NEOEN

Jane Anderson
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Independent Planning Commission NSW

Level 3, 201 Elizabeth Street
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5 March 2021

Culcairn Solar Farm (SSD 10288)

Dear Jane,

Neoen Australia would like to provide further clarification to the questions received during the meeting with the Independent Planning Commission on 25 February 2021 as well as following the public meeting on 2 March 2021 in relation to the proposed Culcairn Solar Farm (SSD 10288).

1. Setbacks to Receiver 24
Question: The distance from receiver R24 is shown to be 498 metres in Table 3 of the NSW Department of Planning, Industry and Environment's State Significant Development Assessment Report (January 2021).

The distance to the non-associated receiver R24 located on the western side of the proposed Culcairn Solar Farm is approximately 544 metres. This distance is measured between the residential dwelling of R24 and the proposed security fence within Culcairn Solar Farm's development footprint. The distance of 498 metres may have resulted from measuring the distance from the development footprint to the R24 icon on the map, which is located further away from the house amongst other buildings owned by this receiver. This is shown on Figure 1. The distance from the residential dwelling of R24 to the proposed security fence directly south is 1,155 metres. This is shown on Figure 2.

2. Visual Impact to Receiver 17
Question: As R17 would be visually impacted by both Culcairn and Walla Walla Solar Farms, provide the photomontage of R17 and show location of R17 on a map in relation to both solar farms.

The inherent visual impact at R17 is deemed to be low. The residence is around 800 metres from the project to the south-west. Broken views of project infrastructure would be noticeable through the riparian vegetation of Back Creek. R17 is located equidistant between the project and the approved Walla Walla Solar Farm. As a result of the distance to each project, existing vegetation and topography, views to either solar farm from R17 would be limited. Each solar farm would be low lying and maximum tip heights of the panels would be 4.2 metres.

Neoen has committed to mitigate these broken views with supplementary plantings along the Back Creek riparian corridor. These plantings would enhance the visual screening of solar infrastructure of the project. Additionally, these supplementary plantings would increase habitat connectivity and mitigate the loss of paddock trees. Figure 3 shows R17 in relation to the two solar farm projects and also the supplementary plantings in the Back Creek riparian corridor. Figure 4 shows a photomontage view from R17 towards the proposed Culcairn Solar Farm.

3. Land Classification and Soil Survey
Question: The soil survey that was done by McMahon Earth Science did not draw conclusions between the soil survey results and the Soil and Land Capability Mapping, which is Class 4 for the whole development footprint.

The current publicly available agricultural land use mapping for the project location includes Biophysical Strategic Agricultural Land (BSAL) and Land and Soil Capability (LSC) (DPI 2017). DPI (2017) notes strengths and limitations with all mapping datasets. The mapping indicates that the project would not be located on prime agricultural land. In NSW, BSAL signifies the state's most valuable farming land (NSW Government 2014), inherent land and water resources that are important on a national and state level for agriculture. BSAL lands "*intrinsically have the best quality soil and water resources, topography, are naturally capable of sustaining high levels of agricultural productivity and require minimal management practices to maintain this*" (DPI 2017).

There is no BSAL mapped for the development site and the current LSC mapping indicates that the site is Class 4, which is moderate capability land (OEH 2012). Key features of the LSC assessment scheme (OEH 2012) include:

- Concentration on the likely land degradation hazards associated with implementing a broad agricultural land use on an area of land.
- To prevent on-site and off-site environmental degradation.
- Relies on general land, climate and soil information.

There are eight hazards that are individually assessed under the LSC scheme (OEH 2012) and include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and rockiness, and mass movement. The highest hazard result of the eight assessments is the class given to the land parcel being assessed (OEH 2012).

McMahon Earth Science prepared a detailed soil survey for the Culcairn Solar Farm (2019). David McMahon of McMahon Earth Science has provided a written submission describing the current LSC mapping, and an assessment of the soil survey results and results of Muller et al. (2015) against the LSC assessment criteria (OEH 2012). The outcome of this assessment correlates with the current LSC mapping – Class 4. The full submission is provided as Appendix 1.

It is noted that there was not empirical data collected for the Culcairn Solar Farm Agricultural Impact Statement (Riverina Agriconsultants 2020). However, as with all soils, a variety of amelioration techniques can be applied to improve soil and mitigate the hazards associated with the LSC classes to improve agricultural productivity. According to the report, information from the landowners has indicated that lime has been used within the development footprint to ameliorate the negative impacts of acidic soils on agricultural productivity (Riverina Agriconsultants 2020). It is also noted in the report that two southern farms are prone to waterlogging and that mitigation techniques, drains and raised beds, have been installed to manage this limitation (Riverina Agriconsultants 2020).

4. Indicative employment figures
Question: Please confirm the number of jobs proposed during construction and operation.

Several employment figures have been calculated for the project, with the NSW Department of Planning, Industry and Environment (DPIE) in their presentation indicating up-to 500 construction jobs and up-to 10 ongoing jobs associated with the project based on average figures per MW for a solar project. Neoen has also commissioned an independent study from Aurecon which calculated job numbers that are consistent with the State's presentation numbers. The Aurecon report, which looked in specific detail at the Culcairn project, indicated 350 on-site jobs plus 1,546 indirect jobs during construction, and, 6 on-site and 113 indirect jobs during operations.

5. Land Purchase
Question: Could you please provide an update of the status of the purchase of the Crown land road?

Crown or 'paper' roads were established during the settlement of NSW and are part of the state's public road network. Over time, the use of some Crown roads and surrounding land has changed, which has led to a change in ownership or management of some Crown roads. This is the case with two 'paper' roads across the Culcairn project.

The paper road called Schoffs Lane has been purchased by a host landholder of the Culcairn Solar Farm. The Crown Road (unnamed lane) that runs north-south within the project footprint between Lot 1 in DP171815 and Lot 53 in DP753735 has not yet been closed and purchased. Neoen anticipates that this will be facilitated in the near future.

6. Water
Questions: Please clarify if the water trucks have been included in the total heavy vehicle count. Please confirm the proposed use of water on the site during construction. The Commission notes that 62 megalitres is proposed to be used during construction, which based on our previous experience is significant when compared to other similar projects.

Water trucks were not included in the total heavy weight vehicle count quoted in the Environmental Impact Statement (EIS) report. Water trucks will be utilised during construction mainly for dust suppression. Up to 62 ML of non-potable water use is estimated to be required during construction. The volume of water use required during construction would be dependent on rainfall and wind events. The bulk of the water supply is planned to be sourced from the Greater Hume Shire Council standpipe and/or the nearby Boral Quarry, and stored on-site in a steel or concrete tank. The EIS report includes correspondence between Neoen and the Greater Hume Shire Council in Appendix C.1.3, which outlines that the Greater Hume Shire Council has in principle approved the use of the standpipe for water supply.

7. Glare
Question: The Commission notes that glare was addressed at section 6.2.6 of the EIS and within the Visual Impact Assessment. Can you provide an additional comment about any potential glare impacts, especially along roads, and proposed mitigation measures.

As written in the EIS, the potential for glare associated with non-concentrating photovoltaic systems which do not involve mirrors or lenses is relatively limited. Improved manufacturing techniques on tier 1 panels include anti-reflective (AR) coatings on solar panels. PV solar panels are designed to reflect as little sunlight as possible, generally around 2-4%

of the light received (Spaven Consulting, 2011), resulting in negligible glare or reflection. AR coating can reduce the normal incidence reflectance to less than 1%.

The panels will not generally create noticeable glare compared with an existing roof or building surface (DoP, 2010). Seen from above (such as from an aircraft) they appear dark grey and do not cause a glare or reflectivity hazard. Solar photovoltaic farms have been installed on a number of airports around the world and in Australia such as Brisbane, Adelaide, Mildura and Darwin Airports.

Onsite infrastructure that may cause glare or reflections, depending on the sun angle, include:

- Steel array mounting - array mounting would be steel
- Temporary site offices, sheds, PV boxes or PV skids
- The onsite delivery station
- Perimeter fencing
- Permanent staff amenities
- Battery facility

This infrastructure would be relatively dispersed and unlikely to present a glare or reflectivity hazard to residences, motorists or aircraft. To date Neoen has not had any complaints from any of its six operating solar farms in Australia relating to glare. These assets have been in operation now for several years and are all close to public roads.

Examples of glint and glare studies in Australia include a report for the Taminda Solar Farm (SLR 2018) and for Bookaar Solar Farm (Pager Power 2018). It is noted that solar panels at Taminda Solar Farm were mounted on a proprietary munting system and on a single-axis tracking system at Bookaar Solar Farm. Both reports note there are no specific guidelines for assessing glare in Australia. The guidelines used are the UK and USA for solar developments in relation to the aviation industry.

The results from Pager Power (2018) indicate that solar reflection is possible from road and receivers if reflecting solar panels are visible, and that no significant impact is expected at roads or residences more than 1 km away from reflecting panels. Any solar reflection was found to last up to 20 minutes in one day for Bookaar Solar Farm (Pager Power 2018) and 5 to 10 minutes in one day for Taminda Solar Farm.

The degree of glare road users would experience would depend on the speed of travel through the solar reflection zone noting that not all of the zone would receive solar reflection at the same time. Pager Power (2018) concluded that the impact upon road users with respect to safety was low and no mitigation was required. SLR (2018) concluded that in all road locations tested, the glare in relation to Motorist Traffic Disability Glare was below the criterion value.

It is noted in beforementioned studies that screening was provided as a mitigation measure where required. Neoen has committed to screening between solar infrastructure and near neighbours, and along key sections of the perimeter adjacent to Weeamera and Cummings Road. Scattered woody native vegetation currently exists along areas of Weeamera and Cummings Road, assisting in mitigating any potential glare impacts. Screening at near neighbours would not only break views of solar infrastructure, but also reduce the duration and likelihood of potential low glare impacts.

8. Hazards

Questions: What do you see as the key hazards that may cause damage to the panels? Do you have a strategy for storm events (e.g. hail that may damage the panels)? Can Neoen please respond to the statements made yesterday relating to the release or leaching of toxic elements into the environment from damaged panels or from the battery facility.

Events that may cause damage to solar panels are usually associated with fire or extreme weather, for example extreme wind, extreme flooding, or large hail. These risks would also apply for household rooftop and residential solar systems installed across Australia. Neoen conducts risk hazard identification during development and we carry comprehensive insurance on all assets. Neoen also monitors all of its assets 24/7 via a remote-control centre and with on-site personnel.

With respect to toxic elements, the panels to be installed at Culcairn Solar Farm are the same technology as those installed on household rooftops across Australia. Modern solar panels do not contain toxic substances in any form that can leach into the environment when damaged. The panels do not contain liquids. We also have on-site maintenance personnel that can attend to any damaged panels quickly. Hazards from damaged panels are physical, including the potential for cuts from broken glass or electrocution from damaged cables or conducting elements.

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Similarly, the batteries Neoen uses in its grid scale storage systems currently operating across three Australian states use lithium-Ion technology. This is the same technology used to power mobile telephones, laptop computers, electric vehicles and household batteries. The battery modules are designed for safety and self-isolation in the event of failure and are monitored through the battery's control system. Hornsdale Power Reserve (the South Australian 'Big Tesla Battery' owned and operated by Neoen) has now completed more than three years of successful operation without any safety incidents.

As with all of the projects in Neoen's $3bn Australian renewable energy and battery project portfolio, all personnel on site will be trained and appropriately qualified to deal with any hazards that can occur.

Please let me know if you require any further clarification on these topics.

Best regards,

Joanna Murphy
Project Manager
Neoen Australia Pty Ltd

Figure 1 Distance of R24 to the Culcairn Solar Farm (eastern boundary)

Figure 2 Distance of R24 to the Culcairn Solar Farm (eastern and southern boundaries)

Figure 3 Location of receivers with respect to Culcairn Solar Farm and Walla Walla Solar Farm

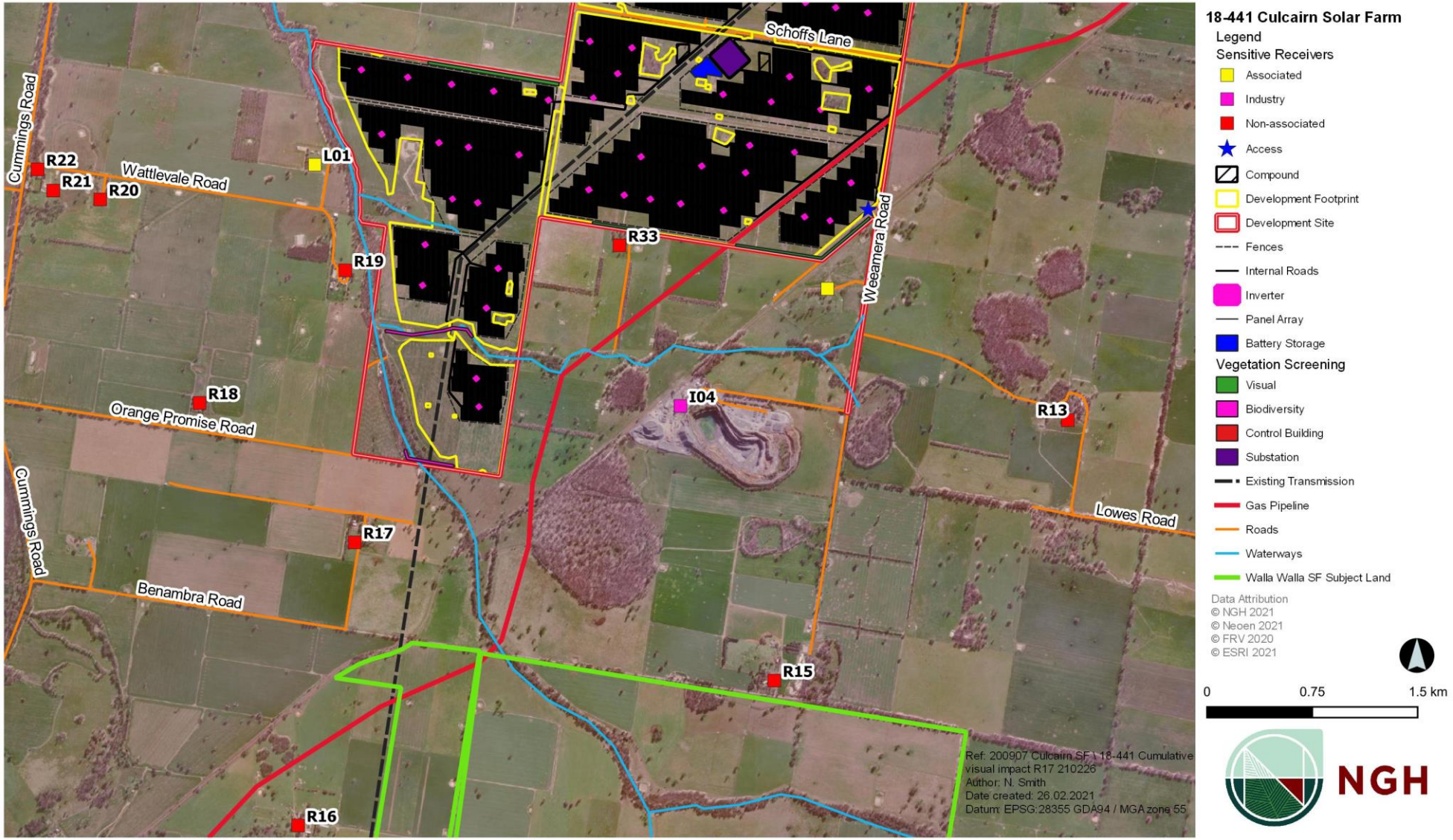

Figure 4 Photomontage from receiver R17 facing the proposed Culcairn Solar Farm

(a) Photomontage view of the proposed infrastructure

(b) Photomontage view of the proposed infrastructure with the proposed infrastructure coloured in red

Appendix A – McMahon Earth Science : Land and Soil Capability (LSC) and Biophysical Strategic Agricultural Land (BSAL) assessment of the proposed Culcairn Solar Farm

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5 March 2021

Attention: Nicola Smith
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BY EMAIL

Dear Nicola

Re: Land and Soil Capability (LSC) and Biophysical Strategic Agricultural Land (BSAL) assessment of the proposed Culcairn Solar Farm

I refer to the written instructions from yourself to undertake an assessment of the area mapped as Class 4 LSC (OEH, 2012), at the Culcairn Solar Farm, referred to as the subject site. This assessment is for the use only of Nicola Smith of NGH Consulting for evaluation purposes and is not to be relied upon for any other purpose. No responsibility is accepted to any third party who may use or rely on the whole or any part of the content of this assessment. This letter format report has been prepared to minimise the cost to the client however, comprehensive reports can be prepared at an additional cost if required. Please find as follows a summary of the inspection and assessment.

1. DM McMahon Pty Ltd (McMahon) was engaged by Nicola Smith of NGH Consulting to undertake an assessment of the area mapped as Class 4 LSC at the subject site. David McMahon of McMahon is a certified expert in soils and geomorphological assessment with over 20 years' experience. David McMahon is well qualified, holding an undergraduate degree in Applied Science (Systems Agriculture) specialising in soils and management, a graduate diploma (Environmental Management) specialising in geomorphology and hydrology, and a master's degree (Environmental Management) specialising in hydrogeology. Based on the findings of the site inspection the following applies:

2. The context and application of the LSC mapping is largely for:

a) Regional assessment of land capability.
b) The assessment of land capability for broad-scale, dry-land agricultural land use.
c) The intended usage of the LSC mapping is for strategic regional land-use plans and to provide a guide to the capability of the land and the broad identification of soil management problems.
d) The LSC mapping is broad-scale and should only be used at the scale of the soil map datasets that underpin the maps. These maps are not suitable for site assessment at the property scale.

3. The LSC mapping is based on the best soil maps (soil landscapes, reconnaissance soils mapping, land systems) available at the time of production, plus expert local knowledge where available. The Class 4 LSC mapping at the subject site is based on Culcairn SLAM Land Condition Summary for Murray (OEH, 2010) at a 1:250,000 scale. The Culcairn map unit has been mapped with a very low confidence which is described as "broad mapping, landscape and soil properties estimated, minimal soil profile data (less than 2 soil profiles) and no laboratory data" (OEH, 2010). Land degradation issues associated with the Culcairn map unit includes:

a) Localised waterlogging.
b) Soil structure degradation where topsoils and organic matter have been lost through cultivation and stock trampling when soils are wet.
c) Localised areas of acidity due to agricultural practices.

4. When an initial LSC determination does not match known or indicative conditions of the landscape or soils, expert knowledge is used to record a modified LSC class that overrides the original assessment. The original value and reasons for the change are documented. This provides a mechanism to refine the logic/decision tables based on applied usage and feedback in a process of continual improvement. To confirm the Class 4 classification as mapped, a property scale assessment-based decision-based approach outlined in Section 5 of OEH (2012), has been undertaken and outlined in this letter format report.

5. McMahon conducted a detailed soil survey across the subject site in 2019 with 47 soil cores, pits and boreholes investigated to 1.5m depth. The findings of the soil survey found the following general soil characteristics:

a) Fine sandy clay loam topsoil with granular structure and a weak consistence with an inferred moderate to high saturated hydraulic conductivity (Ksat). Topsoil is vulnerable to slaking and is moderately acidic.
b) Silty bleached A2 horizon with a very weak consistence with an inferred high Ksat. The A2 horizon is vulnerable to slaking and is strongly to very strongly acid.
c) Massively structured and mottled clayey subsoil with a very low Ksat that is prone to waterlogging. Some dispersion in subsoil noted and moderately to strongly acidic.

6. Muller et. al., (2015) assessed the Walla Walla Hydrogeological Landscape (HGL) which the subject site lies in, to be Class 4 LSC (OEH, 2012) based on the key land degradation issues. The findings by McMahon (2019) corelate with these key land degradation issues, which are as follows:

a) sodicity in lower landscape.
b) salinity (isolated).
c) waterlogging (common).
d) gully erosion (localised).
e) poor soil structure.
f) acidity.
g) sheet erosion.

7. Based on the decision tables for individual hazards in Section 5 of OEH (2012), from data provided by OEH (2010), Muller et. al., (2015) and from the soil survey conducted by McMahon (2019) the following applies:

Hazard	LSC class
Water erosion	**2** (based on 1 to <3% slope class).
Wind erosion	**3** (moderate class >500mm rainfall).
Soil structural decline	**4** (based on fragile topsoil and A2 horizon).
Soil acidification	**4** (red/yellow earth moderately acid topsoil & strongly acid A2 horizon).
Salinity	**4** (moderate-high recharge, low discharge, moderate salt store).
Water logging	**4** (2-3-month waterlogging, every 2 to 3 years) imperfectly drained).
Shallow soil and rockiness	**1** (nil surface outcrop >100cm soil depth).
Mass movement	**1** (no mass movement present >500mm rainfall).

8. In summary, the subject site is Class 4 LSC as it is based on the highest hazard for the subject site being Class 4. A description of the site conditions and the associated hazards are as follows:

a) **Soil structural decline** hazard exists owing to the fragile topsoil as found in the A and bleached A2 horizon with a weak consistence and vulnerability to slaking. It is well established that bleached A2 horizons and mottling of the subsoil are indicative of poor subsoil drainage and waterlogging. The low-lying areas of the subject site where silty soils are more prevalent, are more prone to soil structural decline.
b) **Soil acidification** hazard exists across the subject site and throughout the soil profile. Higher rates of acidification would occur under a continuous cropping regime and legume-based pasture. Topsoils may have been ameliorated with lime but a moderately to very strongly acid A2 horizon and subsoil exists. Amelioration with lime of the A2 horizon and subsoil is not likely to occur under a broad acre agricultural setting.
c) **Salinity** hazard exists owing to a moderate salt store with a high availability. The overall salinity hazard is moderate, and salinity poses a greater risk in the low-lying areas of the subject site.
d) **Water logging** hazard is common across the site with the massively structured and mottled clayey subsoil with a very low Ksat that impedes drainage. Owing to the poor subsoil drainage, excess water moves laterally on top of the subsoil through the A2 horizon as interflow, causing bleaching and a chemically sterile layer (the A2 horizon). The clayey subsoil in the low-lying areas usually had a thin silcrete/ferricrete/fragipan layer on top, acting as a physical barrier to roots and water penetration. This physical barrier causes temporary waterlogging in the upper profile (the A2 horizon), which is conventionally referred to as pseudogley. It is well established that bleached A2 horizons and mottling are indicative of poor profile drainage in depositional environments. Water logging would be more prevalent in the low-lying areas where free draining interflow from higher ground would accumulate. The man-made drains and raised beds formed in the low-lying areas of the site is evidence of management controls designed to attempt to abate water logging. Water logging would be more prevalent in years of average and above average rainfall.

9. By reference to Section 6 of the NSW OEH (2013) Interim protocol for site verification and mapping of Biophysical Strategic Agricultural Land (BSAL), the subject site is classified as not BSAL and no further assessment is necessary, due to the following criteria:

a) Soil drainage being poor across the site and very poor in the low-lying areas.
b) Effective rooting depth to a physical barrier (pseudogley) ≤750mm, more prevalent in low lying areas.

If you have any queries about the contents of the letter format report, please contact the undersigned.

Yours sincerely

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References

McMahon D.M., (2019), Soil Survey Report Culcairn Solar Farm, DM McMahon Pty Ltd, Wagga Wagga, NSW.

Muller, R., Nicholson, A., Wooldridge, A., Jenkins, B., Winkler, M., Cook, W., Grant, S. and Moore C.L. (2015) Hydrogeological Landscapes for the Eastern Murray Catchment, Office of Environment and Heritage, Sydney, NSW.

OEH 2010, Reconnaissance Soil and Land Resources of the Murray Catchment, Office of Environment and Heritage, Sydney, NSW.

OEH 2012, The land and soil capability assessment scheme second approximation, a general rural land evaluation system for New South Wales, Office of Environment and Heritage, Sydney.

OEH (2013), Interim protocol for site verification and mapping of biophysical strategic agricultural land, Office of Environment and Heritage, Sydney.

Disclaimer

The information contained in this report has been extracted from field sources believed to be reliable and accurate. DM McMahon Pty Ltd will not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. It should be noted that findings in this report are based solely upon the said site conditions at the time of inspection. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the substrate within the location may change due to variations in ground conditions outside the inspected area.

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