

5 August 2020

Peter Leeson
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Dear Peter,

Please find attached a short summary of what we see to be the key technical issues associated with the objections to the Corop Solar Project's site hydrology assessment.

Note that the intent of this is to assist in interpretation of the key issues by those reviewing the permit application. In providing this response we have not sought to provide the level of detailed analysis that we might otherwise provide if the issues were being tested as an expert witness for legal proceedings. We could provide a formal scope of work for this if the need eventuates and is requested.

Yours Sincerely,



Dean Delahunty

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The following is a response based on whether any approval conditions should be imposed to manage potential changes (as a result of the proposed development):

1. Catchment size and flow

The upstream catchment characteristics (size, shape, response to rainfall and discharge location) are not being changed by the proposal and are not relevant to assessing the impact of the proposal.

The descriptions provided for the upstream catchment in the report is to demonstrate context; that the primary source of water (the potential volumetric quantity) arriving at the property is via a narrow entry point or frontage along Old Corop Road. The volumes and flow rates arriving at the property are incidental to any impact assessment. Whether they are treated as estimates or not does not materially change the assessment of potential impacts of the development.

2. Surface water behaviour

The objection raises the issue of rainfall direct to the property which is best addressed in two parts below:

Part 1 - Movement of water through Site 1

Property 1 has a whole farm plan and is configured to naturally move water towards a single road culvert on Bedwell Road. Due to the low relief on the property specific flow paths may vary from event to event depending upon the volume of runoff. Whether the source of any surface water moving through the property is from the entry from Old Corop Road or from internal rainfall runoff, the site is graded such that most water will drain to this point.

The potential barriers to allowing the movement of water through property 1 under the current land configuration, and the drivers for recommended development conditions, are:

- Posts for solar arrays – The primary drainage path is approximately 90m wide so the capacity for solar array posts to impact the velocity of flow are not material to water movement. We do not envisage that there is a physical change that needs to be managed by development conditions about these posts.
- Inverters – The development is avoiding placing these within main drainage pathways and the development conditions should be structured to ensure this is the case on any detailed design documents.
- Access tracks / roads – Report recommends that these are configured so that water flow / velocity is maintained appropriately. This should still apply and is appropriate to check during detailed design to demonstrate compliance with approval conditions.

Movement of water through Site 2

Water movements on Property 2 could behave according to a number of different modes depending on whether two conditions arise:

- rainfall runoff from upstream of Bedwell road creates volumes of water that exceed the capacity of the existing Woolwash Depression throughflow system (i.e. this type of event is not within property owner's control); or
- high water levels or obstructions within the drainage path along Carag Road, adjacent to the northern boundary of the site, prevent water from flowing away from the site.

In either of these situations water levels that build up and can spill from the defined drainage system into low lying areas on the property and surrounds. The potential for the proposed works to displace water under these two situations, and the drivers for recommending development conditions, are:

- Posts for solar arrays – The primary drainage path is approximately 90m wide so the capacity for solar array posts to impact the velocity of flow are not material. When the area is flooded then it is expected water velocity would be close to zero and so the presence of posts is not material for changing the velocity. There is no material physical change that needs to be managed by development conditions about these posts.
- Inverters – The development is avoiding placing these within main drainage pathways as well as low lying areas adjacent the main drainage path. Development conditions should be structured to ensure this is the case on any detailed design documents.
- Access tracks / roads – Report recommends that these are configured so that water flow / velocity is maintained appropriately. This should still apply and is appropriate to check during detailed design to demonstrate compliance with approval conditions.

3. Groundwater impacts

The potential for land to be affected by waterlogging and salinisation is acknowledged as a legitimate concern particularly if significant land use changes are proposed. Historically the broadscale development of irrigated agriculture across much of northern Victoria is known to have caused widespread waterlogging and salinization and the property is adjacent to the irrigation district where these effects have been known to occur. It should be noted that the property being examined no longer has access to formal irrigation delivery infrastructure.

The objection is focussed on a concept that the proposed development will change land use through converting the vegetation type from cropping to grazing (perennial). The suggestion is that alternate vegetation types may change (increase) the infiltration rate of water from the surface through the soil profile to the watertable.

The key consideration in assessing potential impact is whether there is evidence of historic changes to groundwater behaviour under existing land use practices. This can be viewed at varying scales:

- Regionally: A review of available (shallow) groundwater monitoring bores adjacent to Two Tree Swamp (where it might be expected water levels would be high) has been declining (>3m DBNS) since the early 1990's. A review of levels at bore 4544, which is within the irrigation district immediately north of the site, has been consistently within 2m of the surface since the mid-1990's. These outcomes suggest that groundwater in the region of the proposed development has been, and will continue to be, fluctuating in a range where capillary rise could be an issue. Regardless of whether the development proceeds, salinisation could occur at low points in the landscape where watertable is within 1.5m to 2.0m of the surface.
- On property: There are three bores located on or close to the property boundary (120593/120594/120595) that provide more than 30years of behavioural data. There is a clear groundwater response to the climatic events examined in Section 3.3 of the report (high residual rainfall) but the spikes in groundwater level are temporary and typically can be seen to decline when the effects of this surface water loading have passed. The volume and timing of water application to the land parcel is not controlled under current operations and will remain uncontrolled with the proposed development.

Rainfall events represent the most significant driver causing spikes in groundwater levels at the development site. In considering changes to evapotranspiration, associated with converting from one vegetation type to another, the

magnitude of change in water use is likely to be many orders of magnitude less in volumetric terms than from surface water flows entering the property. The potential for incremental effects on land salinization will be difficult to separate.

While further analysis may be able to quantify the volumes, it is unlikely to show that the developed will increase further salinization risks to the land than exist now.

We also note that crop water use is likely to be higher on an annual basis with perennial (grazing) vegetation relative than it is with cropping.

Wetlands

It is acknowledged that wetlands exist in the general area and that these are capable of supporting a range of flora and fauna species. It is likely that the wetland sites that exist outside of the property on which the development is proposed do so because they have better characteristics to support wetland values. The potential wetland sites identified on the property, from a hydrologic perspective, do not.