PROJECT.e

RENEWABLE INFRASTRUCTURE SPECIALISTS

Tamworth Solar Farm

Response to Request for Information 29/4/20

Prepared for: Tamworth Solar Farm Pty Ltd

May 2020

Contents

List of Appendices

Abbreviations

AC	Alternating current
BAR	Basic Auxiliary Right
BDAR	Biodiversity Development Assessment Report
EIS	Environmental Impact Statement
kV	Kilovolt
MW	Megawatt
MWh	Megawatt-hour
NML	Noise Management Level
TfNSW	Transport for New South Wales

1 Introduction

This document contains Tamworth Solar Farm's response to a request for additional information from the Department of Planning, Industry and Environment dated 14th April 2020 as well as additional requests on the 4th, 7th and 12th of May.

2 Road Upgrades

Requested Information: "*Clarify the nature and location(s) of the intersection upgrades and intersection treatment types and include a swept path diagram for the largest vehicles travelling to and from the site*."

The intersection of the Oxley Highway and Babbinboon Road is being upgraded to include a deceleration lane for vehicles turning left into Babbinboon Rd. Based on the discussions with TfNSW and on their request, a Basic Auxiliary Right (BAR) treatment is being provided at the intersection. Furthermore, two new bus stops will be provided that will give a much greater level of safety than the existing bus stops. A concept plan for the upgrade and a swept path diagram for the largest vehicle is included as Appendix A. Further information on why a higher level of treatment is not require is provided in the Technical Design Note in Appendix F along with information on sight lines for the bus stops.

The remaining intersection are:

- Babbinboon Rd and Warminster Rd, and
- Warminster Rd and Soldier Settlement Rd

The footprint and alignment of these intersections will not change. The surface will be sealed with asphalt in the locations shown in Appendix B.

Requested Information: "*Clarify all road alignment upgrades including type of road treatment (gravel / asphalt) and length of treatment*."

The only upgrade involving a change to the road alignment is at the intersection of the Oxley Highway and Babbinboon Rd. All other road work will be within the existing footprint of the road with the exception of the removal by hand of one acacia at the intersection of Babbinboon Rd and Warminster Rd. The location of the other road treatments are shown in Appendix B. They include:

- The sealing of the corners.
- The sealing of intersections.
- The sealing of the main entrance into the solar farm.
- The sealing of the road for 100 m either side of houses that are within 250 m of the transport route.

These upgrades are summarised in Table 1. The road upgrades will be made prior to construction of the solar farm.

Table 1. Summary of Road Upgrades

Location	Upgrade Requirements
Intersection of Oxley Highway and Babbinboon Rd	Installation of a deceleration lane, basic auxiliary right and two bus stops as shown in Appendix A
Babbinboon Rd, Warminster Rd and Soldier Settlement Rd as shown in Appendix B. Coordinates of transition points from gravel to sealed are provided.	Sealing of the road with asphalt/bitumen.
Intersection of Babbinboon Rd and Warminster Rd.	Road line marking (centreline) that requires traffic turning right onto Babbinboon Rd from Warminster Rd to approach perpendicular to Babbinboon Rd rather than cutting the corner. Removal or trimming by hand of one acacia to improve sight distances.
Causeways on Babbinboon Rd and Warminster Rd as marked in Appendix B.	Provide appropriate signage at these causeway that notifies traffic that the road narrows.

Requested Information: ***"Provide an updated figure identifying where all intersection and road upgrades are proposed."***

An updated figure identifying where all intersection and road upgrades are proposed is shown in Appendix B.

Requested Information: "***Provide an assessment of any upgrades (including biodiversity and heritage) that are not included in the application to date and identify any additional land parcels which may be affected due to the proposed road upgrades, including landowner consent to be provided for additional land parcels.***"

The road upgrades that are not include in the application to date are:

1. The bus stop on the southern side of the Oxley Highway adjacent to the deceleration lane.
2. The Basic Auxillary Right (BAR) treatment on the northern side of the Oxley Highway and the adjacent bus stop bay.
3. The entrance to the substation access track. This is not a road upgrade as such as the carriageway of Soldier Settlement Rd will not be changed. However, a small section of land on this track was overlooked for survey in the EIS.

Bus stop adjacent to deceleration lane

The location of this upgrade is shown in Appendix A. The bus stop on the southern side of the Oxley Highway, adjacent to the deceleration lane is completely within the "Development Site" that was surveyed as part of the EIS. The Development Site at the deceleration lane is entirely within the road easement. There are no additional land parcels impacted.

The findings of these surveys are reported in the Biodiversity Development Assessment Report (BDAR) and the Aboriginal Cultural Heritage Assessment which respectively form Appendix B and Appendix D of the EIS. The BDAR found that the area was covered with of Coolatai Grass (*Hyparrhenia hirta*) and other exotic species. The BDAR has been included in this report as Appendix G with Figure 1-17 included. The Aboriginal Cultural Heritage assessment of this area found one open camp site (OS7). This site will be impacted by the development of the deceleration lane. There is no additional impact from the development of the bus stop.

BAR and adjacent bus stop

The BAR and adjacent bus stop lay outside the area that was originally surveyed. Consequently, the area was surveyed for biodiversity and Aboriginal cultural heritage on the 18th May 2020. The results of these surveys are provided in Appendices D and E. The survey area is shown in Figure 1. In relation to biodiversity, no threatened flora or fauna species were detected and ecological values for the site were considered to be low. The area was dominated by exotic species.

With respect to Aboriginal cultural heritage, one Aboriginal site was identified (consisting of 3 artefacts). This was an extension of Open Camp Site 7 which was recorded in the Aboriginal cultural heritage assessment: Tamworth Solar Farm 2019 (AREA 2019). This site can be managed with actions provided in Section 9 of the Aboriginal cultural heritage assessment: Tamworth Solar Farm 2019 (AREA 2019).

The BAR and adjacent bus stop are completely within the Crown land of the Oxley Highway. No additional land parcels are impacted.

Entrance to the substation access track

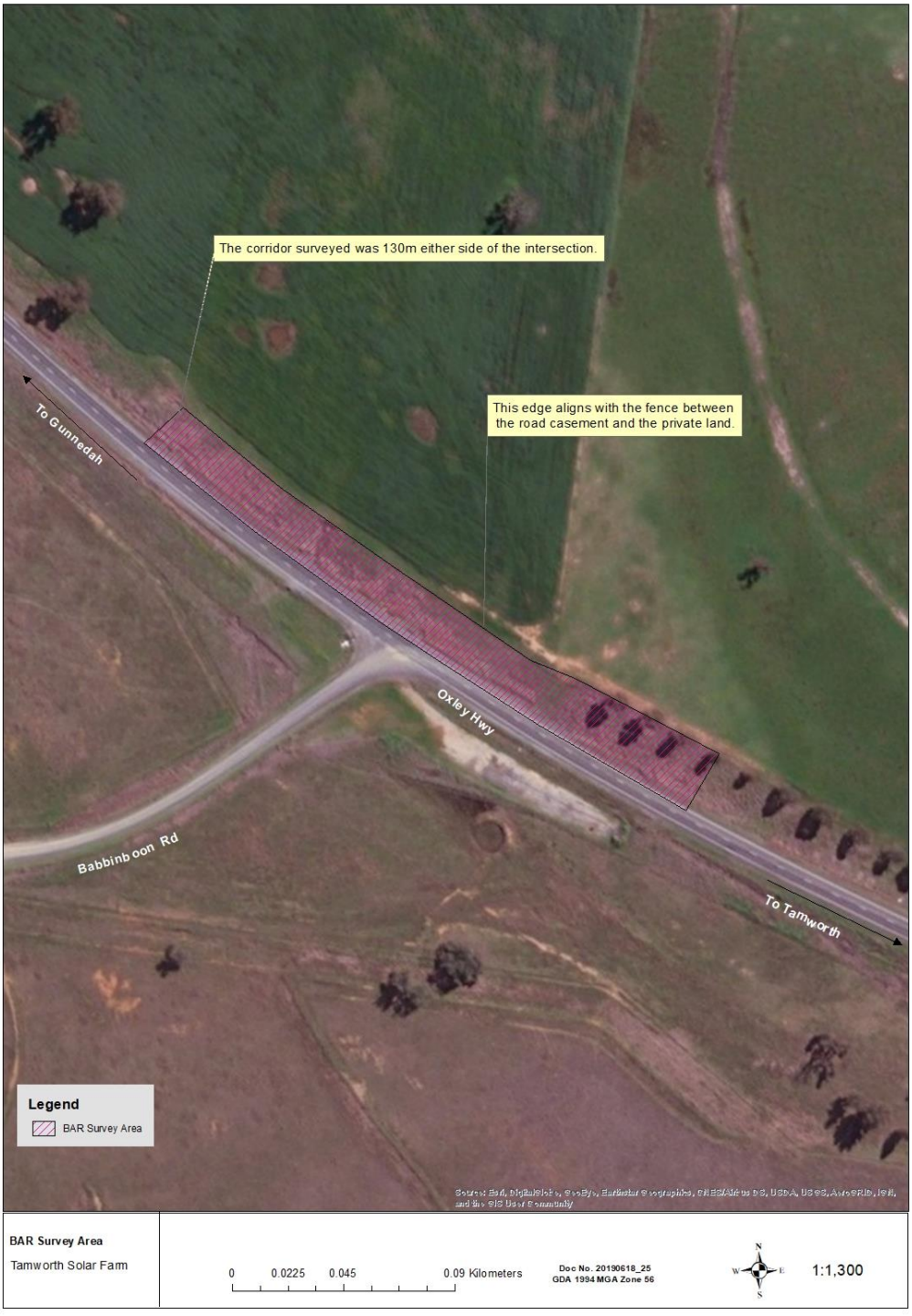
The access track to the substation was included in the EIS, however a small portion of the track from the property boundary fence to the edge of Soldier Settlement Rd was overlooked for survey. This is a distance of about 7.5m. The track is intended to serve as a separate entrance to the substation should the substation be subdivided off. Use of the track will be very limited during construction and operation. The main access for the solar farm (the existing farm entrance) will be the main entrance for vehicles involved in the construction of the substation. The access track will simply abut to the edge of Soldier Settlement Rd. It will be a gravel track with no sealing. There will be no change to the carriageway of Soldier Settlement Rd.

The area was surveyed for biodiversity and Aboriginal cultural heritage on the 18th May 2020. The survey area and the results of these surveys are provided in Appendices D and E. With respect to biodiversity, no threatened flora or fauna species were detected and ecological values for the site were considered to be low. The area was dominated by exotic species. No Aboriginal heritage sites were found in this area.

Sealing sections of Babbinboon and Warminster Rd.

Sealing the intersections and corners along the transport route from the Oxley Highway was included in the EIS as was the option to seal sections of the road to control dust. The sections that will be sealed have been detailed in Appendix B. The precise location of transition points from gravel to sealed road is provided in the embedded table. Sealing will occur within the footprint of the existing formed road. As such, there is no requirement for surveys and there are no additional land parcels affected. The main access to the solar farm will be sealed to the existing front gate to the width of the existing driveway. There will be no removal of any existing vegetation.

Figure 1. Survey area for the Basic Auxiliary Right treatment and adjacent bus stop.

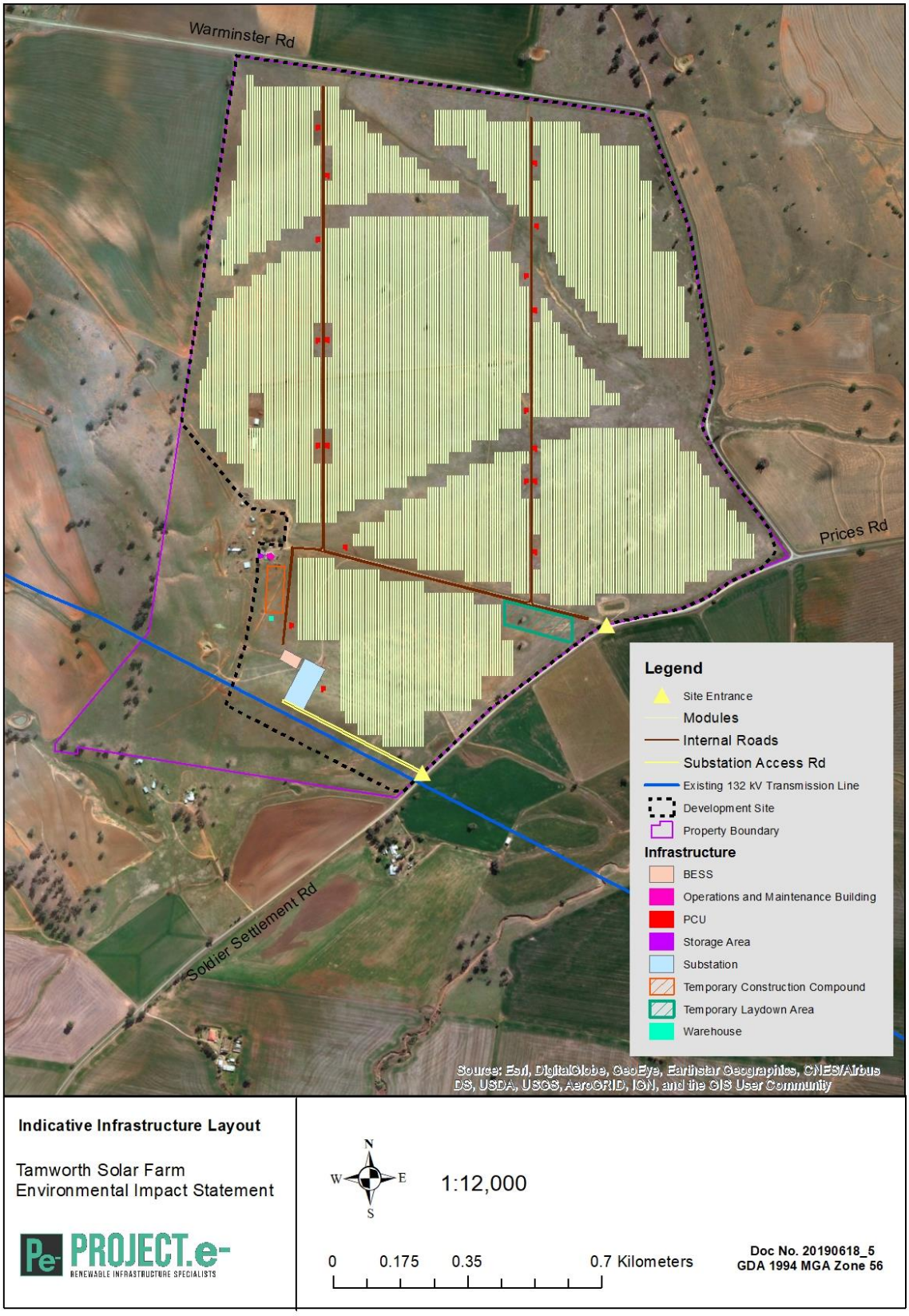


3 Traffic and transport

Requested Information: "*Clarify the number and location of site access points to the site*."

There are two site access points as shown in Figure 2. The most northern access point is the main access point to the site. The southern access point is to the substation and will be used infrequently.

Figure 2. Site entrance points.



Requested Information: "*Clarify the impact on school bus routes near the intersection of Oxley Highway and Babbinboon Road and evidence of consultation with operators.*"

After a meeting with Tamworth Regional Council in March 2020, the Council provided contact details for four bus companies that could possibly operate in the area. They were:

Tamworth Buslines – 67623999
Macphersons Coaches - 67607190
Fiona's Mini Bus - 6760908
Peel Valley Coaches – 67664418

Each of these companies were contacted and asked if they had any school bus routes between the Oxley Highway and the site. All confirmed that they do not. Macphersons Coaches do operate along the Oxley Hwy. Macphersons stated that their bus stop for buses travelling towards Gunnedah was just past the intersection of Babbinboon Rd as shown in Figure 3. For buses travelling to Tamworth, it is just east of the intersection.

To provide better bus stop locations at the intersections, Tamworth solar farm will construct sealed bus stops as shown in Appendix A. These locations have been discussed with Macphersons Coaches and they think the sites are suitable. An email from Macphersons is provided in Appendix C. The request they made to have the bus stop on the northern side of the highway widened to 3.6m has been included in the concept design in Appendix A.

Figure 3. Existing bus stops at the intersection of Babbinboon Rd and Warminster Rd.

4 Other Matters

Requested Information: *"Please clarify the capacity of the solar farm and the number of solar panels proposed."*

The rated output of the solar farm will be 65 MW (AC). There will be approximately 200,000 solar panels.

Requested Information: *"Please clarify the capacity of the battery storage system."*

The battery energy storage system will have a capacity of 19 MW/19 MWh.

Requested Information: *"Please clarify overall development footprint (including other ancillary infrastructure and battery storage)".*

The area of the Development Site is 206.65 Ha. The area of elements within that site are provided in Table 2.

Table 2. Area of elements of the solar farm

Element	Area (Ha)
Area taken up by 200,000 panels	40
Area taken up by panels and the rows in between	145
Substation	0.72
Battery energy storage system	0.15
Power conversion units	0.6
Operations and maintenance building	0.025
Storage area	0.015
Warehouse	0.015
Temporary construction compound	0.55
Temporary laydown area	1.2

Requested Information: *"Please clarify the number of construction jobs".*

At the peak of construction there may be up to 200 people working onsite.

Requested Information: *"Please clarify if staging of works are proposed and what each stage encompasses".*

Staging of works is not proposed.

Requested Information: "***Please clarify daily operations / maintenance hours of operation***."

The hours of operation for daily operations/maintenance are Monday to Friday, 7am to 6pm and Saturdays, 8 am to 1 pm.

Requested Information: ***"Please also confirm the expected noise levels during the decommissioning stage of the development."***

Decommissioning works are anticipated to take approximately 3 months. The main noise generating activities would include:

- Removal of solar panels, above-ground cabling and mounting frames using hand tools/ power tools;
- Removal of posts, underground cables and concrete footings using an excavator; and
- Minor earthworks using an excavator to remove roads and hardstands and reprofile to original grade.

The equipment used to undertake decommissioning works would include hand tools, excavators, trucks, telehandlers and light vehicles. This is similar to the equipment used for construction with the exception of the hydraulic piling rigs which would not be required for decommissioning. With the exclusion of the piling rigs, it is estimated that received noise levels at the current sensitive receptors would remain below the Noise Management Level (NML) during decommissioning works.

However, the concrete footings may require a rock-breaker to break them up. This is considered unlikely to be required. If a rock-breaker is required, noise emissions from this scenario are similar in level and nature to a hydraulic piling rig. Therefore, as with the predicted noise impacts during piling works, it is likely that noise levels would exceed the NML at Receiver R02 on Soldiers Settlement Road when works occur in the southern panel array of the site. The impacts from the removal of concrete footings would be of short duration. It is estimated that work with the rock-breaker would take less than 2 days for the whole site and less than 1 day in the Noise Management Zone. Notwithstanding, the project has developed specific noise management measures to minimise noise impacts. For both construction and decommissioning activities occurring within the Noise Management Zone (NMZ) (ie within 600m of Receiver R02), only one item of significant noise generating equipment (ie piling rig or excavator) is to operate at any time. Furthermore, the project will notify the potentially affected receiver(s) of the work schedule proposed and the likely duration of any activities.

5 Appendices

Appendix A. Oxley Highway / Babbinboon Rd intersection concept plan and swept path diagram

PROPOSED INTERSECTION

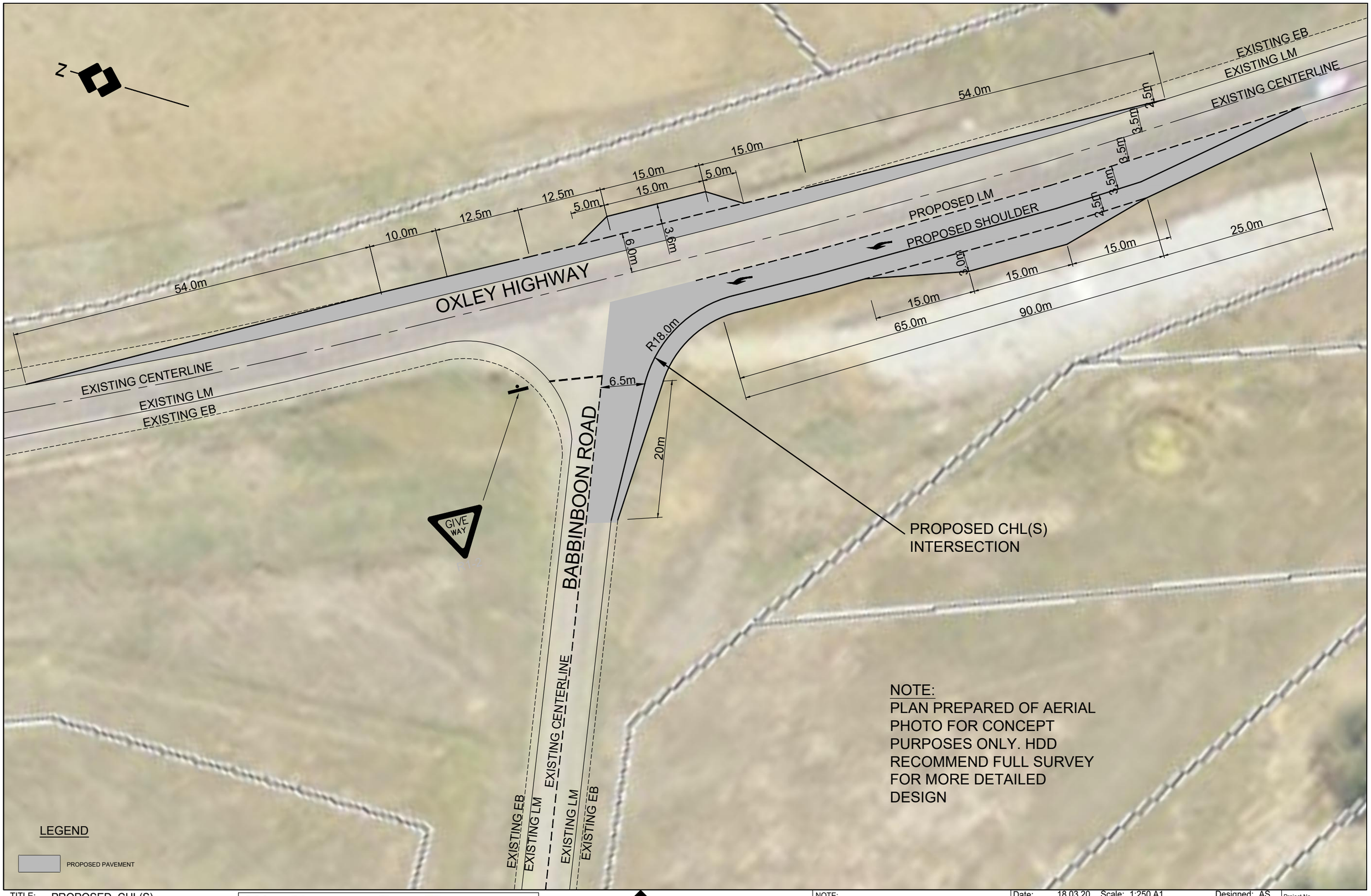
OXLEY HIGHWAY

TAMWORTH, NSW

SECA SOLUTIONS

TAMWORTH REGIONAL COUNCIL

KEVIN URANE 0412009891



TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

OVERALL PLAN

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

NOTE:

ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION AND LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

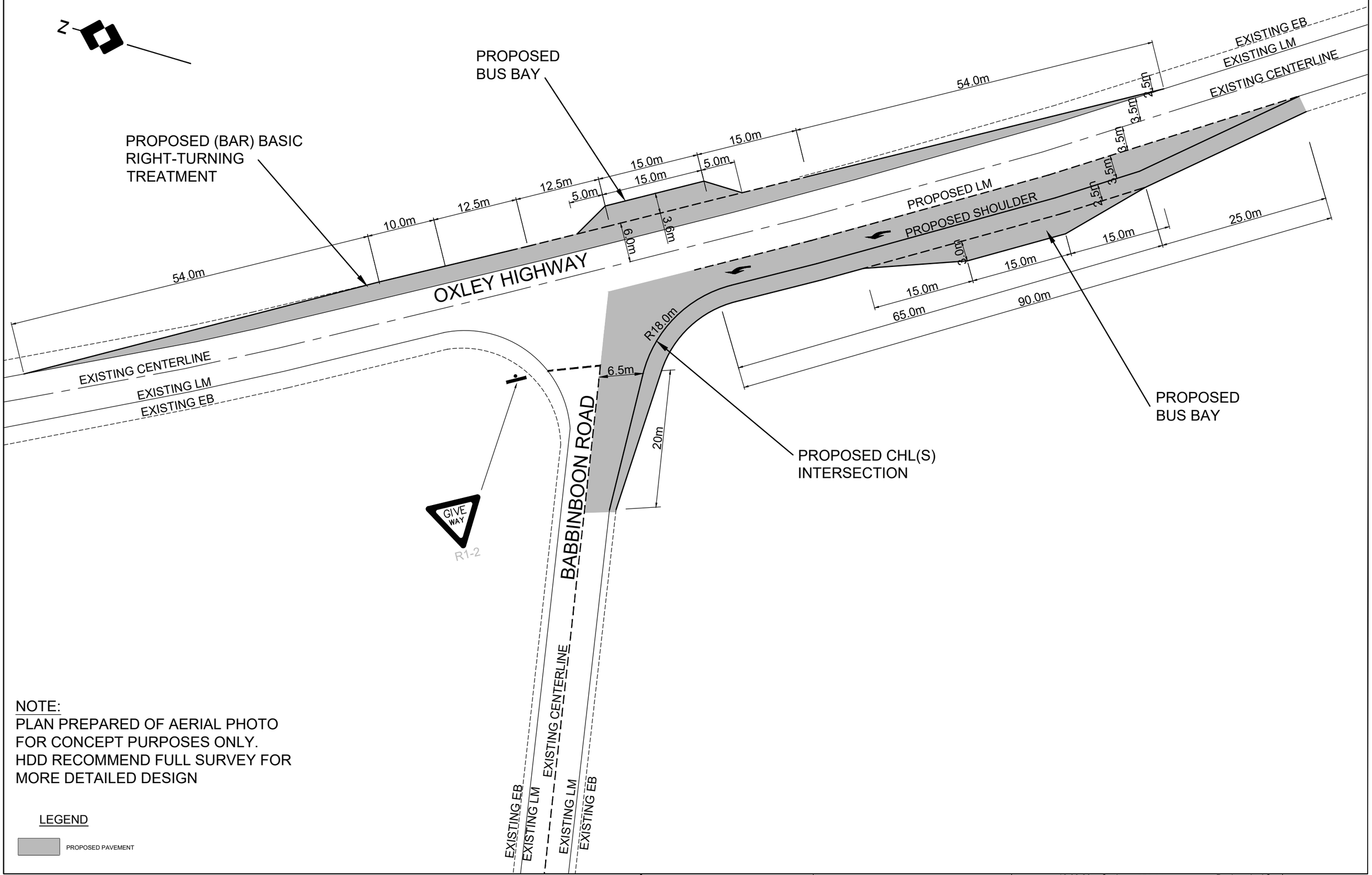
Date: 18.03.20 Scale: 1:250 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
5	WIDEN BAS BAY	KU	22.02.20

Project No HD284

Drawing No INT01

Revision 5



NOTE:
PLAN PREPARED OF AERIAL PHOTO
FOR CONCEPT PURPOSES ONLY.
HDD RECOMMEND FULL SURVEY FOR
MORE DETAILED DESIGN

LEGEND

PROPOSED PAVEMENT

TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

INTERSECTION PLAN

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

NOTE:
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Date: 18.03.20 Scale: 1:250 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
5	WIDEN BUS BAY	KU	22.05.20

Project No HD284
Drawing No INT02
Revision 5

PROPOSED
BUS BAY

PROPOSED (BAR) BASIC
RIGHT-TURNING
TREATMENT

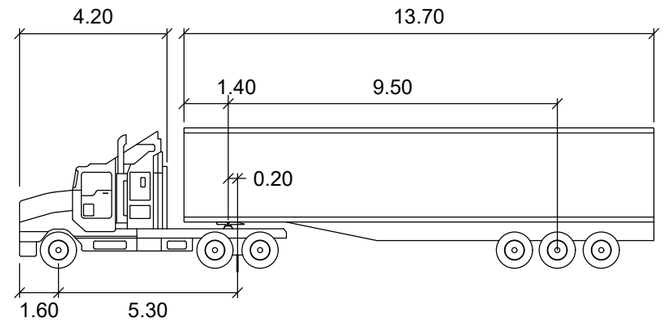
OXLEY HIGHWAY

BABBINBOON ROAD

PROPOSED CHL(S)
INTERSECTION

PROPOSED
BUS BAY

GIVE WAY
R1-2



PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

NOTE:
PLAN PREPARED OF AERIAL PHOTO
FOR CONCEPT PURPOSES ONLY.
HDD RECOMMEND FULL SURVEY FOR
MORE DETAILED DESIGN

LEGEND

PROPOSED PAVEMENT

TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

VEHICLE TURNING MOVEMENTS 1 OF 4

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

NOTE:
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Date: 18.03.20 Scale: 1:250 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
2	PROPOSED CHL(S)	AS	25.03.20

Project No HD284
Drawing No INT03
Revision 4

PROPOSED
BUS BAY

PROPOSED (BAR) BASIC
RIGHT-TURNING
TREATMENT

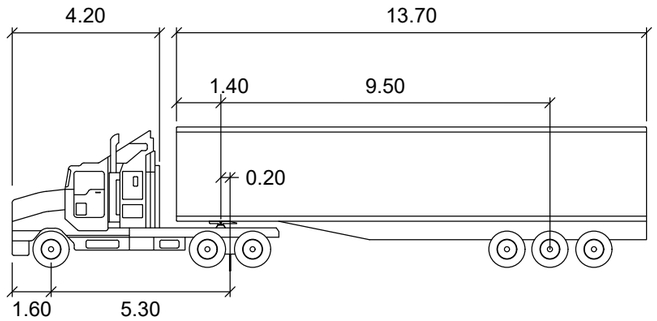
OXLEY HIGHWAY

BABBINBOON ROAD

PROPOSED CHL(S)
INTERSECTION

PROPOSED
BUS BAY

GIVE WAY
R1-2



PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

NOTE:
PLAN PREPARED OF AERIAL PHOTO
FOR CONCEPT PURPOSES ONLY.
HDD RECOMMEND FULL SURVEY FOR
MORE DETAILED DESIGN

LEGEND

PROPOSED PAVEMENT

TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

VEHICLE TURNING MOVEMENTS 2 OF 4

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

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Date: 18.03.20 Scale: 1:250 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
2	PROPOSED CHL(S)	AS	25.03.20

Project No HD284
Drawing No INT04
Revision 4

PROPOSED
BUS BAY

PROPOSED (BAR) BASIC
RIGHT-TURNING
TREATMENT

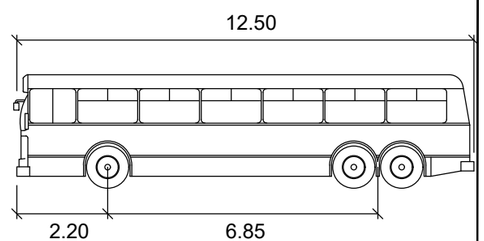
OXLEY HIGHWAY

BABBINBOON ROAD

PROPOSED CHL(S)
INTERSECTION

PROPOSED
BUS BAY

GIVE WAY
R1-2



BUS

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

NOTE:
PLAN PREPARED OF AERIAL PHOTO
FOR CONCEPT PURPOSES ONLY.
HDD RECOMMEND FULL SURVEY FOR
MORE DETAILED DESIGN

LEGEND

PROPOSED PAVEMENT

TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

VEHICLE TURNING MOVEMENTS 3 OF 4

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

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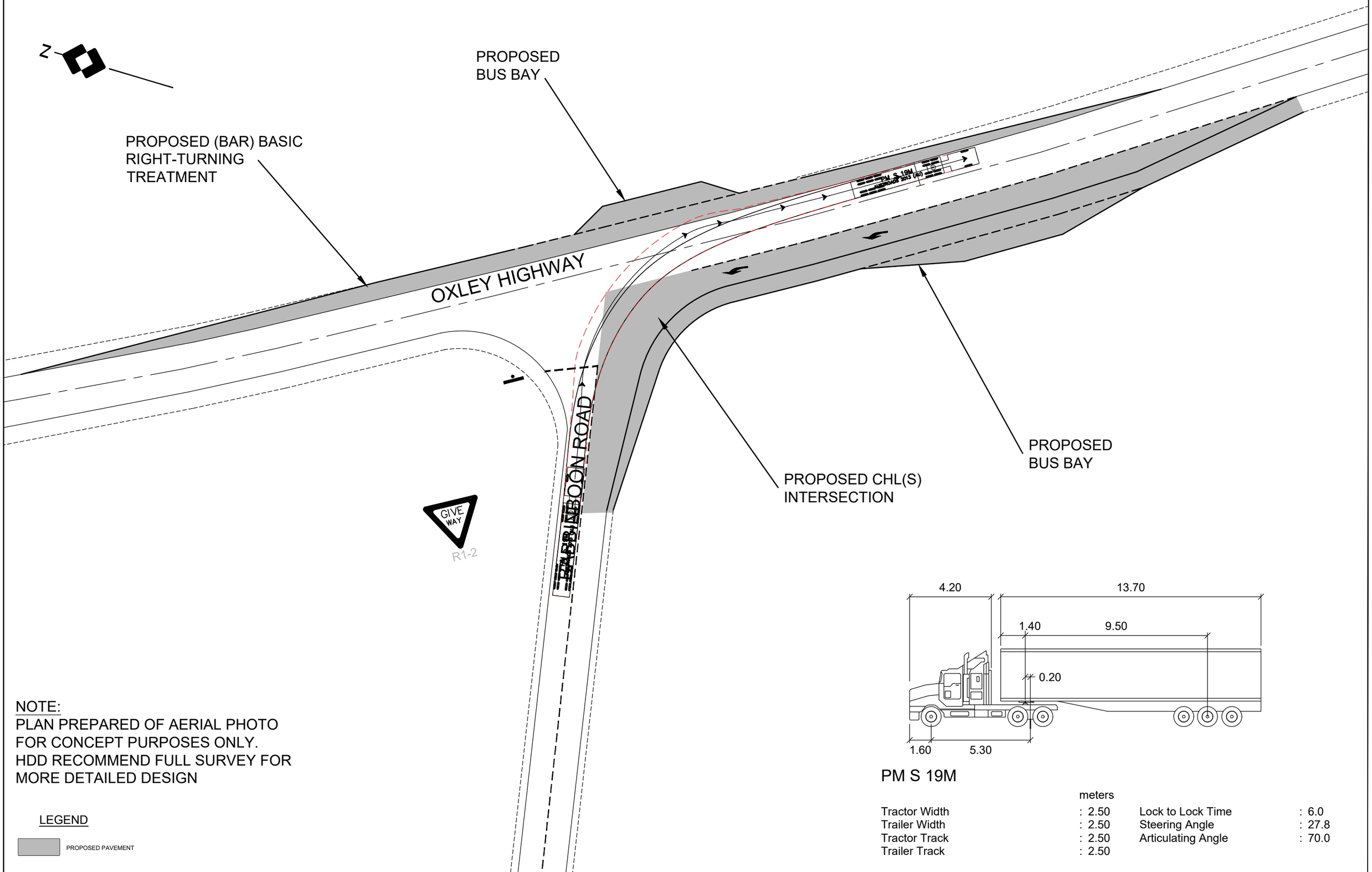
Date: 18.03.20 Scale: 1:250 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
2	PROPOSED CHL(S)	AS	25.03.20

Project No HD284
Drawing No INT05
Revision 4



NOTE:
PLAN PREPARED OF AERIAL PHOTO
FOR CONCEPT PURPOSES ONLY.
HDD RECOMMEND FULL SURVEY FOR
MORE DETAILED DESIGN

LEGEND

PROPOSED PAVEMENT

PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

TITLE: PROPOSED CHL(S)
OXLEY HIGHWAY

VEHICLE TURNING MOVEMENTS 4 OF 4

CLIENT: SECA SOLUTIONS

SECA solution
Suite 1, 161 Scott Street, Newcastle NSW 2300
Ph (02) 40327979 Mb 0425 250 031

High Definition Design Pty Ltd
KEVIN URANE 0412009891

NOTE:
ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION AND LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

Date: 18.03.20 Scale: 1:300 A1 Designed: AS
Cad Ref: HD284 OXLEY HIGHWAY_INTERSECTION_R5

No	Amendment	Drawn	Date
4	ADD BAR AND BUS BAY	AS	18.05.20
3	ADD BUS BAY	KU	28.04.20
2	PROPOSED CHL(S)	AS	25.03.20

Project No HD284
Drawing No INT06
Revision 4

Appendix B. Location of road upgrades

BAR treatment as per concept design

To Gunnedah

Oxley Highway

To Tamworth

Racecourse Rd

Signage for causeway alerting of narrow road.

Deceleration lane as per concept design

R20

R21

R16

R17

R18

R19

R12

R15

R13

R14

Babbinboon Rd

Warminster Rd

R05

Warminster Rd

Signage for causeway alerting of narrow road.

R01

R01A

Main solar farm entrance

Prices Rd

Entrance to the substation. No sealing or other changes to the carriageway of Soldier Settlement Rd. Negligible traffic to use this entrance during construction or operation.

R03

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinates of the Transition Points

Number	Easting	Northing
1	276760	6571675
2	276561	6571704
3	276258	6571753
4	276157	6571675
5	276036	6570832
6	275625	6570809
7	275387	6570845
8	275189	6570874
9	274867	6570922
10	274468	6570980
11	274422	6570986
12	274219	6571016
13	274001	6570527
14	273780	6569049
15	273800	6568876
16	275606	6568612
17	275688	6568552
18	275833	6567852
19	275837	6567729
20	276018	6567480
21	276097	6567446
22	275998	6567419
23	275607	6567270
24	275541	6567246

Legend

- Transition Points
- Site Entrance
- Houses
- Transport Route
- Development Site

Road Treatment

- Existing Sealed Road
- Road to be Sealed with Asphalt

Road Upgrades Along the Transport Route

Tamworth Solar Farm

0 0.25 0.5 1 Kilometers

Doc No. 20190618_8
GDA 1994 MGA Zone 56

N W E S

1:15,000

Appendix C. Email from Archie Macpherson

Daryl Brown

From: Archie <archie@maccoaches.com.au>
Sent: Thursday, 21 May 2020 1:13 PM
To: Daryl Brown
Subject: RE: Oxley Highway design plans
Attachments: HD284 OXLEY HIGHWAY_INTERSECTION_R4.pdf

Hi Daryl

The locations of the bus stops are fine.

Only one small issue
The proposed bus stop heading towards Tamworth will need to be 3.6 metres wide from existing EB 3.0 metres does all allow enough room for passengers to disembark without the need to step down into table drain.

Regards

Archie Macpherson

Macphersons Coaches

PO Box 7076 NEMSC 2348
PH 0267 607190

From: Daryl Brown <daryl.brown@projecte.com.au>
Sent: Thursday, 21 May 2020 12:11 PM
To: archie@maccoaches.com.au
Cc: Victor Bocioc <victor@oriensenergy.com.au>
Subject: FW: Oxley Highway design plans

Hi Archie,

As discussed on the phone please find attached a plan showing the proposed bus stop locations at the Babbinboon Rd / Oxley Hwy intersection. If you could please indicated whether you are happy with the proposed locations that would be great.

Regards

Daryl Brown
Senior Environmental Consultant
PROJECT.e-

Appendix D. Biodiversity supplementary assessment

Tamworth Solar Farm
Biodiversity supplementary assessment

Tamworth LGA, NSW

May 2020

AREA
ENVIRONMENTAL CONSULTANTS & COMMUNICATION

AREA Environmental Consultants & Communication
(a) 6 Belmore Street Dubbo NSW 2830
(b) “Thieles Gate” (Type 2 Conservation Agreement Area) 79 Huonbrook Rd Mullumbimby NSW 2482
Ph 0409 852 098
phil@areaenvironmental.com.au

AREA Environmental Consultants & Communication acknowledge Traditional Owners of the country on which we work

Document Controls

Proponent	Tamworth Solar Farm Pty Ltd		
Client	PROJECTe-		
Document Description	Supplementary biodiversity assessment: Additional areas -Tamworth Solar Farm		
Clients Representative Managing this Document	AREA Person(s) Managing this Document		
Daryl Brown	Phil Cameron (PJC) - Principal Consultant		
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Prepared For	Prepared by		
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Certified by:  Phillip Cameron BAM Assessor: BAAS17082 Date: 21/05/2020			

1. Introduction

Tamworth Solar Farm Pty Ltd (the proponent) is seeking approval under Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a Development Application (DA) for the Tamworth Solar Farm (the project) on Lot 186 DP755340.

An Environmental Impact Statement (EIS) is required as part of the approval process and this project is to be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Under s.4.15(1)(b) of the EP&A Act, the applicant must consider "the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality".

AREA Environmental Consultants & Communication (AREA) was commissioned by PROJECTe- on behalf of Tamworth Solar Farm Pty Ltd to complete a Biodiversity Development Assessment Report as part of the DA, which was delivered in December 2019. A review of the DA concluded that additional information was required, and two additional areas needed to be assessed:

- A proposed new Deceleration Lane Development Area along the Tamworth bound lane of the Oxley Highway at Babbinboon Road intersection (additional 0.42 hectares) (Figure 1-2)
- The portion of the substation access track between the solar farm boundary and Soldier Settlement Rd (an area of 0.03 hectares) (Figure 1-3).

The purpose of this document is to report the findings of further biodiversity assessments carried out by AREA at these two study areas, and to identify if additional biodiversity or ecological constraints were present.

The Solar Farm Development Area is located approximately seven kilometres south of Somerton in the Tamworth Local Government Area (LGA). The proposed Tamworth bound lane Basic Auxiliary Right treatment is along the Oxley Highway at the Babbinboon Road intersection, 4.5 kilometres east of Somerton (Figures 1-2 and 1-2).

Desktop threatened species, population and community database searches conducted for the AREA Environmental Biodiversity Development Assessment Report 2019 (AREA 2019) remain relevant for this additional assessment.

Field survey for this project took place on Monday 18 May 2020. No threatened flora or fauna species were detected and ecological values for each of the sites were considered low both study areas were dominated by exotic species. As such, the results of these additional assessments will not change the outcomes of the existing BDAR provided by AREA 2019.

2. Methods and results

2.1 Site descriptions

The Development Area is located approximately 32 kilometres north west from Tamworth, NSW (Figure 1-1). Two additional areas of land associated with the Tamworth Solar Farm Biodiversity Development Assessment Report (2019) were assessed (Study Area 1 & 2).

Study Area 1: The Tamworth bound lane Basic Auxiliary Right treatment development area

This development area is approximately 4.5 kilometres from Somerton at the intersection of the Oxley Highway and Babbinboon Road (afront to Lot 2 DP1137306 and Lot 11 DP658678) and includes approximately 266 metres of roadside verge from the edge of the highway to the agricultural fence line, totalling 0.42 hectares. This additional development area is opposite of a Gunnedah bound deceleration lane assessed in AREA (2019).

Study Area 1 is part of a state highway road corridor with no remaining trees or shrubs. Vegetation present is a mixture not native groundcover dominated by exotic grasses with occasional native species (Figure 1-2).

Study Area 2: Entrance for the Solar Farm substation access track

This assessment site is approximately seven kilometres south of Somerton on Soldiers Settlement Road (Lot 186 DP755340) and includes approximately 37 square metres extending from just beyond the lot boundary to the edge of Soldiers Settlement Road (Figure 1-3). This additional assessment area for totals 0.03 hectares.

Study Area 2 is part of a historically cleared rural landscape with no remaining trees or shrubs and a mixture of not native groundcover dominated by exotic grasses and forbs with occasional native species.

2.2 Survey effort

Field survey for biodiversity assessment was conducted by Greg Bible of AREA Environmental Consultants & Communication on 18 May 2020. Survey effort was transects on foot over the total area of both additional development areas.

Figure 2-1: Location of the Study Areas assessed

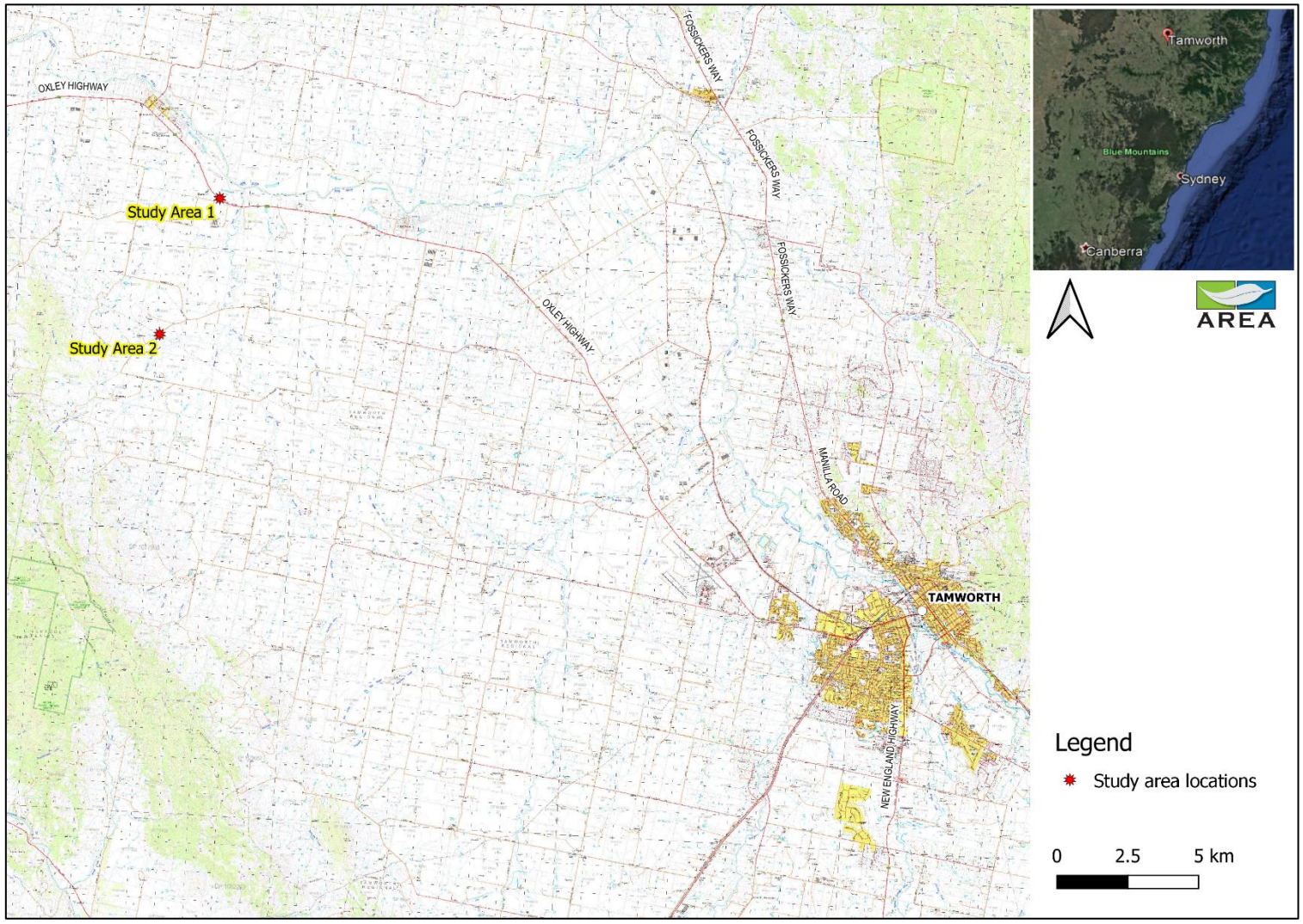

Figure 1-2: Additional assessment area for the Tamworth bound lane Basic Auxiliary Right treatment (Study Area 1) (Base image source: Bing Satellite).

Figure 1-3: Additional assessment area for the entrance of the substation access track (Study Area 2) (Base image source: Google Hybrid).

2.3 Findings

Study Area 1 was devoid of trees and shrubs or woody debris and was dominated by exotic grass species, particularly Johnson grass and Feathertop Rhodes grass. Some native grasses and forbs were identified but they represented a very small proportion of total vegetation at the site. A summary is:

- The vegetation evaluated at this site would be characterised as exotic grassland and, with negligible amounts of native flora, has little ecological value for native species.
- No threatened fauna or flora was identified at Study Area 1.
- A full list of flora species identified is in Table 1-1.

Table 1-1: Identified flora species at Study Area 1 and estimated percentage of cover per species

Flora species identified	Estimated cover (%)
Exotic species	
Feathertop Rhodes grass (*Chloris virgate*)	10
Nutgrass (*Cyperus rotundus*)	15
Phalaris sp.	8
Black oat (*Avena strigosa*)	5
Stink grass (*Eragrostis cilianensis*)	5
African lovegrass (*Eragrostis curvula*)	5
Hedge mustard (*Sisymbrium officinale*)	5
Medicago sp. 1	5
Medicago sp. 2	10
Cleavers (*Galium aparine*)	3
Brassica sp.	3
Native species	
Australian cranesbill (*Geranium solanderi*)	5
Plains grass (*Austrostipa aristiglumis*)	3
Queensland bluegrass (*Dichanthium sericeum*)	3

Study Area 2 was devoid of trees, shrubs or woody debris and was dominated by a mix of exotic grasses and forbs, particularly Nutgrass, Feathertop Rhodes grass, clover and Hedge mustard. Some native grasses and forbs were identified but they represented a small proportion of total vegetation at the site. A summary is:

- The vegetation evaluated at this site would be characterised as exotic grassland and, with small amounts of native flora, has low ecological value for native species.
- No threatened fauna or fauna was identified at Study Area 2.
- A full list of flora species identified is in Table 1-2.

Table 1-2: Identified flora species at Study Area 2 and estimated percentage of cover per species

Flora species identified	Estimated cover (%)
Exotic species	
Coolatai Grass (*Hyparrhenia hirta*)	25
Johnson grass (*Sorghum halepense*)	30
Feathertop Rhodes grass (*Chloris virgate*)	10
Couch grass (*Elymus repens*)	5
Stink grass (*Eragrostis cilianensis*)	5
African lovegrass (*Eragrostis curvula*)	5
Awnless barnyard grass (*Echinochloa colona*)	2
Canary grass (*Phalaris sp*)	1
Medicago sp.	2
Prickly sowthistle (*Sonchus asper*)	1
Digitaria sp.	1
Paddy's lucerne (*Sida rhombifolia*)	1
Chicory (Cichorium intybus)	<1
Hypericum sp.	<1
Pattersons Curse (Echium plantagineum)	<1
Brassica sp.	<1
Verbena sp.	<1
Cockspur sp.	<1
Native species	
Windmill grass (Chloris truncate)	2
Australian cranesbill (*Geranium solanderi*)	2

3. Conclusion

Additional biodiversity assessments for the Solar Farm Development Area and the Tamworth bound lane Basic Auxiliary Right treatment development area described highly disturbed exotic grasslands of low ecological value. No trees, shrubs or woody debris and with isolated native groundcover species were present. No suitable native habitat exists. It is unlikely development impact within these study areas would impact threatened species, populations, or communities. No further assessment is required at these locations.

The outcome of this assessment will not change the result of Biodiversity Development Assessment Report (2019) prepared by AREA Environmental Consultants & Communication.

Appendix E. Aboriginal heritage supplementary assessment

Tamworth Solar Farm
Aboriginal heritage supplementary assessment

Tamworth LGA, NSW

May 2020

AREA
ENVIRONMENTAL CONSULTANTS & COMMUNICATION

AREA Environmental Consultants & Communication
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AREA Environmental Consultants & Communication acknowledge Traditional Owners of the country on which we work

Document Controls

Proponent	Tamworth Solar Farm Pty Ltd		
Client	PROJECTe-		
Document Description	Supplementary Aboriginal heritage assessment: Additional areas - Tamworth Solar Farm		
Clients Representative Managing this Document	AREA Person(s) Managing this Document		
Daryl Brown	Phil Cameron (PJC) - Principal Consultant		
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FINAL when draft is approved by client			
Prepared For	Prepared by		
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Certified by:  Phillip Cameron *CEnvP, BSc, Ass Dip App Sci, Cert III* Date: 21/05/2020			

1. Introduction

Tamworth Solar Farm Pty Ltd (the proponent) is seeking approval under Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a Development Application (DA) for the Tamworth Solar Farm (the project) on Lot 186 DP755340.

An Environmental Impact Statement (EIS) is required as part of the approval process. The Standard Environmental Assessment Requirements (SEARS) for the EIS state that an Aboriginal and historic heritage assessment be carried out including adequate consultation with the local Aboriginal Community. Consultation has been carried out with the local Aboriginal community according to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. For details of the consultation process, see Appendix B of *Aboriginal cultural heritage assessment: Tamworth Solar Farm* 2019 (AREA 2019).

A review of the DA concluded additional information was required for two additional areas needing assessment:

- A 12 x 7.5 metre an electricity substation access track between the Solar Farm boundary to Old Soldier Road to (additional 0.03 hectares) (Figure 1-2)
- The portion of the substation access track between the solar farm boundary and Soldier Settlement Rd (an area of 0.03 hectares) (Figure 1-3).

The purpose of this document is to report the findings of additional Aboriginal heritage assessments carried out by the Registered Aboriginal Parties (RAPs) and AREA at these two study areas, and to identify any new Aboriginal heritage constraints.

The Solar Farm Development Area is located approximately seven kilometres south of Somerton in the Tamworth Local Government Area (LGA). The proposed Tamworth bound lane Basic Auxiliary Right treatment is along the Oxley Highway at the Babbinboon Road intersection, 4.5 kilometres east of Somerton (Figures 1-2 and 1-2).

Desktop database searches conducted for the Aboriginal Assessment Report (AREA 2019) remain relevant for this additional assessment.

Field survey for this project took place on Monday 18 May 2020. One definite and two possible Aboriginal objects were recorded along the proposed Tamworth bound lane Basic Auxiliary Right treatment in highly disturbed contexts. No further archaeological work is recommended and management actions in Section 9 of AREA (2019) apply to management of these additional constraints.

2. Methods and results

2.1 Site descriptions

The Development Area is located approximately 32 kilometres north west from Tamworth, NSW (Figure 1-1). Two additional areas of land associated with the Tamworth Solar Farm Aboriginal heritage assessment report (2019) were assessed (Study Area 1 & 2).

Study Area 1: The Tamworth bound lane Basic Auxiliary Right treatment development area

This development area is approximately 4.5 kilometres from Somerton at the intersection of the Oxley Highway and Babbinboon Road (afront to Lot 2 DP1137306 and Lot 11 DP658678) and includes approximately 266 metres of roadside verge from the edge of the highway to the agricultural fence line, totalling 0.42 hectares. This additional development area is opposite of a Gunnedah bound deceleration lane assessed in AREA (2019). An Aboriginal site (Open Camp Site #7 consisting of two Aboriginal stone flakes) was recorded in this Gunnedah bound lane study area in a highly disturbed context.

Study Area 2 is part of a state highway road corridor built largely on imported fill with no remaining trees or shrubs. Vegetation present is a mixture not native groundcover dominated by exotic grasses with occasional native species (Figure 1-3).

Study Area 2: Entrance for the Solar Farm substation access track development area

This assessment site is approximately seven kilometres south of Somerton on Soldiers Settlement Road (Lot 186 DP755340) and includes approximately 37 square metres extending from just beyond the lot boundary to the edge of Soldiers Settlement Road (Figure 1-3). This additional assessment area for totals 0.03 hectares.

Study Area 1 is part of a historically cleared rural landscape with no remaining trees or shrubs and a mixture of not native groundcover dominated by exotic grasses and forbs with occasional native species.

2.2 Survey effort

Field survey for biodiversity assessment was conducted on 18 May 2020 by:

- AT Gomilaroi Cultural Consultancy (Aaron Talbott)
- Gomeroi People Registered Native Title Claimants (Steve Talbott)
- Tamworth Local Aboriginal Land Council (Don and Edward Fermour)
- Phillip Cameron of AREA Environmental Consultants & Communication.

Survey effort was transects on foot over the total area of both additional development areas.

Figure 2-1: Location of the Development Areas (Sight Distance Development Area was not assessed as part of this report)

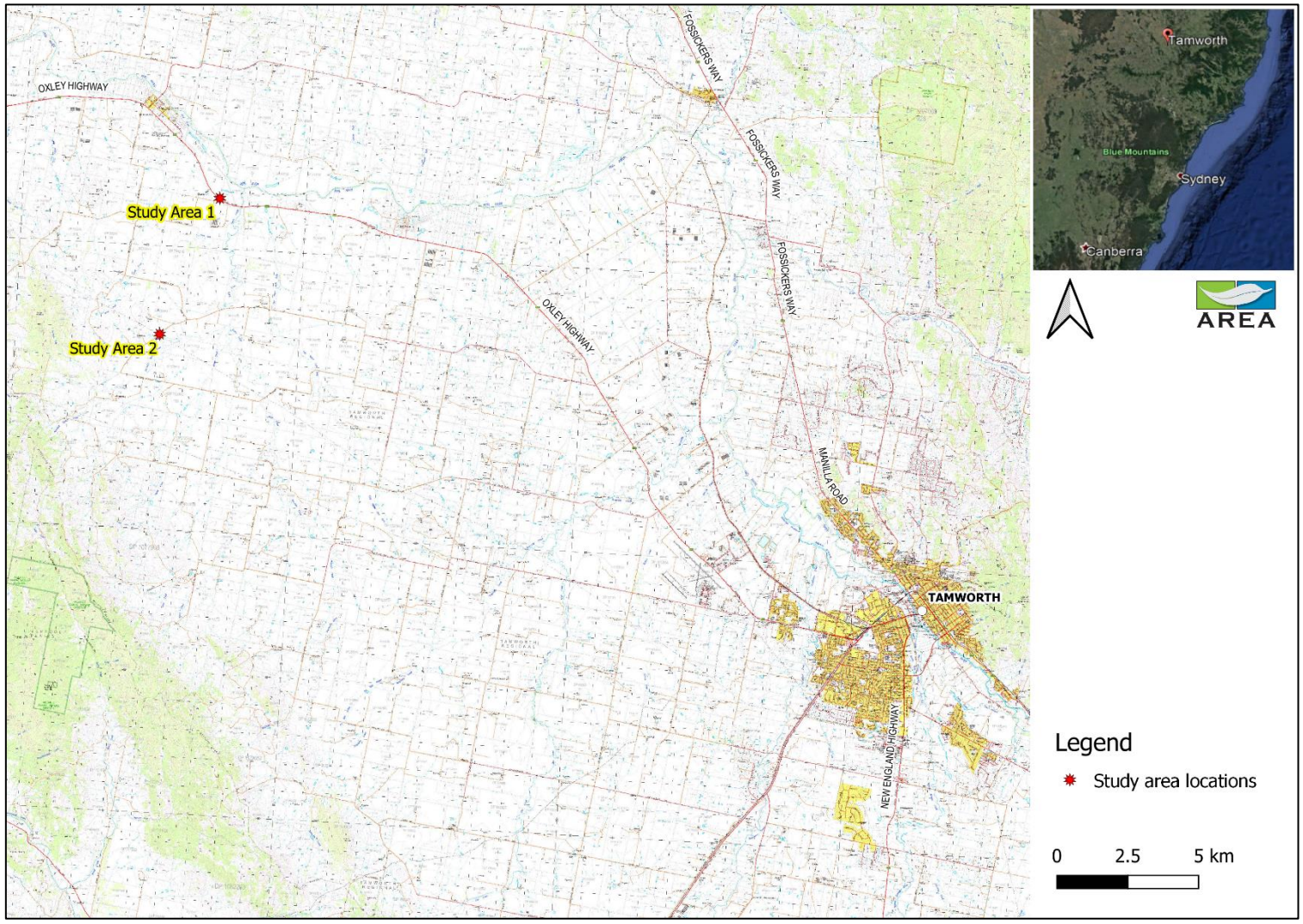


Figure 1-2: Additional assessment area for the Tamworth bound lane Basic Auxiliary Right treatment (Study Area 1) (Base image source: Bing Satellite).

Figure 1-3: Additional assessment area for the entrance of the substation access track (Study Area 2) (Base image source: Google Hybrid).

2.3 Findings

Study Area 1 is part of the Oxley Highway road corridor and is built largely on fill. This study area is devoid of trees, shrubs or woody debris and is dominated by a mix of exotic grasses and forbs. This demonstrates prior ground surface disturbance.

Three Aboriginal objects were recorded on an area not built on fill toward the agricultural fence line (Figure 1-4). One stone artefact has characteristic attributes while two were possible artefacts. Unfortunately, the photos taken of these objects were all out of focus and are not useful for the purpose of this report. The following attributes were noted:

- Object 1 is a basalt broken flake, 42x26x4mm, 20 per cent cortex possessing a bulb, eralier scar, broken narrow platform with evidence of bipolar flaking.
- Object 2 is quartzite and possibly a broken flake 16x9x9mm, no cortex. A possible negative flake scar was noted. This is in proximity to other more definitive Aboriginal objects both sides of the highway.
- Object 3 is quartzite and possibly a broken flake 23x22x6mm, no cortex, a bulb and possible flake scar. This is in proximity to other more definitive Aboriginal objects both sides of the highway.

For the purposes of this report the ‘possibles’ have been managed as they were bona fide Aboriginal objects.

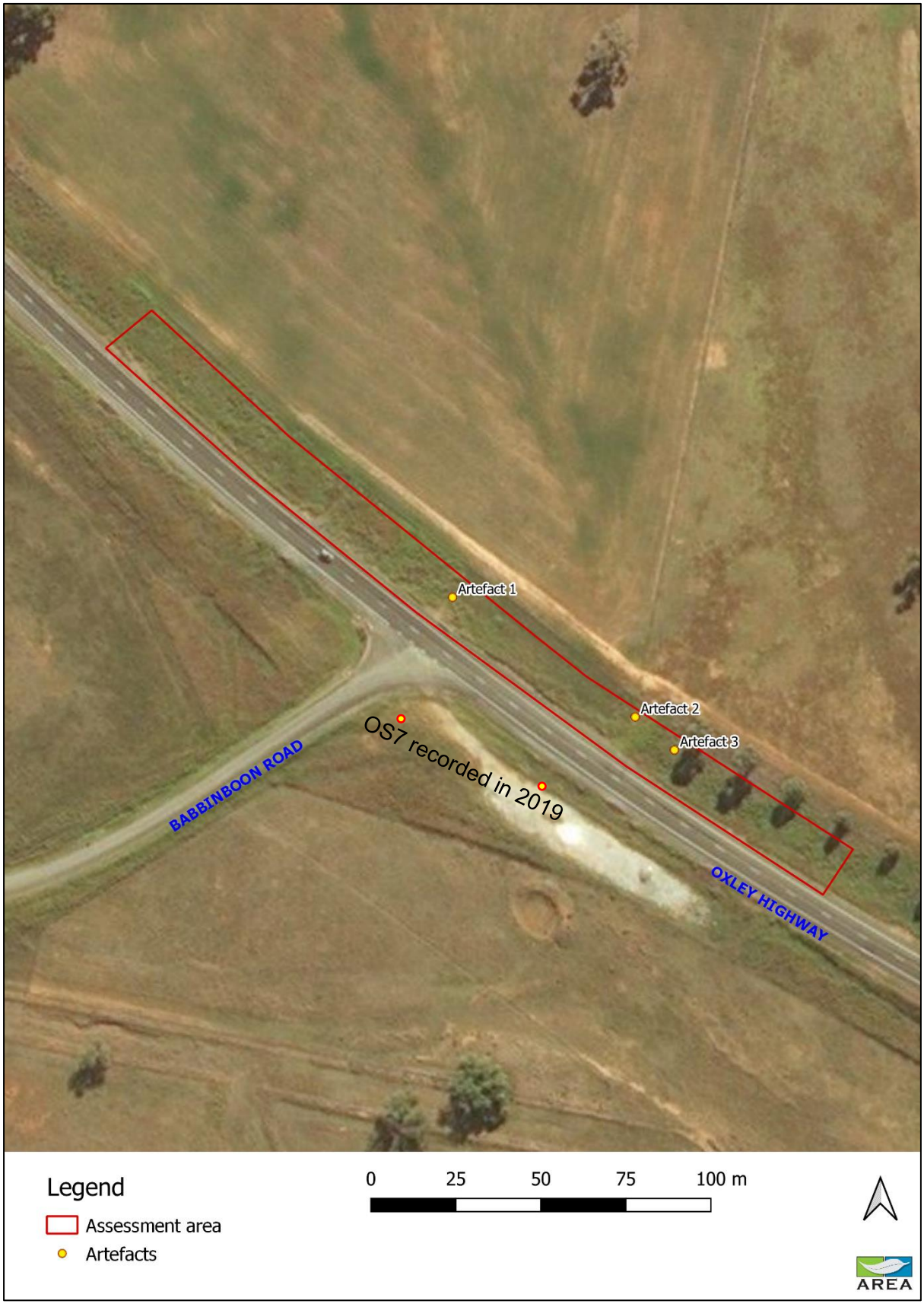
AREAs (2019) comments pertaining to Open Camp Site 7 are directly relevant to these artefacts insomuch as this additional information supports what was observed on the other side of the highway within 40 metres and there is an argument it is an extension to Open Camp Site 7 as opposed to a standalone Aboriginal site.

Study Area 2 was devoid of trees and shrubs or woody debris and was dominated by exotic grass species. This demonstrates prior ground surface disturbance. No Aboriginal objects were recorded in this proposed development area and none were considered likely to be present and undetected.

No further work was required in this area.

If unexpected finds are observed, then follow Section 9 of AREA (2019).

Figure 1-4: Extension to Open Camp Site 7 for the Tamworth bound lane Basic Auxiliary Right treatment (Study Area 2) (Base image source: Bing Satellite).



3. Conclusion

Additional Aboriginal heritage assessments for the Solar Farm Development Area and the Tamworth bound lane Basic Auxiliary Right treatment Development Area described highly disturbed land. One Aboriginal site, an extension of Open Camp Site 7 recorded by AREA (2019) was identified at the Tamworth bound lane Basic Auxiliary Right treatment Development Area. This site can be managed with actions provided in Section 9 of AREA (2019).

The outcome of this assessment will not significantly change the result of Aboriginal heritage assessment report (2019) prepared by AREA Environmental Consultants & Communication. A minor change is needed to note Open Camp Site #7 consisting of two Aboriginal stone flakes recorded on the Gunnedah bound lane at the Babbinboon x Oxley Highway intersection extends to both side of the highway.

Appendix E. Technical Design Note

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Technical Design Note

Project: Projecte Tamworth Oxley Hwy impact

Subject: Assessment of impact of construction traffic – Oxley Hwy and Babbinboon Road

Date: 22 May 2020

Attention: Daryl Brown

A Sidra assessment has been completed at the intersection of the Oxley Highway and Babbinboon Road to determine the impact of the construction traffic at this location. The current intersection layout provides a simple give-way controlled intersection with no shoulder widening for southbound traffic on the Oxley Highway.

Traffic data further to the south of this location show that the daily traffic flows on the Oxley Highway are 3,264 vehicles. As a conservative approach the peak hour flow could be 10% of this giving a 2-way flow on the Oxley Highway of 350 vehicles. Assuming 60% southbound (210) and 40% northbound (140) would provide a worst-case scenario for traffic at this intersection. The heavy vehicle content is as per the data from TfNSW at 17%.

Based on site observations on a number of occasions, the traffic flows on Babbinboon Road is very low. For this assessment, the base traffic flow has been allowed for with 2 vehicles turning left and right into the side road per hour and a similar 2 vehicles turning left and right out of Babbinboon Road.

The results of the Sidra assessment for the current situation is provided below.

Table 1 – Sidra assessment, 2020 current peak hour flows (AM) at intersection of Oxley Highway and Babbinboon Road

Approach	Level of Service	Delay (seconds)	Queue (metres)
Oxley Highway south left turn	A	7.8	0.0
Oxley Highway south through	A	0.0	0.0
Oxley Highway north through	A	0.0	0.1
Oxley Highway north right turn	A	8.0	0.1
Babbinboon Road left turn	A	10.0	0.0
Babbinboon Road right turn	A	10.8	0.0
Overall	A	0.2	0.1

Ground Floor, 161 Scott Street
Newcastle NSW 2300
Ph (02) 4032-7979

The intersection was then assessed allowing for the construction traffic and the results of the Sidra assessment are provided below. Note that this assessment allowed for 70 light vehicles turning left into Babbinboon Road and 2 heavy vehicles turning into Babbinboon Road.

To allow for the potential for construction light traffic to also turn in right at this location (from Gunnedah) we have allowed for an additional 15 light turning vehicles turning right at this location.

Approach	Level of Service	Delay (seconds)	Queue (metres)
Oxley Highway south left turn	A	7.9	0.0
Oxley Highway south through	A	0.0	0.0
Oxley Highway north through	A	0.1	1.0
Oxley Highway north right turn	A	8.3	1.0
Babbinboon Road left turn	A	10.1	0.1
Babbinboon Road right turn	A	11.1	0.1
Overall	A	1.7	1.0

The above results show the following critical values for the right turn into Babbinboon Road off the Oxley Highway the delay for the right turn into Babbinboon Road could increase from the current level of 8 seconds to 8.3 seconds, even allowing for the 15 additional right turning light vehicles at this location. This represents an increase of just 3.75% over the existing situation.

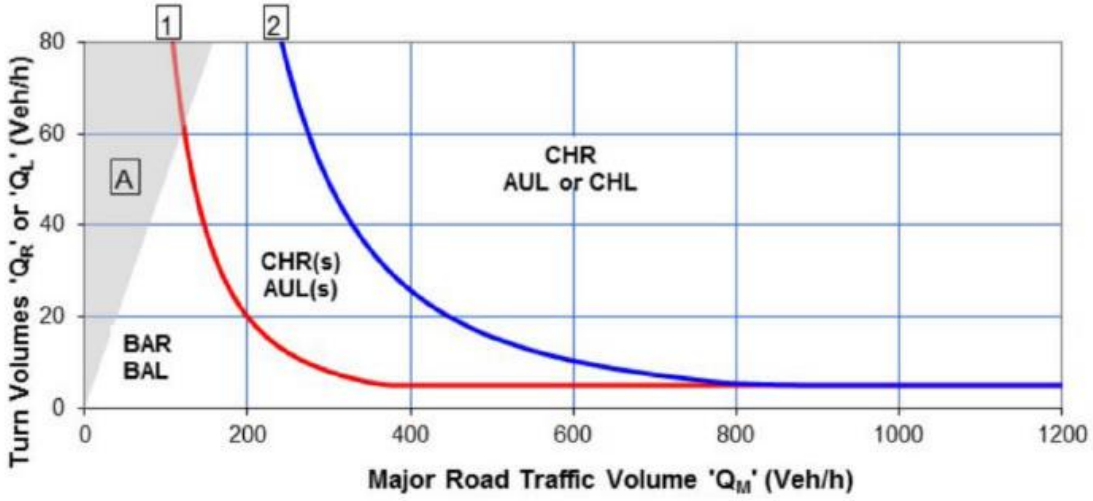
Assessment of intersection design requirements

The design requirements for this intersection have been assessed against the requirements provided by Austroads Guidelines. Austroads Guidelines Part 4a provides advice with regards to safe intersection sight distance (SISD). This distance is the distance required for a driver to safely enter the Oxley Highway from Babbinboon Road. For the posted speed limit of 100 km/h, the SISD is 262 metres for a reaction time of 2.5 metres. The sight distance available (500 metres) exceeds the requirements for a design speed of 130 km/h (383 metres) and is therefore considered acceptable.

For the left turn into Babbinboon Road, visibility is good allowing a driver to observe a vehicle braking to turn left into the side road. There is however no left turn deceleration lane provided at this location nor a wide shoulder. The current peak flow at this location could be in the order of 330 vehicles per hour 2-way. Turning traffic currently is very low, however the traffic movements associated with the project could be in the order of 70 vehicles or more during the morning for the left turn in, associated with staff movements and delivery vehicles.

Based on the construction traffic demands and associated increase in heavy vehicle demands, this intersection will need to be upgraded to allow for a left turn deceleration lane. Based upon the warrants provided by Austroads Guidelines Part 6: Traffic Management for Intersections, Interchanges and Crossings (reproduced below) a short Auxiliary Left turn lane is proposed (AUL(S)).

Figure 2.26: Warrants for turn treatments on major roads at unsignalised intersections



(a) Design Speed ≥ 100 km/h

Daily flows on the Oxley Highway are 3265, so based on peak flow of 10% gives 326 2-way. Assume 60% peak westbound gives 196 vehicles for Qm and left turn movement of 70 vehicles in the AM peak (Ql).

For the right turn, existing right turn demands at this location are very low at less than 5 per hour based upon observations on site during the work competed by Seca Solution on the road network. As part of the project's Code of Conduct staff will generally be approaching the site from Tamworth and as such little if any additional traffic is expected to turn right at this location. Using the above graph it can be seen that the BAR treatment is appropriate and will allow for an improvement for the existing local demands for this right turn.

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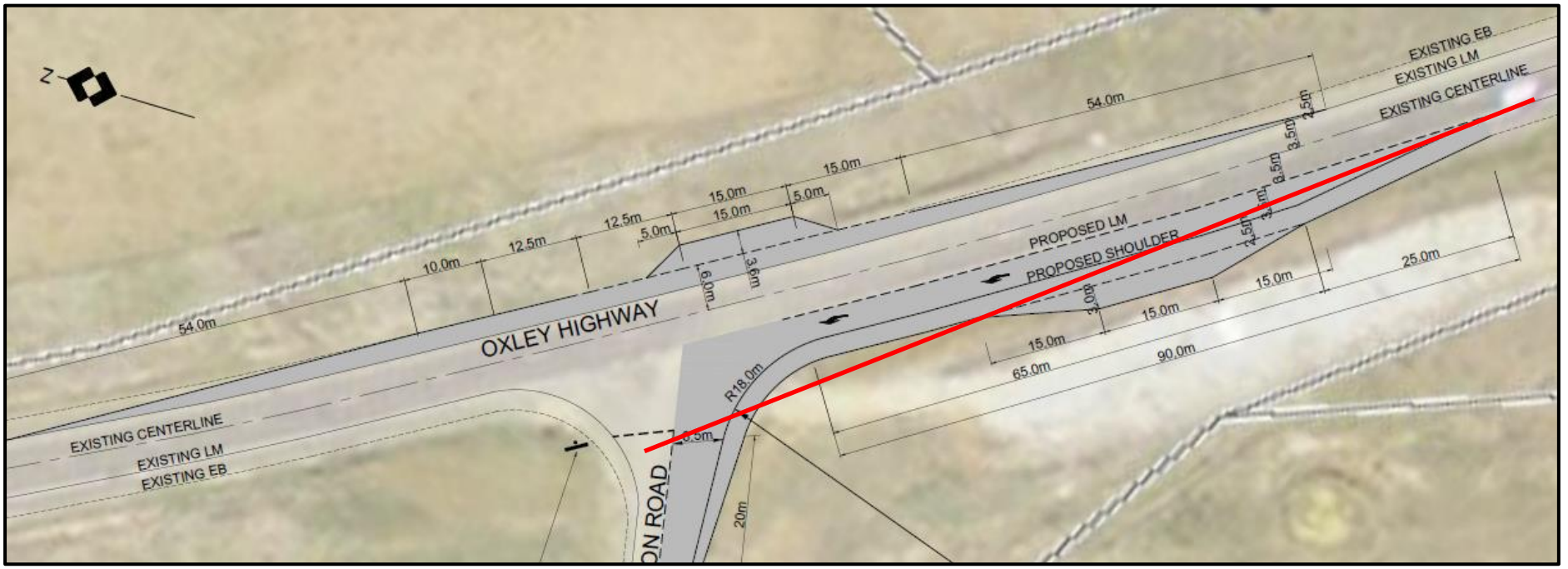
Sight lines associated with bus standing area

An assessment has been completed for the impact of the proposed bus standing area to the south of the intersection of Babbinboon Road and the Oxley Highway to ensure that the bus standing area does not impacting upon the sight lines for a driver exiting Babbinboon Road. The Figure 1 and 2 show that the design will not impact upon this sight line, with the curvature of the road providing a benefit for the sight line. The bus standing zone is located behind the 3.5 metres wide deceleration lane and the 2.5 metres wide sealed shoulder and hence 6 metres away from the northbound travel lane on the Oxley Highway. It is noted that the current intersection layout and bus stand area is located adjacent to the running lane northbound on the Oxley Highway and as such could impact upon the sight line.

Figure 1 – Sight line (red line) showing the sight line for a driver exiting Babbinboon Road is not impacted upon by a bus in the proposed hard stand area



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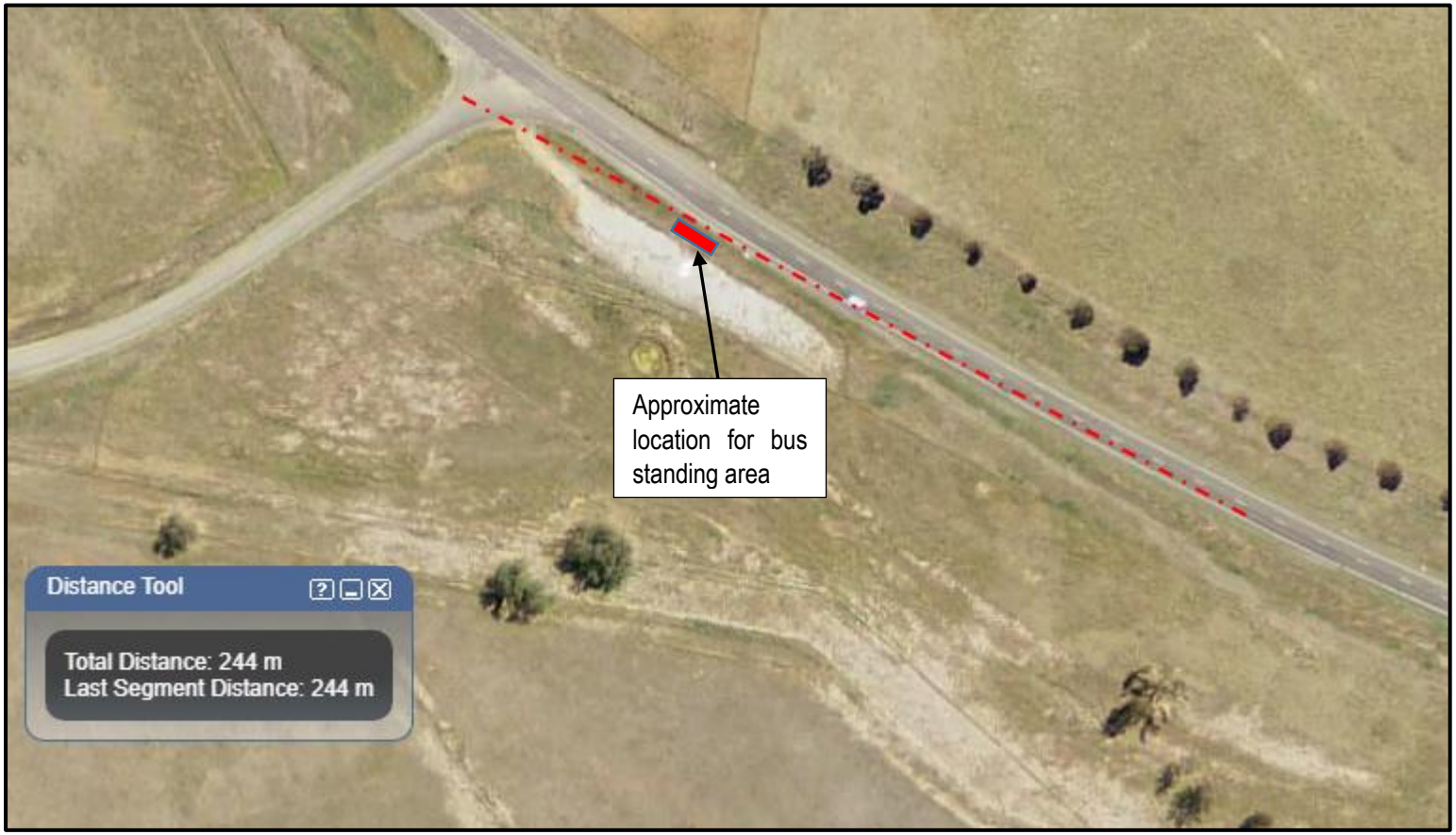
Approximate location for bus standing area
Distance Tool
Total Distance: 244 m
Last Segment Distance: 244 m

Photo 1 – View to right for a driver exiting Babbinboon Road and potential impact on visibility by bus in hard stand area

Appendix G. Biodiversity Development Assessment Report