Peer Review – Elgin Energy EIS Submission 9th December 2022

Glanmire Action Group

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Private and Confidential

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Dear Jo,

The report attached summarises my review of relevant sections of the EIS, as submitted by Elgin Energy.

Should you wish for further clarification of any of the material presented, please do not hesitate to contact me.

Yours sincerely,

David Harbison
Director.

Peer Review Report – Elgin Energy EIS

I, David Harbison, of D R Agriculture Pty Ltd, 2470 Mitchell Highway, Molong, being an independent agronomist / agricultural advisor say;

1. I wish to have noted that my views in my previous reports, 16th November 2020 and 8th June 2022 have not changed, and remain supported by the NSW Department of Planning, Industry and Environment's eSpade service, 'Raglan Soil Landscape' (espade.environment.nsw.gov.au) who classify the soil and land capability as Class 2 and Class 3. Within the Raglan Soil Landscape document, it is noted for the Solodic soils (of which much of the proposed site has been classified as) that the 'erodibility' rating of the topsoil is "high" and of the subsoil is "moderate or high". As an advisor, that information guides me strongly as to how such a site should be managed; disturbed physically as little as possible and try at all cost not to expose the subsoil. Such exposure can easily transform Class 2 or Class 3 land into Class 5 land as shown in figure 1 (photograph 5a of the OEH document). With today's best management practices employed by the current operators of the proposed site, the use of "no-till", "direct drill" and "conservation farming" activities, along with rotational grazing of crops and pastures, it shows clear evidence of 'careful management' as suggested by OEH for Class 3 land. That is exactly what is occurring at the site with little or no land or environmental degradation evident.

Figure 1 - Image from *The Land and Soil Capability Assessment Scheme* of Class 5 land (source – *The Land and Soil Capability Assessment Scheme* 2012).

Opinion

2. Item 2.4.3 – *Key values and risks*

   While ever we disagree on the land class rating we will have a different understanding of the capability of this land. For more than 30 years now, this site has been intensively managed as it is today. If the land was not capable of sustaining such management, we would observe clear evidence by now. To say the land has only "moderate to moderately low land capability", I believe, is erroneous.

   Whilst I was not invited to attend the actual soil sampling / assessing of the site when it was conducted, one wonders why the south-western quarter (figure 6-28) of the property has no data reported. Check sites were supposedly conducted, but nothing has been presented. It should be noted also that soil sampling site 1 is taken in nearly the lowest point on the whole site in the middle of the farm's main drainage line. From observations and analysis of neighbouring land adjacent to this south-western area, it may be that this is some of the best and well drained productive soil on the site. It may well have been classified a different land class, with different soil properties, had it been sampled/reported.

   I also challenge that the risks to erosion of such land is 'well understood and manageable with standard safeguards'. What is a 'standard safeguard' for erosion? My immediate response is use best practice technology and disturb it as little as possible. In the last 12 months, some areas of the Central West of NSW have had two or three "1 in a 100 year" events. The climate is clearly not "1 in a 100" anymore, and no-one can assume there is a safe period for land management. As 'land managers', we need to protect our soil assets with 100% cover, 100% of the time. By their own admission, 4% of the soil surface (1m in every 25m) will "require substantial levels of disturbance". That is "significant risk" and I am unaware of a "standard safeguard" to manage it.

3. Item 2.5.3 *Do nothing and opportunity costs*

   If one was to maintain the current 'status quo' of the proposed site, it remains a quality, productive, profitable and sustainable agricultural operation, as it has been for many years. There will always be opportunity costs of any project or decision considered, be it a change of farming enterprise, development, sub-division etc. As land custodians, we wish those "costs" to be as small as can be managed.

   There will be far less profitable land (from an agricultural production basis as quoted from the gross margins in the EIS) within the Bathurst LGA than this site. I find it difficult to understand how the quoted 16 dry sheep equivalents (DSE)/ha production level in the gross margins equals 'low intensity agricultural activities that could be continued'. 16 DSE/ha in any grazing operation within the Bathurst LGA would be in the top 5% of any grazing land and is only possible on highly productive soils with very good land management.

As for potential rural residential development, from observed outcomes of other recent land sub-division, this activity has increased the number of 'land managers' and 'labour units' available, and in many cases increased the level of management over the original land area. From a soil health and environmental aspect, these new land managers have been able to implement new approaches with higher biodiversity values than were previously present. Such could occur here and further improve the proposed site.

4. Item 6.4.2 – *Existing environment; Land and soil capability*

"Noted that Classes 1-3 are considered important agricultural land and would typically not be considered appropriate for solar farm development without very strong justification".

Such a statement should stand in this case, with "desktop mapping sources" showing the **site** and **surrounding areas** contain **Class 3 land.** It is interesting to note that Figure 6-29 in the EIS, with data supported by soil surveys, is NOT supported by NSW Department of Planning, Industry and Environment's eSpade service.

The results from the Land and soil classification, and cited in the EIS, has strongly referred to 'Hazard 6 – Water logging' to downgrade this land to Class 4. Within this hazard category is the subjective assessment of how long (duration) waterlogging occurs, and how frequently it happens (figure 2 – Table 14, taken from *The land and soil assessment scheme - OEH*). For Class 4 to be determined, this infers the soil is waterlogged for at least 2 – 3 months at a time, approximately every 2 to 3 years. It would take 2 to 3 site visits each year to determine if such waterlogged conditions were still present at each respective visit to make such a classification. I am unaware of that procedure occurring.

Given the timing of the assessment, and the wetter than usual season experienced at that time, the resultant class rating, being purely subjective in this category, could easily have been assessed differently by others. If one assessed the land in November 2019, waterlogging durations of "0-0.25 months" or "0.25-2 months" could easily have been made, and Land class 2 or 3 would have been confirmed.

Table 14. LSC class for waterlogging hazard

Typical waterlogging duration (months)	Return period	Typical soil drainage*	LSC class**
0	every year	rapidly drained and well drained	1
0–0.25	every year	moderately well drained	2
0.25–2	every year	imperfectly drained	3
2–3	every 2 to 3 years	imperfectly drained	4
2–3	every year	imperfectly drained	5
>3	every year	poorly drained	6
Almost permanently	every year	very poorly drained	8

* NCST (2009, p.202–4)
** Based on slope position, climate and length of time soils are wet.

Figure 2 - Image from *The Land and Soil Capability Assessment Scheme* re Waterlogging Hazard (Source – *The Land and Soil Capability Assessment Scheme* 2012).

I am also aware of pictures taken 10 days after another extreme rainfall event, during the night of November 13th 2022. Rainfall records to 9am on the 14th November 2022 for the Bathurst Airport show 86.4 mm fell. These pictures clearly show some Class 1 land (with irrigation) with ponding/short term waterlogging, while pictures of the proposed site, on the same day, show no such water logging present. The site is obviously draining better than reported in the EIS.

Has the community been under the misconception of land class? No. It has been classified Class 2 and Class 3 land for many years by NSW Department of Planning, Industry and Environment (or its known predecessor), and still is on its eSpade service. Draft Inherent General Fertility does not represent the site today, nor that of the surrounding areas, but yes, was at a point in time some years ago. One doesn't conduct a 16 DSE/ha operation on low fertility! Given the past two years have been 'decile 9' rainfall years (in the top 10% of wettest years on record), to determine the site 'non BASL' on 'poor drainage and moderately low inherent fertility' is extreme. 90% of the site has < 10 degrees slope and is some of the most productive, arable land in the Bathurst LGA.

5. Item 6.4.2 – *Existing environment; Agriculture*

   I am unsure as to where the employment figures quoted in the EIS of 689 persons has come from, however I believe the number of employed persons in the three sectors of agriculture, forestry and fisheries will be far greater than this. I am of the belief that there is well in excess of 4000 rural entities within the Bathurst LGA alone. Each of these will have somebody 'managing' that rural land. Quite simply, it seems self-employed people in agriculture don't seem to count!

   With less than half (42%) of the land use in the Bathurst LGA being used for agriculture, and 95% of that being predominately grazing, areas for crop and fodder production are finite. Behrendt and Eppleston (2011) quote only 31% of the region is suitable for grazing with occasional cropping, and just 11.4% capable of maintaining regular cultivation. This site, with approximately 170 ha of arable land, is a significantly larger contributor to the crop and forage production area of the region when there is only 5% of total agricultural land available. They continue citing the district sheep enterprises have an average stocking rate of 3-5 DSE/ha, while cattle and mixed enterprises average 5-8 DSE/ha.

   Those numbers clearly highlight again just how productive the proposed site is to livestock production in the region, especially when contributing up to 16 DSE/ha from the forage crop production system currently in place.

6. Item 6.4.3 – *Potential impacts; Agricultural conflicts*

   The lack of noted agricultural conflicts to neighbouring land concerns me. One of only four conflicts noted refer to adjacent land. The current practices employed on many of the adjacent paddocks are of mixed farming nature, including grain and forage cropping, and improved pasture production. Much of this land is arable and class 2 and 3.

Water – there is commentary for the life of the project to remove the dams. Removing such will increase overland flows to neighbours land, highly likely to impact on whatever production system is being conducted. Further, increased water flows and intensity will likely cause greater erosional forces. With the erodibility factors already noted, this will not only increase erosion on the site as water concentrates into the natural water lines, but will then leave the site with greater velocity into neighbours land. There are claims the 'reduced' stocking will lead to greater infiltration of water on the site. One cannot claim poor drainage and waterlogging for the benefit of land classification and then allude to greater infiltration as a benefit on the same ground! Shading by solar panels will limit plant growth at times of the day/month/year and grazing on lesser covered and drier soil will increase compaction. Both of these attributes may well lead to increased surface run off in contrast to the claimed 'increased infiltration'.

Soil erosion and consequences – During construction there will be "significant disturbance" of the soils. This in itself is a significant risk. Should an intense rainfall event occur at any stage while soil is being disturbed, erosion is likely. The soil analysis identifies if sodicity is present in the layers that were analysed. However, analysis of all depths was not conducted, which means identifying where the sodic layers commence is not possible. Yes, it does appear to start in the A2 horizon, but at what depth does this A2 horizon start. The analysis doesn't report the 10-20cm zone. Some of the 20-30cm layers contains sodic soils (> 6% sodium – actual levels 8% and better) which gets quite significant with depth in the 65-75cm layer. Here, sodium levels are up to 17%.

With trenches proposed to be dug to 1m, this is 33% deeper than any depth there is physical and chemical data reported for. Not knowing what soil properties exist in the full depth of trenching is, quite frankly, beyond belief. Is this next depth, 75-100cm even more sodic and unstable than what is above it and reported, who knows. What we do know is sodicity in most soils generally increases with depth, as the sodium ion is mobile in the soil and keeps moving further down the soil profile over time. Is the environmental risk of disturbing this deeper layer even greater again?

Gypsum is a known ameliorant of sodic soils and its' proposed use at significant rates is noted. How gypsum 'works' is by the calcium ion (Ca^{++}), on wetting of the gypsum, dissolving into solution. Ca^{++} then outcompetes the sodium ion (Na^{+}) for a 'place' on the clay complex and attaches in sodium's place. This leaves Na^{+} in solution which now moves wherever the water moves.

Again, given the reported waterlogging and poor drainage attributes of the site, this sodium, remains in solution. Where it end ups is where ever the water goes, ie into the neighbours!! Longer term and over the life of the proposed project, it is most likely to gradually increase the sodicity of the surface soils of the adjacent paddocks owned by neighbours. Does increased sodicity cause production losses and other degradation of soils, yes. Neighbours will inevitably be disadvantaged by rising sodicity issues of their soils whilst ever there are elevated Na^{+} ions in solution of the water that leaves the proposed site.

As a ‘safeguard’ to any of the above occurring, soil layers would need to be measured and isolated according to their sodicity content during excavation, and then replaced to the same depth as the trenches are filled. No amount of ‘dispersive’ and erodible soil can remain on the surface as this will just become an erosion point of the future, and a source of Na+ ions.

Weeds – An ongoing issue of any agricultural enterprise is weed management. At this point in time, I am of the understanding that weed management of the site is conducted chemically, by broadacre boom spraying. Such will not be possible for the future under a solar farm. So how will assurances be given to neighbours that weed control will be maintained? Weeds travel by wind, water, livestock, machinery etc. All these processes are likely to continue, and potentially some increase, and the flow of weeds will widen. Such a risk would add significant cost to a neighbouring business, both in time management to control such and the physical expense to do it.

7. Item 6.4.3 – *Potential impacts; Agricultural productivity and value*

Much of my opinion/concern in this section has been covered above. That said, some new material appears that requires comment.

Access roads, external and internal and hardstand areas – despite the obvious compaction in such zones, will the resulting roads/infrastructure impact and/or change the direction of natural water flows? It will increase run-off from those areas.

The ‘trenching’ remains a major erosional hazard. At construction and decommissioning, any disturbance of a sodic layer is likely to cause an issue. Why disturb such a sodic and dispersive layer, profess to address the situation via the ameliorant gypsum, and potentially shift the sodicity issue onto neighbouring agricultural land. It will reduce soil stability.

Some of the proposed benefits during operation may in fact be detrimental. Perennial grasses do not just appear. They would need to be established via a seeding activity. If perennials are not established, annual plants will dominate and by their nature, start and finish life annually. As such, there are times when ground cover will be very limited in an annual system, especially if grazing management has been used to control total dry mater (DM) as a fire control strategy.

Increases in soil moisture and infiltration is the last thing wished for in a waterlogged prone area with poor drainage Class 4 soil. All that says is plants will potentially be exposed to greater waterlogging events for longer. That leads to plant death and less ground cover, greater soil erosion and environmental damage.

Without internal fencing, how are “controlled stocking rates” to be achieved? Being unable to control where stock graze and do not graze simply leads to overgrazing and compaction in their ‘desired’ area of the ‘paddock’. In the ‘ungrazed’ areas, plants progress through their lifecyle, become even less digestible and less attractive to eat, and grow excessive DM. Fire risk increases in areas with high DM levels.

References

8. State of NSW and Department of Planning, Industry and Environment (2022) ©. Raglan Soil Landscape - from espade.environment.nsw.gov.au

9. NSW Office of Environment and Heritage (2012). The Land and Soil Capability Assessment Scheme, Second Approximation. Sydney: NSW Office of Environment and Heritage.

10. Behrendt K. and Eppleston J. (2011). Proceedings of the 26th Annual Conference of The Grassland Society of NSW Inc.