a cause for concern for police and emergency service personnel.
https://www.nvi.com.au/story/1265202/gunnedah-on-flood-watch/

The Namoi River peaked at Gunnedah at 7.82 metres last night and is now falling. The Gunnedah to Manilla Road is open but the Gunnedah to Kelvin Road is CLOSED at Pig Hole. The SES also warns that low lying farmlands downstream of Gunnedah on the Namoi River may be inundated and farmers should consider securing pumps and other equipment and prepare to move livestock to high ground
http://www.abc.net.au/local/stories/2008/12/01/2434437.htm

As indicated on Figure 2 and described in Section 3.2, a broad swale is present in the north-east of the development area, with a fall towards the northwest. This is mapped as a first order stream[6]. It is not evident from available topographic mapping whether this swale represents a breakout channel from the north side of the Namoi River or whether it is a channel conveying runoff from the hills to its north ...Modelled flood discharge rates of 897 m^3/s and 211 m^3/s are reported in this swale ... The proposed construction of project infrastructure (refer Sections 2.1 and 4.1) including buildings, chain mesh fence and the PV solar panel arrays themselves have the potential to affect flood levels if these developments were to occur ..EIS

For landowners the following is advised:
Fences and privacy walls may obstruct or divert flood flow and waves, causing big problems. For this reason, before your fencing permit will be approved, your request must be analysed for its effects on flood conditions and the effects of debris generated by your fence's failure during flood events.
It is presumed that open fences, like wood and vinyl with slats and generous openings, will not lead to harmful diversion of floodwaters. Fences with smaller openings and solid fences may be prone to trapping debris and should be avoided. (69)

The northern portion of the development footprint will be fenced off by a chain mesh fence, which will be approximately 1.8–2.4 m high

Do not

Fence immediately adjacent to the watercourse, this increases the chances of debris becoming caught up in the fence during flood events, therefore increasing risk of damage and loss.

Fence across the line of the flow, use a detachable water gate approach – chained at one end and tied at the other as a quick-release system

Fence in one continuous line

Over fence! Think about the lines that are needed and most efficient within a floodplain Environment (70)

Biodiversity

The project may contribute to further encroachment of invasive exotic weed species which could lead to loss of habitat and suppression of native seedling establishment resulting in changes to vegetation communities over time. EIS

Gunnedah Local Environmental Plan 2012

'to minimise conflict between land uses within this zone and land uses within adjoining zones to conserve and enhance the quality of valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use.'

One Koala feed tree species (Bimble Box), as defined within Schedule 1 of SEPP 44, was identified within the development footprint. Bimble Box makes up greater than 15% of the tree species within the development footprint, therefore the vegetation within the development footprint is considered potential Koala habitat as defined under SEPP 44.

Most of the trees within the development footprint are likely to provide foraging or sheltering resources for Koala. Koala scats were recorded on the southern banks of the Namoi River, in more timbered habitat south of the development footprint (Biosis 2017), however, no scats were found in the development footprint. The development footprint is therefore not considered core Koala habitat under SEPP 44.

This area is well known for its Koala capital population. In 2016 Commonwealth laws have already relaxed on protection of our koalas. The core area, by natural corridors and particularly more often near the river when drought drives them to this corridor and they have less movement, this would be their habitat for survival. If Overland doesn't care about local people they have no claim to care about local koalas.

protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats..

'Gunnedah is in immediate danger of losing its title as Koala Capital of the World, with the koala population believed to be plummeting.
Koala foundation chief executive officer Deborah Tabart – also known as "The Koala Woman" – says on the foundation's website the Gunnedah koala population is estimated at 2900-3300.

“This electorate is now on the cusp of becoming the Coal Capital of the world and Gunnedah may have to relinquish its title of Koala Capital of the world if that comes to pass,” Ms Tabart said.

“I am particularly concerned about the future of this electorate because it is a major food bowl of our country and the conflicts between these two worlds loom large.”

But Ms Tabart, who said she has visited Gunnedah many times, went further in an interview with the Namoi Valley Independent. “I think you can no longer call yourselves the Koala Capital of the World, because you are not showing enough care with the habitat,” she said.

Ms Tabart said Gunnedah Shire Council had done little to ensure the koala’s future and had not accepted the maps and research of the foundation when it was offered some time ago.

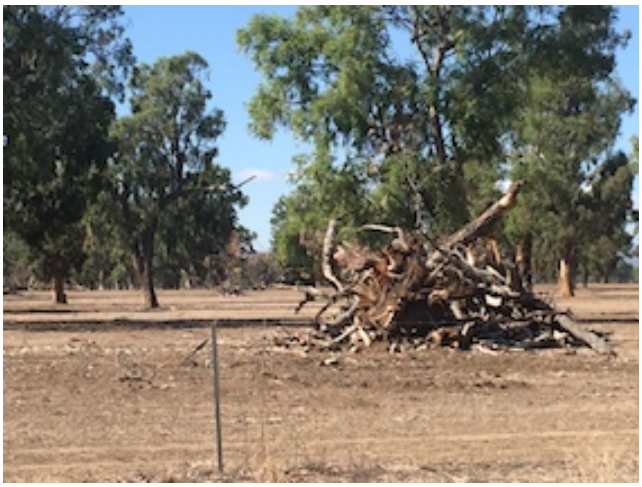
Environmental consultant John Lemon, who is well-known for his work with koalas in Gunnedah, said he believed the koala population had plummeted at least 60 per cent since 2007.

“Gunnedah’s claim to being the koala capital of the world may be challenged by other centres in the not-too-distant future as the population declines,” Mr Lemon said.

Liverpool Plains Land Management executive officer David Walker said while it was not correct to say nothing had been done to protect the koala in Gunnedah, the population was “struggling”.’(71)

Koalas live in complex social groups. Contrary to popular opinion, they are not migratory animals, but highly territorial. In stable breeding groups, individual members of Koala society maintain their own "home range" areas.
The home range of each animal fits together like a jigsaw. This illustrates that the habitat supporting this Koala population is ideal for its survival. However, if the available habitat were to be reduced in any way, the potential for survival of each individual would also be reduced.
A ‘home range’ consists of a number of ‘home range trees’ and ‘food trees’ which comprise the long-term territory of the individual Koala. These trees provide the Koala with food, shelter and places for social contact, which will support it for the term of its natural life (assuming there is no habitat clearing).
Trees are the Koalas' family homes, bedrooms, kitchens and nurseries. If the home range trees are removed, the Koalas lose both food and shelter. Because of the structure of overlapping home ranges, one Koala cannot just 'move next door' if its trees are removed, as 'next door' already belongs to someone else and cannot support another Koala. Also, if an obstacle like a road or house is placed between the trees that comprise the Koala's home range, it may be cut off from adequate food and shelter and risk injury or death from cars, dogs or disease. (72)

but there is little fallen timber, EIS



This could be why. Photograph taken on 9th of May 2018 of proposed site.

Indigenous consultation

The project is unable to avoid impacts to OG_ISF2, an isolated artefact in the northern portion of the development footprint. EIS

Parties of the local Kilamaroi have visited this property. It is not socially or ethically courteous for their consultation to be only advertised in the paper as an invitation for professional and inclusive consultation and definitely not for their opportunity as community in consultation.

an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, including adequate consultation with the local Aboriginal community.EIS

A small advertisement in a local paper after the comparison of the company promotion on local news is almost more insulting than our own towns community consultation process an opportunity to promote and create an invitation into the process. It is completely unacceptable.

More information withheld on land for battery storage and facilities

'As with Wee Waa, the Orange Grove facility may also incorporate battery storage, but details of capacity haven't been fleshed out as yet.' (73)

There is no information for residents including those in close proximity to know what type of battery and storage they are proposing which is our entitlement for safety and health. To ensure safety, it is necessary to research the relevant legislative and normative requirements on battery based grid storage systems.

Currently for grid energy storage development, there are almost no standards available for risk analysis and storing large amounts of energy, whether it's in big batteries for electric cars or water reservoirs for the electrical grid, is still a young field. It presents challenges, especially with safety.

Energy Storage Summit in London, England, organised by our publisher Solar Media, brought together more than 350 representatives from the battery storage industry.

Harry Vickers at Camborne Capital, a financier-turned project developer which installed the UK's first 500kWh Tesla Powerpack, now providing frequency regulation and other services, remarked that insurance companies are still reticent to back battery storage following a widely recognised incident involving a lithium-ion battery at the Kahuku wind farm in Hawaii more than five years ago….The 30MW wind farm was combined with a 15MW battery before it developed a fault, triggering a fire that was estimated to cause more than US$30 million worth of damage. Firefighters did not combat the fire until seven hours after the incident started due to concerns surrounding how to combat a fire involving the energy-dense technologies. (74)

How do batteries of various chemistries and technologies react in a fire?
How do firefighters make sure burning batteries are fully extinguished?
How do responders handle a damaged battery that still contains energy? This also includes solar panels.
What are the risks to first responders and the public from exposure to toxic fumes, electricity, and other hazards associated if a fire or other incident were to occur?
How much land, size and increased risk will the storage and battery capacity be?

lightning strikes on R1 property one of many trees

'The current available systems contain enormous amounts of energy up to several MWh. Due to the increasing number of battery storage systems in the market, it becomes necessary to perform pilot projects in order to minimize risk. At the moment there is almost no access to information about the safety of these systems operated under real conditions
Experts identify mechanical, thermal, electrical and chemical dangers according to a newly defined framework, containing the phase development, testing, production, warehousing, delivery, operation, maintenance and post-operation.' (75)

"'Clearly, storing large amounts of energy is difficult from a physics standpoint; [the energy] would rather be somewhere else," said Paul Denholm, a senior energy analyst at the National Renewable Energy Laboratory.
He explained that energy naturally wants to spread out; so packing it into a small space like a battery or a fuel cell creates the risk of an uncontrolled energy release like a fire or explosion. Similar issues come up with mechanical storage, whether it's water behind a dam, compressed air underground or spinning flywheels… in the case of a thermal runaway, it's usually not the batteries that catch fire but their fumes, though lithium itself is flammable. Even after the fire is extinguished, the batteries can still generate tremendous amounts of heat and reignite fumes, hampering rescue efforts'. (76)

'The energy storage battery seeing the most explosive growth is undoubtedly lithium-ion. ***Lithium-ion batteries*** *are classed as a dangerous good and are toxic if incorrectly disposed of. Support for lithium-ion recycling in the present day is little better than that for disposal — in the EU, fewer than 5% of lithium-ion batteries for any application are recycled. Companies such as Tesla are investing in battery recycling programs, but worldwide the efforts fall far short of the mark.' (77)*

Waste
- battery and solar panels and cables

reduce waste production; recover resources; and dispose of waste appropriately
During decommissioning, underground cables may be left in situ to avoid unnecessary ground disturbance.

Land management practises will avoid or minimise impacts with adjoining land uses, and ensure that the development footprint is not precluded from being returned to a productive agricultural use at the end of operation. EIS

The problem of large-scale **battery and solar panel** disposal is not yet upon us, but it's on its way down the pipeline.

'Demand for batteries is expected to accelerate in coming decades with the need to store energy generated from renewable sources, such as solar photovoltaic panels. But rising concerns about mining practices and shortages in raw materials for lithium-ion batteries – as well as safety issues – have led to a search for alternative technologies.

"Our initial investigations found that cobalt mined by children and adults in horrendous conditions in the DRC is entering the supply chains of some of the world's biggest brands. When we approached these companies we were alarmed to find out that many were failing to ask basic questions about where their cobalt comes from,"'

said Seema Joshi, Head of Business and Human Rights at Amnesty International

no waste material will be received or disposed of on-site;

Yet under is written….?

all waste material will be removed from site as soon as practicable and will be sent to an appropriately licensed waste facility for disposal.

"This is a crucial moment for change. As demand for rechargeable batteries grows, companies have a responsibility to prove that they are not profiting from the misery of miners working in terrible conditions in the DRC. The energy solutions of the future must not be built on human rights abuses."

"Cobalt plays a vital role in sustainable energy solutions. It is a key component in the batteries that power electric cars, and could also play a major part in developing green technologies like wind farms and solar energy. But demand for cobalt could also be sustaining human rights abuses," said Joshua Rosenzweig, Strategy Advisor on Business and Human Rights at Amnesty International.
Public disclosure of human rights risk assessments is a vital step that none of the companies in this report are taking. Companies should admit to human rights abuses existing in their supply chains if they find them.' (78)

The engagement activities undertaken included community information sessions, phone calls, meetings and informal discussions, thus providing opportunity for public involvement and participation in environmental planning and assessment EIS

After defining the lack of consultation and proximity and un addressed issues showing this company and its process - it is just interested in money despite energy concerns. Other solar farming creates and remains owned and produced for Australians. This is the one industry that Australia could regulate for our own investment in more than one way.

'German power company innogy SE, the renewables arm of utility RWE, will purchase the rights to two large-scale solar development projects from Overland Sun Farming in New South Wales, Australia, for an undisclosed sum.The projects Limondale (347MW) and Hillston (115MW) have a combined capacity of more than 460MW. The two projects are already in advanced development stages, with all land, planning and connection processes, arrangements and approvals as well as designs and construction arrangements expected to be finalised during Q2.' (79)

The project will not result in significant adverse biophysical, social or economic impacts, and the project design has actively sought to avoid and minimise adverse impacts, in particular to biodiversity, heritage, land use, flooding and visual amenity, through the siting and design of project infrastructure. EIS

This is a solar company following conquer and divide strategies of which mining companies are notorious, unnessarily. They have displaced need for genuine consultation and transparency, proximity concerns, flood concerns, water run offs with replaced disrespect, no mitigation apart from seedlings, with a brutish design to unable accommodating existing businesses, animal welfare or homes with the people that will live with the solar farm. They haven't seriously addressed soil affects and therefore engineering because they presented a lack of respect not only for "community" and environment but also for this project and its future affects. This project cannot represent how renewables work with agriculture.

Spatial separation between the proposed sites for the project and the Gunnedah Solar Farm, in conjunction with vegetation present around these receptors and project-specific mitigation measures are considered appropriate to mitigate potential cumulative impacts. EIS

This is impossible to be assumed. The information from governments and energy bodies listed in this objection continuously confirm cumulative impacts are unknown or recently beginning to be scientifically proven. This is a disinterest in local environment and social cumulative impacts.

Conservation of ecological resources will be achieved through avoiding valuable areas.

Precautionary principle *- This means that if there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

But where is our scientific certainty throughout this EIS? With language of, its unlikely/not significantly/not expected and question marked soil samples with regional desktop data for deductive results? All land, soil, location is different. Despite having to admit to flood zoning, noise and EMF's, plant and soil impacts, Overland must be responsible for what is an obviously an unscientific assumption the spatial distance is sufficient. Throughout this entire process has been a one way interest from Overland that does not promote or engage a renewable that should be sustainable and CLEAN in all management areas from start to finish. As international frameworks and regulations emerge with climate concerns Australians are hoping we will be the people that can trust our government and sub governments to provide safe and healthy living for everyone.

Most of the countries in principle have followed a seven-step planning process:

1. government commitment to proceed
2. environmental health assessment
3. public consultation
4. implementation strategy
5. framework for planning
6. government position on priority actions
7. finalizing and adopting an action plan

the environmental guideline follows

The assessment should not only consider the environmental impacts on a site, but whether or not off-site effects are possible

8. noise and vibration on the health and amenity of adjacent residents will need to be included in the assessment.
9. changes to drainage and identification of sources of clean and contaminated stormwater
10. Determining risk levels is an iterative process. The objective of the process is to reduce risk to acceptable levels by implementing an action plan.
11. Identify, assess and rank risks to all segments of the environment, human beings, nuisance and loss of amenity from plans of the proposed development.
12. calculation of stormwater flows within micro-catchments within the site, based on a one-in-two-year storm event (two-year ARI with intensity of six hours), for each stage of the project
13. Hazard identification involves identifying activities that could lead to an adverse effect on the environment, impair human health, result in a nuisance, or decrease the amenity of residents adjacent to a construction site.

'It is necessary to consider both direct and potential causes of hazard, which could cause water, air, land or noise pollution. Hazards may arise out of features of the site, or the nature of construction activities

The level of risk is also a function of time. The longer a risk is allowed to continue, the more likely it is that there could be an undesirable consequence. '

'It's clear that PV panels will cause shading and changes to wind flow, and in principle is likely to alter temperature, change the rainfall distribution (which impacts on soil moisture) and the wind flow over the land'. Dr Alona Armstrong

Within the Sustainable Development Strategies their goals toward the environment were also for Citizens, just like corporations, have a social responsibility towards the environment and their own health.

As part of the same SDG goals that emerged to address energy crisis and climate change, we are seemingly obliged to be dependent on the government to share and protect and legitimize our concerns toward our environment and health when living next to a solar farm.

The degree of exposure to EMFs within the development footprint will vary depending on proximity to different components of the project infrastructure. EIS

'authorities have proximity and close connection to residents and are thus equipped to explore and understand the specific needs of different groups and respond to these needs. They are equipped to identify and respond to inequity in health in the local population and to change people's behaviour.'

'authorities engage upstream with local communities and neighbourhoods in decision-making processes that will affect these communities and neighbourhoods. Participatory tools such as environment and health impact assessments are useful to inform these decisions.

facilitate the exchange of knowledge and experience ' (SDG)

Conclusion

The region has potential sources of solar energy, receiving 1920 megajoules daily of solar exposure, making it the second highest solar penetration region in NSW (NSW Government 2017). EIS

The region having "potential" solar is not specific, sun is abundantly available and every state has "potential" which is evident in solar development. Solar has the opportunity to administer greater, more acceptable and strict guidelines to achieve a much better renewable implementation plan as a leading global example.

Healthy and productive soils are central to achieving a number of the 17 sustainable development goals adopted by the United Nations General Assembly this year. Soils sustain our food systems, filter and regulate the flow of freshwater, store vast quantities of carbon and support myriad organisms. But the world's soils are increasingly under pressure from climate change, population growth and poor land management. (81)

This is land part of a food belt. Farmers have already appealed to the Royal Commission for regional focus due to levels of injustice and false information. These plains play a large part of a billion dollar industry for Australia in agriculture. The money and competitively of the solar industry is greater than the impacts on adjoining land and businesses and consequently the future environment if emplaced like Orange Grove Solar. The cutting corners and experiences of mismanagement, misleading and (desktop) data, lack of concern for adjoining land impacts and their contribution, creates more loss of agricultural land, now and in the future. This is in a country with areas less productive with "solar potential" and with an agreement to participate in response to rising global concern for biodiversity and food security. Australian Government

could internationally benchmark itself to credit concerns seriously and genuinely lift the image of this one renewable as responsible and sustainable from beginning to end.

Objection basis

- Required consultation process
- Community consultation meeting
- Noise
- Missing inverters to access noise impacts
- Incorrect residence distance from project
- Livestock and noise and the impacts of an existing business
- Noise levels based on calm conditions
- Cumulative noise impacts
- Emissions and impacts to:
- Soil conditions and health
- Livestock welfare
- Loss of land use over construction period
- Dust impacts on our livestock
- Cumulative affects of dust from both solar projects
- Road condition with traffic increase
- Waste water
- Glint and glare
- Lack of reasonable coverage
- Cumulative glint and glare
- Devaluation from glint and glare and visual impact
- Devaluation from noise
- Livestock productivity and devaluation
- Devaluation of property with health concerns
- Health concerns with proximity
- Vibrational impacts on adjoining land
- Soil conditions – limitations not addressed including
- Complex terrain and dry land salinity
- Limited soil sampling with question marks
- Permeability not addressed
- Possible engineering hazard from lack of soil description
- Erodibility and soil erosion
- Localised run offs unaddressed
- Water contamination with no run offs
- Discharge area and seasonal waterlogging
- Aquifer vulnerability
- Wind erosion risk
- Flood hazard
- Biodiversity impacts
- Lack of information for battery storage and more facilities within project
- Waste problems with battery, solar panels and cables

Whilst scientists are already discovering soil impacts and algae growth this will result of a microclimate based on the few scientific reports given throughout this objection, obtained in a in a short period of time by a lay person. Energy sustainability addresses clean energy and

and rapidly changing climate, it cannot be denied with this sizable amount of land change from solar farming that the impacts will not transfer to our lives, our land and heritage and our our ancestors land. Nor can it claim it's socially responsible or have interest in our immediate community and environmental health with short or long term impact, or validate itself on an energy example working within agriculture. It would become a leading example of solar cumulative impacts to agricultural land. This would be a social inequity to take place with such proximity and another example of a company's abdication of responsibility.

Sincerely,

Residents from R1.

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