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# PROVISION OF CONSULTING ENGINEERING SERVICES

## MUDGEES SOLAR FARM PROJECT

### STORMWATER MANAGEMENT PLAN

17 SEPTEMBER 2020

REFERENCE: TX15019.00-01.RPT.JD-REV0

SYDNEY | ADELAIDE | BAROSSA | DARWIN | MUDGEES

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## 1 INTRODUCTION AND PROJECT DESCRIPTION

Triaxial have been engaged by Macquarie Geotech to undertake a review of the stormwater drainage and flooding considerations for the proposed Mudgee 5MW Solar Farm site, located at 33 Blain Road, Caerleon 2850.

The proposed 5MW solar farm is to be located on the site below adjacent to the existing Mudgee Sewer Treatment Plant.



Figure 1: Existing Site

## 2 EXISTING SITE CONDITIONS

### 2.1 DEVELOPMENT SITE

The existing site drains to the East towards the Caerleon Estate. The site has been constructed with a series of diversion banks running perpendicular the general fall of the land to direct the stormwater towards existing farm dams that have historically serviced the site.

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## 2.2 STORMWATER CATCHMENT

The proposed site sits at the upper end of the catchment that extends into the heavily timbered area upstream of the site as shown in Figure 2 below:



Figure 2: Catchment draining through proposed development site.

The total size of the catchment at the solar farm site was measured as 41Ha. The length of the catchment from West to East was calculated at 800m.

The catchment is generally well contained in defined ridges originating from mountainous country to the West of the site.

Three major inflows were identified leading into the site, these have been labelled as inflow 1, 2 and 3 on the image below.

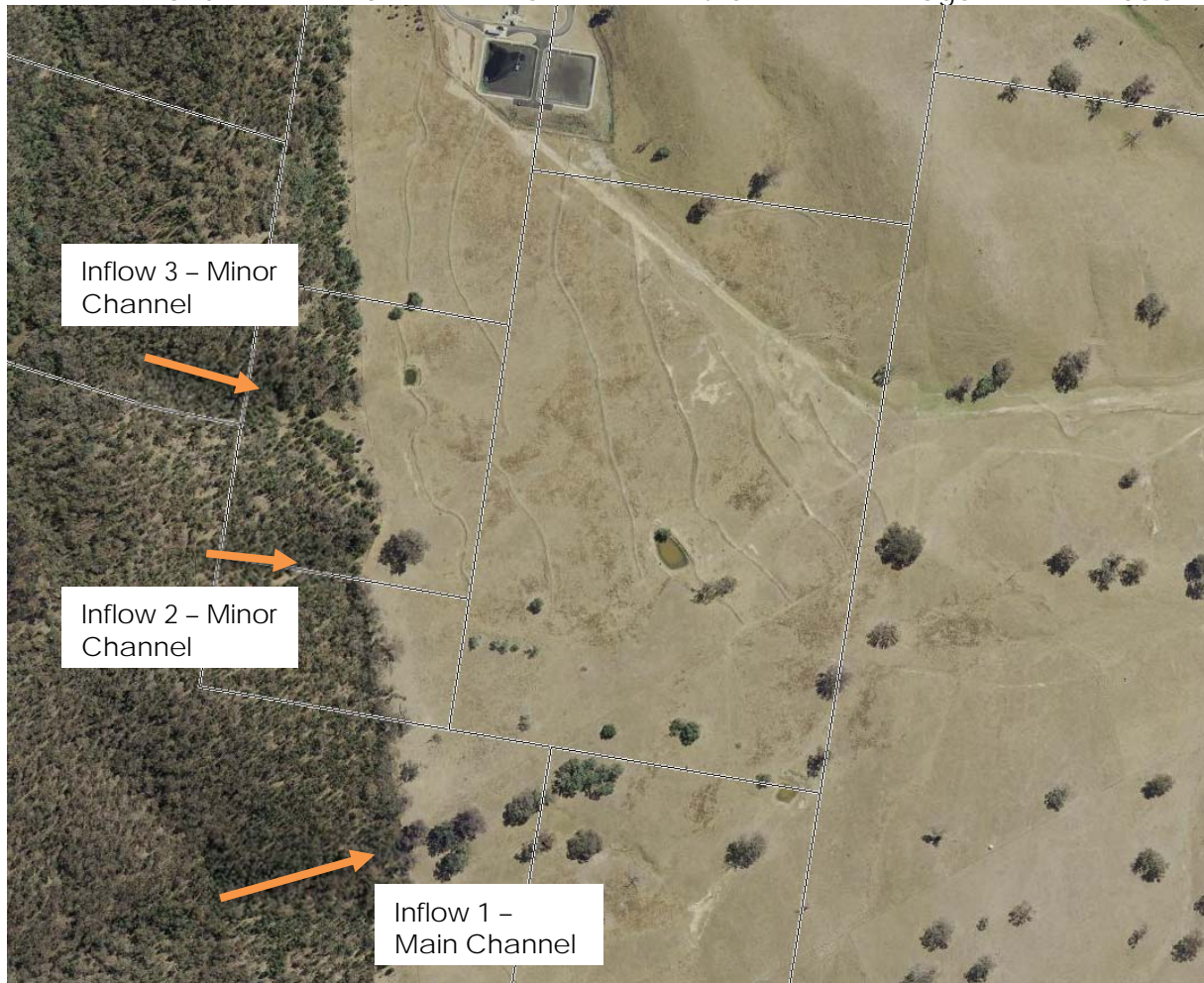


Figure 3: Inflows through the site

Peak flow rates generated for each inflow catchment in the 1%AEP event are listed below:

	Main Channel - Inflow 1	Minor Inlet - Inflow 2	Minor Inlet 2 - Inflow 3
Flow Rate (m <sup>3</sup> /s)	3.9	0.6	0.6

Table 1: Flow rates input into model based on catchment analysis.

The flow rates generated in the modelling were obtained using a RAFTS model with the following characteristics:

- Initial loss = 25mm/hr
- Continuing loss = 2.5mm/hr

- Catchment fraction impervious = 10% for rural areas, 0% for natural undisturbed areas (heavily vegetated).

These parameters are in line with previous catchment studies completed within the Mudgee region.

### 3 STORMWATER MODELLING

#### 3.1 TUFLOW 2D MODEL DEVELOPMENT

Due to the nature of the site with numerous diversion banks installed perpendicular to the natural fall of the land it was decided to model the site with a 2 Dimensional stormwater model to accurately determine the extent of the stormwater flow across the site.

The TUFLOW model was developed using the following input:

- Site specific topographic survey produced by ORyan Geospatial.
- Catchment elevation data from ELVIS website (ANZLIC Committee on Surveying and Mapping).
- Bing maps aerial imagery.

The TUFLOW model was then run using the following specific input:

- 1m elevation grid (to AHD).
- 1 second timestep. 4-hour model run time.
- Downstream boundary condition was representative of the existing ground slope at the model boundary.

Hydrographs were input for each of the inflow upper boundaries corresponding to the 1%AEP inflow hydrograph.

#### 3.2 FLOOD MODEL RESULTS

Model results were output and have been shown on the attached plan in Appendix A.

**Refer Appendix A – Triaxial Plan TX15019.00**

Summarising the model outputs is as follows:

- There were no major flows recorded through the site from the upstream catchment that would jeopardise the construction of the solar farm.
- Minor sheet flow was found to be occurring due to the existing diversion swales that direct stormwater into the existing farm dams.
- The majority of the flow across the site is less than 100mm deep and is moving at a velocity of less than 0.5m/s.
- The greatest depth of flow is through the defined channel in the South Eastern corner of the development site. Flows depths here were observed to be between 0.2m and 0.4m deep with velocities of up to 1.2m/s.

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#### **4 SUMMARY**

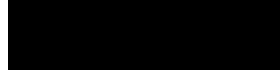
In summary, the development of the proposed Mudgee Solar Farm will not be impeded by the expected sheet flows occurring over the site due to the existing diversion swales as the observed depths and velocities of flow are of a very minor nature and pose no inundation threat to the infrastructure to be constructed on site.

Access to and from the site will be available during large storm events and will not be impeded by the sheet flow across the site.

We trust that this report meets your requirements at this stage and should you wish to discuss anything further please do not hesitate to contact us.

Yours faithfully,

**TRIAxIAL CONSULTING**



**JIM DISHER**

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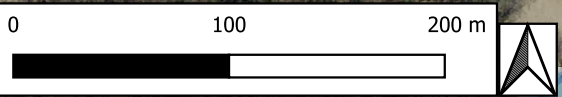
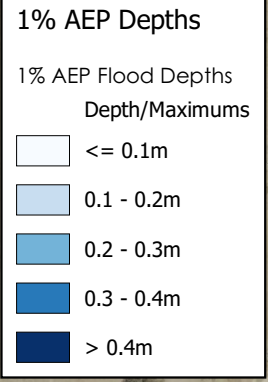
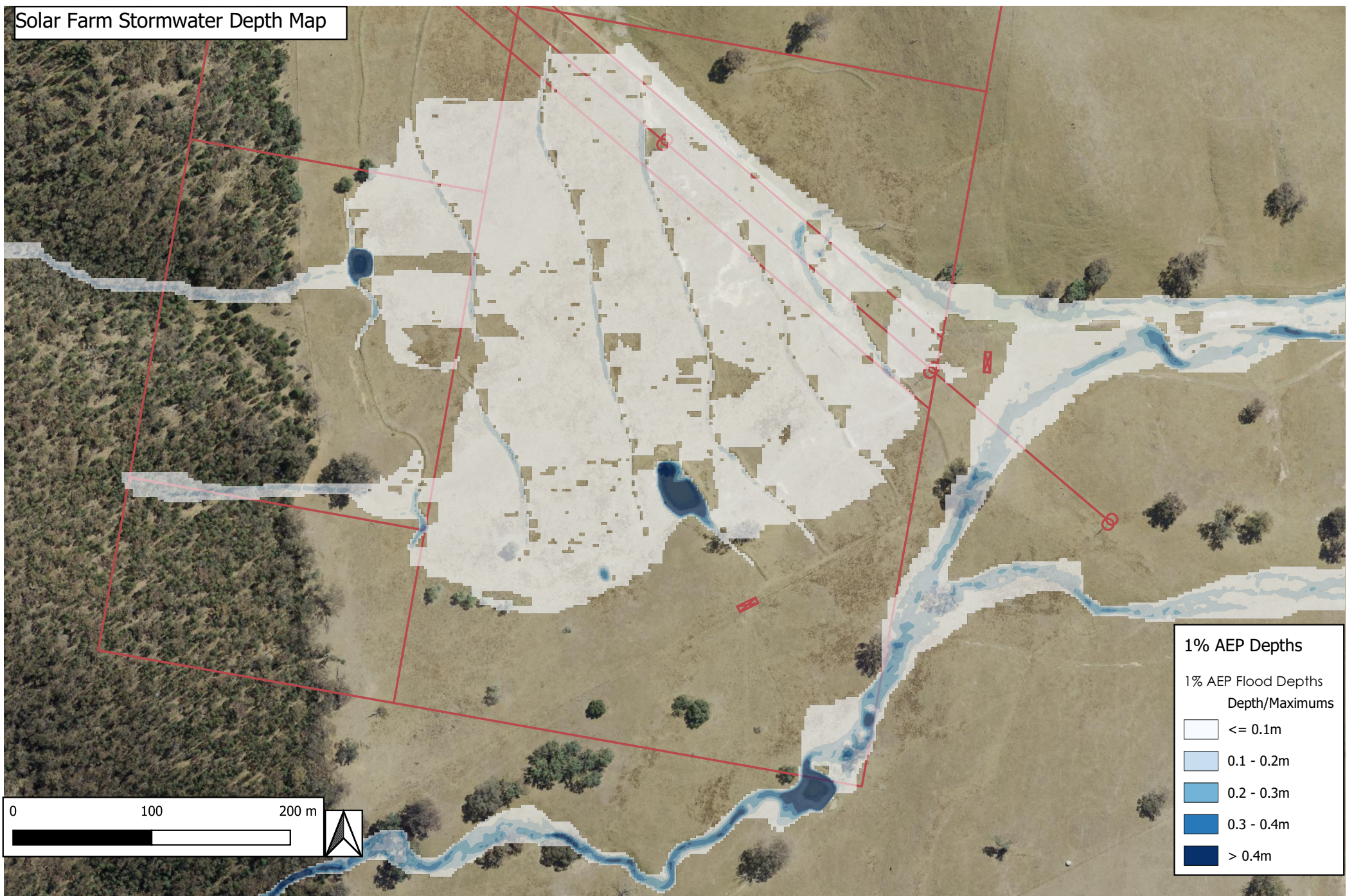


**APPENDIX A – TRIAXIAL PLANS TX15019.00**

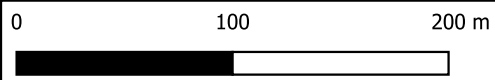
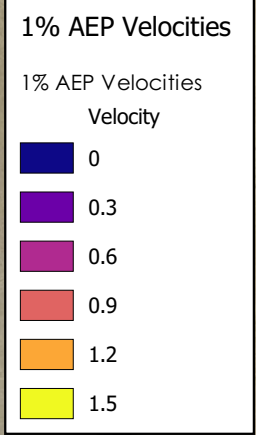
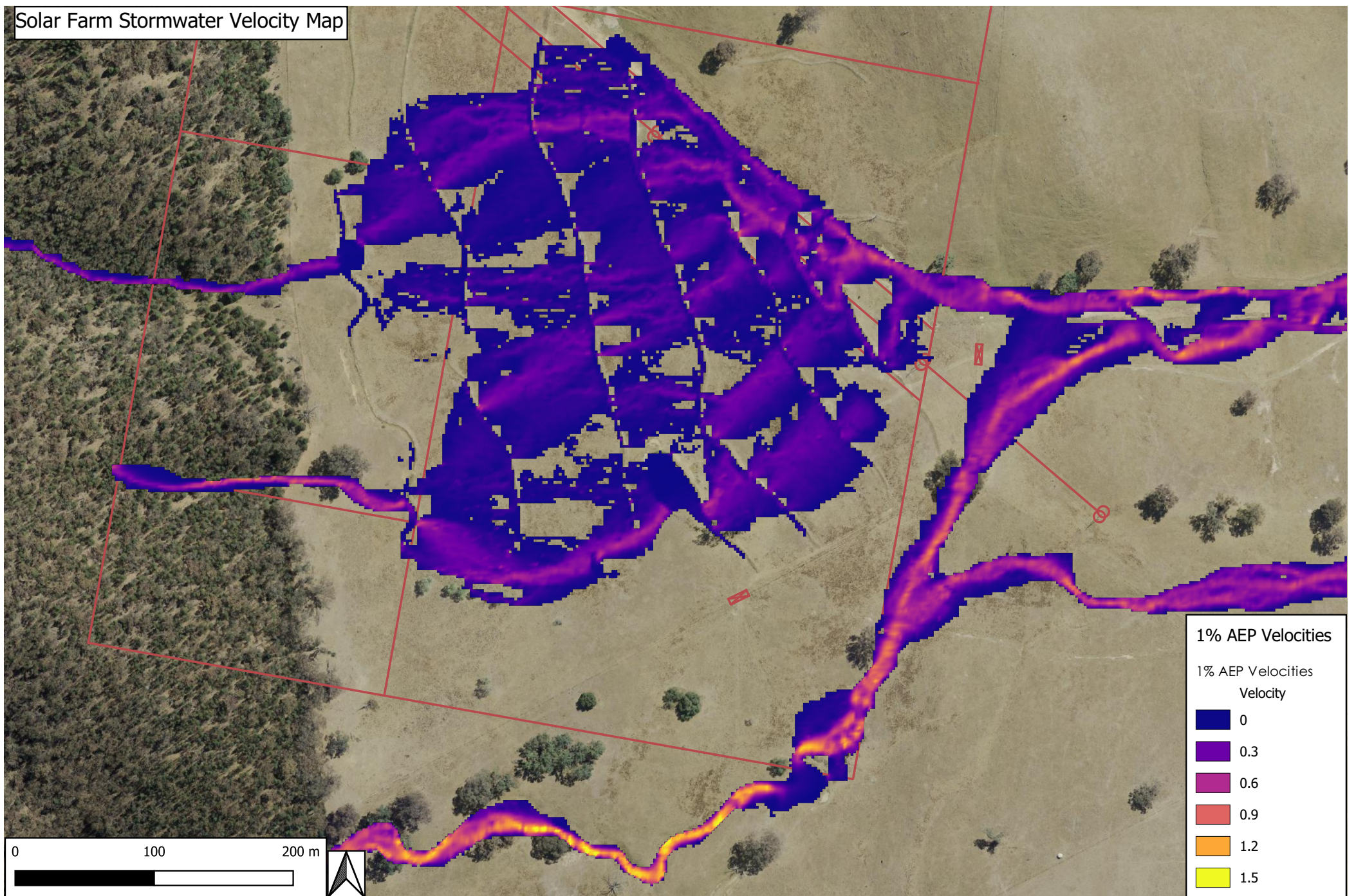
**FLOOD DEPTH**

**FLOOD VELOCITY**

# Solar Farm Stormwater Depth Map



# Solar Farm Stormwater Velocity Map



OWNER

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PROJECT  
SITE MAP - 1% AEP EVENT



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DRAWING TITLE

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DESIGNED	DRAWN	DATE	SIZE AS NOTED	CAD REF TX15019.00

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY