AECOM Imagine it. Delivered.

West Mokoan Solar Farm

892 Benalla-Yarrawonga Development Pty Ltd

10-Jun-2021

Project Amendment Addendum

Surface Water Assessment

Project Amendment Addendum

Surface Water Assessment

Client: 892 Benalla-Yarrawonga Development Pty Ltd

ABN: 628034300

Prepared by

AECOM Australia Pty Ltd
Level 10, Tower Two, 727 Collins Street, Melbourne VIC 3008, Australia
T +61 3 9653 1234 F +61 3 9654 7117 www.aecom.com
ABN 20 093 846 925

10-Jun-2021

Job No.: 60597809

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

1.0 Introduction

1.1 Planning Permit Application

AECOM Australia Pty Ltd (AECOM) continues to act on behalf of the applicant, 892 Yarrawonga Development C/- South Energy, in relation to Planning Permit Application No. PA2000978 for the West Mokoan Solar Farm.

Planning Permit Application No. PA2000978 was submitted to Department of Environment, Water, Planning and Land (DELWP) on 07 October 2020. The Application is for the use and development of a Renewable Energy Facility and Utility Installation (solar farm and energy storage) and associated buildings and works, removal of native vegetation, display of business identification signage, removal and creation of easements and the creation or alteration of access to a Road Zone Category 1 (the Project).

This letter is an addendum to the Surface Water Assessment (Date 21/09/20) (*The Report*).

1.2 Requests for Further Information

Pursuant to Section 54 of the *Planning and Environment Act 1987 (P&E Act),* DELWP issued a Request for Further Information (RFI) dated 5 November 2020. A separate RFI was issued from DELWP – Hume Region, on 26 November 2020. There were no matters raised in either of the RFIs in relation to or concerning surface water.

1.3 Project Amendments

As a result of changes to the Project area and technical requirements, and in response to the RFI's, a formal amendment to the Planning Permit Application is being sought, pursuant to Section 50 of the *P&E Act.* The changes to the project are summarised below:

- ***Change to the substation location***

  Due to AusNet requirements, the substation has been relocated from 892 Benalla-Yarrawonga Road (Lot 1 PS625748), on the northern side of Lake Mokoan Road to the southern side of Lake Mokoan Road on land at Benalla-Yarrawonga Road (Lot 1 TP173518). As a result, the vehicle access gates along Lake Mokoan Road have been altered – with the northern access point to the (former) substation removed and a new access point for the new substation added. Furthermore, the location of solar panels and associated equipment has changed, with solar panels now located on the former substation site.

- ***Change to native vegetation retention and removal***

  In response to the RFI from DELWP – Hume Region (dated 26 November 2020), additional habitat assessments and native vegetation assessments have been undertaken, and the solar farm layout has been revised to optimise native vegetation retention. Previously, a total of 2.868 ha of native vegetation was proposed to be removed, which included 43 scattered trees (39 large trees and 4 small trees). The revised solar layout proposes a total of 1.891 ha of native vegetation to be removed which includes 28 scattered trees (26 large trees and 2 small trees). Refer to the Flora and Fauna Impact Assessment for full details.

- ***Reduction in Project area and capacity***

  Land at 81 Lake Mokoan (Lot 2 PS625748) is now excluded from the project. The dwelling at 81 Lake Mokoan Road (proposed to be used for construction purposes) is now excluded from the Project and maintains its current use as a dwelling on private land and a 'sensitive receptor'.

  As a result of the changes described above, the capacity (energy generation) of the solar farm has been slightly reduced, which is summarised in Table 1.

Table 1 Comparison of Solar Energy Facility Details

Item	Previous Concept Plan	Revised Concept Plan
Total Project Area (ha)	467.2	426.4
Direct Current Capacity (MW)	245.19	233.74
Number of PCUs	60	57
Total Modules	557,256	531,216

2.0 Assessment

A review of the revised Concept Plan (60597809-DWG-EL-0003_Rev11 dated 3/6/2021), presented in Appendix A was undertaken to confirm any surface water impacts as a result of the changes to the project described above.

- ***Change to the substation location***

  The Report provides high level guidance for the siting of a substation (Section 5.3). This guidance was informed by the Goulburn Broken Catchment Management Authority (GBCMA) who advised that finished floor levels must be constructed to a minimum of 300mm above the 1% AEP Flood Level and set back from designated waterways. The revised substation location is set back from the designated waterways and will still allow for the substation design to meet these requirements.

- ***Change to native vegetation retention and removal***

  The Report outlines the impacts of vegetation removal and highlights the importance of timely land remediation (Section 5.7). Retaining more native vegetation across the site could potentially reduce the area of soil disturbance and therefore, sedimentation impacts.

- ***Reduction in Project area and capacity***

  The project area has been revised following the removal of land at 81 Lake Mokoan (Lot 2 PS625748) resulting in minor changes to the layout of solar energy infrastructure (Table 1). The revised layout presented in Appendix A and B does not encroach on the designated waterways or their agreed setbacks. The siting of solar energy infrastructure has also been designed in accordance with the requirements of the GBCMA.

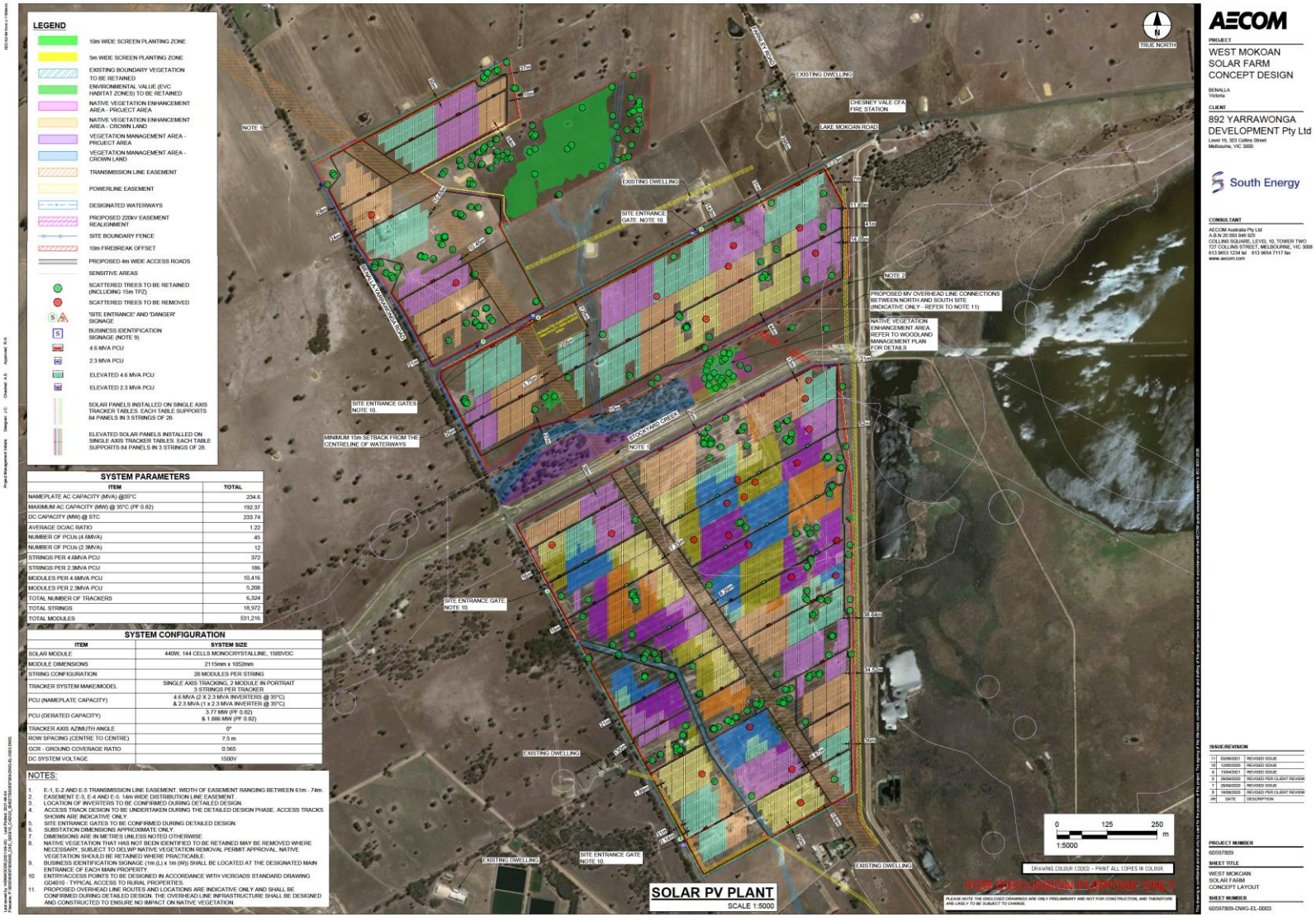
3.0 Conclusion

The proposed amendments to the Project area and technical requirements in response to the RFI's raised by DELWP, dated 5 November 2020, and DELWP – Hume Region, on 26 November 2020, have been reviewed against the Surface Water Assessment (Date 21/09/20).

Based on the planning amendments outlined herein, it is proposed the Surface Water Assessment remains unchanged. It should also be noted that the scope, assumptions, and limitations presented in the Surface Water Assessment are applicable to the conclusions presented in this addendum.

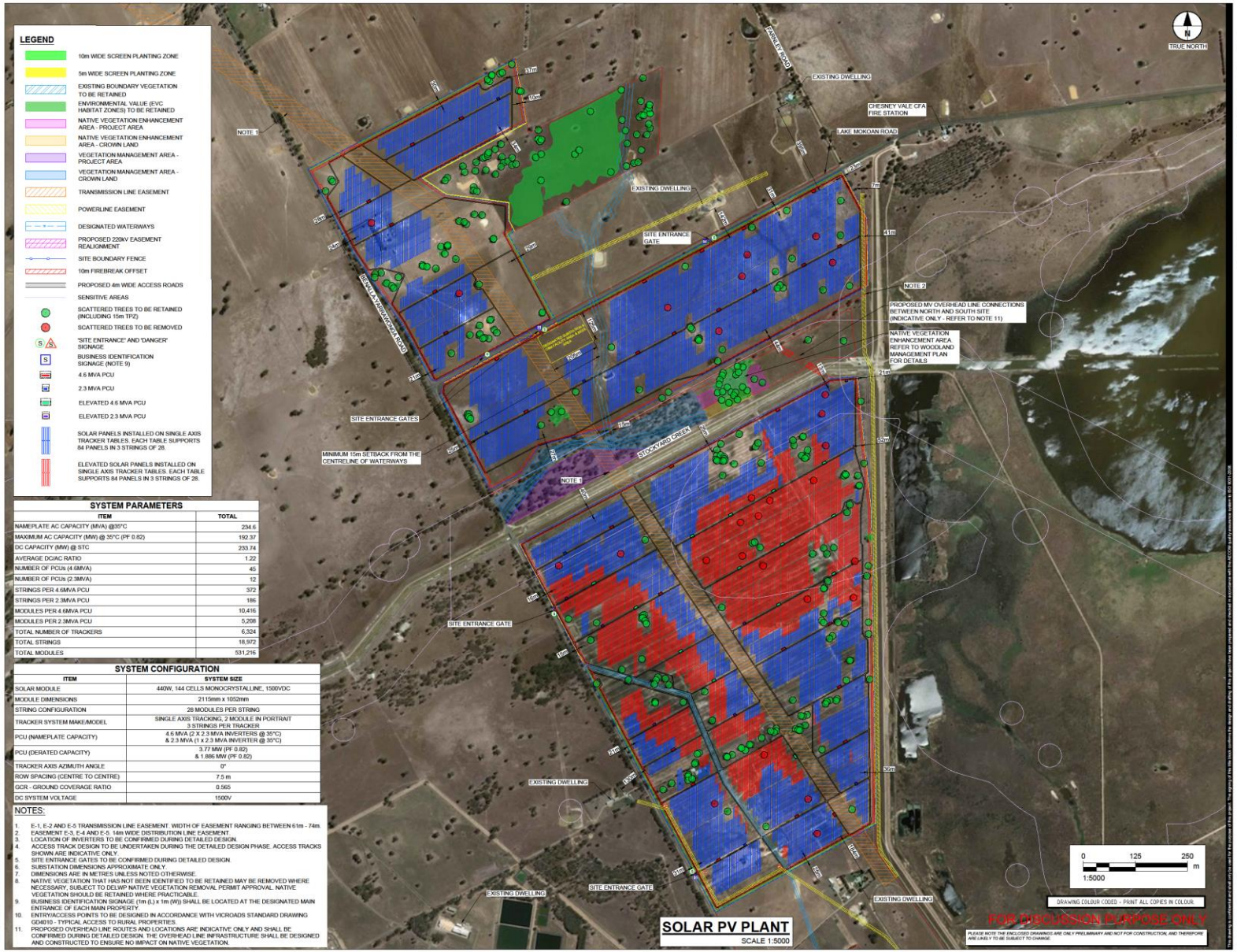
Appendix A

Revised Concept Plan


LEGEND
10m WIDE SCREEN PLANTING ZONE
5m WIDE SCREEN PLANTING ZONE
EXISTING BOUNDARY VEGETATION TO BE RETAINED
ENVIRONMENTAL VALUE (EVC HABITAT ZONES) TO BE RETAINED
NATIVE VEGETATION ENHANCEMENT AREA - PROJECT AREA
NATIVE VEGETATION ENHANCEMENT AREA - CROWN LAND
VEGETATION MANAGEMENT AREA - PROJECT AREA
VEGETATION MANAGEMENT AREA - CROWN LAND
TRANSMISSION LINE EASEMENT
POWERLINE EASEMENT
DESIGNATED WATERWAYS
PROPOSED 220kV EASEMENT REALIGNMENT
SITE BOUNDARY FENCE
10m FIREBREAK OFFSET
PROPOSED 4m WIDE ACCESS ROADS
SENSITIVE AREAS
SCATTERED TREES TO BE RETAINED (INCLUDING 15m TPZ)
SCATTERED TREES TO BE REMOVED
'SITE ENTRANCE' AND 'DANGER' SIGNAGE
BUSINESS IDENTIFICATION SIGNAGE (NOTE 9)
4.6 MVA PCU
2.3 MVA PCU
ELEVATED 4.6 MVA PCU
ELEVATED 2.3 MVA PCU
SOLAR PANELS INSTALLED ON SINGLE AXIS TRACKER TABLES. EACH TABLE SUPPORTS 84 PANELS IN 3 STRINGS OF 28.
ELEVATED SOLAR PANELS INSTALLED ON SINGLE AXIS TRACKER TABLES. EACH TABLE SUPPORTS 84 PANELS IN 3 STRINGS OF 28.
SYSTEM PARAMETERS
ITEM | TOTAL
NAMEPLATE AC CAPACITY (MVA) @35°C | 234.6
MAXIMUM AC CAPACITY (MW) @ 35°C (PF 0.82) | 192.37
DC CAPACITY (MW) @ STC | 233.74
AVERAGE DC/AC RATIO | 1.22
NUMBER OF PCUs (4.6MVA) | 45
NUMBER OF PCUs (2.3MVA) | 12
STRINGS PER 4.6MVA PCU | 372
STRINGS PER 2.3MVA PCU | 186
MODULES PER 4.6MVA PCU | 10,416
MODULES PER 2.3MVA PCU | 5,208
TOTAL NUMBER OF TRACKERS | 6,324
TOTAL STRINGS | 18,972
TOTAL MODULES | 531,216
SYSTEM CONFIGURATION
ITEM | SYSTEM SIZE
SOLAR MODULE | 440W, 144 CELLS MONOCRYSTALLINE, 1500VDC
MODULE DIMENSIONS | 2115mm x 1052mm
STRING CONFIGURATION | 28 MODULES PER STRING
TRACKER SYSTEM MAKE/MODEL | SINGLE AXIS TRACKING, 2 MODULE IN PORTRAIT 3 STRINGS PER TRACKER
PCU (NAMEPLATE CAPACITY) | 4.6 MVA (2 X 2.3 MVA INVERTERS @ 35°C) & 2.3 MVA (1 x 2.3 MVA INVERTER @ 35°C)
PCU (DERATED CAPACITY) | 3.77 MW (PF 0.82) & 1.886 MW (PF 0.82)
TRACKER AXIS AZIMUTH ANGLE | 0°
ROW SPACING (CENTRE TO CENTRE) | 7.5 m
GCR - GROUND COVERAGE RATIO | 0.565
DC SYSTEM VOLTAGE | 1500V
NOTES:
1. E-1, E-2 AND E-5 TRANSMISSION LINE EASEMENT. WIDTH OF EASEMENT RANGING BETWEEN 61m - 74m.
2. EASEMENT E-3, E-4 AND E-5. 14m WIDE DISTRIBUTION LINE EASEMENT.
3. LOCATION OF INVERTERS TO BE CONFIRMED DURING DETAILED DESIGN.
4. ACCESS TRACK DESIGN TO BE UNDERTAKEN DURING THE DETAILED DESIGN PHASE. ACCESS TRACKS SHOWN ARE INDICATIVE ONLY.
5. SITE ENTRANCE GATES TO BE CONFIRMED DURING DETAILED DESIGN.
6. SUBSTATION DIMENSIONS APPROXIMATE ONLY.
7. DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
8. NATIVE VEGETATION THAT HAS NOT BEEN IDENTIFIED TO BE RETAINED MAY BE REMOVED WHERE NECESSARY, SUBJECT TO DELWP NATIVE VEGETATION REMOVAL PERMIT APPROVAL. NATIVE VEGETATION SHOULD BE RETAINED WHERE PRACTICABLE.
9. BUSINESS IDENTIFICATION SIGNAGE (1m (L) x 1m (W)) SHALL BE LOCATED AT THE DESIGNATED MAIN ENTRANCE OF EACH MAIN PROPERTY.
10. ENTRY/ACCESS POINTS TO BE DESIGNED IN ACCORDANCE WITH VICROADS STANDARD DRAWING GD4010 - TYPICAL ACCESS TO RURAL PROPERTIES.
11. PROPOSED OVERHEAD LINE ROUTES AND LOCATIONS ARE INDICATIVE ONLY AND SHALL BE CONFIRMED DURING DETAILED DESIGN. THE OVERHEAD LINE INFRASTRUCTURE SHALL BE DESIGNED AND CONSTRUCTED TO ENSURE NO IMPACT ON NATIVE VEGETATION.
SOLAR PV PLANT
SCALE 1:5000
TRUE NORTH
EXISTING DWELLING
CHESNEY VALE CFA FIRE STATION
LAKE MOKOAN ROAD
SITE ENTRANCE GATE. NOTE 10.
NOTE 2
PROPOSED MV OVERHEAD LINE CONNECTIONS BETWEEN NORTH AND SOUTH SITE (INDICATIVE ONLY - REFER TO NOTE 11)
NATIVE VEGETATION ENHANCEMENT AREA. REFER TO WOODLAND MANAGEMENT PLAN FOR DETAILS
SITE ENTRANCE GATES NOTE 10.
MINIMUM 15m SETBACK FROM THE CENTRELINE OF WATERWAYS
STOCKYARD CREEK
NOTE 1
SITE ENTRANCE GATE NOTE 10
SITE ENTRANCE GATE NOTE 10
0 125 250 m
1:5000
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR
FOR DISCUSSION PURPOSE ONLY
PLEASE NOTE THE ENCLOSED DRAWINGS ARE ONLY PRELIMINARY AND NOT FOR CONSTRUCTION, AND THEREFORE ARE LIKELY TO BE SUBJECT TO CHANGE.
AECOM
PROJECT
WEST MOKOAN SOLAR FARM CONCEPT DESIGN
BENALLA Victoria
CLIENT
892 YARRAWONGA DEVELOPMENT Pty Ltd
Level 19, 303 Collins Street Melbourne, VIC 3000
South Energy
CONSULTANT
AECOM Australia Pty Ltd A.B.N 20 093 846 925 COLLINS SQUARE, LEVEL 10, TOWER TWO 727 COLLINS STREET, MELBOURNE, VIC 3008 613 9653 1234 tel 613 9654 7117 fax www.aecom.com
ISSUE/REVISION
11 03/06/2021 REVISED ISSUE
10 12/05/2020 REVISED ISSUE
9 13/04/2021 REVISED ISSUE
8 26/08/2020 REVISED FOR CLIENT REVIEW
7 26/08/2020 REVISED ISSUE
6 16/08/2020 REVISED FOR CLIENT REVIEW
(#) DATE DESCRIPTION
PROJECT NUMBER
60597809
SHEET TITLE
WEST MOKOAN SOLAR FARM CONCEPT LAYOUT
SHEET NUMBER
60597809-DWG-EL-0003

Appendix B

Elevated Panels Plan



SYSTEM PARAMETERS

ITEM	TOTAL
NAMEPLATE AC CAPACITY (MVA) @35°C	234.6
MAXIMUM AC CAPACITY (MW) @ 35°C (PF 0.82)	192.37
DC CAPACITY (MW) @ STC	233.74
AVERAGE DC/AC RATIO	1.22
NUMBER OF PCUs (4.6MVA)	45
NUMBER OF PCUs (2.3MVA)	12
STRINGS PER 4.6MVA PCU	372
STRINGS PER 2.3MVA PCU	186
MODULES PER 4.6MVA PCU	10,416
MODULES PER 2.3MVA PCU	5,208
TOTAL NUMBER OF TRACKERS	6,324
TOTAL STRINGS	18,972
TOTAL MODULES	531,216

SYSTEM CONFIGURATION

ITEM	SYSTEM SIZE
SOLAR MODULE	440W, 144 CELLS MONOCRYSTALLINE, 1500VDC
MODULE DIMENSIONS	2115mm x 1052mm
STRING CONFIGURATION	28 MODULES PER STRING
TRACKER SYSTEM MAKE/MODEL	SINGLE AXIS TRACKING, 2 MODULE IN PORTRAIT 3 STRINGS PER TRACKER
PCU (NAMEPLATE CAPACITY)	4.6 MVA (2 X 2.3 MVA INVERTERS @ 35°C) & 2.3 MVA (1 x 2.3 MVA INVERTER @ 35°C)
PCU (DERATED CAPACITY)	3.77 MW (PF 0.82) & 1.886 MW (PF 0.82)
TRACKER AXIS AZIMUTH ANGLE	0°
ROW SPACING (CENTRE TO CENTRE)	7.5 m
GCR - GROUND COVERAGE RATIO	0.565
DC SYSTEM VOLTAGE	1500V

NOTES:

1. E-1, E-2 AND E-5 TRANSMISSION LINE EASEMENT. WIDTH OF EASEMENT RANGING BETWEEN 61m - 74m.
2. EASEMENT E-3, E-4 AND E-5. 14m WIDE DISTRIBUTION LINE EASEMENT.
3. LOCATION OF INVERTERS TO BE CONFIRMED DURING DETAILED DESIGN.
4. ACCESS TRACK DESIGN TO BE UNDERTAKEN DURING THE DETAILED DESIGN PHASE. ACCESS TRACKS SHOWN ARE INDICATIVE ONLY.
5. SITE ENTRANCE GATES TO BE CONFIRMED DURING DETAILED DESIGN.
6. SUBSTATION DIMENSIONS APPROXIMATE ONLY.
7. DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
8. NATIVE VEGETATION THAT HAS NOT BEEN IDENTIFIED TO BE RETAINED MAY BE REMOVED WHERE NECESSARY, SUBJECT TO DELWP NATIVE VEGETATION REMOVAL PERMIT APPROVAL. NATIVE VEGETATION SHOULD BE RETAINED WHERE PRACTICABLE.
9. BUSINESS IDENTIFICATION SIGNAGE (1m (L) x 1m (W)) SHALL BE LOCATED AT THE DESIGNATED MAIN ENTRANCE OF EACH MAIN PROPERTY.
10. ENTRY/ACCESS POINTS TO BE DESIGNED IN ACCORDANCE WITH VICROADS STANDARD DRAWING GD4010 - TYPICAL ACCESS TO RURAL PROPERTIES.
11. PROPOSED OVERHEAD LINE ROUTES AND LOCATIONS ARE INDICATIVE ONLY AND SHALL BE CONFIRMED DURING DETAILED DESIGN. THE OVERHEAD LINE INFRASTRUCTURE SHALL BE DESIGNED AND CONSTRUCTED TO ENSURE NO IMPACT ON NATIVE VEGETATION.

AECOM

PROJECT
WEST MOKOAN SOLAR FARM CONCEPT DESIGN
BENALLA
Victoria

CLIENT
892 YARRAWONGA DEVELOPMENT Pty Ltd
Level 19, 303 Collins Street
Melbourne, VIC 3000

South Energy

CONSULTANT
AECOM Australia Pty Ltd
A.B.N.20 093 846 925
COLLINS SQUARE, LEVEL 10, TOWER TWO
727 COLLINS STREET, MELBOURNE, VIC 3008
613 9653 1234 tel 613 9654 7117 fax
www.aecom.com

ISSUE/REVISION

3	07/06/2021	REVISED ISSUE
2	14/05/2021	REVISED ISSUE
1	13/04/2021	FOR ISSUE
NO.	DATE	DESCRIPTION

PROJECT NUMBER
60597809

SHEET TITLE
WEST MOKOAN SOLAR FARM ELEVATED VS NON-ELEVATED

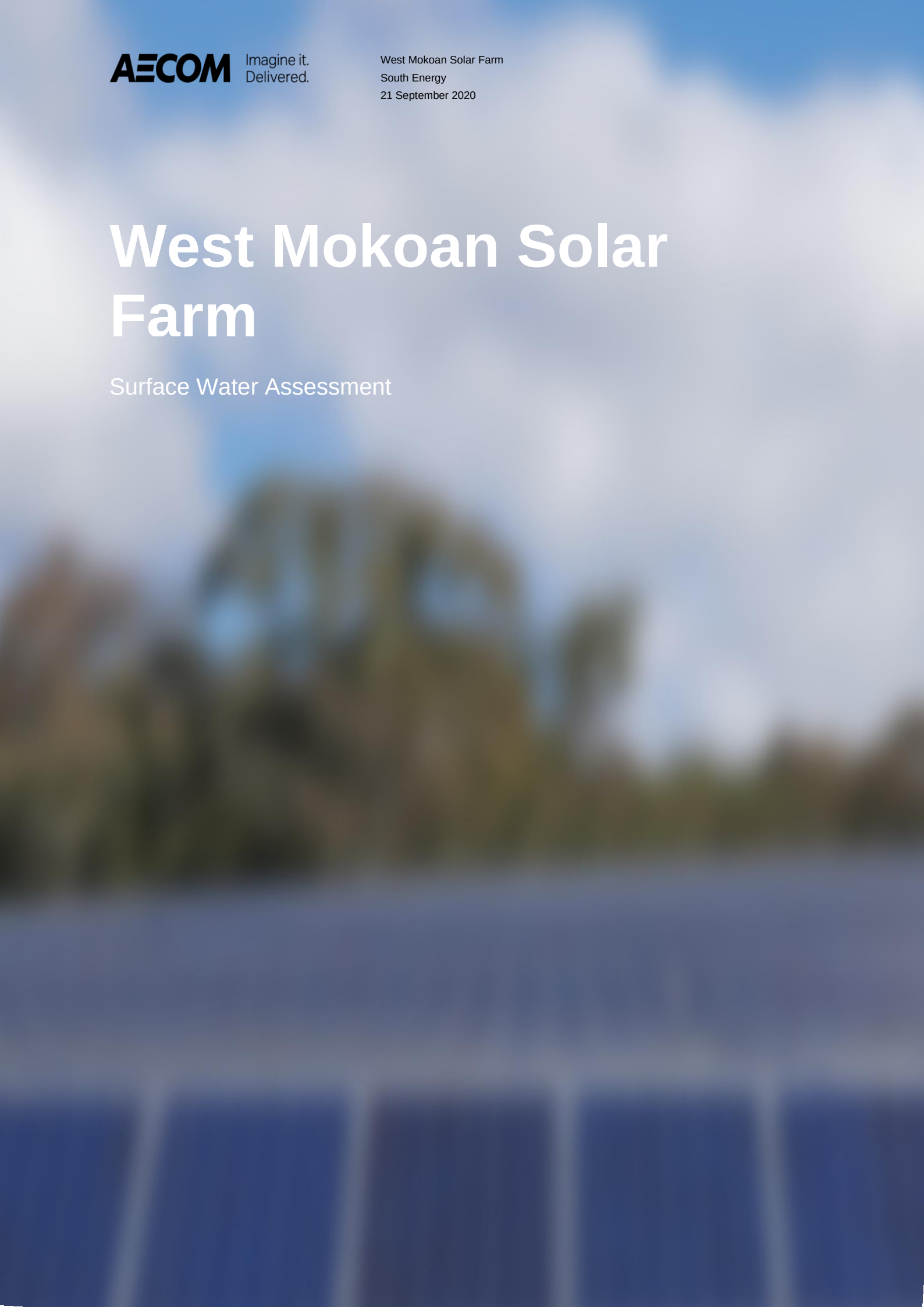
SHEET NUMBER
60597809-DWG-EL-0005

AECOM Imagine it. Delivered.

West Mokoan Solar Farm
South Energy
21 September 2020

West Mokoan Solar Farm

Surface Water Assessment



West Mokoan Solar Farm

Surface Water Assessment

Client: 892 Yarrawonga Development Pty Ltd

ABN: 30 628 034 300

Prepared by

AECOM Australia Pty Ltd
Level 10, Tower Two, 727 Collins Street, Melbourne VIC 3008, Australia
T +61 3 9653 1234 F +61 3 9654 7117 www.aecom.com
ABN 20 093 846 925

21-Sep-2020

Job No.: 60597809

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Table of Contents

1.0 Introduction

1.1 Site Context

AECOM Australia Pty Ltd is preparing a planning permit application on behalf of 892 Yarrawonga Development Pty Ltd (South Energy) (the Applicant) for the construction of a solar farm facility on land adjacent to Benalla-Yarrawonga Road and Lake Mokoan Benalla, Victoria. The site and lot address are presented in Table 1.

Table 1 Site addresses included in the development

Site Address	892 Benalla-Yarrawonga Road, Goorambat 81 Lake Mokoan Road, Goorambat Benalla - Yarrawonga Road, Benalla 616 Benalla - Yarrawonga Road,
Legal Description	Lot 1 PS625748F Lot 2 PS625748F Lot 1 TP173518C Lot 1 TP104377 Lot 1 LP206524H 98B PP2704 and Lots 2-5 LP206524H

The land is currently used for broadacre farming, located within a Farming Zone (FZ), in accordance with the Benalla Planning Scheme. It is located approximately 5 kilometres north-east of the town centre of Benalla, and approximately 8 kilometres south-east of the township of Goorambat. Figure 1 provides the site context and proximity to the town of Benalla and the Winton Wetlands.

Figure 1 Site Context and Surrounding Features (Source: VicPlan 2019)

1.2 Scope of Work

The purpose of this Surface Water Assessment is to define, at a high level, the potential changes in water quality, water quantity and stream stability as a result of the proposed development. It also outlines strategies to mitigate, minimise and manage the potential impacts associated with changes in surface water quality and quantity.

The scope of this high-level surface water assessment is to:

- engage the local CMA to discuss potential flooding implications of development;
- obtain and collate relevant GIS data from public sources;
- identify all watercourses and other surface water bodies within and adjacent to the study area;
- provide high level commentary on the existing site conditions and likely changes (if at all) in water quantity, quality and stream stability as a result of the proposed development; and
- broadly outline strategies to minimise and manage any likely adverse impacts resulting from the discharge of stormwater from the site to the surface water receiving environment.

2.0 Existing Waterways and Surface Water Features

2.1 Catchment Context

The study area is located in a sub-catchment of Broken River; which lies approximately 4.8km west of the site. East of the site is the Winton Wetlands Natural Features Reserve, formally known as Lake Mokoan. This wetlands reserve is located on a recently decommissioned artificial lake that was previously fed with water from the Broken River via the Lake Mokoan Inlet Channel.

Historically, outflow from Lake Mokoan was conveyed along the Stockyard Creek and back into the Broken River, west of the study area. However, as part of Lake Mokoan decommissioning works completed by Goulburn Murray water, some sections of the outlet channel/Stockyard creek channel have been regraded (reverse graded) to allow water to be diverted from the Broken River and to flow in the opposite direction towards the Lake Mokoan Diverters Pipeline Pumping Station located immediately west of the dam wall.

The Stockyard Creek forms a natural low point through the local catchment with gentle gradients extending to the north of the study area.

Figure 2 provides an overview of the catchment context and surrounding waterways.

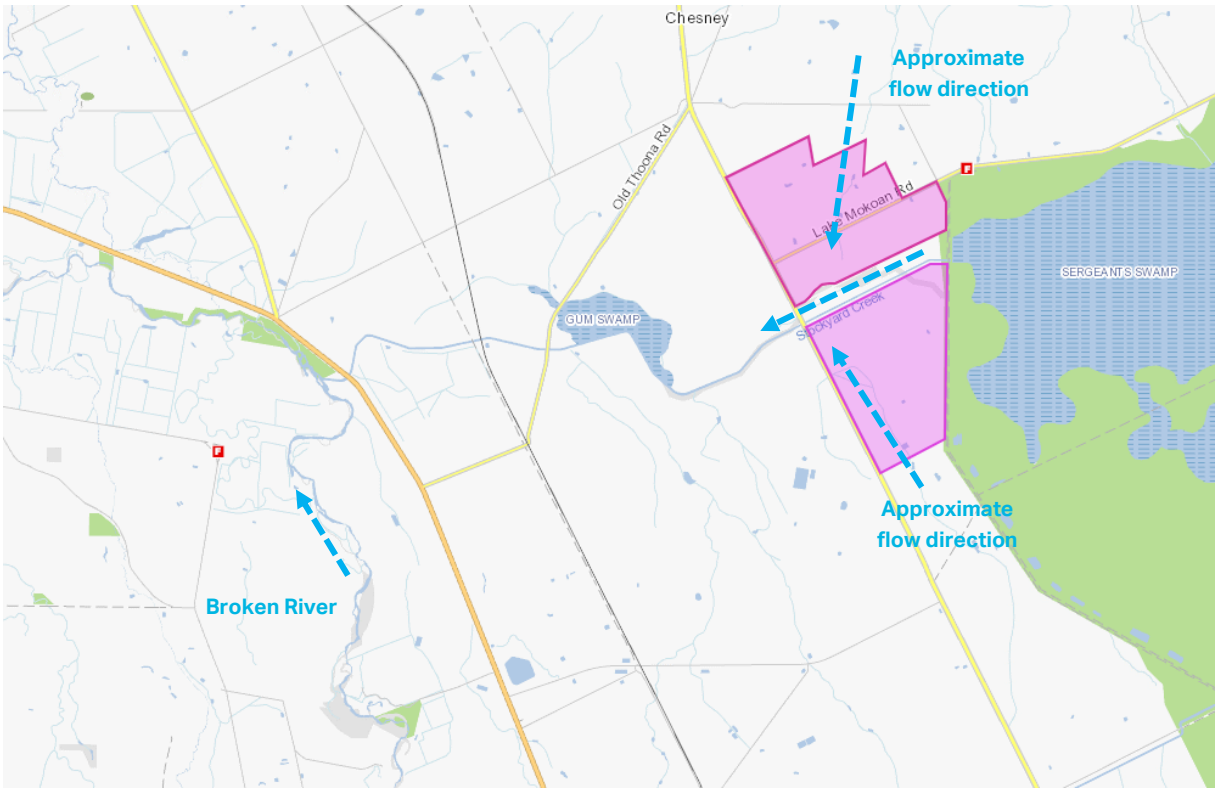


Figure 2 Site context and proximity to Broken Creek, Stockyard Creek and Winton Wetlands Reserve (Source, MapShareVic – DELWP 2019)

2.2 Land Subject to Inundation Overlays and Floodway Overlays

The Department of Environment, Land Water and Planning's (DELWP) 'Mapshare' and 'VicPlan' mapping portals provide information on the extent of Land Subject to Inundation Overlays (LSIO) and Floodway Overlays (FO) across the state.

According to these datasets, the site is not directly affected by any LSIO or FO. The nearest FO is located on the Stockyard Creek that runs between the two proposed sites, just beyond the site boundaries.

It should be noted that there are discrepancies between the data sets presented in each of these map portals. Figure 3 highlights the proximity of the LSIO (pale blue) and FO (light blue) as defined on the VicPlan mapping portal, whereas Figure 4 illustrates the data presented on the Mapshare portal.

Figure 4 shows that DELWP's Mapshare portal does not display the LSIO layer and there are also gaps in the FO layers when compared to those presented in Figure 3.

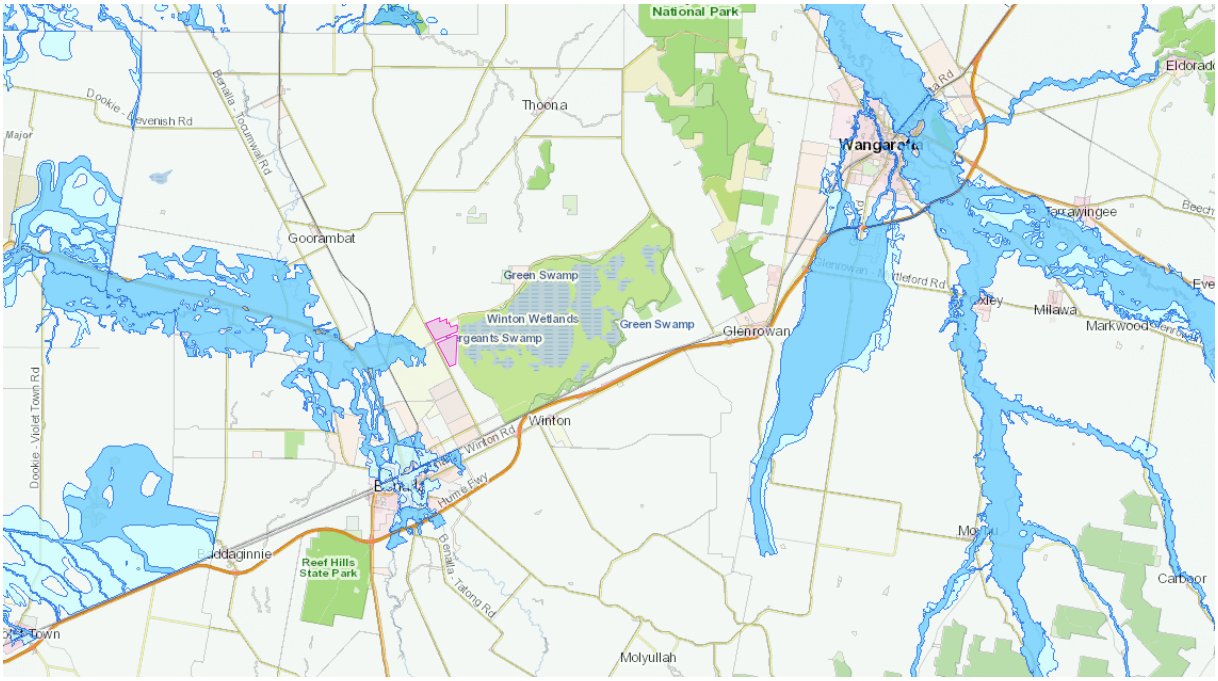


Figure 3 Proximity of Land Subject to Inundation Overlays (LSIO, Light blue), Floodway Overlays (FO, blue) (Source: DELWP VicPlan 2019)

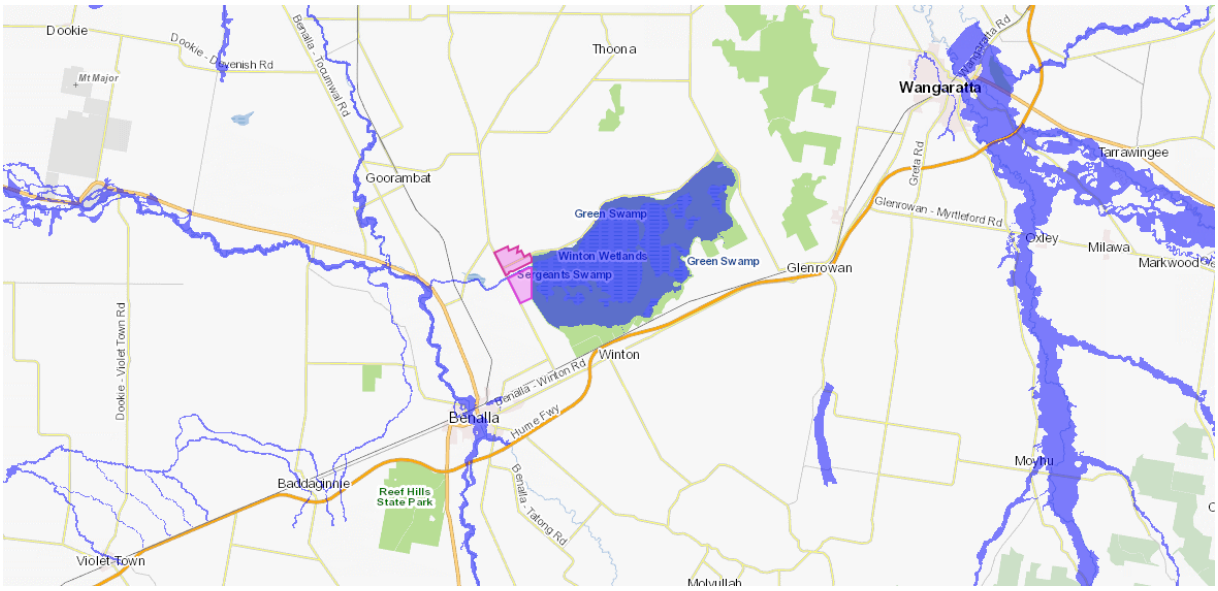


Figure 4 Proximity of Floodway (blue) (Source: DELWP Mapshare 2019)

2.3 Urban Floodway Zone

The Goulbourn Broken Catchment Management Authority (GBCMA) 1% Flood Level Contour Atlas displays an area of Urban Floodway Zone (UFZ) encroaching the southern land parcel, as well as the southern reaches of the northern land parcel (Figure 5 below with full map sheet presented in Appendix A).

An Urban Floodway Zone is categorized to specific land use types that are of low intensity uses, such as agricultural and recreational purposes (Melbourne Water, 2017). Development on an area of UFZ is restricted and requires permission from the catchment management authority. Additionally, an UFZ has limited land use types, neither of which the solar farm will fall under.

However, this UFZ is not referenced on any planning related maps or databases. Additionally, the area of suspected UFZ was not represented on any of the DELWP Mapshare sites.

AECOM sought clarification on the extent of the UFZ from GBCMA on 30 July 2019. The GBCMA responded the same day stating that the Flood Atlas includes water bodies that look like UFZ and that there was no area of UFZ around or over the Winton Wetlands Reserve.

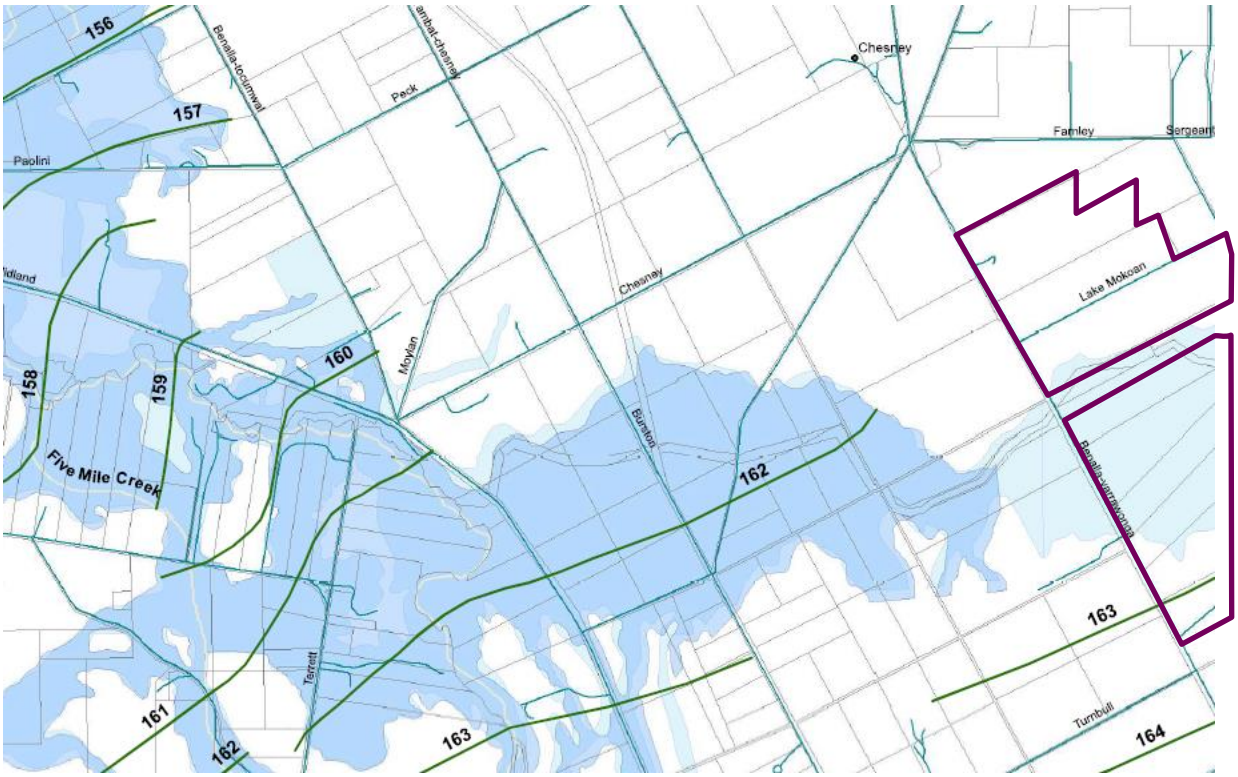


Figure 5 Floodway Overlay zone (blue), Urban Floodway Zones (light blue) and 1%AEP Flood depth contours (Source: GBCMA)

2.4 Wetlands

DELWP's online mapping data identified a wetland, southeast of the study area (wetland ID No. 67909) within the Winton Wetland Natural Features Reserve. The Winton Wetland, formerly recognised as Lake Mokoan, includes a number of additional swamps. These collectively encompass an area of 3,198 hectares and also provide water to the Stockyard Creek.

The area has been described as a largely reformed wetland, containing freshwater marshes and meadows that are periodically inundated. Historically, the Winton Wetlands acted as an offline water storage supply for irrigation, fed by a channel from Broken River. However, the decommissioning of Lake Mokoan potentially decreases the quantity of floodwater during peak flood flows.

2.5 Site features

The spatial and survey data obtained indicates the highest elevation on northern land parcel is approximately 173m AHD, close to the homestead. The lowest elevation for this land parcel is 163m AHD close to the Stockyard Creek embankment. Consequently, all sub-catchment flows within the norther land parcel drain southward towards the Stockyard Creek.

Topographical survey data for the southern land parcel indicates the land is relatively flat with a gentle gradient falling towards the stockyard creek. Elevation on the southern land parcel ranges from approximately 163m AHD in the south east, to 160m AHD along the north western boundary.

The site contains a number of water features including constructed drains, natural channels and farm dams. Aerial imagery indicates that some of these farm dams are interconnected, however, only 2 dams, in the centre of the northern and parcel, appear to be connected by a broken, dry channel. This channel is shown on the site survey data (Figure 6). All other potential flow pathways across the site seem to be less formal with little evidence of channels or eroded lines.

At the southern boundary of the northern land parcel, the aerial imagery shows the land becoming more vegetated and eventually transitioning to marsh-like conditions, close to the Benalla-Yarrawonga Rd bridge. This vegetated channel forms the lowest part of the catchment, adjacent to the Stockyard Creek embankment.

The southern land parcel also has a number of features that will influence the eventual siting and design of the proposed solar farm. These features include a drainage easement that runs through the lower south western portion of the study area, an area of Crown Land in the north east area and an adjacent channel that runs to the Stockyard Creek. This channel drains excess water from the land and discharges it into the Stockyard Creek during wet seasons. It is worth noting this channel has not been identified by the GBCMA or GMW as a designated waterway.

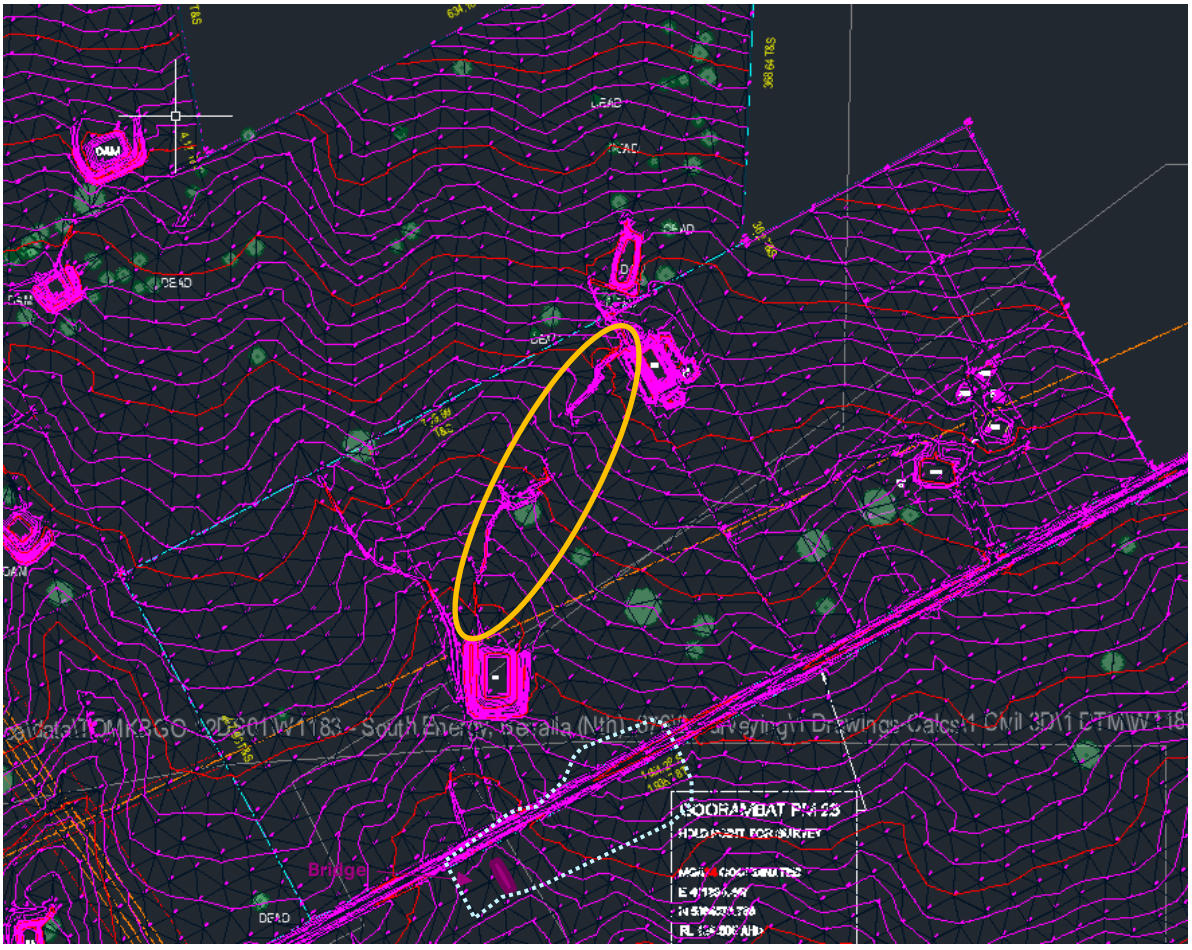


Figure 6 Sample of survey data showing remnants of a channel (circled) between two farm dams (20cm contours)

3.0 Feedback from the Goulburn Broken Catchment Management Authority

The Goulburn Broken Catchment Management Authority (GBCMA) is the region's peak natural resource management body and is responsible for the implementation of the Regional Catchment Management Strategy. In this role, the GBCMA guides development to ensure the region's land and water resources are protected for the benefit of the region.

AECOM submitted two Floodplain Advice Requests to the GBCMA on 07 February 2019 for the West Mokoan Solar Farm and the Kennedys Creek Solar Farm. The Kennedys Creek Solar Farm is also a South Energy Project located on nearby land to the south of the West Mokoan Solar Farm (Planning Application no. PA1900684 – Benalla Planning Scheme). The objective of these enquiries was to seek their in-principle support for the projects and understand the nature of any permit conditions they may place on the development.

GBCMA responded on 27th February 2019 outlining guidance for the West Mokoan Solar Farm and on 28th February 2019 outlining guidance for the Kennedys Creek Solar Farm. The two letters outlined that the GBCMA would not object to the proposed solar farms, subject to conditions outlined at Section 3.2 below (the full responses are provided in Appendix B of this report).

Despite the proximity of the Kennedys Creek Solar Farm and the West Mokoan Solar Farm, the two letters set slightly different freeboard requirements for finished floor levels of inverters, transformer blocks and buildings. The letter dated 27th February 2019 required 450 mm above general surrounding ground level for inverters and transformer blocks, whereas the letter dated 28th February 2019 required 300 mm above the applicable 1% AEP flood level.

GBCMA provided clarification via the email dated 27 August 2020, which identified that where flood level information is available, then 300 mm freeboard above 1% AEP is applicable. In the absence of flood information, 450 mm above general surrounding ground level is recommended by GBCMA (refer to Appendix B for GBCMA correspondence).

For the West Mokoan sites, detailed flood level information is available in the adjacent Stockyard Creek gauging station. This provided the justification to use 300 mm freeboard above the 1% AEP flood level for the West Mokoan Solar Farm.

It is worth noting the southern land parcel was added to the proposed project area after this floodplain advice application was made. However, the GMW Waterway Determination assessment does consider this additional land parcel and is presented in Section 4.0 of this report.

3.1 Goulburn Broken CMA Observations

At the time of the floodplain advice application response, the GBCMA stated there was no flood or detailed ground level information for the site, however they drew attention to the nearest 1% AEP flood contour, beyond the western boundary of the site. These flood contours were established from limited 1993 flood levels.

The GBCMA also identified a designated waterway crossing the site from the north towards the Stockyard Creek.

3.2 Goulburn Broken CMA Conditions

The response received on 27 February 2019 from the GBCMA indicated that they would not object to the proposed solar farm, subject to the following conditions:

1. Inverter and transformer blocks, any buildings, infrastructure and solar panels must be located a minimum of 30 metres from the nearest top of bank of the waterway shown in Figure 7.
2. The finished floor levels of inverter and transformer blocks and any buildings are to be set at least 450 millimetres above general surrounding ground level.
3. The corridors along the waterway shown in Figure 1 shall be revegetated in accordance with the Revegetation Guide for the Goulburn Broken Catchment (https://revegetation.gbcma.vic.gov.au/).

4. Where fencing crosses the waterway shown in Figure 1 the fencing shall be designed such that it does not obstruct flood flows. For example, farm type fencing, large open mesh (150 mm centres), vertical pool style fencing (150mm centres), fencing that lifts with the floodwater or similar.

The response received on 28 February 2019 from the GBCMA indicated that they would not object to the proposed solar farm, subject to the following conditions:

1. Inverter and transformer blocks, any buildings, infrastructure and solar panels must be located a minimum of 30 metres from the nearest top of bank of the waterway shown in Figure 7.
2. The finished floor levels of inverter and transformer blocks and any buildings are to be set at least 300 millimetres above the applicable 1% AEP flood level as shown in Figure 1.
3. The corridors along the waterway shown in Figure 1 shall be revegetated in accordance with the Revegetation Guide for the Goulburn Broken Catchment (https://revegetation.gbcma.vic.gov.au/).
4. Where fencing crosses the waterway shown in Figure 1 the fencing shall be designed such that it does not obstruct flood flows. For example, farm type fencing, large open mesh (150 mm centres), vertical pool style fencing (150mm centres), fencing that lifts with the floodwater or similar.

3.3 Further clarification and site visit

The designated waterways map provided with the GBCMA response showed some discrepancies with the aerial imagery and site survey data. Furthermore, several waterways across the site were poorly defined with little evidence of a drainage channel or eroded line.

AECOM sought further clarification on determining setbacks for these poorly defined designated waterways. The GBCMA provided a response stating setbacks of 15 m from the centreline of a waterway would be acceptable (Appendix B).

A joint site meeting was organised with the GBCMA and Goulburn Murray Water (GMW) on 02/07/19 to discuss these waterways and determine the next steps.

The site meeting provided an opportunity to discuss setback sizes for some of the waterways across the site. It was confirmed during the discussion that setbacks can vary for different waterways and, where it can be demonstrated there are no impacts, setbacks of 5m wide may be accepted.

The site meeting also confirmed that some of the designated waterways were not well defined. It was recommended that a waterway determination assessment should be carried out by GMW to ascertain the purpose, status and delineate these waterways.

Figure 7 Location of designated waterways across the site, shown purple (Source: GBCMA Floodplain Advice Response)

4.0 Goulburn Murray Water, Waterway Determination

Goulburn Murray Water (GMW), a statutory corporation, is Australia's largest rural water corporation. It manages approximately 70 per cent of Victoria's stored water resources, 50 per cent of Victoria's underground water supplies and Australia's largest irrigation delivery network.

AECOM submitted a Waterway Determination application to GMW on 15 July 2019. GMW subsequently carried out the waterway determination assessment and provided a response on 30 July 2019.

4.1 Waterway determination assessment findings

The waterway determination for the West Mokoan site identified one designated waterway within the northern site area and one within the southern area.

The waterway across the northern site drains a catchment of approximately 62 hectares. It is described by GMW as a waterway with developed and undeveloped drainage lines as it passes through the site. The waterway determination assessment also indicated the lowest section of this waterway flows in a south easterly direction. Figure 8 illustrates the location of the waterway across the northern site area.

The waterway across the southern site area is described by GMW as a developed drainage channel. This channel serves a catchment of approximately 72 hectares and links multiple land parcels as it flows north towards the Stockyard Creek.

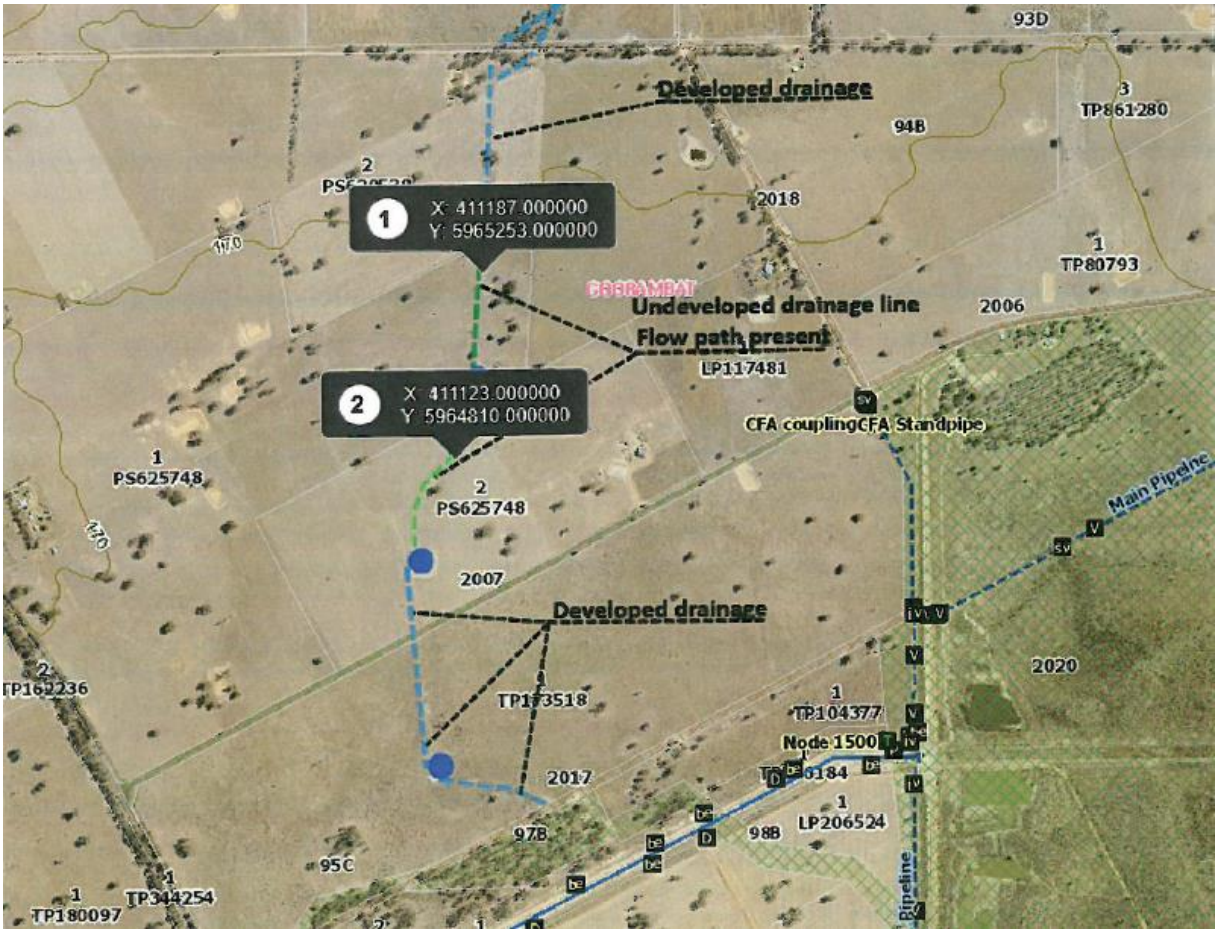


Figure 8 The GMW confirmed waterway on the northern area of the West Mokoan site (shown blue and green).

Figure 9 The GMW confirmed waterway across the southern area of the West Mokoan site (shown blue).

The waterway determination inspection report concluded that additional drainage lines, depressions, gullies may be present, requiring further protection development by means of setbacks. The full response from GMW is provided in Appendix C of this report.

5.0 Managing flood risks

The construction activities and some of the proposed infrastructure may change the local drainage and flood characteristics. The following sections highlight some of these aspects for further consideration including measures on how these impacts will be managed.

5.1 Solar Arrays

Runoff from the proposed solar arrays will be intercepted by grassed, pervious surfaces and will not significantly change the fraction of imperviousness for the total area of the site. Nevertheless, the solar arrays may change local flow characteristics if they are sited in active flood pathways.

The solar panels in the site area located north of the Stockyard Creek will be set back at least 15m from the centreline of the designated waterway that traverses the centre of the site. This is in line with the guidance provided by the GBCMA in an email (dated 12 June 2019).

The designated waterway that flows through the south western corner of the southern site is contained within a 5m wide drainage easement. The proposed solar arrays in this area will be set back at least 5m from the edges of the easement. This will provide access for future waterway maintenance activities, on both sides of the channel.

Additionally, the solar panels will be elevated such that they are least 300mm above the predicted 1% AEP flood level when stowed in the horizontal position.

5.2 Internal Access Roads

The concept plan for the northern site indicates a perimeter access road with multiple ‘lateral’ connecting roads that run south west to north east through the arrays. These access roads will be designed on grade to allow surface water flows to continue across the site during significant flood events. Additionally, roads that cross well defined waterways (e.g. waterways with channels) may require bridges or culverts to allow uninterrupted flows of floodwater.

Local drainage may be required to convey flows captured in swale drains associated with the access tracks and at low points. All existing access tracks and local roads will be maintained at the current elevation.

A works on waterways permit will be sought where the access roads cross the designated waterway. All other waterway crossings will be designed in accordance with the guidance of the relevant authorities.

5.3 Substation Area

The finished floor levels of the substation area will be constructed 300mm above the 1% AEP flood level as conditioned by the GBCMA.

5.4 Inverter Blocks

The inverter blocks will be distributed throughout the site, adjacent to the access tracks. Recognising the requirements of the GBCMA, the base for these structures will be set at least 300mm above the predicted 1% AEP flood event.

5.5 New impervious areas (e.g. Concrete, roofing and transformer cabinets)

Impervious areas of the site could concentrate runoff or displace surface water storage. However, the impacts of these structures are expected to be minor with runoff flowing onto impervious areas where infiltration will occur. For these areas, design considerations will include level spreaders to convert channelised flow back to sheet flow or discharge into infiltration drainage channels or soak pits.

5.6 Site Fencing

Poorly designed fencing can collect debris and exacerbate local flood impacts. Site fencing will be designed so that it does not obstruct flood flows across the land. This likely to include farm type fencing that features a large open mesh construction or vertical farm style fencing as conditioned by the GBCMA.

5.7 Land Remediation

Changes in soil characteristics occur primarily due to construction activities through excavation, compaction, erosion, leaching and contamination. The removal of vegetation, due to excavation activities and disturbance will also change the infiltration capacity of the soil, leading to increase runoff.

To manage these impacts, disturbed ground will be quickly stabilised and reinstated. Similarly, any land drains or ditches will be reinstated or replaced to maintain existing drainage characteristics.

Reestablishment of surface treatments are critical to erosion and sediment control. consideration of rock lining drainage channels where reestablishment cannot be achieved should be made.

5.8 Flood Resilience

Information from the GBCMA and anecdotal evidence from the landowner suggest the land may be flood prone with extended periods of waterlogging. The proposed infrastructure will be designed to shed water as well as withstand regular and extended periods of inundation.

5.9 Site Grading

Upstream and downstream boundaries of the site will be suitably graded with the site surfaces to retain the existing flood flow pathways across the site.

5.10 Localised Flows

It is not anticipated that runoff from the solar arrays will cause erosion. However, local drainage controls will be implemented where concentrated flows have been identified.

5.11 Understanding Flood Risk

The lower catchment position and close proximity of the Stockyard Creek indicate the potential for flooding across the site. Additionally, there are a number of waterways and water management structures on site that have not been identified as a designated waterway by the GBCMA or GMW.

Detailed hydrologic and hydraulic investigations will be undertaken as part of detailed design to determine the extent, depth and flow hazards of surface water within the site.

6.0 Managing surface water quality

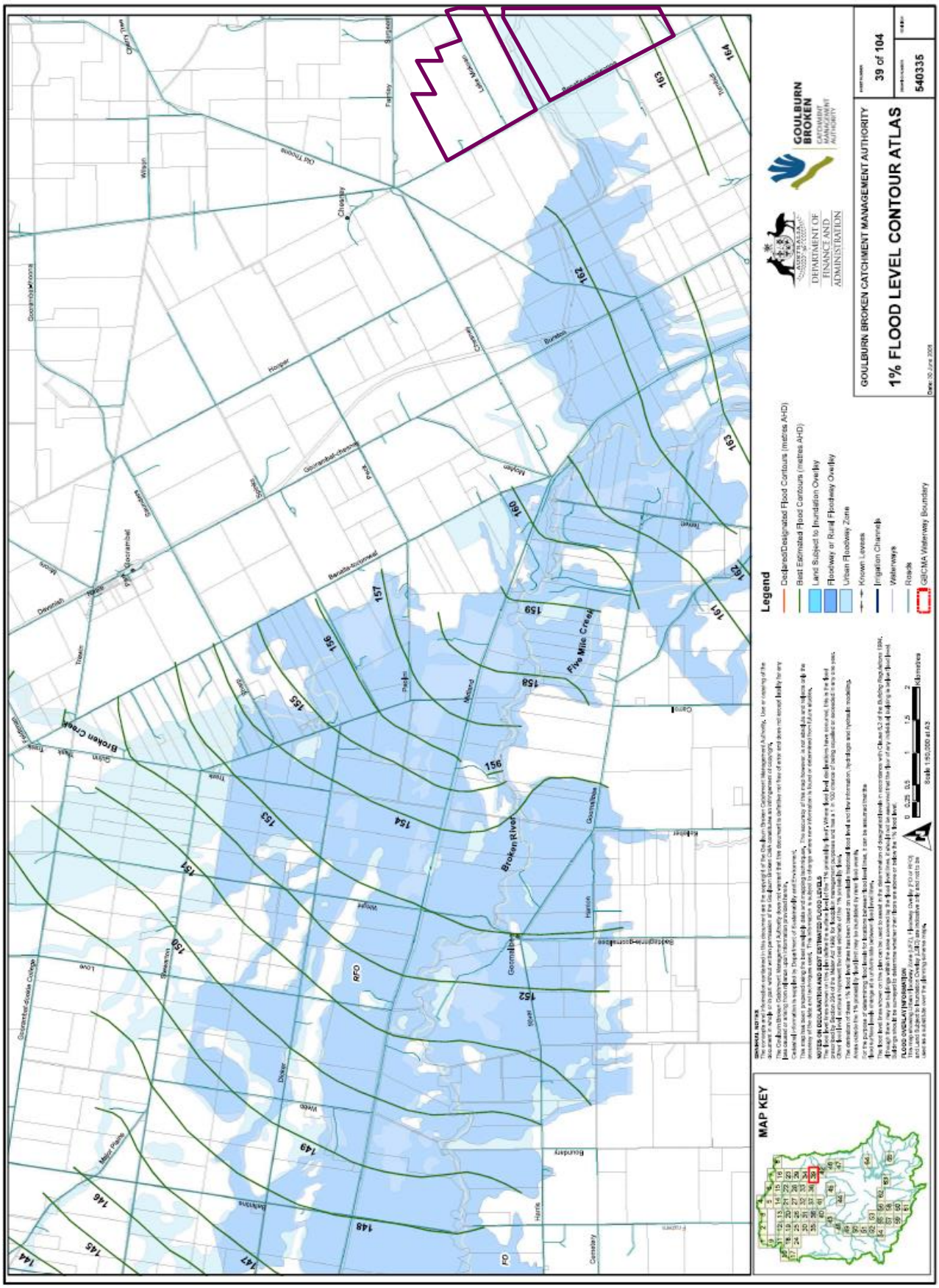
Conversion from farming activities to a solar farm may ultimately reduce the risk of surface water contamination following construction, once the site is operational and the ground conditions have been re-established with appropriate drainage. However, the project may present a risk to surface water quality for the Stockyard Creek and Broken River during the construction phase.

The following measures will be included in the Environmental Management Plan and Construction Environmental Management Plan.

- Construction activities will be effectively managed by best practice pollution prevention strategies in accordance with EPA publications *480 Environmental Guidelines for Major Construction Sites and 275, Construction Techniques for Sediment Pollution Control and International Erosion and Sediment Control Association (IECA) Australasia guidelines.*
- Construction activities will also adhere to a site-specific erosion and sediment control plan.
- Works on and around waterways will only occur when they are dry.
- Areas of disturbed ground will be quickly reinstated following completion. Optimum surface treatments will be selected to fast track stabilisation of surfaces and prevention of erosion during establishment.
- Sediment control fences will be employed downstream of work areas.
- Sedimentation ponds will be constructed to collect silty runoff (the use of flocculants will also be considered where appropriate).
- Diversion bunds will be used to direct water to sedimentation ponds for treatment. The height and alignment of bunds will be considered so as not to increase the risk of flooding.
- Works with a high risk of causing erosion will be scheduled during the driest periods.
- Soils will be quickly remediated with topsoil (where compacted or leached), seeded and over-seeded during the correct season.
- Mulches and soil binders (e.g. hydromulch) will be considered for newly exposed embankments, slopes and longer-term stockpiles.
- Any man-made impoundment or conveyance structures (e.g. irrigation storage ponds and channels) will be assessed for their necessity, environmental impact and ongoing safety.
- Surface treatments for drainage infrastructure will be designed to resist scour and erosion. drainage will be designed to limit flow velocities to prevent scour.
- Discharge of channelised flow shall be via the use of level spreaders or direct outfall into Stockyard Creek with suitable erosion protection.

Appendix A

1% AEP Flood Map


GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY
1% FLOOD LEVEL CONTOUR ATLAS
39 of 104
540335
GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY
DEPARTMENT OF FINANCE AND ADMINISTRATION
Legend
Declared/Designated Flood Contours (metres AHD)
Best Estimated Flood Contours (metres AHD)
Land Subject to Inundation Overlay
Floodway or Rural Floodway Overlay
Urban Floodway Zone
Known Levees
Irrigation Channels
Waterways
Roads
GBCMA Waterway Boundary
MAP KEY
Broken River
Five Mile Creek
Broken Creek
Lake Mokoan
Scale 1:50,000 at A3
Kilometres

Appendix B

GBCMA Response

Our Ref: GBCMA-F-2019-00089
Document No: 1

GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

Date: 27 February 2019

Mr Tony Barrett
AECOM Australia Pty Ltd
727 Collins Street
Melbourne VIC 3008 tony.barrett@aecom.com

Dear Mr Barrett

Floodplain Management Advice for
Proposed Solar Farm
892 Benalla-Yarrawonga Road Goorambat

Thank you for your application dated 7 February 2019, received by the Goulburn Broken CMA on 7 February 2019, regarding the above matter.

The Goulburn Broken CMA's assessment of the above information has determined that the proposed development location is covered by the Farming Zone, Road Zone - Category 1 in the Benalla Planning Scheme.

The Goulburn Broken CMA does not have any flood or detailed ground level information for the site. However, information derived from the 1993 flood (which is representative of the 1% AEP flood adjacent to the site is shown in **Figure 1**. This figure also depict designated waterways that traverses through the site, which should remain free from obstruction.

In the light of the above information, the Goulburn Broken CMA would not object to the proposed solar farm, **subject to the following conditions**:

1. Inverter and transformer blocks, any buildings, infrastructure and solar panels must be located a minimum of 30 metres from the nearest top of bank of the waterway shown in Figure 1.
2. The finished floor levels of inverter and transformer blocks and any buildings are to be set at least 450 millimetres above general surrounding ground level.
3. The corridors along the waterway shown in Figure 1 shall be revegetated in accordance with the Revegetation Guide for the Goulburn Broken Catchment (https://revegetation.gbcma.vic.gov.au/).
4. Where fencing crosses the waterway shown in Figure 1 the fencing shall be designed such that it does not obstruct flood flows. For example, farm type fencing, large open mesh (150 mm centres), vertical pool style fencing (150mm centres), fencing that lifts with the floodwater or similar.

Note, where access roads cross the waterway shown in Figure 1 a works on waterways permit will be required from the Goulburn Broken CMA.

www.gbcma.vic.gov.au

SHEPPARTON
Head Office
168 Welsford Street
PO Box 1752
Shepparton VIC 3632
Tel: (03) 5822 7700
Fax: (03) 5831 6254

BENALLA
89 Sydney Road
PO Box 124
Benalla VIC 3672
Tel: (03) 5822 7700

YEA
5/10 High Street
Yea VIC 3717
Tel: (03) 5797 4400

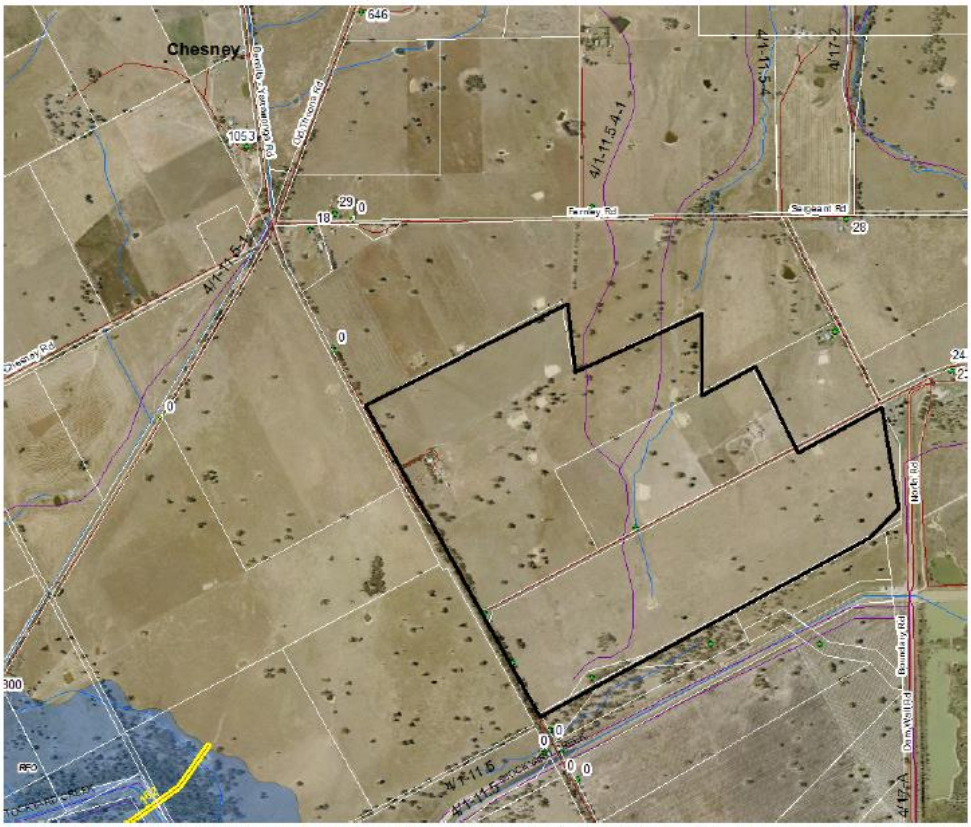


Figure 1: Flood overlay controls (Benalla Planning Scheme) and 1% AEP flood level contour adjacent to the site.

Please Note:

- This document contains floodplain management advice only. It does not constitute approval from any other statutory body. It is your responsibility to obtain any other required approvals.
- The 100-year ARI flood is not the maximum possible flood. There is always a possibility that a flood larger in height and extent, than the 100-year ARI flood, may occur in the future.

If you have any queries, please contact me on **(03) 5822 7700**. To assist in handling any enquiries please quote **GBCMA-F-2019-00089** in your correspondence. Please note that all electronic correspondence should be directed to planning@gbcma.vic.gov.au.

Yours sincerely

Guy Tierney
Statutory Planning and Floodplain Manager

Information contained in this correspondence is subject to the definitions and disclaimers below.

Definitions and Disclaimers

1. The area referred to in this letter as the 'proposed development location' is the land parcel(s) that, according to the Authority's assessment, represent(s) the location identified by the applicant. The identification of the 'proposed development location' on the Authority's GIS has been done in good faith and in accordance with the information given to the Authority by the applicant(s) and/or local government authority.
2. While every endeavour has been made by the Authority to identify the proposed development location on its GIS using VicMap Parcel and Address data, the Authority accepts no responsibility for or makes no warranty with regard to the accuracy or naming of this proposed development location according to its official land title description.
3. **AEP** as Annual Exceedance Probability – is the likelihood of occurrence of a flood of given size or larger occurring in any one year. AEP is expressed as a percentage (%) risk and may be expressed as the reciprocal of ARI (Average Recurrence Interval).
4. **ARI** as Average Recurrence Interval - is the likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100 years.
5. **AHD** as Australian Height Datum - is the adopted national height datum that generally relates to height above mean sea level. Elevation is in metres.
6. No warranty is made as to the accuracy or liability of any studies, estimates, calculations, opinions, conclusions, recommendations (which may change without notice) or other information contained in this letter and, to the maximum extent permitted by law, the Authority disclaims all liability and responsibility for any direct or indirect loss or damage which may be suffered by any recipient or other person through relying on anything contained in or omitted from this letter.
7. This letter has been prepared for a proposed **Solar Farm** and is for the use only of the party to whom it is addressed and no responsibility is accepted to any third party for the whole or any part of its contents. Neither the whole nor any part of this letter or any reference thereto may be included in any document, circular or statement without the Authority's written approval of the form and context in which it will appear.
8. The flood information provided represents the best estimates based on currently available information. This information is subject to change as new information becomes available and as further studies are carried out.
9. ***The responsible authority may use this information within 90 days of this letter***.

Our Ref: GBCMA-F-2019-00090
Document No: 1

GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

Date: 28 February 2019

Mr Tony Barrett
AECOM Australia Pty Ltd
727 Collins Street
Melbourne VIC 3008 tony.barrett@aecom.com

Dear Mr Barrett

Floodplain Management Advice for
Proposed Solar Farm
Lot 4, Plan PS318659
226 Murray Road Benalla Vic 3672

Thank you for your application dated 07 February 2019, received by the Goulburn Broken CMA on 07 February 2019, regarding the above matter.

The Goulburn Broken CMA's assessment of the above information has determined that the proposed development location is covered by the Industrial 1 Zone, Industrial 2 Zone, Road Zone - Category 1, Road Zone - Category 2 in the Benalla Planning Scheme.

The Authority's best estimate of the 1% AEP flood levels for the location described above varies from 165.5 and 168.5 metres AHD (see Figure 1), which was established from limited 1993 flood levels. The Authority has no detailed ground level information to determine depths of flooding over the site.

Figure 1 also shows a number of designated waterways that traverse through the site. In this regard, the waterways should remain free from obstruction with vegetated corridors.

In the light of the above information, the Goulburn Broken CMA would not object to the proposed solar farm, **subject to the following conditions**:

1. Inverter and transformer blocks, any buildings, infrastructure and solar panels must be located a minimum of 30 metres from the nearest top of bank of the waterway shown in Figure 1.
2. The finished floor levels of inverter and transformer blocks and any buildings are to be set at least 300 millimetres above the applicable 1% AEP flood level as shown in Figure 1.

www.gbcma.vic.gov.au

SHEPPARTON
Head Office
168 Welsford Street
PO Box 1752
Shepparton VIC 3632
Tel: (03) 5822 7700
Fax: (03) 5831 6254

BENALLA
89 Sydney Road
PO Box 124
Benalla VIC 3672
Tel: (03) 5822 7700

YEA
5/10 High Street
Yea VIC 3717
Tel: (03) 5797 4400

3. The corridors along all waterways, as shown in Figure 1, shall be revegetated in accordance with the Revegetation Guide for the Goulburn Broken Catchment (https://revegetation.gbcma.vic.gov.au/).
4. Where fencing crosses waterways, as shown in Figure 1, the fencing shall be designed such that it does not obstruct flood flows. For example, farm type fencing, large open mesh (150 mm centres), vertical pool style fencing (150mm centres), fencing that lifts with the floodwater or similar.

Figure 1: Showing estimated 1% AEP flood contours and designated waterways.

Note, where access roads cross the waterway shown in Figure 1 a works on waterways permit will be required from the Goulburn Broken CMA.

Please Note:

- This document contains floodplain management advice only. It does not constitute approval from any other statutory body. It is your responsibility to obtain any other required approvals.
- The 100-year ARI flood is not the maximum possible flood. There is always a possibility that a flood larger in height and extent, than the 100-year ARI flood, may occur in the future.

If you have any queries, please contact me on **(03) 5822 7700**. To assist in handling any enquiries please quote **GBCMA-F-2019-00090** in your correspondence. Please note that all electronic correspondence should be directed to planning@gbcma.vic.gov.au.

Yours sincerely

Guy Tierney
Statutory Planning and Floodplain Manager

Information contained in this correspondence is subject to the definitions and disclaimers below.

Definitions and Disclaimers

1. The area referred to in this letter as the 'proposed development location' is the land parcel(s) that, according to the Authority's assessment, represent(s) the location identified by the applicant. The identification of the 'proposed development location' on the Authority's GIS has been done in good faith and in accordance with the information given to the Authority by the applicant(s) and/or local government authority.
2. While every endeavour has been made by the Authority to identify the proposed development location on its GIS using VicMap Parcel and Address data, the Authority accepts no responsibility for or makes no warranty with regard to the accuracy or naming of this proposed development location according to its official land title description.
3. **AEP** as Annual Exceedance Probability – is the likelihood of occurrence of a flood of given size or larger occurring in any one year. AEP is expressed as a percentage (%) risk and may be expressed as the reciprocal of ARI (Average Recurrence Interval).
4. **ARI** as Average Recurrence Interval - is the likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100 years.
5. **AHD** as Australian Height Datum - is the adopted national height datum that generally relates to height above mean sea level. Elevation is in metres.
6. No warranty is made as to the accuracy or liability of any studies, estimates, calculations, opinions, conclusions, recommendations (which may change without notice) or other information contained in this letter and, to the maximum extent permitted by law, the Authority disclaims all liability and responsibility for any direct or indirect loss or damage which may be suffered by any recipient or other person through relying on anything contained in or omitted from this letter.
7. This letter has been prepared for a proposed Solar Farm and is for the use only of the party to whom it is addressed and no responsibility is accepted to any third party for the whole or any part of its contents. Neither the whole nor any part of this letter or any reference thereto may be included in any document, circular or statement without the Authority's written approval of the form and context in which it will appear.
8. The flood information provided represents the best estimates based on currently available information. This information is subject to change as new information becomes available and as further studies are carried out.
9. ***The responsible authority may use this information within 90 days of this letter.***

Taggert, Natalie

From: Barrett, Tony
Sent: Thursday, 27 August 2020 9:30 AM
To: Guy Tierney
Cc: Kasraie, Leila; Butler, Kristina
Subject: RE: Use of 300mm Freeboard for Inverters and Transformer Blocks

Thanks Guy,

That's correct. Our modelling and flood risk assessments are using the gauge data from the Stockyard Creek. This gauge provides a level for the major flooding in 1993 which was considered equivalent to the 1% AEP event for this catchment.

Thanks again,
Tony

Tony Barrett
Principal Consultant Water
D +61 3 9653 8073
Tony.Barrett@aecom.com

AECOM
Collins Square, Level 10, Tower Two 727 Collins Street, Melbourne, VIC 3008
T +61 3 9653 1234 F +61 3 9654 7117
aecom.com

From: Guy Tierney <guyt@gbcma.vic.gov.au>
Sent: Wednesday, 26 August 2020 9:15 PM
To: Barrett, Tony <Tony.Barrett@aecom.com>
Cc: Kasraie, Leila <leila.kasraie@aecom.com>; Butler, Kristina <Kristina.Butler@aecom.com>
Subject: [EXTERNAL] RE: Use of 300mm Freeboard for Inverters and Transformer Blocks

Dear Tony

The logic is that if you have available flood level information then the freeboard is the usual 300mm above the applicable flood. If you have such information then use it.

In the absence of flood information and allowing for those localised severe thunderstorm episodes due the climate change the allow 450mm above the general surround ground level. This only allows for 150mm of overland localised flooding with 300mm freeboard.

Sincerely

GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

Guy Tierney
Statutory Planning and
Floodplain Manager
Floodplain advice application forms; Works on waterways application forms
P | 03 5822 7700 M | 0408 359 991
E | guyt@gbcma.vic.gov.au W | www.gbcma.vic.gov.au
Workdays: Monday to Friday

I acknowledge the Traditional Owners of the land on which we work.
I pay my respects to their Elders; past, present and emerging and our Indigenous staff.

From: Barrett, Tony <Tony.Barrett@aecom.com>
Sent: Wednesday, 26 August 2020 4:10 PM
To: Guy Tierney <guyt@gbcma.vic.gov.au>
Cc: Kasraie, Leila <leila.kasraie@aecom.com>; Butler, Kristina <Kristina.Butler@aecom.com>
Subject: Use of 300mm Freeboard for Inverters and Transformer Blocks

Hi Guy,

Great to catch up again…. T-Minus 2 weeks and hopefully things will be a 'little' more normal.

As discussed, the two floodplain advice application responses we received in February 2019 (attached) had slightly different recommendations for the elevation of transformers and inverters above the predicted 1% AEP flood level (one requiring 300mm and one for 450mm).

Based on our conversation, it's my understanding that you would accept the use of a 300mm freeboard requirement for these two neighbouring sites.

However, please let me know in the meantime if you require any further information to satisfy this decision.

Many thanks,
Tony

Tony Barrett
Principal Consultant Water
D +61 3 9653 8073
Tony.Barrett@aecom.com

AECOM
Collins Square, Level 10, Tower Two 727 Collins Street, Melbourne, VIC 3008
T +61 3 9653 1234 F +61 3 9654 7117
aecom.com

Imagine it. Delivered.

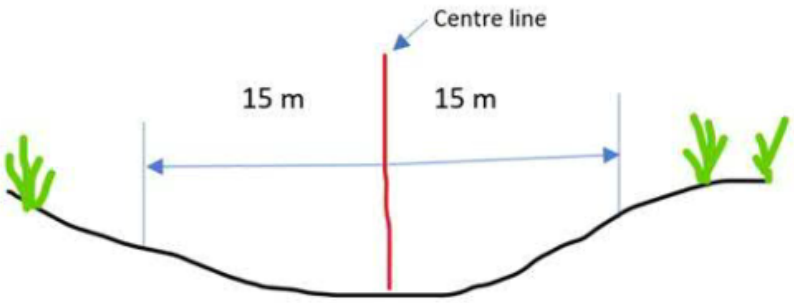
LinkedIn Twitter Facebook Instagram

2

Barrett, Tony

From: Russel Haque <russelh@gbcma.vic.gov.au>
Sent: Wednesday, 12 June 2019 2:56 PM
To: Barrett, Tony
Cc: Guy Tierney
Subject: GBCMA-F-2019-00089 & GBCMA-F-2019-00090

Hi Tony,
Referring to the subject mentioned applications, we have reviewed our responses and setback distances from the waterways. Please see the figure
below:



A 15 metres setback distance is required from the centreline of the waterways i.e. 30 metres corridors for the waterways. This corridor needs to be maintained for the waterways throughout the project areas for both solar farm projects.

Please let me know if you need to know anything further details.

Sincerely

GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

Russel Haque
Floodplain and River Health Projects Officer

P | 03 5822 7724 M | 0407 199 954
E | russelh@gbcma.vic.gov.au W | www.gbcma.vic.gov.au
My work days are Monday to Fridays, 8:30-5:00pm

1

Appendix C

GMW Waterway Determination Response

GOULBURN-MURRAY WATER

Our Ref: #A3638804
Your Ref: PN8195460

30 July 2019

Tony Barrett
AECOM - c/o Link Development Pty Ltd
Collins Square, Level 10, Tower 2
727 Collins St.
MELBOURNE VIC 3008

Lake Mokoan Solar Farm Proposal

Dear Tony,

I refer to a recent inspection at the properties listed below by Goulburn-Murray Water Diversion Inspector Ben Ives.

Lot 1, Plan of Subdivision 625748, Parish of Goorambat
Lot 1, Title Plan 173518C, Parish of Goorambat
Lot 2, Plan of Subdivision 625748, Parish of Goorambat

The purpose of this inspection was to carry out a "Waterway Determination" on the above described properties to identify any existing waterways.

This inspection identified a waterway commencing at the point identified by co-ordinates Zone 55, Eastings: 411559, Northings: 5966301 on lot 1 TP 819039, Parish of Goorambat.

A "Waterway Determination" is made by matching criteria used by Goulburn-Murray Water to determine if there is a waterway/watercourse at the site, as defined under Section 3 of the Water Act 1989.

As a result of the inspection, our findings show there is a waterway at the specific site inspected on this property at the above coordinates. It was identified during this inspection that the waterway also traverses the properties described above that are subject to the proposed development. In accordance with your advice, the purpose of the Waterway Determination is in relation to a proposed Planning Permit application.

There may be additional drainage lines, depressions or gullies that may require protection from development by means of setbacks. A map showing the location of the significant drainage lines, depressions or gullies is attached for your information.

PO Box 165 Tatura Victoria 3616 Australia | Email reception@gmwater.com.au | Phone 1800 013 357 | Website www.gmwater.com.au

Additionally, please be advised that the application has not been assessed for potential impacts on surface or groundwater quality and this letter is not prior written approval of the development proceeding.

GMW's interest is with the protection of surface water and groundwater and an assurance that proposed developments will not impact detrimentally on the flow and quality of surface water and groundwater.

Any proposed works planned on the waterway will require approval in the form of a Works Licence from Goulburn-Murray Water if the works relate to the 'take and use' of water.
Approval from the Goulburn Broken Catchment Management Authority is required for any other works.

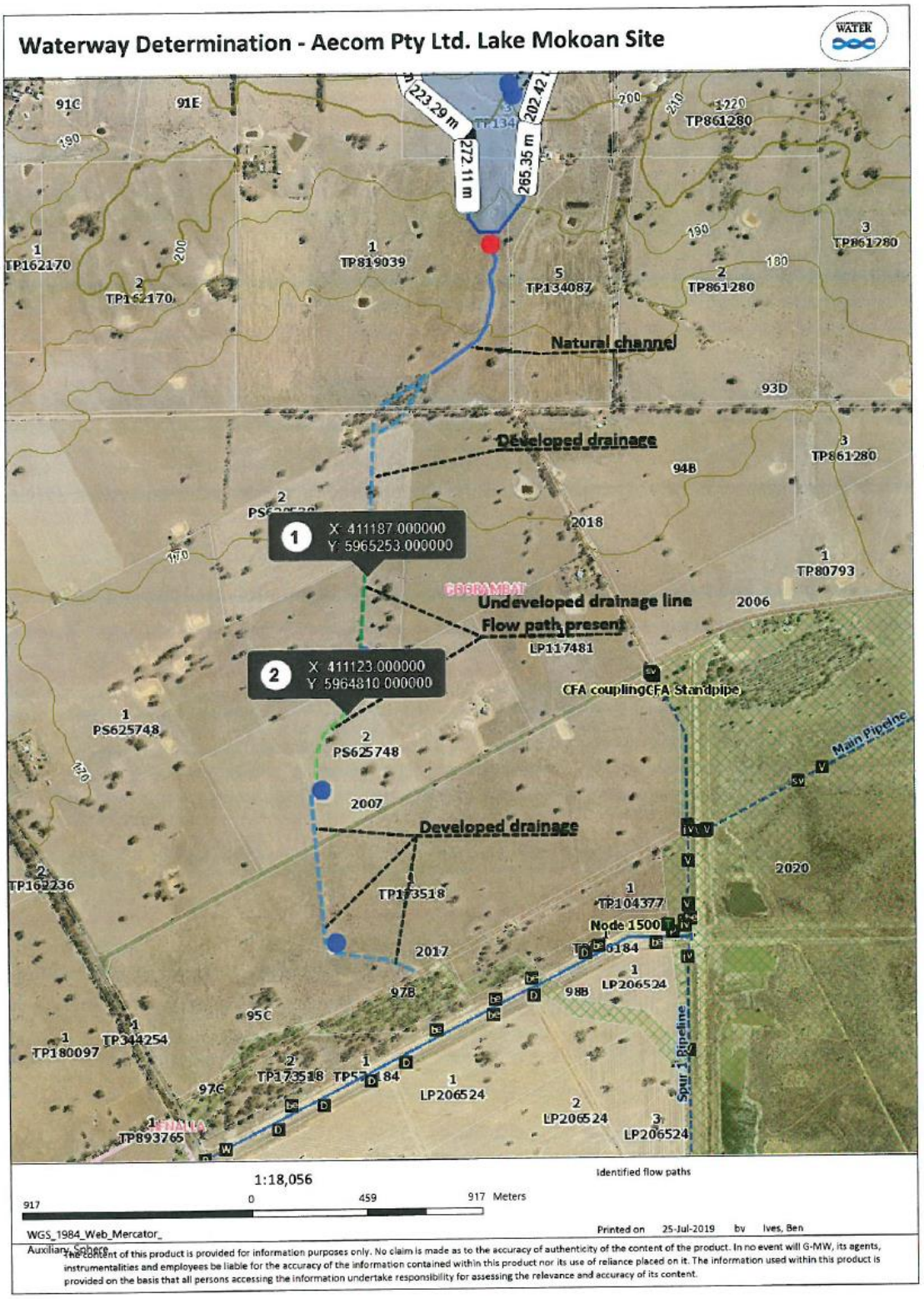
You are advised that you may require a planning permit from your Local Shire Council for the building and subsequent works and it is your responsibility to obtain permits as necessary.

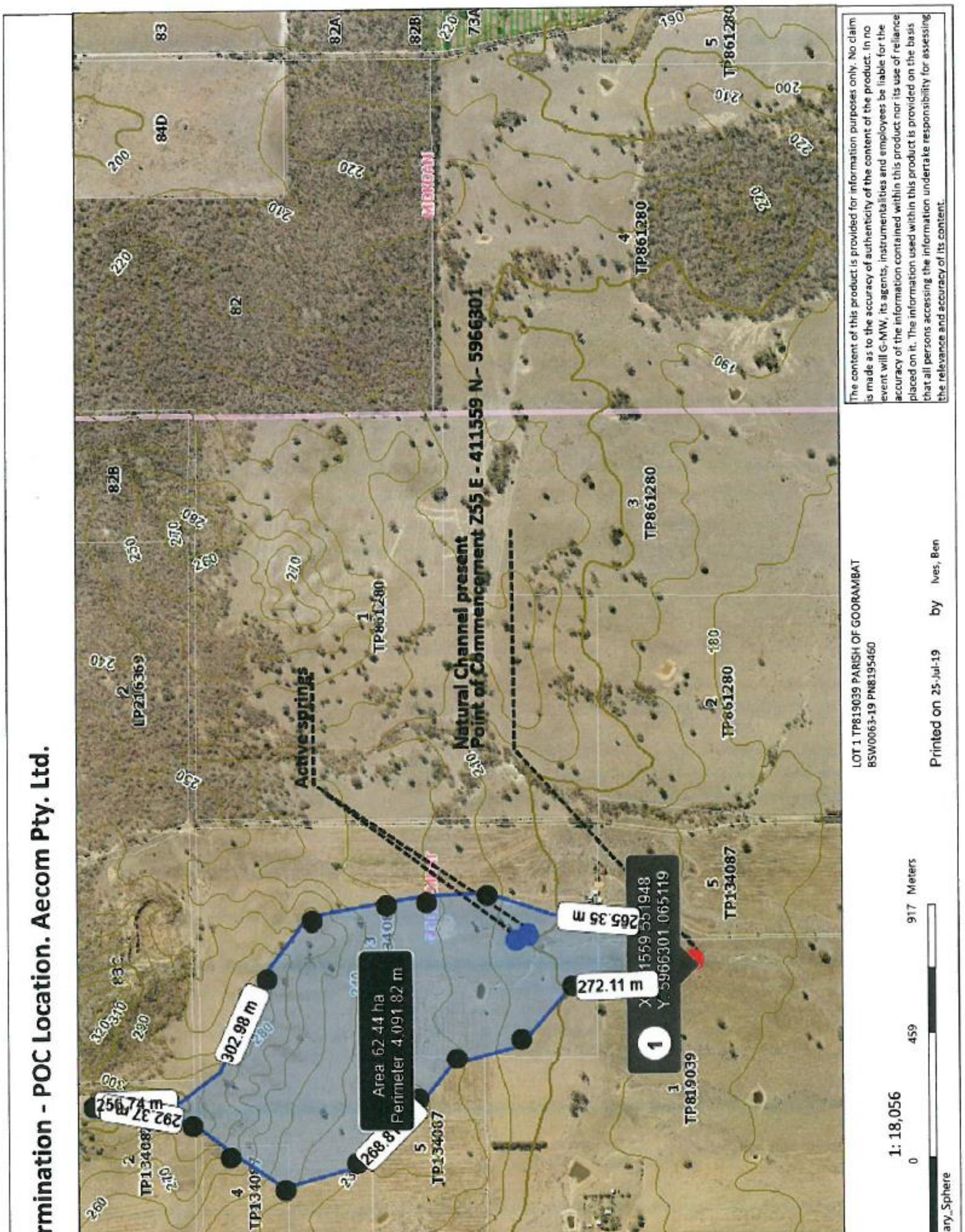
Should you require any further information on this inspection please do not hesitate to contact Diversion Inspector Ben Ives at the Shepparton office of Goulburn-Murray Water on (03) 58 227 958.

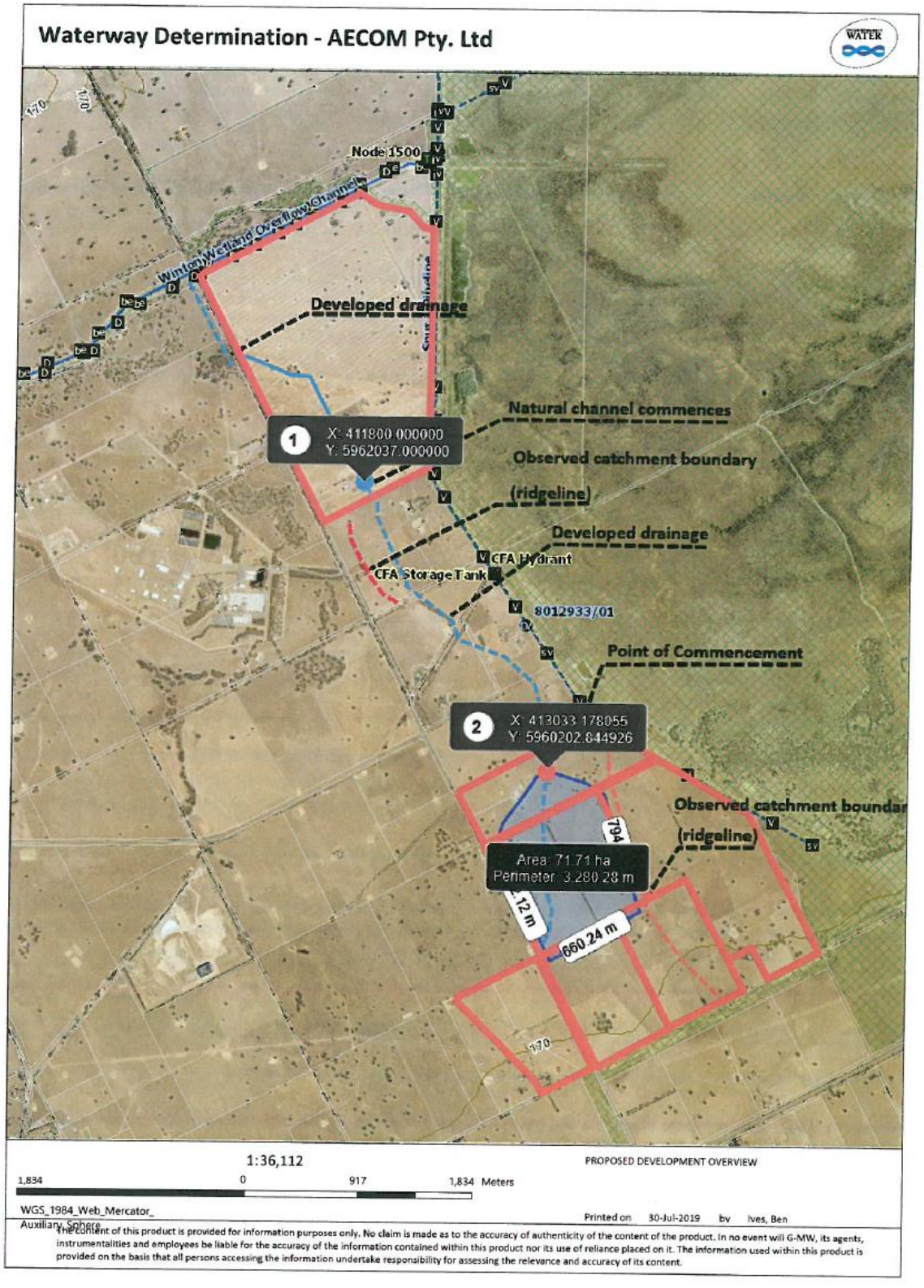
Yours sincerely

Cathy Wood
CUSTOMER SERVICE MANAGER
DIVERSIONS CENTRAL

cc Goulburn Broken Catchment Managent Authority
cc Benalla Rural City council
cc Ranine McKenzie – GMW Statutory Planning Unit


Waterway Determination - Aecom Pty Ltd. Lake Mokoan Site
WATER
223.29 m
272.11 m
265.35 m
202.42 m
Natural channel
Developed drainage
Undeveloped drainage line
Flow path present
Developed drainage
1 X: 411187.000000 Y: 5965253.000000
2 X: 411123.000000 Y: 5964810.000000
CFA couplingCFA Standpipe
Main Pipeline
Spur 1 Pipeline
Node 1500
TP861280
TP162170
TP819039
TP134087
TP80793
LP117481
PS625748
TP173518
TP104377
TP96184
LP206524
TP180097
TP344254
TP893765
93D
94B
2018
2006
2007
2020
2017
97B
95C
97C
1:18,056
0 459 917 Meters
Identified flow paths
WGS_1984_Web_Mercator_Auxiliary_Sphere
Printed on 25-Jul-2019 by Ives, Ben
The content of this product is provided for information purposes only. No claim is made as to the accuracy of authenticity of the content of the product. In no event will G-MW, its agents, instrumentalities and employees be liable for the accuracy of the information contained within this product nor its use of reliance placed on it. The information used within this product is provided on the basis that all persons accessing the information undertake responsibility for assessing the relevance and accuracy of its content.


Waterway Determination - POC Location. Aecom Pty. Ltd.
Active springs
Natural Channel present
Point of Commencement Z55 E - 411559 N - 5966301
Area 62.44 ha
Perimeter 4,091.82 m
302.98 m
272.11 m
265.35 m
256.74 m
292.37 m
TP819039
TP134087
TP861280
LP216369
LOT 1 TP819039 PARISH OF GOORAMBAT
BSW0063-19 PN8195460
Printed on 25-Jul-19 by Ives, Ben
1: 18,056
0 459 917 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
The content of this product is provided for information purposes only. No claim is made as to the accuracy of authenticity of the content of the product. In no event will G-MW, its agents, instrumentalities and employees be liable for the accuracy of the information contained within this product nor its use of reliance placed on it. The information used within this product is provided on the basis that all persons accessing the information undertake responsibility for assessing the relevance and accuracy of its content.


Waterway Determination - AECOM Pty. Ltd
Node 1500
Winton Wetland Overflow Channel
Developed drainage
Natural channel commences
1
X: 411800.000000
Y: 5962037.000000
Observed catchment boundary
(ridgeline)
Developed drainage
CFA Hydrant
CFA Storage Tank
8012933/01
Point of Commencement
2
X: 413033.178055
Y: 5960202.844926
Observed catchment boundar
(ridgeline)
Area: 71.71 ha
Perimeter: 3,280.28 m
794
660.24 m
1:36,112
1,834 0 917 1,834 Meters
PROPOSED DEVELOPMENT OVERVIEW
WGS_1984_Web_Mercator_
Auxiliary_Sphere
Printed on 30-Jul-2019 by Ives, Ben
The content of this product is provided for information purposes only. No claim is made as to the accuracy of authenticity of the content of the product. In no event will G-MW, its agents, instrumentalities and employees be liable for the accuracy of the information contained within this product nor its use of reliance placed on it. The information used within this product is provided on the basis that all persons accessing the information undertake responsibility for assessing the relevance and accuracy of its content.

AECOM Australia Pty Ltd
Level 10, Tower Two, 727 Collins Street
Melbourne, VIC 3008
T +61 3 9653 1234
F +61 3 9654 7117