Traffic Management Plan

Stubbo Solar project- Blue Springs Road upgrade and site access construction

26 September 2022

Traffic Management Plan
Stubbo Solar project - Blue Springs Road upgrade and site access construction

AE1214

September 2022

Version V4			
Issued to			
Cédric Bergé, Project Development Manager, ACEN Australia Michael Yeo, Construction Project Manager, ACEN Australia			
Prepared by		Reviewed by	Approved by
Ian Finlay, Principal Environmental Consultant Accent Environmental		Michael Cramer, Director Accent Environmental	 Michael Cramer, Director Accent Environmental
Previous versions			
Version:	V1 V2 V3	30 May 2022 8 June 2022 15 September 2022	Draft for client review Submitted to DPE Revised Draft for client review

www.accentenvironmental.com.au info@accentenvironmental.com.au

Contents

Appendices

Tables

Figures

Abbreviations

AC	alternating current
Accent	Accent Environmental Pty Ltd
ACEN	ACEN Australia
ACOR	ACOR Consultants
AFM	advanced fatigue management
BAL	basic left turn
BAR	basic right turn
BESS	battery energy storage system
BFM	basic fatigue management
BMP	Biodiversity Management Plan
BoP	balance of plant
CoC	condition of consent
DC	development consent
DoEE	Department of the Environment and Energy
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EIR	Environmental Incidents Register
EIS	Environmental Impact Statement
EMP	environmental management plan
EMS	environment management strategy
EPA	Environment Protection Authority
EPC	engineering, procurement and construction
FC NSW	Forestry Corporation of NSW
HSE	health, safety and environment
km	kilometre
km/hr	kilometre per hour
kV	kilovolt
LGA	local government area
MWRC	Mid-Western Regional Council
MW	megawatt
NEM	National Energy Market
NSW	New South Wales
NSW RFS	NSW Rural Fire Service

O&M	operations and maintenance
OD	over-dimensional
POEO Act	*Protection of the Environment Operations Act 1997*
Ramboll	Ramboll Australia Pty Ltd
RPMS	raised pavement markers
Stubbo SF	Stubbo Solar Farm
SWMP	Soil and Water Management Plan
TBD	to be determined
TCP	traffic control plan
TfNSW	Transport for NSW
TMP	Traffic Management Plan
TTA	traffic and transport assessment
UPC\AC	UPC\AC Renewables Australia Pty Ltd

1 Introduction

ACEN Australia Pty Ltd, operating as ACEN Australia (ACEN, formerly known as UPC\AC Renewables Australia) is developing the Stubbo Solar and Battery project (Stubbo Solar), a grid-connected photovoltaic solar farm of up to 400 megawatts (MW) alternating current (AC) and a Battery Energy Storage System (BESS) of up to 200MW for 1 hour, in the New South Wales (NSW) Central West Orana region. The project is located approximately 90 kilometres (km) east of Dubbo, in the Mid-Western Regional Council (MWRC) Local Government Area (LGA).

ACEN is required under the development consent (DC) to upgrade of Blue Springs Road from its intersection with Cope Road to its intersection with the main site access. Simultaneously ACEN is also proposing to undertake construction of the main site access prior to commencement of construction of the Stubbo Solar project.

1.1 Purpose and scope of this document

The purpose of this Traffic Management Plan (TMP) is to provide management controls for impacts that may occur during upgrade of Blue Springs Road and construction of the main site access works. ACEN engaged Accent Environmental Pty Ltd (Accent) to prepare the TMP.

1.2 Strategic framework for environmental management of traffic-related impacts

The TMP provides the means by which ACEN and the Road Construction Contractor (the "Contractor") can manage project-related environmental risks by:

- systematically tracking and documenting compliance with DC conditions, environmental impact statement (EIS) and Amendment Report commitments, external regulatory requirements and internal policy obligations
- effectively communicating with external and internal stakeholders, including regulators, neighbours of Blue Springs Road, the broader community, contractors and company personnel achieving continuous improvement in environmental management.

The TMP enables ACEN and the Contractor and subcontractors to meet environmental obligations and to implement environmental management best practices to identify, manage and mitigate traffic-related environmental impacts during the upgrade of the Blue Springs Road and the construction of the main site access works.

A Traffic and Transport Assessment (TTA) Report was completed by SCT Consulting (SCT 2020) and appended to the EIS prepared by Ramboll (2020) and the Amendment Report also prepared by Ramboll (2021) in support of the Development Application (DA) for the Stubbo SF. This TMP considers the findings and recommendations of the Amendment Report in addition to the findings of the TTA.

1.3 Project overview

The Stubbo Solar is an up to 400 MW AC solar farm development with a battery energy storage system (BESS). ACEN is the project owner. Energy will be generated through the conversion of solar radiation to electricity via photovoltaic modules (solar panels). The solar panels will generate direct current electricity that will be inverted to AC electricity via the use of power conversion units. The electricity output from the project will then be supplied to the existing 330 kilovolt (kV) transmission line (Line 79) operated by TransGrid.

The Development Consent (DC) - Application Number: SSD-10452 – requires the preparation, approval and implementation of an environmental management strategy (EMS) and subordinate environmental management plans (EMPs) for both construction and operations phases of the project, including a TMP.

The focus of this TMP is the works for the Blue Springs Road upgrade and for construction of the main site access.

The upgrade of the external roads and the construction of the main site access will be completed by the Contractor and the works will be managed in accordance with the Contractors Workplace Health, Safety and Environmental Management Systems.

In meeting the specific environmental performance criteria established under the DC, ACEN will implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from construction activities.

It will be a requirement of the contract between ACEN and the Contractor, that the Contractor will carry out the construction:

- in accordance with the relevant conditions of consent (CoCs) in the DC
- generally in accordance with the EIS and the Amendment Report.

1.4 Project staging

In accordance with CoC 3 (Schedule 4) of the DC, ACEN has sought the Planning Secretary's discretion to stage the development and undertake construction of the main site access prior to completion of road upgrades, such that an upgraded access will be available into the site prior to the commencement of construction on site.

This TMP provided is for Stage 1 of the development. An additional TMP will be prepared for the remaining of the project prior to commencement of subsequent stages.

2 Statutory requirements

2.1 Key legislation

Key legislation used to develop this TMP is listed in Table 2.1. The EMS presents and more fully describes additional legislation, guidelines and guidance materials of relevance to the environmental management of the solar farm.

Table 2.1 Key legislation

Abbreviated title	Document Name
Heavy Vehicle National Law	Heavy Vehicle National Law No 42a 2013 (NSW)
RRT (DG) Act	*Road and Rail Transport (Dangerous Goods) Act 1997* (NSW)

2.2 Development consent conditions

This TMP has been developed to comply with the relevant DC conditions set out in DC Application Number: SSD 10452. The CoCs as they relate to traffic management during construction are presented in Table A1 in Appendix A.

2.3 Commitments described in the Environmental Impact Statement

In addition to the CoCs, a number of commitments were made in the EIS and the Amendment Report and, as these documents were the basis for DC, are commitments which must be adhered to. The commitments relevant to traffic impact management during construction are presented in Table A2 in Appendix A.

2.4 Relevant policies, standards, guidelines and codes of practice

Additional policies, guidelines and guidance materials used to develop this TMP are listed in Table 2.2.

Table 2.2 Relevant laws, policies, standards, guidelines and codes of practice

Document title
Austroads Guide to Road Design (as amended by TfNSW supplements)
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
Australian Dangerous Goods Code
Australian Standard 4452 Storage and Handling of Toxic Substances
Interim Construction Noise Guideline
NSW Noise Policy for Industry

3 Implementation and operation

ACEN, as the proponent and owner of the Stubbo Solar project has ultimate responsibility and accountability to ensure the project is designed, constructed, operated, upgraded and decommissioned in compliance with the approvals requirements.

Although ACEN has ultimate responsibility, a Road Construction Contractor will be engaged who will be contractually-obliged to manage these works in accordance with the consent. Therefore, most of the obligations in this TMP will sit with the Road Construction Contractor.

All personnel working on the Stubbo Solar project are responsible for:

- reporting all environmental incidents to their supervisor
- carrying out work duties at all times in an environmentally sensitive and responsible manner.

Actions to achieve compliance during construction will be managed or undertaken by the Contractor and ACEN.

3.1 Key stakeholders

The stakeholders in the Stubbo Solar project include regulators, project stakeholders and community stakeholders. Table 3.1 lists the key stakeholders.

Table 3.1 List of key stakeholders

Regulators	Project stakeholders	Community stakeholders
Department of Planning and Environment (DPE)	ACEN	Stubbo Solar associated landholders
Mid-Western Regional Council	Road Construction Contractor EPC Contractor	Stubbo Solar sensitive receptors
Registered Aboriginal Parties (RAPs)	Specialist subcontractors	Other neighbours
NSW Rural Fire Service (NSW RFS)	Specialist consultants	Local business owners
Department of Agriculture, Water and the Environment (DAWE) (Commonwealth)	Transport and logistics companies	Local employers
Transport of NSW (TfNSW)	Project financiers/ investors	Local suppliers
SafeWork NSW		Local employees
Forestry Corporation of NSW (FC NSW)		Local accommodation providers
TransGrid		

3.2 Project organisational structure

Understanding the organisational structure of the project is important when it comes to understanding the roles and responsibilities of the various project stakeholders. During the specific construction works for the Blue Springs Road upgrade and for construction of the main site access, only a Contractor (or contractors) will be engaged, with no Balance of Plant (BoP) contractors engaged.

3.2.1 Applicant (Project Proponent)

UPC\AC Renewables Pty Ltd (ACEN, formerly known as UPC\AC) is the Stubbo Solar Applicant and is the proponent of the project.

3.2.2 Contractor

The contractor/s will be engaged by ACEN. The Contractor for the Blue Springs Road upgrade may be MWRC. The Contractor for the construction of the site access has not yet been selected (i.e. is to be determined (TBD).

3.3 Roles and responsibilities

The project roles that ACEN has assigned to the project are briefly described below.

3.3.1 The ACEN Project Manager

The ACEN Project Manager role is to ensure the Blue Springs Road upgrade and construction of the site access is undertaken according to relevant CoCs of Development Consent SSD 10452. The ACEN Project Manager is accountable to ACEN senior management.

The ACEN Project Manager is also responsible for engaging consultants and contractors to do the detailed design work, completing the necessary construction, providing safety and environmental advice to the project team and engaging with the regulators and the community.

3.3.2 Contractor management team

The works will be constructed by a contractor (yet to be selected). The key Contractor roles are most likely to include a project manager, a health, safety and environment (HSE) manager, a construction manager and a site manager. Their roles are described below.

Contractor Project Manager

The Contractor Project Manager is responsible for providing general support to the Construction Manager and the HSE manager and for ensuring the ACEN Project Manager is informed on all major project developments. The Contractor Project Manager is accountable to the ACEN Project Manager.

Contractor Health, Safety and Environment Manager

The Contractor HSE Manager is responsible for providing safety and environmental advice to the project team. He/she is in charge of implementation of all environmental, fire protection, and safety plans and for reporting non-conformances to the Contractor Construction Manager.

The Contractor HSE Manager is responsible for conducting daily site inspections. The Contractor HSE Manager is accountable to the Contractor Project Manager

Contractor Construction Manager

The Contractor Construction Manager is responsible for the general supervision and day-to-day coordination of works on the Project site. The Contractor Construction Manager is also responsible for ensuring all site works are completed in accordance with the contractor and subcontractor scopes of works and for ensuring safety and environmental procedures/processes are followed. He/she is also responsible for reporting non-conformances to the Contractor Project Manager. The Contractor Construction Manager also provides support to the Contractor Site Manager and Contractor HSE Manager and for ensuring the Project Manager is informed on all major project developments. The Contractor Construction Manager is accountable to the Contractor Project Manager.

Contractor Site Manager

Contractor The Contractor Site Manager is responsible for ensuring day-to-day works are completed in accordance with the subcontractor scope of works. He/she is also responsible for reporting non-conformances, including safety and environmental issues, to the Contractor Project Manager.

3.4 ACEN's environmental management documentation

ACEN has developed an overarching EMS document which includes a number of plans and strategies that have been put in place to manage environmental impacts that may result from the Blue Springs Road upgrade and for construction of the main site access include biodiversity management plan (BMP), this TMP and a soil and water management plan (SWMP).

3.4.1 Prior to commencing construction

In accordance with CoC 5 (Schedule 4), prior to commencing construction, ACEN will submit detailed plans of the final layout of the main site access road development to the Secretary. Plans will be submitted via the Major Projects website, showing comparison to the approved layout.

3.4.2 Compliance with DPE requirements

In accordance with CoC 4 (Schedule 2), ACEN will comply with any requirement/s of the Planning Secretary arising from DPE's assessment of:

- any strategies, plans or correspondence that are submitted in accordance with this consent
- any reports, reviews or audits commissioned by the Department regarding compliance with this consent; and
- the implementation of any actions or measures contained in these documents.

4 Project description

4.1 Blue Springs Road upgrade

As per the TTA (EIS Appendix H), Blue Springs Road is a local access road starting from Cope Road in the south and provides sealed access to the project from the east. The unsealed section starts from about 8 km north of the site and extends to the Golden Highway to the north. It has no centre line or road edge markings (SCT Consulting 2020).

To use Blue Springs Road effectively for the construction and operation of the Stubbo Solar, the road needs to be upgraded from the intersection of Blue Springs Road and Cope Road to the Site Access Road, a distance approximately 4.66 km, as shown on Figure 4.2. In accordance with commitment T5 of the Amendment Report, ACEN engaged ACOR Consultants (ACOR) to produce a report for the design of the upgrade works required (ACOR 2022a).

The works includes:

- upgrading of road geometry, including improvement of super elevations and pavement widening on curves
- improved formation width, pavement design, delineation, roadside safety treatments and drainage culvert extensions and replacements
- upgrades to the Cope Road Intersection to allow for the heavy vehicles to access the solar farm along with minor upgrades to all other intersections and property access points along the extent of the upgrade works.

Figure 4.1 shows the location of the Blue Springs Road upgrade.

Figure 4.1 Blue Springs Road upgrade area

As part of their work, ACOR (2022b) have proposed safety features be installed at the Cope Road / Blue Springs Road intersection. Once the design is finalised and approved, the designed safety features will be implemented.

In accordance with commitment T12 of the Amendment Report, ACEN will apply for a s138(2) application (under the Roads Act) for the Blue Springs Road upgrade with MWRC, who will refer to TfNSW to obtain concurrence prior to the commencement of works.

In accordance with commitment T13 of the Amendment Report, ACEN will undertake consultation with landholders affected by the Blue Springs Road upgrade where proposed upgrades impact on land outside of the road reserve. Affected landholders' consent would also be required to continue with the SSD process. ACEN has requested consent from FC NSW to access part of their land. If granted, ACEN commits to undertaking all works accordance with the permit issued by FC NSW.

4.2 Site access construction

Initially, the EIS considered two potential site access roads and these are shown as "Preferred site access" and "Alternative site access" in Appendix 5 of the DC. However, after further consideration including safety, ACEN intends to use the "Alternative option for main site access" road as the main site access.

Access to the Stubbo Solar requires construction of a road suitable to be used by construction and operation vehicles.

The main site access road will be a gravel road and will be an "all weather" road. This is consistent with the Operating Conditions - CoC 10 (Schedule 3).

Figure 4.2 shows the location of the main site access road shown as "Alternative option". Construction works such as road geometry and pavement construction will be similar to those required to upgrade Blue Springs Road.

In addition to the main site access road, a lay-down area of approximately 7,000 m^2 will be created adjacent to the Blue Springs Road entrance (Figure 4.3) and is proposed as a laydown area for both Blue Springs Road upgrade and the construction of the main site access.

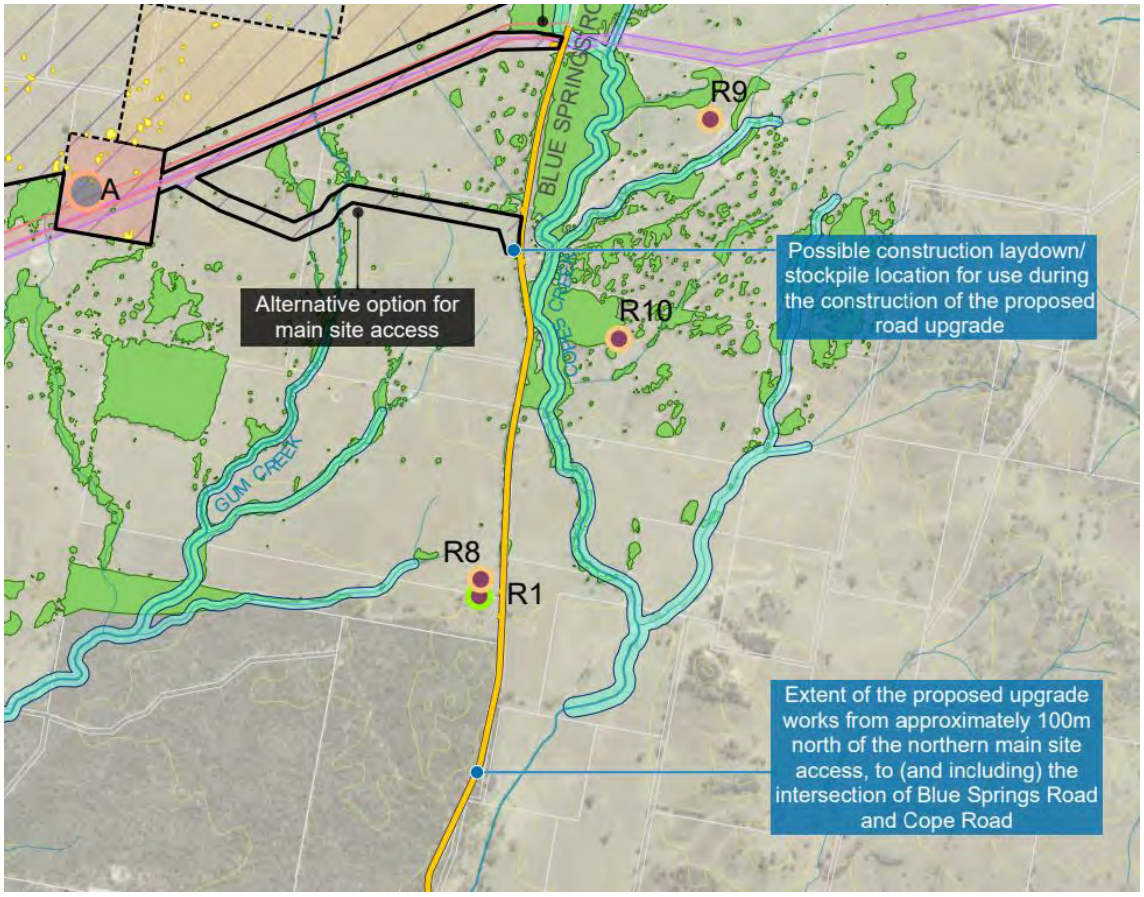


Figure 4.2 Main site access – shown as "alternative option"

Figure 4.3 Main site access showing the lay-down area (from Google Earth)

As part of their work, ACOR (2022b) have proposed safety features be installed on Blue Springs Road at the entrance to the main site access road site. Once the design is finalised and approved, the designed safety features will be implemented.

4.3 Construction schedule

Proposed construction start and finish dates are shown in Table 4.1.

Table 4.1 Construction milestones

Milestone	Date
Blue Springs Road Upgrade	
Construction Start	1 August 2022
Construction Finish	31 December 2022
Site access road (depending on DPE approval)	
Construction Start	1 August 2022 (if concurrent construction with Blue Springs Road Upgrade us permitted)
Construction Finish	31 December 2022 (if concurrent construction with Blue Springs Road Upgrade us permitted)

4.4 Existing road network

4.4.1 Cope Road / Blue Springs Road intersection

In accordance with Condition 8 (Schedule 3), ACEN will upgrade the intersection of Cope Road and Blue Springs Road with basic right turn (BAR) and basic left turn (BAL) treatments to be sealed, designed and constructed for 100 km/h speed environment, able to accommodate the largest vehicle using the intersection, match existing road levels and not interfere with existing road drainage as identified in Appendix 5 of the DC.

As noted in Section 4.2.2, ACEN engaged consultants ACOR to assist with designing the Cope Road / Blue Springs Road intersection upgrade.

4.4.2 Blue Springs Road from Cope Road

In accordance with Condition 8 (Schedule 3), ACEN will upgrade Blue Springs Road from the Cope Road up to a minimum 100 m beyond the selected site access point, as identified in Appendix 5 of the DC.

These upgrades will comply with the Austroads Guide to Road Design where practicable or as agreed otherwise with MWRC (the road authority) to minimise impacts on roadside vegetation and on neighbouring properties. The road upgrades will be carried out to the satisfaction of the relevant roads authority.

4.5 Site access

In accordance with Condition 6 (Schedule 3), ACEN is constructing the “alternative site access” point off, as identified in Appendix 5 of the DC.

The “alternative site access” location selection and upgrading is in accordance with Council requirements as Council endorsed the Concept Design (at DC stage) and the Detailed Design. MWRC issued ACEN with s138 Permit (attached as Appendix D).

In accordance with Condition 7 (Schedule 3), ACEN acknowledges that the site access point off Barneys Reef Road will only be used for emergency purposes. No upgrades are proposed for the emergency access.

4.6 Construction stockpile locations

It is expected that two construction stockpile locations would be required during construction, one at each end of the proposed upgrade works. It is proposed that one would be within the refined development footprint area for the Site Access Road. The other would be at the existing north-western corner of the Cope Road / Blue Springs Road intersection, where there is an existing cleared area of suitable size. Consultation with MWRC will be ongoing regarding the use of this area during construction.

4.7 Over-dimensional and heavy vehicle restrictions

In accordance with Condition 6 (Schedule 3), ACEN is constructing the “alternative site access” point, as identified in Appendix 5 of the DC.

In accordance with Condition 7 (Schedule 3), ACEN acknowledges that the site access point off Barneys Reef Road will only be used for emergency purposes.

In accordance with Condition 2a (Schedule 3), the Contractor will ensure that the development does not generate more than:

- 60 heavy vehicle movements a day during construction, upgrading and decommissioning
- 20 over-dimensional (OD) vehicle movements during construction and upgrading.

Note: OD vehicles are not anticipated to be required for the proposed phase of works.

In accordance with Condition 2b (Schedule 3), the Contractor will ensure the length of any vehicles (excluding OD vehicles) used for the development does not exceed 26 m, unless the Planning Secretary agrees otherwise.

In accordance with Condition 3 (Schedule 3), the Contractor will keep accurate records of the number of over-dimensional and heavy vehicles entering or leaving the site each day for the duration of the project.

4.8 Hours of operation

The hours of operation for the site and the corresponding noise criteria are detailed in Table 4.2.

4.9 Controls for transport and use of dangerous goods

The controls for transport and use of dangerous goods to the site will comply with:

- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*
- *Australian Dangerous Goods Code*
- *Australian Standard 4452 Storage and Handling of Toxic Substances*.

It is considered unlikely that materials classified as dangerous goods will be used for the Blue Springs Road upgrade works or for the main site access road construction works. However, if such materials are required, the Contractor will ensure that when they are transported, the controls required to safely transport them are in place.

Table 4.2 Hours of operation and applicable noise criteria

Day	Normal working hours	Noise
Monday to Friday	7:00am - 6:00pm	The Contractor must minimise the noise generated by any construction, upgrading or decommissioning activities on site in accordance with the best practice requirements outlined in the Interim Construction Noise Guideline (DECC 2009), or its latest version The Contractor must ensure that the noise generated by the operation of the development during the night does not exceed 35 dB(A) $L_{Aeq,15min}$ to be determined in accordance with the procedures in the NSW Noise Policy for Industry (NSW EPA 2017) at any non-associated residence
Saturday	8:00am - 1:00pm	
Sundays	at no time on Sundays	
NSW public holidays	at no time on NSW public holidays	

5 Traffic access

5.1 Vehicle access routes

5.1.1 Over-dimensional and heavy vehicle access

The EIS described the route to the Stubbo Solar for OD and heavy vehicles as being:

- from Newcastle: Golden Highway → Ulan Road → Cope Road → Blue Springs Road.

Note: OD vehicles are not anticipated to be required for the currently phase of construction works.

5.1.2 Light vehicle access

The EIS described two possible routes to the Stubbo Solar for light vehicles. The routes are:

- from Gulgong: Station Street → Cope Road → Blue Springs Road
- from Mudgee: Castlereagh Highway → Herbert Street → Station Street → Cope Road → Blue Springs Road.

Most construction traffic will follow the "proposed access route" as shown on Figure 5.1. Other construction vehicles may use a different routes, for example from Gulgong and/or Bungaba, where appropriate (workforce, water trucks, gravel, etc.).

Figure 5.1 Potential water and gravel delivery routes

5.1.3 Water deliveries

External water deliveries required for construction and dust suppression will be sourced locally and be delivered to site via Cope Road and Blue Springs Road, as shown on Figure 5.1.

5.1.4 Construction staff

During the current construction phase of the project, the workforce is likely to be sourced locally and would access the site using their own private vehicles. As the workforce number is likely to be limited to approximately 50 staff, accommodated locally, shuttle buses will not be practicable. However, car-pooling will be encouraged.

5.1.5 Emergency vehicle access

Emergency vehicle access to/from the site will be via Cope Road. The site access will provide an appropriate ingress and egress point for emergency service vehicles.

5.1.6 Haulage route use minimisation

ACEN intends to minimise the use of local roads where possible and to ensure that any disruption to local road users is kept to a minimum. ACEN will require the Contractor to liaise with subcontractors and suppliers, particularly in relation to the haulage of civil materials (e.g. coarse and fine crushed gravel and water deliveries) to and from the site, to coordinate deliveries.

5.2 Site access

5.2.1 Access corridor

The EIS notes that the access corridor for construction vehicles will enter the Blue Springs Road Upgrade construction site via Cope Road, with a right-hand turn onto Blue Springs Road for traffic coming from the northwest and with a left-hand turn for traffic coming from the southeast (i.e. from Gulgong). Once on Blue Springs Road, traffic will enter the main site access road construction area with a left-hand turn.

5.2.2 Internal road configuration

To minimise dust/debris from being tracked onto Blue Springs Road and on to Cope Road, the main site access road will be of gravel construction and will have an "all weather" road type pavement. This is consistent with the Operating Conditions - CoC 10 (Schedule 3).

5.2.3 Pre-approved heavy vehicle routes

As per the TTR (SCT Consulting 2020), the site route via Ulan Road, Cope Road and Blue Springs Road or Barneys Reef Road, would occur along on designated B-double routes. Therefore, truck turning circles at intersections should be able to be accommodated along the proposed haulage route.

OD vehicles will require adequate traffic management (including escort vehicles and pilot cars) to the satisfaction of the relevant authority; the extent of the escort would be determined when securing the relevant TfNSW OD permits.

Note: OD vehicles are not anticipated to be required for the currently phase of construction works.

5.3 Turning lane assessment

The TTA (SCT Consulting 2020) assessed the turning lane requirements for the proposed project access intersections on Blue Springs Road and Barneys Reef Road and considered that, based on the forecast traffic volumes, each of those intersections would require a basic rural property access treatment, without additional turning lanes.

The turning lane assessment was further considered in the detailed design of the road upgrades (ACOR 2022a and 2022b).

6 Traffic management

This TMP has been developed to comply with the relevant DC conditions set out in DC Application Number: SSD 10452.

Schedule 3 Condition 11 of the approval requires an TMP to be developed to the satisfaction of the NSW Planning Secretary. The CoCs as they relate to construction management described in the DC are presented in Table 2.2.

6.1 Road maintenance

6.1.1 Road repair

As per CoC 9b (Schedule 3), the Contractor will repair Ulan Road, Cope Road and Blue Springs Road along the transport route if dilapidation surveys identify that the road has been damaged during construction, upgrading or decommissioning works.

ACEN commits to performing dilapidation road surveys of Ulan Road, Cope Road and Blue Springs Road prior to the commencement of Construction as defined under the DC for SSD-10452" (i.e. prior to the "site access road" works).

ACEN also commits to consulting with the road owner and maintainer for closure of any identified defects once Stage 1 works are completed.

Road repair will be undertaken in consultation with the relevant roads authority, to the satisfaction of the Planning Secretary. ACEN acknowledges that, if there is a dispute about the repair of Ulan Road, Cope Road and Blue Springs Road between ACEN and the relevant roads authority, then either party may refer the matter to the Planning Secretary for resolution. The Planning Secretary's decision on the matter must be final and binding on both parties.

6.1.2 Minimising dirt tracked onto the public road network

As per CoC 11c (Schedule 3), the Contractor will minimise dirt, dust and debris from being tracked tracked onto the public road network from development-related traffic. The Blue Springs Road upgrade and the main site access road will be constructed with "all weather" road type pavements. This is consistent with the Operating Conditions - CoC 10 (Schedule 3).

In addition, and as per the detailed design drawings for the Blue Springs Road upgrade (ACOR 2022b), the Contractor will install a Stabilised Site Access point at the Cope Road / Blue Springs Road intersection. This will reduce the tracking of sediment off the site on to the paved road surface of Cope Road.

6.1.3 Minimising dust generation

As per CoC 18 (Schedule 3), the Contractor will minimise dust generated by the project works.

The EIS (Ramboll 2020) identified that the project has the potential for dust to be generated and impact on the environment. With respect to the current phase of works, the sources of dust are:

- heavy civil works, such as grading/levelling and compaction and vegetation clearing associated with site preparation of the internal access roads
- installation of fencing involving ground disturbance.

To minimise dust generation throughout the current phase of works, the Contractor will:

- employ water trucks for dust suppression along internal, unsealed access roads and disturbed areas when required (i.e. if visible dust emissions are observed).
- wheel-generated dust will be reduced by ensuring unnecessary on-site vehicle movements are minimised.

6.1.4 Design features of Blue Springs Road

As noted in Section 4.2.2, the proposed upgrade works of Blue Springs Road include improved formation width, pavement design, delineation, roadside safety treatments and drainage culvert extensions and replacements. In their design report, ACOR (2022a) note the following have been included in the design.

Regulatory signage has been detailed around the intersections within the project. Giveaway signage in conjunction with pavement marking controls traffic movement through the intersections as design on the design plans. Speed limit regulatory signage will be included in the final design. ACEN will consult with MWRC to confirm requirements for and reinstatement of existing signage.

Guide and warning signage is incorporated into the design as part of the road safety system to account for the locations which provide a design speed below the regulatory speed of the roadway. Signage has been included in the design for these locations, including curve warning signs, speed restriction signs and chevron alignment marker signs.

Detailed delimitation design has been provided as part of the Blue Springs Road project. A combination of pavement marking, pavement marking and raised pavement markers (RPMS) and guideposts provide delineation through the project providing a significant improvement in road safety over the existing unsealed roadway.

Extent of tree foliage / growth along the northern side of Cope Road either side of Blue Springs Road will be assessed prior to commencement of construction. If appropriate safe sight distances are not achieved, tree trimming or removal will be undertaken to ensure safe sight distances requirements and / or the speed limit on the Cope Road approach to the Blue Springs Road intersection will be reduced on the approaches to the intersection. The Biodiversity Management Plan (BMP) will be referenced to ensure any tree-trimming or removal is done in accordance with regulatory conditions.

ACOR's design report *Stubbo Solar Farm: Design Report – Blue Springs Road*, is attached as Appendix B.

6.2 Temporary traffic controls

The Contractor will develop a Traffic Control Plan (TCP) (prepared by a suitably qualified person) which will show type and location of temporary signage on Cope Road and Blue

Springs Road along the construction vehicle route. This temporary signage will include a reduction in the posted speed limit as described in this TMP.

TfNSW and MWRC will be consulted as the TCP is being developed and prior to its implementation. The Contractor will seek formal direction from relevant roads authorities for installation of any temporary signage, including restoring the existing speed limit on completion of the Project.

6.3 Driver behaviour

6.3.1 Vehicle speed

All vehicle drivers operating for the Stubbo Solar project are required to comply with the Australian road rules, keep to the posted speed limits and observe instruction on other signage.

6.3.2 Weather conditions

CoC 11c (Schedule 3) requires the TMP to consider responses to local climate conditions that may affect road safety, such as fog, dust, wet weather and flooding.

In the event of adverse weather events, the Contractor will contact contractors, sub-contractors, staff and site personnel to ensure safe travel to work is maintained. Close attention will be paid to weather conditions and proposed road works and the Contractor will issue traffic alerts and communicated to all site-based parties travelling on the effected routes. Weather conditions will be discussed during meetings such as toolbox meetings, weekly site meetings, etc.

6.3.3 Code of Conduct

CoC 11d (Schedule 3) requires the TMP to include a Code of Conduct that addresses:

- travelling speeds
- driver fatigue
- procedures to ensure that drivers adhere to the designated transport routes and speed limits
- procedures to ensure that drivers implement safe driving practices.

The drivers' Code of Conduct is detailed in Section 7.1.

6.4 Transporting workers to and from site

CoC 11c (Schedule 3) requires the TMP to include:

- details of the employee shuttle bus service, including pick-up and drop-off points and associated parking arrangements for construction workers, and measures to encourage employee use of this service
- encouraging car-pooling or ride sharing by employees.

The scale of work required, and therefore the numbers of workers involved, for the proposed phase of works is much less than that for the main construction phase. Therefore, ACEN considers that there is no need for an employee shuttle bus service. However, worker car-pooling may be possible. The Contractor will encourage car-pooling by ensuring the topic is discussed at weekly site meetings.

On-site parking will be provided within the lay-down area, to provide a dedicated safe area where personnel can access their vehicles.

6.5 Over-dimensional and heavy vehicles

6.5.1 General

As specified in CoC 1 (Schedule 3), the Contractor will ensure the development does not generate more than:

- 60 heavy vehicle movements a day during construction, upgrading and decommissioning
- 20 over-dimensional vehicle movements during construction, upgrading and decommissioning, and
- 5 heavy vehicle movements a day during operations.

on the public road network, unless the Planning Secretary agrees otherwise.

The Contractor will keep accurate records of the number of over-dimensional and heavy vehicles entering or leaving the site each day for the duration of the project.

The Contractor will ensure length of any vehicles (excluding OD vehicles) used for the development does not exceed 26 m, unless the Planning Secretary agrees otherwise.

6.5.2 Access route

As specified in CoC 4 (Schedule 3), all OD and heavy vehicles associated with the development will travel to and from the site via Golden Highway, Ulan Road, Cope Road and Blue Springs Road as identified in Appendix 1 and Appendix 5 of the DC.

If required, as per CoC 4 (Schedule 3), the Contractor would obtain relevant permits under the Heavy Vehicle National Law (NSW) for the use of OD vehicles on the road network.

6.5.3 OD vehicle management

CoC 11c (Schedule 3) requires the TMP to include a traffic management system for managing OD vehicles. However, OD vehicles are not anticipated to be required for the current proposed phase of construction works. If such vehicles were considered necessary, the following measures would be put in place.

- adequate on-road traffic management (including escort vehicles and pilot cars) to the satisfaction of the relevant authority with the extent of the escort to be determined when securing the relevant OD permits

- in the locations where the OD vehicles need to encroach onto the opposing carriageway, the pilot cars and/or a spotter would stop and hold the traffic so that the vehicle can safely undertake this manoeuvre.

6.6 Vehicle scheduling

6.6.1 Minimising potential cumulative traffic impacts

As specified in CoC 11c (Schedule 3), ACEN will minimise potential cumulative traffic impacts with other projects in the area. ACEN will consult with developers of other projects that may be occurring at the same time and discuss ways in which vehicle movements could be scheduled to minimise traffic impacts.

6.6.2 Minimising potential for conflict with other road users

As specified in CoC 11c (Schedule 3), ACEN will seek to minimise potential for conflict with school buses and other road users as far as practicable, including preventing queuing on the public road network.

ACEN and the Contractor will consider local school bus routes that interact with the construction traffic haulage routes to identify any opportunities to minimise potential conflict. If required, suitable windows of inactivity (curfew times) will be imposed and communicated to the construction workforce.

6.6.3 Minimising convoying and / or platooning impacts

As specified in CoC 11c (Schedule 3), the Contractor will minimise potential impacts caused by haulage vehicle convoying and / or platooning by, as far as practicable, organising deliveries to occur at different (staggered) times from one another, thereby minimising the likelihood of convoying occurring. Departures of haulage vehicles from the site will also be staggered.

6.6.4 Heavy vehicle movements during school bus operation times

As specified in commitment T10 of the Amendment Report, to improve safety of road users along the section of Blue Springs Road upgrade, where possible heavy vehicle movements on Blue Springs Road will be restricted during school bus operation times.

7 Driver and vehicle protocols

7.1 Code of conduct

The drivers' Code of Conduct is to ensure that drivers adhere to the designated transport routes, and procedures to ensure that drivers implement safe driving practices.

All employees and contractors are to be made aware that responsible driving and adhering to the code is a condition of employment on the Stubbo Solar project, with all drivers to be trained in the Code of Conduct during the site induction.

Any drivers reported or found to be acting in a manner contrary to the Code of Conduct may be subject to disciplinary action.

All personnel operating vehicles for the Stubbo Solar project must:

- have undertaken a site induction
- hold a valid driver's licence for the class of vehicle that they operate
- operate the vehicle in a safe manner on the site (including access roads) and off the project site
- adhere to the designated transport routes
- comply with directions of authorised site personnel when within the site.

To ensure (as far as possible) that vehicles are able to operate safely, regular maintenance and vehicle checks of all project construction vehicles are to be undertaken. Drivers are to assist with vehicle maintenance.

7.1.1 Vehicle speed

There are two main types of driver behaviour with respect to vehicle speed which are of concern, they are when a driver travels:

- faster than the posted speed limit; and
- within the speed limit but, because of road conditions (e.g. rain), this speed is considered inappropriate.

All vehicle drivers operating for the Stubbo Solar project are required to:

- comply with the Australian road rules.
- observe the posted speed limits, with vehicle speed adjusted to suit the road environment and prevailing weather conditions as appropriate
- ensure vehicle speed is appropriate to maintain the safe movements of vehicles, based on the configuration/set up of the vehicle.

7.1.2 Driver fatigue

The heavy vehicle driver fatigue law commenced in NSW in February 2016 and applies to trucks and truck combinations over 12 tonne GVM. Under the law, industry has the choice of operating under three fatigue management schemes:

- Standard Hours of Operation
- Basic Fatigue Management (BFM)
- Advanced Fatigue Management (AFM).

All heavy vehicle drivers operating by or for the Stubbo Solar project are to be aware of their adopted fatigue management scheme and operate within its requirements.

7.1.3 Vehicle management

All vehicles will enter and exit Blue Springs road and the main site access area in a forward direction, no vehicles are to reverse out of the subject construction areas at any time or under any circumstance.

In addition, vehicles exiting the construction areas, should limit the amount of dirt transferred from the construction areas onto the external road network.

If necessary, a cleaning station will be provided near the laydown area/s to enable vehicles to conveniently remove excess debris as required.

This procedure for vehicles exiting the property (and entering) should be addressed within the employee / driver induction. In addition, monitoring is to be undertaken intermittently to ensure that drivers are complying with the requirement to ensure that vehicles are cleaned of excess debris before departing.

7.2 Induction training

Drivers will be trained / inducted prior to beginning their tenure at the construction site. Due to the anticipated (relatively short) length of the construction (approx. 4 months), refresher training is not expected to be required. However in the event that construction lasts for more than 12 month, recertification / refresher inductions will be held every 12 months (if required).

Training will include:

- reiteration/reinforcement of the need to:
  - observe road rules and speed limits
  - to drive to the conditions
  - adhere to the designated transport routes
  - comply with directions of authorised site personnel when within the site
  - conduct regular vehicle inspections for faulty or fatigued/broken parts
  - conduct vehicle exit inspections for excessive mud or dirt
- encouragement for drivers to observe safe operating speeds by providing examples of positive driver practices and, where appropriate, examples of in unacceptable practices in

order to educate and improve driver behaviour. ACEN and/or the Contractor may introduce a system of “demerit points” to enhance good driver behaviour.

The Contractor is responsible for monitoring and encouraging the safe operation in accordance with these practices.

7.3 On-site management

ACEN and the Contractor will implement or provide the following:

- traffic management techniques and strategies for external roads
- radio communication between construction vehicles available at all times
- flashing lights fitted and utilised by construction vehicles where possible
- all loads correctly and securely restrained
- induction/training for drivers and staff (as per Section 7.2)
- warning signage at critical points.

On-site parking will be provided within the lay-down area/s, to provide a dedicated safe area where personnel can access their vehicles – this measure will ensure unnecessary vehicles are not parking within public road reservation areas. The Contractor will be responsible for managing the construction of the parking area and ensuring that all construction vehicles park on-site.

8 Compliance monitoring

Compliance monitoring is an important part of the TMP. The monitoring requirements are summarised in Appendix C.

8.1.1 Site access road, Blue Springs Road and other public roads

Visual inspections of the site access roads, site entry and public road traffic routes will be undertaken on a daily basis to observe condition (whether dirt/debris is present, damage has occurred, etc.). Observations will be recorded and, where necessary, action will be taken to address any issues observed.

8.1.2 Heavy vehicle site access

As per CoC 2a (Schedule 3), the Contractor will ensure that, during the current phase of works, the development does not generate more than:

- 60 heavy vehicle movements a day on the public road network
- 20 OD vehicle movements on the public road network.

As per CoC 2b (Schedule 3), the Contractor will ensure that the length of any vehicles (excluding OD vehicles) used for the development does not exceed 26 metres (unless otherwise agreed by the Planning Secretary).

Data of daily heavy vehicle and OD movements and vehicle lengths will be recorded and monitored to ensure compliance with the DC.

All compliance data / monitoring will be undertaken and recorded daily.

9 Community and stakeholder engagement

9.1 Consultation during project planning

Community and stakeholder consultation was undertaken during the preparation of the EIS for the Project and responses were taken into consideration in the design of both the Project and the environmental impact mitigation measures.

Details of the consultation undertaken during the EIS stage are provided in Chapter 5 of the EIS.

9.2 Engagement with Regulators

9.2.1 Notifications to DPE prior to key project stages

In accordance with CoC 4 (Schedule 4), prior to commencing construction, operations, upgrading or decommissioning of the development or the cessation of operations, the Applicant (ACEN) will notify DPE in writing via the Major Projects website portal of the date of commencement, or cessation, of the relevant phase.

If any of these phases of the development are to be staged (as is proposed with the current construction works), then the Applicant (ACEN) will notify DPE in writing prior to the commencement of the relevant stage, and clearly identify the development that would be carried out during the relevant stage.

9.2.2 Consultation with TfNSW and Council

In accordance with CoC 11 (Schedule 4) prior to commencing road upgrades the Applicant (ACEN) must prepare a TMP for the development in consultation with TfNSW and Council and to the satisfaction of the Planning Secretary. Appendix E lists the consultation undertaken to date.

In accordance with commitment T11 of the Amendment Report, ACEN will continue consultation with MWRC regarding the use of the existing cleared area located at the north-western corner of the Cope Road and Blue Springs Road intersection as a potential laydown area/stockpile location during construction of the Blue Springs Road upgrade.

9.3 Consultation during construction

To ensure the community is kept informed of works at the site, ACEN will:

- make information available on the Stubbo Solar Facebook page (https://www.facebook.com/StubboSolarFarm)
- make information available at the ACEN Gulgong office
- inform residents along Blue Springs Road by mail and provide them with information such as timeframes, contact numbers, etc.

- ACEN will conduct a local letter-box drop to those immediately affected containing contact information approximately three week prior to commencement of construction. Social media notification of similar messaging will also be utilised.

9.4 Website

A website has been established for the Project https://stubbosolarfarm.com.au/

This website will be maintained and kept up-to-date by the Applicant (ACEN). Contact and complaint details will be kept up-to-date on the Stubbo Solar project website. In accordance with CoC 17 (Schedule 4) the website will make the following information publicly available at minimum, as relevant to the stage of the development:

- EIS and response to submissions
- the final layout plans for the development
- current statutory approvals for the development
- approved strategies, plans or programs required under the conditions of this consent
- the proposed staging plans for the development if the construction, operations or decommissioning if the development is to be staged
- notifications about development-related traffic impacts
- how complaints about the development can be made

a complaints register (see Section 9 of EMS). This complaints register (attached as Appendix F) includes provision for documenting what measures would be taken to resolve the issue, measures to avoid recurrence to be registered and responsibility for actioning the outcomes.

- compliance reports
- any independent environmental audit, and the Applicant's response to the recommendations in any audit (see Section 7.5 of EMS)
- any other matter required by the Secretary.

9.5 Dissemination of environmental information

ACEN commits to ensuring stakeholders are kept informed about the environmental performance of the development. This will be achieved by:

- ensuring the website is updated with environmental performance data
- making information available at the ACEN Gulgong office
- informing residents along Blue Springs Road by mail and providing them with information such as timeframes, contact numbers, etc. Contact details will be provided in the above mentioned letter-box drop.

10 References

ACOR (2022a). Stubbo Solar Farm: Design Report – Blue Springs Road, prepared for UPC\AC Renewables Australia Pty Ltd by ACOR Consultants. Rev04, 20 July 2022

ACOR (2022b). Mid-Western Regional Council Stubbo Solar Farm: Detailed Design – Blue Springs Road (NSW212453-DD-REVA), prepared for UPC\AC Renewables Australia Pty Ltd by ACOR Consultants. 22 April 2022

DECC (2007). Storing and Handling of Liquids: Environmental Protection – Participant's Manual. Department of Environment and Climate Change NSW. May 2007

DECC (2009). Interim Construction Noise Guideline. Department of Environment and Climate Change NSW. July 2009

Landcom (2004). Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition, Office of Environment, New South Wales NSW EPA (2017). NSW Noise Policy for Industry

SCT Consulting (2020). Traffic and Transport Assessment, Stubbo Solar Farm: EIS, prepared for UPC\AC Renewables Australia Pty Ltd by Ramboll Australia Pty Ltd. 9 December 2020

Ramboll (2020). Stubbo Solar Farm: Environmental Impact Statement, prepared for UPC\AC Renewables Australia Pty Ltd by Ramboll Australia Pty Ltd. December 2020

Ramboll (2021). Stubbo Solar Farm: Amendment Report, prepared for UPC\AC Renewables Australia Pty Ltd by Ramboll Australia Pty Ltd. June 2021

Appendix A
Conditions of Consent reference table

Table A1 Conditions of Consent reference table

No.	Condition	Reference
	Schedule 3	
	Over-Dimensional and Heavy Vehicle Restrictions	
2	The Applicant must ensure that the:	
2a	development does not generate more than: • 60 heavy vehicle movements a day during construction, upgrading and decommissioning • 20 over-dimensional vehicle movements during construction, upgrading and decommissioning, and • 5 heavy vehicle movements a day during operations on the public road network, unless the Planning Secretary agrees otherwise	See Section 6.5
2b	length of any vehicles (excluding over-dimensional vehicles) used for the development does not exceed 26 m, unless the Planning Secretary agrees otherwise	See Section 6.5
3	The Applicant must keep accurate records of the number of over-dimensional and heavy vehicles entering or leaving the site each day for the duration of the project	See Section 8
	Access Route	
4	All over-dimensional and heavy vehicles associated with the development must travel to and from the site via Golden Highway, Ulan Road, Cope Road and Blue Springs Road as identified in Appendix 1 and Appendix 5. Note: The Applicant is required to obtain relevant permits under the Heavy Vehicle National Law (NSW) for the use of over-dimensional vehicles on the road network.	See Section 6.5
	Site Access	
5	All vehicles associated with the development must enter and exit the site via the preferred site access point off Blue Springs Road, as identified in Appendix 1 and Appendix 5	See Section 5.1
6	If the applicant cannot secure access via the preferred site access point detailed in condition 5 of Schedule 3 of this consent, all vehicles associated with the development must enter and exit the site via the alternative site access point off Blue Springs Road, as identified in Appendix 1 and Appendix 5	See Section 5.1
7	The site access point off Barneys Reef Road may only be used for emergency purposes	See Section 5.1
	Road Upgrades	

No.	Condition	Reference
8	Unless the Planning Secretary agrees otherwise, prior to commencing construction the Applicant must upgrade:	
8a	the selected access point off Blue Springs Road, as identified in Appendix 1 and Appendix 5, in accordance with Council requirements	the purpose of this TMP
8b	Blue Springs Road from the Cope Road up to a minimum 100 m beyond the selected site access point, as identified in Appendix 5; and	the purpose of this TMP
8c	the intersection of Cope Road and Blue Springs Road with basic right turn (BAR) and basic left turn (BAL) treatments to be sealed, designed and constructed for 100 km/h speed environment, able to accommodate the largest vehicle using the intersection, match existing road levels and not interfere with existing road drainage, identified in Appendix 5	See Section 5.4
	Unless the relevant roads authority agrees otherwise, these upgrades must comply with the *Austroads Guide to Road Design* (as amended by Transport for NSW (TfNSW) supplements), and be carried out to the satisfaction of the relevant roads authority	
	Road Maintenance	
9	The Applicant must:	
9a	undertake an independent dilapidation survey to assess the: • existing condition of Ulan Road, Cope Road and Blue Springs Road on the transport route, prior to construction, upgrading or decommissioning works; and • condition of Ulan Road, Cope Road and Blue Springs Road on the transport route, following construction, upgrading or decommissioning works	Not applicable to this phase of works
9b	repair Ulan Road, Cope Road and Blue Springs Road on the transport route if dilapidation surveys identify that the road has been damaged during construction, upgrading or decommissioning works	Section 6.1.1
	in consultation with the relevant roads authority, to the satisfaction of the Planning Secretary	
	If there is a dispute about the repair of Ulan Road, Cope Road and Blue Springs Road between the applicant and the relevant roads authority, then either party may refer the matter to the Planning Secretary for resolution. The Planning Secretary's decision on the matter must be final and binding on both parties	
	Operating Conditions	
10	The Applicant must ensure that the:	

No.	Condition	Reference
10a	the internal roads are constructed as all-weather roads	Not applicable to this phase of works
10b	there is sufficient parking on site for all vehicles, and no parking occurs on the public road network in the vicinity of the site	Not applicable to this phase of works
10c	the capacity of the existing roadside drainage network is not reduced	Not applicable to this phase of works
10d	all vehicles are loaded and unloaded on site, and enter and leave the site in a forward direction; and	Not applicable to this phase of works
10e	vehicles leaving the site are in a clean condition, with loads appropriately covered or contained, to minimise dirt being tracked onto the sealed public road network	Not applicable to this phase of works
	Traffic Management Plan	
11	Prior to commencing road upgrades, the Applicant must prepare a Traffic Management Plan for the development in consultation with TfNSW and Council and to the satisfaction of the Planning Secretary. This plan must include:	This document (see Section 9.2 for consultation record)
11a	details of the transport route to be used for all development-related traffic	See Section 5.1
11b	details of the road upgrade works required by condition 8 of Schedule 3 of this consent	See Section 5.1
11c	details of the measures that would be implemented to minimise traffic impacts during construction, upgrading or decommissioning works, including: • details of the dilapidation surveys required by condition 7 of Schedule 3 of this consent • temporary traffic controls, including detours and signage) • notifying the local community about development-related traffic impacts • procedures for receiving and addressing complaints from the community about development- related traffic • minimising potential cumulative traffic impacts with other projects in the area, including during construction, upgrading or decommissioning works • minimising potential for conflict with school buses and other road users as far as practicable, including preventing queuing on the public road network (measures also required during operation of the project) • minimising dirt tracked onto the public road network from development-related traffic • details of the employee shuttle bus service, including pick-up and drop-off points and associated parking arrangements for construction workers, and measures to encourage employee use of this service • encouraging car-pooling or ride sharing by employees	See Section 6

No.	Condition	Reference
	• scheduling of haulage vehicle movements to minimise convoy length or platoons • responding to local climate conditions that may affect road safety such as fog, dust, wet weather and flooding • monthly monitoring for, and responding to, any emergency repair and/or maintenance requirements; and • a traffic management system for managing over-dimensional vehicles	
11d	a driver's code of conduct that addresses: • travelling speeds • driver fatigue • procedures to ensure that drivers adhere to the designated transport routes and speed limits; and • procedures to ensure that drivers implement safe driving practices	See Section 7.1
11e	a program to ensure drivers working on the development receive suitable training on the code of conduct and any other relevant obligations under the Traffic Management Plan	See Section 7.2
	Following the Planning Secretary's approval, the Applicant must implement the Traffic Management Plan	

*Table A**Error! No text of specified style in document.** Construction-phase commitments reference table*

No.	Commitment Description	Reference
	Traffic and Transport	
T1	ACEN will continue to consult with Mid-Western Regional Council (MWRC) to agree the appropriate treatment or upgrade requirements for the safe use of Blue Springs Road during construction and the process for undertaking any treatment or upgrade works in accordance with DC conditions	See Section 9
T2	A construction traffic management plan will be prepared in consultation with TfNSW and MWRC. The plan will include: • details of the transport route to be used for all project-related traffic • details of any road upgrade works required by DC • a protocol for undertaking independent dilapidation surveys to assess the existing condition of the proposed construction routes prior to construction, upgrading or decommissioning activities and the condition of the proposed construction routes following construction, upgrading or decommissioning activities • a protocol for the repair of the construction routes if dilapidation surveys identify these roads to be damaged during construction, upgrading or decommissioning works	See Section 6

No.	Commitment Description	Reference
	• details of the measures that will be implemented to minimise traffic impacts during construction, upgrading or decommissioning works, including: - temporary traffic controls, including detours and signage - notifying the local community about project-related traffic impacts - procedures for receiving and addressing complaints from the community about project-related traffic - minimising potential for conflict with school buses, other road users during peak hours and rail services as far as practicable (measures also required during operation of the project) - minimising dirt tracked onto the public road network from project-related traffic - scheduling of haulage vehicle movements to minimise convoy length or platoons - responding to local climate conditions that may affect road safety such as fog, dust and wet weather - responding to any emergency repair or maintenance requirements - a traffic management system for managing over-dimensional vehicle trips to and from the project • a program to ensure drivers associated with the project receive suitable training on the Driver Code of Conduct and any other relevant obligations under the construction traffic management plan prior to construction • a flood response plan detailing procedures and options for safe access to and from the site in the event of flooding • controls for transport and use of dangerous goods in accordance with State Environmental Planning Policy No. 33 – *Hazardous and Offensive Development*, *Australian Dangerous Goods Code* and *Australian Standard 4452 Storage and Handling of Toxic Substances*.	
T3	The safe sight distance analysis undertaken at the Cope Road / Blue Springs Road intersection and at the proposed site access point options from Blue Springs Road will be ground-truthed to determine if vegetation trimming or speed limit reductions need to be applied to provide the required safe sight distance for all vehicle types expected to access the project. Ground-truthing of the analysis undertaken for the emergency-only access point proposed from Barneys Reef Road will also be undertaken, with appropriate measures to be put in place for the (unlikely) event of this access point being utilised.	See Section 5.3 and Section 6.1.4
T4	Parking requirements for the project construction and operation workforce will be provide onsite and parking will not be provided on public roads adjacent to the site.	See Section 6.4 and Section 7.3
T9	UPC\AC and/or its selected EPC contractor will work towards a full detailed design for the proposed Blue Springs Road upgrade prior to commencing construction. The full detailed design will be prepared in consultation with MWRC and Transport for NSW and any other	See Section 4.1

No.	Commitment Description	Reference
	relevant public agencies as part of a Traffic Management Plan and relevant DC conditions.	
T10	The following traffic management measures will be implemented during construction of the Blue Springs Road upgrade to improve safety of road users along the section of road: • implement a temporary lowered sign posted speed limit from 100 km/hr (existing) to 80 km/hr during construction • restrict heavy vehicle operation on Blue Springs Road during school bus operation times where possible.	See Section 6.6.4
T11	Consultation with MWRC will be ongoing regarding the use of the existing cleared area located at the north-western corner of the Cope Road and Blue Springs Road intersection as a potential laydown area/stockpile location during construction of the Blue Springs Road upgrade.	See Section 4.6 and Section 9.2.2
T12	UPC\AC will apply for a s138(2) application (under the Roads Act) for the Blue Springs Road upgrade with MWRC, who will refer to TfNSW to obtain concurrence prior to the commencement of works.	See Section 4.1
T13	UPC\AC would undertake consultation with landholders affected by the Blue Springs Road upgrade where proposed upgrades impact on land outside of the road reserve. Affected landholders' consent would also be required to continue with the SSD process.	See Section 4.1
T14	UPC\AC commits to preparing a Concept Design for the Blue Springs Road upgrade on the basis of a topographic survey (April/May 2021).	See Section 4.1
T16	UPC\AC will continue to consult with State Forestry Commission of NSW throughout development of the proposed Blue Springs Road upgrade. All works in the State Forest area for the proposed Blue Springs Road upgrade would be undertaken in accordance with a forest permit issue by Forestry Corporation of NSW (FC NSW) as per section 60 Forestry Act 2012. State Forestry Corporation of NSW has provided its consent to lodge the application.	See Section 4.1

Appendix B
Detailed Design report and drawings

Appendix B1
ACOR detailed design report

Level 1, 54 Union St
Cooks Hill
Newcastle NSW 2300

T +61 2 4926 4811

ENGINEERS

MANAGERS

INFRASTRUCTURE PLANNERS

DEVELOPMENT CONSULTANTS

Stubbo Solar Farm

Design Report – Blue Springs Road

Prepared for: UPC/AC Renewables Australia

Revision No: 04

Disclaimer

This Report has been prepared in accordance with the scope of services described in the agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements and results based on instructions from, and in consultation with, the Client. Except as otherwise stated, ACOR Consultants Pty Ltd has not attempted to verify the accuracy or completeness of any information provided by the Client. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that changes may be required to the Report. Changes in circumstances or facts, the passage of time, manifestation of latent conditions or impacts of future events may also impact on the accuracy, completeness or currency of the information or material set out in this Report. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd] accepts no responsibility for its use by any third parties without the specific authorisation of ACOR Consultants Pty Ltd. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this Report, to the extent permitted by law.

Revisions

Revision	Description	Date	Prepared by	Approved by	Signature
01	50% Detailed Design	28.04.22	G. Carter	G. Couch	
02	50% Detailed Design	03.05.22	G. Couch	J. Rhodes	
03	IFC	06.07.22	G. Couch	J. Rhodes	
04	Amended IFC	20.07.22	J. Kidd	G. Couch	

Review Panel

Division/ office	Name
#	#

Table of Contents

List of Figures

List of Tables

1 Approvals

1.1 Road Design Approval of Design Report

The signatures below do not provide evidence of approval to the design. Approval signatures are shown on the title sheet of the design plans.

Approval for the report	
Greg Couch	Position title: NSW Civil Lead
Signature:	Date:06/07/2022
Josh Rhodes	Position title: Senior Civil Designer
Signature:	Date: 06/07/2022

Table 1 - Road Design approval for the report

2 Executive Summary

ACOR Consultants has been commissioned by UPC/AC Renewables to produce the detailed design and construction documentation for the Blue Springs Road upgrade as part of the Stubbo Solar Farm development. The detailed design has been based on the approved Concept Design previously undertaken by BTE Consulting.

Blue Springs Road commences at the intersection with Cope Road in Stubbo NSW and extends approximately 30kms through to the intersection with the Golden Highway in Uarbry. Located within the Mid-Western Regional Council area, it is an existing sealed rural road providing access to many private properties. As part of the development consent, Blue Springs Road is undergoing 4.66km of road upgrade commencing from the Cope Road intersection through to approximately 100m beyond the proposed Solar Farm access location. The design upgrades include improved formation width, pavement design, delineation, roadside safety treatments and drainage culvert extensions and replacements. The works also includes upgrades to the Cope Road Intersection to allow for the heavy vehicles to access the solar farm along with minor upgrades to all other intersections and property access points along the extent of the upgrade works.

2.1 Client

Client contact details	
Name:	Tim Greenaway
Position title:	Project Director
Email:	tim.greenaway@upc-ac.com
Phone:	+61 413 625 097

Table 2 – Client Details

2.2 Design objectives

Design and road upgrade requirements for part of the Stubbo Solar Farm development consent. The below extract from the development consent relates directly to the required road upgrades.

Unless the Planning Secretary agrees otherwise, prior to commencing construction the Applicant must upgrade:

(a) the selected access point off Blue Springs Road, as identified in Appendix 1 and Appendix 5, in accordance with Council requirements;

(b) Blue Springs Road from the Cope Road up to a minimum 100 m beyond the selected site access point, as identified in Appendix 5; and

(c) the intersection of Cope Road and Blue Springs Road with BAR and BAL treatments to be sealed, designed and constructed for 100 km/h speed environment, able to accommodate the largest vehicle using the intersection, match existing road levels and not interfere with existing road drainage, identified in Appendix 5.

Unless the relevant roads authority agrees otherwise, these upgrades must comply with the Austroads Guide to Road Design (as amended by TfNSW supplements), and be carried out to the satisfaction of the relevant roads authority.

Further to the consent requirements the following design objectives form a major part of the current design.

- Design adherence to Austroads Standards & Guidelines, and Australian Standards.
- Cost-effective design methodology and consideration of on-site constraints.
- Where applicable, maintain a line of best fit to existing road geometry, whilst remaining inside the road corridor, and reducing impacts to roadside vegetation and adjacent property boundaries.
- Review Concept Design in conjunction with appropriate design standards and identify changes where applicable.
- Determine any deviations from standards and where unable to be rectified due to site and project constraints these are to be nominated for client and Council review.

2.3 Design issues and considerations

- Drainage requirements for the road upgrade require additional culverts. As a result, minimum cover for the said culverts requires the vertical profile of Blue Springs Road to be raised in certain locations. This is to achieve a minimum clearance of 400mm between the culvert obvert and the finished design surface. In some instances, the results of raising the road profile are impacts property access and variations of the Concept Design footprint.
- Sight distance calculations can only be estimated, specifically around horizontal curves due to the information provided in the topographical survey. The proposed design has followed a line of best fit of the existing road horizontal geometry and therefore, would not be making the situation worse than what is currently available on-site.
- The implementation of speed reduction signs will assist in meeting the sight distances required at each horizontal curve.
- Considering the existing road corridor and existing constraints, it is not possible to apply a constant 100km/hr design speed on Blue Springs Rd, as it does not comply with AGRD standards and general road safety.
- The speed restriction signs from the Concept Design have been assessed in conjunction with appropriate geometric design standards and amended to comply with safe driver manoeuvrability.

Detailed risk assessment of roadside hazards in accordance with Austroads – Guide to Road Design Part 6 – Roadside Design, Safety and Barriers. This process reviewed the roadside hazards on Blue Springs Road against the standard provided by the surrounding network. The aim is to treat hazards that present an A-Typical risk in comparison to the surrounding roads.

3 Scope of project

3.1 Road Design

- Detailed design of the Blue Springs Road upgrade from the Cope Road up to a minimum 100 m beyond the selected site access point (approximately 4.66kms).
    - Upgrading road geometry including improvement of super elevation and pavement widening on curves.
    - Widening of road pavement in other locations where required.
    - Development of one of two site access points (main and/or alternative).
    - Incorporate concept design comments from Council and Client.
    - Roadside furniture and pavement marking as required.
    - Merge to existing property access points.
- Detailed design of the intersection of Cope Road and Blue Springs Road with BAR and BAL treatments for 100 km/h speed environment. Intersection to accommodate the largest vehicle using the intersection.
- Unless the relevant roads authority agrees otherwise, these upgrades must comply with the Austroads Guide to Road Design (as amended by TfNSW supplements) and be carried out to the satisfaction of the relevant road authority.
- Review and adjust existing roadside drainage to suit revised road design. Capacity of existing drainage system to be maintained. Adjustment and extension of culverts as well as additional culverts where required.
- Review and design appropriate treatments for roadside hazards.
- Review associated reports impacting road design such as any applicable Review of Environmental Factors (REF) or Environmental Impact Statement (EIS) for the project.

3.2 Geotechnical Investigation & Pavement Design (Kleinfelder)

- Desktop Study.
    - Review of relevant Client suppled information including existing geological, hydrogeological and geospatial data along with a review of publicly available information, including acid sulfate soil maps, borehole logs, site investigation reports and geological information.
    - Walkover inspection by a Geotechnical Engineer experienced in local transport improvement projects.
    - Reporting will summarise the data and assess the potential impact to the Project. It will also be used to target intrusive investigation in the fieldwork phase of the works.
- Fieldwork General.
    - Provision of Health Safety, Environmental and Quality Plan (HSEQP) noting that a copy can be provided for UPC, if required.
    - Acquiring DBYD service plans for the investigation area and non-destructive service detection at borehole locations by an accredited Telstra utility clearance sub-contractor.

- Boreholes: - Drilling a maximum of 20 No. boreholes to 1.5m depth along Blue Springs Road at approximately 250-300m intervals, boreholes will be undertaken using an auger fitted to a mini excavator (or similar). Reinstatement with arisings only lightly compacted with the excavator. Boreholes will be located on alternating sides of the existing road and several will be located adjacent the existing road pavement to define the existing pavement construction.
- Traffic Management: - Given the rural nature of the site and limited traffic volumes we have planned to undertake the site works as a mobile worksite with an appropriate Traffic Management Plan (TMP) and signage.
- Laboratory Testing (5 No. tests for each of the following).
    - Soil Aggressivity.
    - Atterberg Limits.
    - Particle Size Distribution.
    - CBR on Subgrade materials.

- Geotechnical Reporting:
  - Detailing encountered ground and groundwater conditions.
  - - Subgrade CBR.
  - - Advice on earthworks and site preparation.
  - - Advice on excavations and slopes.
  - - Granular pavement thickness design of suitable overlay for existing pavement and full depth pavement for widening areas.

3.3 Project Team

ACOR Consultants	
Josh Rhodes – Associate Principal	Project Director - Quality Assurance.
Greg Couch – Associate Principal	Project Lead - Design and Client Manager
Gavin Carter – Senior Civil Designer	Road Design and Documentation Manager
Stephen Paterson – Senior Civil Designer	Road Design – Quality Assurance Review
Caleb Davis – Civil Engineer	Roadside Drainage Review
Michael Mattey – Civil Drafter	Civil Project Documentation
Kleinfelder (sub consultant) to complete the Geotechnical Investigation and Pavement Design:	
Phil Band – Senior Geotechnical Engineer	Geotechnical Lead and Pavement Design
Megan Fergusson – Environmental Scientist	Pavement Investigation
Brendan Grant – Senior Principal	Peer Review and Quality Assurance
Gayle Joyce – GIS Specialist	Map production, design & management of field data collection

Table 3 - Design team

3.4 Locality Map

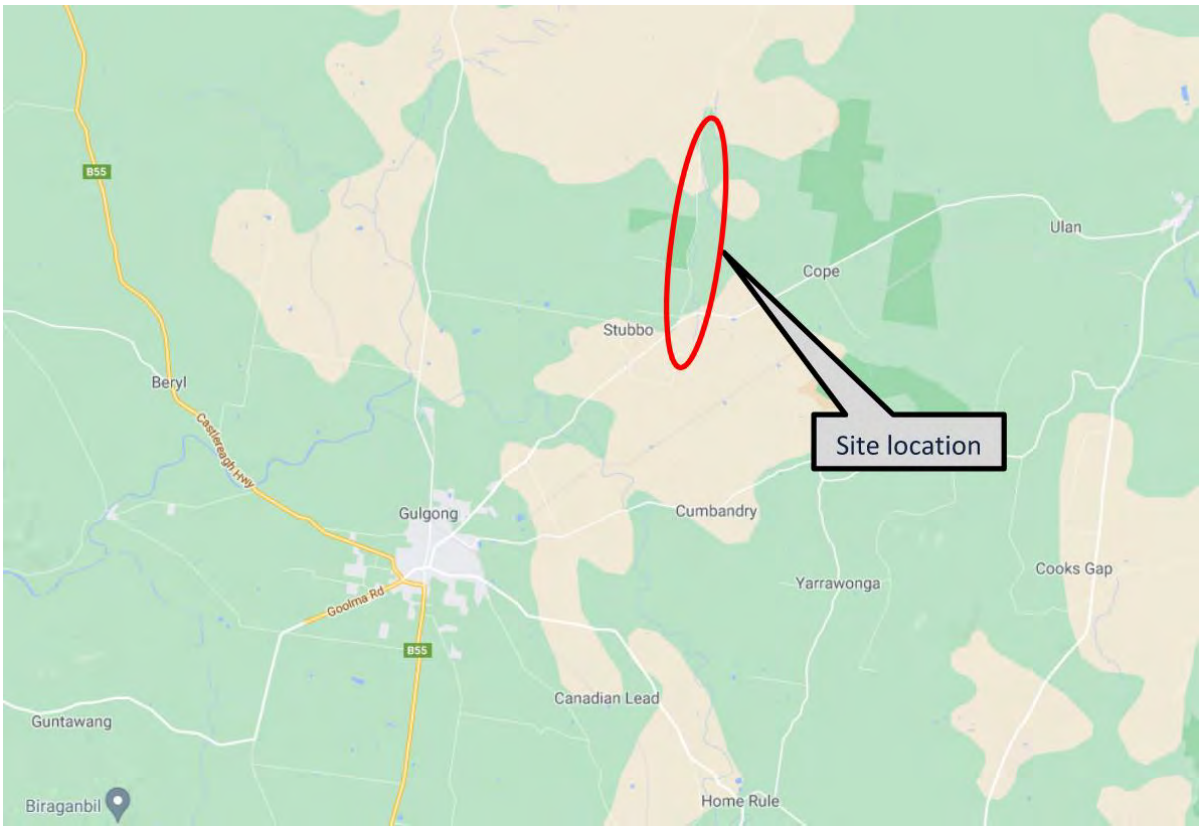


Figure 1: Sourced Google Maps 2021

4 Design criteria

4.1 Design guidelines

The guidelines used for design are, in order of priority:

- The Authorised Scope of Works and Technical Criteria
- Published Transport for NSW supplements to Austroads Guides
- Austroads Road Design Guides
- Australian Standards.

Other guidelines such as Network Planning Targets were considered while setting design values.

4.2 Design vehicles

Design vehicles used for this project are shown below.

Proposed design vehicle	Purpose
26m B-Double	Blue Springs Road and Cope Road intersection, and site access intersection
26m B-Double	Acceleration / deceleration requirements
26m B-Double	Stopping sight distance

Table 4: Design vehicles

4.3 Speed

Speed adopted for this project is shown below:

Speed Parameter	Value
Existing posted speed	100 km/hr
Design Speed – Cope Road	100 km/hr
Design Speed – Blue Springs Road	100 km/hr

Table 5: Speed parameter

4.4 Cross section

Typical cross sections of Blue Springs Road are shown in Figures 2 to 4.

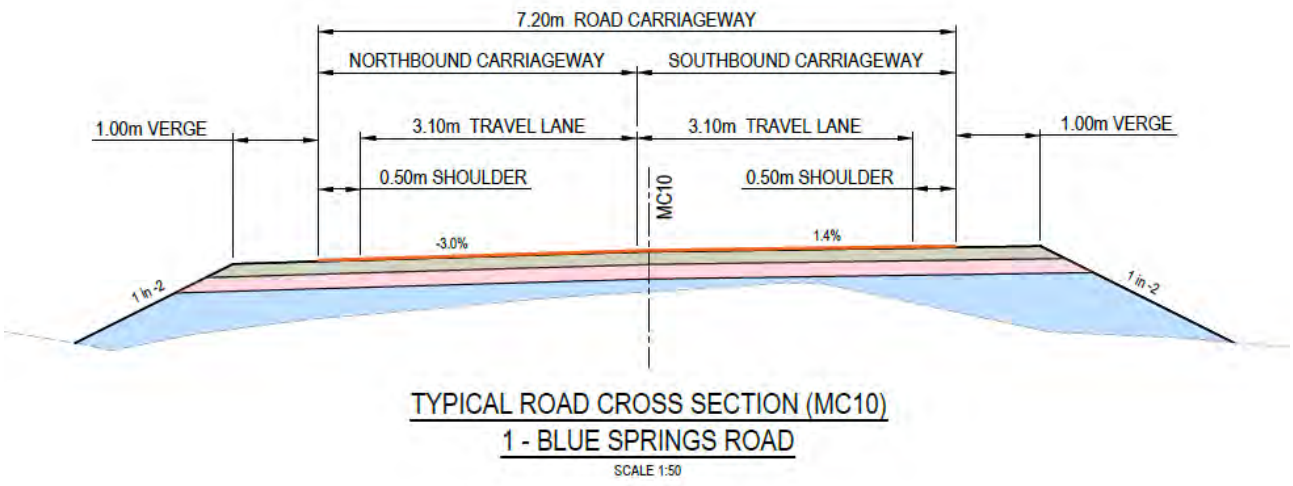


Figure 2: Typical Cross Section 1 – Blue Springs Road

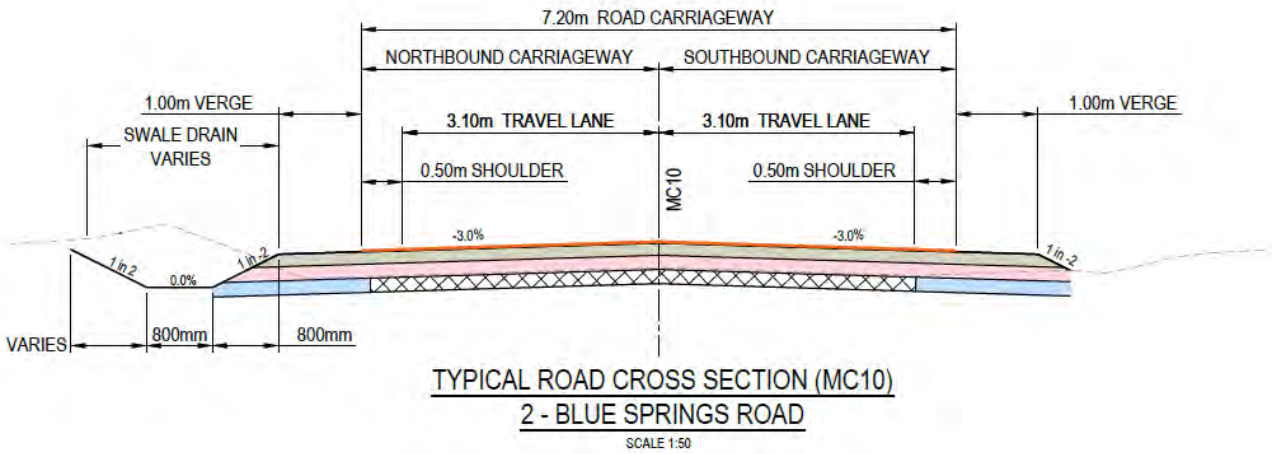


Figure 3: Typical Cross Section 2 – Blue Springs Road

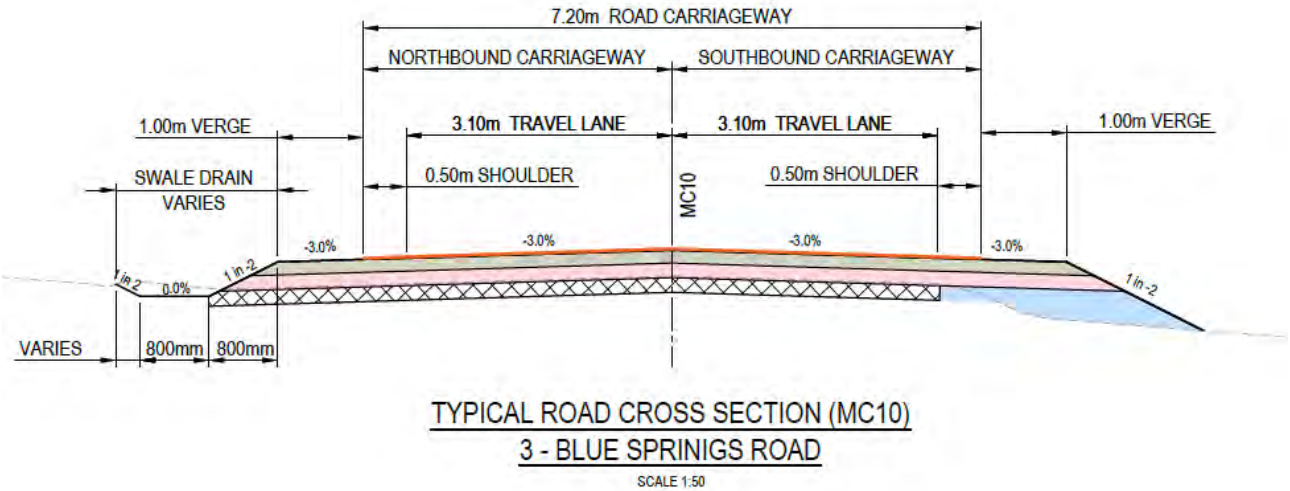


Figure 4: Typical Cross Section 3 – Blue Springs Road

5 Design input

5.1 Survey

Detailed survey of the project site was undertaken by de Witt Consulting as part of the concept design process. This was provided to ACOR by UPC/AC Renewables are part of the data package for the project. The survey contains detailed representation of the existing Blue Springs Road corridor. Survey also includes details on the existing services within the road reserve and cadastral information for the adjacent properties.

5.2 Geotechnical and Pavement Design

Geotechnical testing and road pavement design was undertaken by Kleinfelder as part of the detailed design scope of works. Refer to Appendix B for Geotechnical Report. As part of the investigation and reporting 20 boreholes were taken along this section of Blue Springs Road. Laboratory tests were performed on selected samples obtained from the boreholes to assess the soil classification and properties. The following tests were undertaken:

- Atterberg Limit
- Particle Size Distribution (PSD)
- California Bearing Ratio (CBR)
- Proctor Compaction
- Aggressivity Suite (pH, Sulphate and Chloride)

Based on the test results Kleinfelder have provided a pavement design for the project. The pavement for Blue Springs Road is detailed in the below figure.

Road	Design ESA	Design CBR (%)	Total Thickness	Wearing Course Thickness (1) (mm)	Basecourse Thickness (mm)	Subbase Thickness (mm)
Blue Springs Road	$4x10^5$	5	350	30 (AC10) Normal Duty	150	170

Notes:
1. A 10mm Primer Seal shall be applied prior to the asphalt wearing course.

Figure 5 - Pavement Design

An asphalt wearing course as per the above pavement design in recommended by the Geotechnical Engineer due to the volume of heavy vehicles that we use the Blue Springs Road during the construction. An alternative spray seal wearing course option was provided by Kleinfelder in the Geotechnical report.

Although the spray seal is not recommended due to the higher risk of potential ongoing maintenance during the construction period, advice from Kleinfelder has noted that there is a lower risk of ongoing maintenance if the spray seal wearing course is limited to pavement sections where,

- heavy vehicle speeds are above 15km/h,
- stop/starting movements and queuing is not likely
- screwing of the vehicles tyres is minimal or restricted.

In general, intersections and access points on/off Blue Springs Road should be constructed with an asphalt wearing course to reduce the risk of ongoing maintenance. Refer to Appendix B for Geotechnical Report

5.3 Property constraints

The detailed design has been undertaken to minimise impacts to all adjacent properties. No additional property impacts are proposed beyond those already noted in the approved concept design. All existing property access points will be reconstructed as part of the road upgrade works to ensure suitable access has been maintained.

6 Geometric design

6.1 Horizontal curves and alignment

The criteria used to determine the minimum curve radius are listed in Table 6 below:

Design Parameter	Value adopted
Speed	The initial design speed is 100 km/hr however, design speed varies throughout the design
Width between the edge of the travel lane and obstructions (e.g. face of safety barrier)	1.1 m
Sight distance required for 100 km/hr	180 m
Sight distance required for 80 km/hr	125 m
Sight distance required for 60 km/hr	75 m
Superelevation (Maximum and Minimum)	6% Min. 7% Max.
Adopted minimum curve radius	Varies subject to various design speeds and superelevation

Table 6 - Minimum curve radius

Matching curve radii to sight distance and operating speed

Table 7 details the horizontal geometry for the Blue Springs Road design. Curves below the targeted design speed are highlighted in the below table. These curves have been upgraded where required with speed reduction signage, pavement marking and safety barrier. The horizontal geometry was impacted by several constraints including

- Roadside vegetation.
- Existing road corridor width and alignment.
- Maintaining a construction footprint similar to the approved concept design.

MC10 HORIZONTAL GEOMETRY				
TYPE	**CHAINAGE**	**HEIGHT**	**RADIUS**	**DESIGN SPEED (km/h)**
IP	0	452.65		
TC	4.599	452.905		
IP	21.16	453.123	75	Intersection
CT	37.72	453.174		
TC	61.326	453.289		
IP	103.712	453.579	1600	100
CT	146.099	454.031		
TC	207.935	454.699		
IP	273.955	455.4	450	100

CT	339.975	456.026		
TC	429.169	456.82		
IP	449.196	456.998	-5000	100
CT	469.222	457.17		
TC	709.677	456.645		
IP	745.172	456.681	-275	80
CT	780.666	456.787		
TC	836.411	457.559		
IP	855.053	458.077	-1600	100
CT	873.695	458.918		
TC	1071.29	461.131		
IP	1095.848	461.057	-104	65
CT	1120.407	460.984		
TC	1349.163	461.576		
IP	1373.372	461.746	250	80
CT	1397.582	461.953		
TC	1767.295	465.833		
IP	1810.304	466.592	157	65
CT	1853.313	467.565		
TC	2277.606	475.445		
IP	2316.948	476.622	-350	90
CT	2356.29	477.089		
TC	2655.738	481.264		
IP	2693.982	482.091	-450	100
CT	2732.226	482.878		
TC	2957.877	482.103		
IP	2981.169	482.173	-5000	100
CT	3004.461	482.243		
TC	3184.249	484.25		
IP	3205.779	484.717	5000	100
CT	3227.309	485.184		
TC	3494.727	489.027		
IP	3615.182	491.13	1600	100
CT	3735.638	492.632		
TC	3939.192	494.846		
IP	3957.788	495.013	-5000	100
CT	3976.383	495.18		

TC	4055.904	496.264		
IP	4099.244	497.039	-250	80
CT	4142.584	497.041		
TC	4326.321	498.76		
IP	4432.602	500.277	650	100
CT	4538.883	502.545		

Table 7 - Horizontal Geometry - Blue Springs Road

6.2 Vertical alignment

Following review of the 50% detailed design the vertical alignment was revised to closely match the existing vertical geometry while allowing for a pavement overlay construction methodology. Sections of the vertical alignment have been improved to marginally increases both driver safety and comfort while closely maintaining the revised design approach. Table 8 below details the vertical alignment and its relative design speed based on the stopping distance criteria details in the Austroads Guide to Road Design.

MC01 VERTICAL GEOMETRY					
CHAINAGE	**HEIGHT**	**LENGTH**	**K VALUE**	**RADIUS**	**DESIGN SPEED (km/h)**
-10	452.021				Intersection
6.91	453.085	12.04	2	200	Intersection
35	453.161			7500	Intersection
90.847	453.434	44.25	75	7500	100
287.895	455.562	95	500	5000	100
508.75	457.528	96	60	6000	100
655.871	456.483	20.2	20	2000	80
729.149	456.703	38.297	88.349	8834.94	80
850.117	457.766	33.428	10	1000	80
900.475	460.226	42.94	25	2500	65
972.633	462.511	49.756	10	1000	65
1044.514	461.211	30.172	20	2000	65
1152.666	460.887	12.2	20	2000	65
1361.714	461.535	126.4	160	16000	80
1545	463.551	90	200.495	20049.505	80
1635	464.137	90	147.81	14781.022	65
1799.002	466.203	108.003	86.563	8656.289	65
1876.147	468.138	46.287	23.055	2305.497	65
1965.531	468.585	42.481	13.474	1347.432	65
2008.012	470.137	42.481	17.32	1731.985	100

MC01 VERTICAL GEOMETRY					
CHAINAGE	**HEIGHT**	**LENGTH**	**K VALUE**	**RADIUS**	**DESIGN SPEED (km/h)**
2144.731	471.777	66.8	40	4000	100
2228.162	474.172	53.004	124.604	12460.445	90
2272.332	475.251	35.336	40.491	4049.147	90
2316.893	476.73	36.09	15	1500	90
2414.695	477.621	34.406	31.303	3130.259	90
2449.101	478.313	34.406	22.527	2252.666	90
2494.073	478.53	22.754	15	1500	90
2552.62	479.701	40	50	5000	100
2621.878	480.532	48.09	50	5000	100
2746.868	483.234	54.115	19.3	1930	100
2797.882	482.906	34.556	54.813	5481.298	100
2832.438	482.902	34.556	26.485	2648.5	100
2905.185	481.945	67.889	42	4200	100
3055.646	482.396	35	50	5000	100
3135.641	483.196	58.445	50	5000	100
3280.183	486.331	63.445	50	5000	100
3370.03	487.14	61.18	100	10000	100
3525.092	489.484	77.534	169.98	16997.969	100
3602.625	491.01	77.534	103.664	10366.36	100
3854.777	494.086	96	300	30000	100
4031.106	495.673	72.212	50.435	5043.454	80
4103.317	497.357	72.212	23.033	2303.262	80
4179.751	496.743	76.293	35	3500	80
4435.842	500.268	53.18	50	5000	100
4543.933	502.905	85.5	30	3000	100
4622.65	502.582	42.975	19.1	1910	100
4667.068	503.4	21.75	15	1500	100
4729.77	505.462	38.4	60	6000	100
4794.223	507.17	82.62	81	8100	100
4863.387	508.298	55.26	18	1800	100
4939.857	511.892	88.242	19.1	1910	100

Table 8 - Vertical Geometry - Blue Springs Road

Design for errant vehicles – Roadside Environment

Blue Springs Road is a low volume rural road with substandard geometry and heavy roadside vegetation. It is consistent with the surrounding road network. As part of the design development process a risk assessment was undertaken in accordance with Austroads – Guide to Road Design Part 6 – Roadside Design, Safety and Barriers. The process uses a risk matrix to determine a combined risk score for the hazards at a particular location.

The combined risk score is compared to the Network Roadside Risk Intervention Threshold (NRRIT) for run-off-the-road crashes. The NRRIT sets the typical standard for the road network. In accordance with Clause 2.5 in Austroads Part 6 a typical NRRIT of 2 was adopted and approved by Council. Risk scores above the NRRIT are seen as non-typical risks in comparison to the surrounding network and as a result require treatment.

An assessment based on the proposed road profile and each substandard curve in the design was undertaken and based on the results recommendations for revised roadside treatments in several locations were submitted to Council for approval. The following table details the risk review results for each curve based on the Austroads assessment. Refer to Appendix C for the Austroads – Roadside Hazard Risk Assessment Worksheet. Table 9 shows the risk assessment review and results.

BLUE SPRINGS ROAD – CURVE RISK ASSESSMENT RESULTS				
CHAINAGE	**CURVE RADIUS (m)**	**DESIGN SPEED (km/h)**	**Combined Risk Score (2 Target)**	**Treatment required**
207.935	450	100	2.38	Barrier or Tree Removal
429.169	-5000	100	N/A	
709.677	-275	80	2.3	Barrier or Tree Removal
836.411	-1600	100	1.01	No. Treat with pavement marking & signage
1071.29	-104	65	3.54	Barrier or Tree Removal
1349.163	250	80	1.51	No. Treat with pavement marking & signage
1767.295	157	65	3.82	Barrier or Tree Removal
2277.606	-350	90	1.53	No. Treat with pavement marking & signage
2655.738	-450	100	1.09	No. Treat with pavement marking & signage
2957.877	-5000	100	N/A	N/A
3184.249	5000	100	N/A	N/A

3494.727	1600	100	1.01	No. Treat with pavement marking & signage
3939.192	-5000	100	N/A	N/A
4055.904	-250	80	2.16	Barrier or Tree Removal
4326.321	650	100	0.54	No. Treat with pavement marking & signage

Table 9 – Risk Assessment

6.3 Intersections

General

There is one major rural intersection located within the project area. This is the intersection of Cope Road and Blue Springs Road. Three minor rural intersections are also located along Blue Springs Road. Carramar Road – CH 100, Governor Road – CH 1370, and the proposed Solar Farm Access – CH 4430.

Intersection investigation and modelling

Cope Road and Blue Springs Road

Cope Road intersection has been upgraded to allow for a BAL movement into Blue Springs Road. This is to accommodate 26m B-Double vehicles entering the Solar Farm Site. Furthermore, there is an existing BAR treatment at the intersection, and as part of the Concept Design it was agreed to not upgrade the BAR due to proximity to existing property boundaries.

Blue Springs Road and Carramar Road – CH 100

Due to vertical improvements to the existing road profile on Blue Springs Road, this intersection has been slightly raised (approximately 100mm), matching back into the existing surface at the proposed kerb return. The design has improved the existing horizontal geometry for the kerb returns at this intersection.

Blue Springs Road and Governor Road – CH 1370

Blue Springs Road has been upgraded to accommodate 80km/hr speeds at the intersection of Governor Road, resulting in 7% superelevation and raised vertical levels. It should be noted, the existing superelevation around the bend at the subject intersection is nominally 2.7%, which is not adequate to achieve safe and maximum velocity for the existing horizontal curve.

Due to the superelevation and difference in levels, the intersection is proposed to be fully upgraded, as indicated in the detailed design.

Blue Springs Road and Solar Farm Access Road – CH 4430

Blue Springs Road has been upgraded to accommodate 100km/hr speeds at the intersection of the Solar Farm Access Road, resulting in 6% superelevation and slightly raised vertical levels. It should be noted, the existing superelevation around the bend at the subject intersection is nominally 0.8%, which is not adequate to achieve safe and maximum velocity for the existing horizontal curve. This is being rectified as part of the upgrade works.

6.4 Stormwater management

Design information

In accordance with the development consent the capacity of the existing roadside drainage network has not been upgraded. All existing culverts have been reviewed and extended/replaced as required to suit the revised road design. A number of additional culverts have been included in the design to drain isolated low points in the roadside table drain.

Cross drainage

Culvert analysis has resulted in the addition of culverts and where required, the extension of existing culverts to ensure safe clear zones from the adjacent carriageway edge line. A summary of cross drainage features is shown in Table 10 below.

Location (approx.) (Ch on MC10) & Culvert	Description of existing crossing structure	Description of proposed crossing structure or upgrade.
CH740 – DV2	Twin Cell 450mm Ø RCP	Replace existing culvert with twin cell Ø450 Class 4 culvert length 5.5x2.44m units at 0.5% grade. Install precast headwalls and adjust roadside batter to suit. Regrade outlet to ensure free flowing. Dumped rock scour protection 1.5m long x 2.4m wide. 300mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH1115 – DV3	Single Cell 375mm Ø RCP	Replace existing culvert with new single cell Ø375 Class 4 culvert length 5x2.44m units at 1.0% grade. Install precast headwalls and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH1220 – DV4	Twin Cell 450mm Ø RCP	Extend twin cell Ø450mm Class 4 culvert downstream by 1x2.44m units at 1.35% grade. Install precast headwall and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH1600 – DV5	Twin Cell 450mm Ø RCP	Extend twin cell Ø450mm Class 4 culvert upstream by 1x2.44m units at 0.8% grade. Install precast headwall and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 2.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end
CH1920 – DV6	Twin Cell 600mm Ø RCP	Extend twin cell Ø600mm Class 4 culvert upstream & downstream by 1x1.22m units at 1.8% grade. Install

Location (approx.) (Ch on MC10) & Culvert	Description of existing crossing structure	Description of proposed crossing structure or upgrade.
		precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 3m wide. 300mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2040 – DV7	Single Cell 600mm Ø RCP	Extend single cell Ø600mm Class 4 culvert upstream & downstream by 1x1.22m units at 3.0% grade. Install precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 1.8m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2110 – DV8	Single Cell 525mm Ø RCP	Extend single cell Ø525mm Class 4 culvert upstream & downstream by 1x1.22m units at 1.6% grade. Install precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 1.8m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2230 – DV9	Single Cell 525mm Ø RCP	Replace existing culvert with new single cell Ø525 Class 4 culvert length 5.5x2.44m units at 1.0% grade. Install precast headwalls and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2385 – DV10	Single Cell 450mm Ø RCP	Extend single cell Ø450mm Class 4 culvert upstream & downstream by 1x1.22m units at 0.7% grade. Install precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 1.6m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2450 – DV11	Twin Cell 525mm Ø RCP	Replace existing culvert with new twin cell Ø525 Class 4 culvert length 5x2.44m units at 1.0% grade. Install precast headwalls and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 2.5m wide. 300mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2625- DV12	Single Cell 450mm Ø RCP	Replace existing culvert with new single cell Ø450 Class 4 culvert length 5x2.44m units at 2% grade. Install precast headwalls and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH2800 – DV13	Single Cell 525mm Ø RCP	Extend single cell Ø525mm Class 4 culvert upstream & downstream by 1x1.22m units at 0.45% grade. Install precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 1.8m wide. 200mm nominal rock diameter placed on

Location (approx.) (Ch on MC10) & Culvert	Description of existing crossing structure	Description of proposed crossing structure or upgrade.
		geotextile Bidim A34 or equal keyed 300mm each end.
CH2955 – DV14	Single Cell 525mm Ø RCP	Extend single cell Ø525mm Class 4 culvert upstream by 1x1.22m units at 2.9% grade. Install precast headwall and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.8m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH4185 – DV16	Single Cell 525mm Ø RCP	Extend single cell Ø525mm Class 4 culvert downstream by 1x2.44m units at 1.3% grade. Install precast headwall and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.8m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH4440 – DV18	N/A	Install new single cell Ø375 Class 4 RCP culvert. Length 13x2.44m units at 1.7% grade. Install sloped precast headwalls and adjust roadside batter to suit. Regrade outlet to ensure free flowing. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH4630 – DV19	Twin Cell 525mm Ø RCP	Extend twin cell Ø525mm Class 4 culvert upstream & downstream by 1x1.22m units at 1.5% grade. Install precast headwalls and adjust roadside batters to suit. Dumped rock scour protection 1.5m long x 2.5m wide. 300mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.

Table 10 - Cross drainage features

Driveway Culverts

Driveway culverts have been noted for removal and replacement or adjustment on the design plans. Minimum pipe size used for culvert replacements is 375mm diameter along with sloped headwalls to improve safety. This was an increase in capacity for all replaced culverts. Effort was made during the design process to minimise impacts and adjustments to existing property accesses. Details on the new and adjust driveway culvert are included the following table.

Location (approx.) (Ch on MC10) & Culvert	Description of existing crossing structure	Description of proposed crossing structure or upgrade.
CH650 – DV1	N/A	Install new single cell Ø375 Class 4 RCP culvert under driveway. Length 3x2.44m units at 0.56% grade. Install sloped precast headwalls and adjust roadside batter to suit. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.

Location (approx.) (Ch on MC10) & Culvert	Description of existing crossing structure	Description of proposed crossing structure or upgrade.
CH3040 – DV15	Existing Box Culvert	Relocate existing box culvert under driveway to suit new road formation. Adjust roadside batter to sui and regrade outlet to ensure free flowing. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim A34 or equal keyed 300mm each end.
CH4210 – DV17	N/A	Install new single cell Ø375 class 4 RCP Culvert under driveway. Length 3x2.44m units at 1.0% grade. Install sloped precast headwalls and adjust roadside batter to suit. Regrade outlet to ensure free flowing. Dumped rock scour protection 1.5m long x 1.5m wide. 200mm nominal rock diameter placed on geotextile Bidim a34 or equal keyed 300mm each end

Table 11 – Driveway Culverts

Roadside Table Drains

Formal roadside table drains have been included in the design for most of the project. The drain profile (refer to Typical Cross Sections) will provide an increased capacity of the roadside system with much of the existing roadside drainage non-existent. Roadside drainage provides significant protection to the pavement and needs to be at a depth below the pavement materials. In some locations due to site constraints a “V” shaped drain was adopted instead if the flat bottom typical table drain profile.

7 Design integration

7.1 Signposting

Regulatory signs

Regulatory signage has been detailed around the intersections within the project. Giveaway signage in conjunction with pavement marking controls traffic movement through the intersections as design on the design plans. Speed limit regulatory signage has not been included in the current design. Further discussion with Client and Council to confirm requirements for and reinstatement of existing signage.

Guide and Warning Signage

The geometric alignment of Blue Springs is impacted by several site constraints which reduce the design speed. The design incorporates guide and warning signage as part of the road safety system to account for the locations which provide a design speed below the regulatory speed of the roadway. At these locations the follow signage has been included in the design.

- Curve Warning Signs
- Speed Restriction Signs
- Chevron Alignment Marker Signs

7.2 Delineation

Pavement Marking and Raised Pavement Markers (RPMS)

Detailed delimitation design has been provided as part of the Blue Springs Road project. A combination of pavement marking, RPMS and Guideposts provide delineation through the project. This provides a significant improvement in road safety over the existing roadway and its installation as part of the construction works is critically important.

Appendix A Design Issues Log

Key Points to remember while using this Issues Log:

Record all design related issues originating from reviews, audits and team meetings in this Issues Log.

Once you are finished with the Safety by Design workshops, please cut and paste those issues to this Issues Log.

Design Issues Log for:			NSW212453 - STUBBO SOLAR FARM					
ID	**Date raised**	**Where does the issue originate from**	**The issue / problem / change is …..**	**Type of Issue**	**Action to Resolve or Close-out**	**Status**	**Evidence**	**Close-out Comments**
BTE CONCEPT DESIGN - BTE CONSULTING								
34	18-May-21	Designer Comments	Existing BAR treatment on Cope Road at Blue Springs Road intersection, width does not comply with Austroads Guide to Road design part 4A treatment requirements by less than 0.5m. As discussed during the site inspection on 12.05.21, it is proposed to retain the existing BAR treatment to avoid property impacts (including existing trees, fences and property boundaries).			Closed out		
35	18-May-21	Designer Comments	No Geotechnical assessment has been undertaken prior to the concept design development. The design profile will be adjusted during the Detailed design stage to suit the pavement design requirements			Closed out		
36	18-May-21	Designer Comments	There are multiple locations which contain substandard horizontal curves. Curve advisory signage, speed advisory and CAMS have been provided at these locations to suit AS1742.2.			Closed out		
37	18-May-21	Designer Comments	There are existing telecommunication cable crossing locations along Blue Springs Road within the limit of works. These cables are to be reviewed during the detailed design to review whether these cables require relocation or protection during construction			Passed on the issue		Services are noted on plans. Contractor to manage services during construction
38	18-May-21	Designer Comments	There are multiple existing trees with braches which overhang the proposed pavement area. These trees are to be reviewed pending the geotechnical assessment.			Closed out		Tree removal plan included in detailed design. On site management of tree to be undertaken by contractor in close consultation with Council.
39	18-May-21	Designer Comments	Existing vegetation at Lot 14 DP750765 impacts the residents sight distance to oncoming vehicles. Vegetation within the verge to be cleared / trimmed by MWRC.			Closed out		Tree removal plan included in detailed design. On site management of tree to be undertaken by contractor in close consultation with Council.
ACOR CONSULTANTS PTY LTD DETAILED DESIGN								
40	01-Apr-22	Designer Comments	Existing mail boxes impacted by updated design footprint at CH 1360	Other	Relocation of existing mail boxes subject to final design foot print	Closed out		Relocation as required during construction.
41	08-Apr-22	Designer Comments	Proposed roadside batters are not compliant with verhicle recoverability and impact the required clear zone. 1:2 Batters have been adopted in line with approved concept design. Max 1:4 Batters are typically used however this will impact the project footprint.	Safety	Council / Client to review and advise on road side batter requirements to allow for final road, safety barrier and clearing design to be confirmed.	Closed out		Profile and risk review accepted by Council
42	08-Apr-22	Designer Comments	Cover over tranverse culverts hase been modelled to achive a minimum of 400mm cover. This has been check using the pipe class software based on Class 4 pipes. Many existing culverts have less than 400mm existing cover.	Construction	Council / Client / Geotech to review and advise if there are any further issues regarding the reduced cover to the culvert structures.	Closed out		50% Design and methodology accepted by Council.
ACOR CONSULTANTS PTY LTD DETAILED DESIGN								
43	29-Apr-22	Design Review	Is the upgrade footprint strictly contained within the Concept Design footprint	Design	Review detailed design footprint	Closed out		Detailed design was revised to reduce the foot print and align it as close to the concept design as possible. This was undertaken and reviewd by the client.

44	29-Apr-22	Design Review	Some of the driveway upgrades are outside the road reserve and encroach on freehold land – is there a way the driveway can be designed within the road reserve whilst still complying with standards	Design	Review driveway design profiles	Closed out		Driveway designs were adjusted to suit the revised road design and remove any encrouchment beyond the road corridor.
45	29-Apr-22	Design Review	Review vertical alignment. A number of locations with the 50% design have significant fill above the existing design.	Design	Review design alignment inline with client comments and geotechincal report / pavement design.	Closed out		Detailed design alignment revised to better reflect pavement overlay construction.
46	29-Apr-22	Design Review	Review propsoed safety barrier treatments nominated in 50% design. Barrier design seems excessive.	Design	Review propsoed safety barrier treatments nominated in 50% design. Undertake detailed risk assessment.	Closed out		Revised design based on Austroads roadside risk assessment. Asessment issued to Council for approval priot to finalising design.

Appendix B Geotechnical Report

Pavement Investigation – Stubbo Solar Farm

Blue Springs Road Widening

20225666.001A

10 May 2021

KLEINFELDER
Bright People. Right Solutions.

Suite 3, 240-244 Pacific Hwy
Charlestown, NSW, 2290
Phone: +61 2 4949 5200

Pavement Investigation – Stubbo Solar Farm
Blue Springs Road Widening

Kleinfelder Project: 20225666.001A

Kleinfelder Document: NCA22R140184

Prepared for:

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill
NSW 2300

Prepared by:

Kleinfelder Australia Pty Ltd

Suite 3, 240-244 Pacific Hwy
Charlestown, NSW, 2290
Phone: +61 2 4949 5200

ABN: 23 146 082 500

Document Control:

Version	Description	Date
1	Draft	10 May 2021
Prepared	**Reviewed**	**Endorsed**
		
Phil Band	A Marshall	P Band

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

Kleinfelder Australia Pty Ltd (Kleinfelder) was commissioned by ACOR Consultants Pty Ltd (ACOR) to undertake a Pavement Investigation for the proposed upgrade to Blue Springs Road, northwards from the intersection with Cope Road, for approximately 5km. The Site area is shown on in text Figure 2.1 below and Figure 1 in **Appendix A**. The pavement investigation will inform the design and construction of the road upgrade and widening, which is required to facilitate construction of the Solar Farm.

1.2 PURPOSE

The objective of this investigation is to investigate the underlying ground conditions and provide geotechnical recommendations, as appropriate, for the proposed road upgrade and widening works, including a pavement thickness design.

1.3 SCOPE OF WORK

The following scope of works was proposed by Kleinfelder in our proposal Ref 20225666.001A dated 11 February 2022:

- Desktop Study;
- Walkover inspection by a Geotechnical Engineer experienced in transport improvement projects.
- Provision of Health Safety, Environmental and Quality Plan (HSEQP).
- Acquiring DBYD service plans for the investigation area and non-destructive service detection at borehole locations by a Telstra accredited utility clearance sub-contractor.
- Drilling 20 No. boreholes to up to 1.5m depth along Blue Springs Road, at approximately 250-300m intervals. Boreholes were undertaken using a flight auger fitted to a mini excavator;
- Traffic Management.
- Laboratory Testing; and
- Geotechnical Reporting.

2 SITE DESCRIPTION AND GEOLOGICAL SETTING

2.1 SITE SETTING

Blue Springs Road follows a local north south trending ridgeline with a gentle upward slope northwards from Cope Road.

Elevations across the site range from 454m Australian Height Datum AHD) at Cope Road to 518m AHD at the northern end of the Site.

The only significant surface water feature present in the vicinity of the site is Copes Creek, that flows approximately parallel to Blue Springs Road, some 200-300m to the east. Copes Creek flows south into Wialdra Creek and ultimately into the Cudgegong River.

Overland flow is expected to be away from Blue Springs Road to the east and west.

The land surrounding the site is generally in agricultural use with the exception of a section of the Cope State Forrest that straddles the road from 1.3km to 2.7km from the Cope Road Intersection.

2.2 SITE WALKOVER

A site walkover was undertaken on the 22nd March 2022 to document Site conditions. The site location is shown in the **Figure 2.1** below.

Figure 2.1: Aerial Photograph

Blue Springs Road is aligned in an approximately north - south direction. The road was immediately bordered by grassed nature strips on both the east and west sides. Remote rural properties were observed sporadically on both sides of the road.

Between 1.3km and 2.9km from Cope Road the dense mature bush land of the Cope State Forrest was observed on the west of the road and a thin tree lined border on the east of the road, beyond which agricultural land predominates.

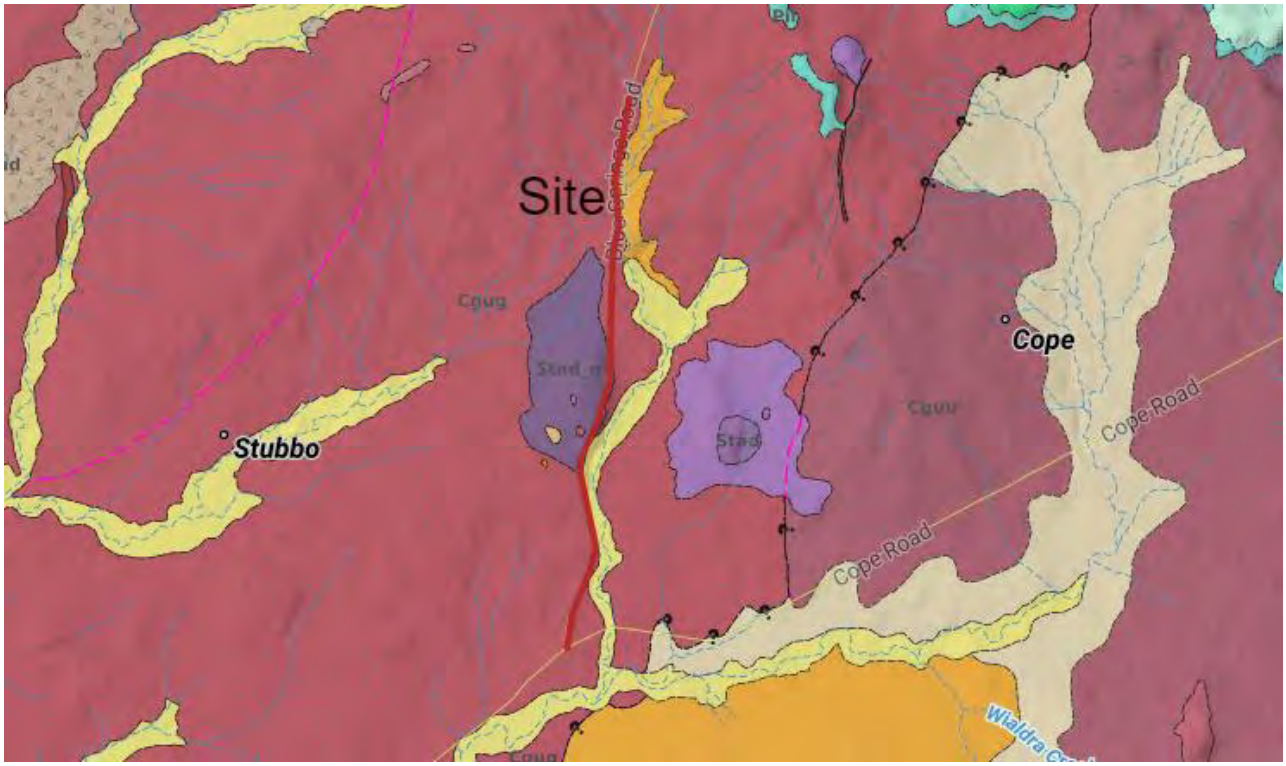
The existing carriageway is approximately 5-6m wide and is raised above the surrounding ground to facilitate drainage, creating informal table drains which are heavily vegetated. The road corridor is approximately 20m wide.

The road surface was a spray seal that was in average to poor condition.

2.3 GEOLOGICAL SETTING

Geological mapping of the site from https://minview.geoscience.nsw.gov.au/ (See **Figure 2.2** below) indicates that the site soils comprise a variety of deposits of varying compositions and ages.

Figure 2.2: Geological Map



Key

Cgug Granite	Cgug	Gulgong Granite	Leucocratic medium- to coarse-grained porphyritic megacrystic granite, minor aplite phases, minor quartz monzonite of Carboniferous age.
Stad_g Sandstone	Stad_g	Dungeree Volcanics sandstone	Greenish grey, almost aphanitic, rhyolite and white altered rhyolite (brecciation is common) of late Silurian age.
Q_avt Clastic sediment	Q_avt	Alluvial valley deposits, terraced	Clastic sediment of Cenozoic age.
CZ_ath Sand	CZ_ath	Alluvial terrace deposits, high-stand facies	Sand of Cenozoic Age

3 FIELDWORK AND TESTING

3.1 TEST BORES

A geotechnical investigation was undertaken in the subject area on 22 March 2022, which consisted of drilling 20 boreholes to an approximate maximum depth of 1.5m below ground level (bgl). Borehole Locations are shown on **Figure 1** in **Appendix A**.

A Kleinfelder representative observed and logged the boreholes and classified the soils in general accordance with Australian Standard AS 1726:2017. Soil classifications, samples and other field observations are recorded on the bore logs in **Appendix B.**

A summary of constituents outlined in the bore logs is provided below:

The boreholes were undertaken in a variety of locations within the road corridor, to gain an understanding of current ground conditions. The locations encountered various different surface treatments which are detailed below:

- Verge – Topsoil up to 150mm thick (encountered in BH4, BH6, BH7, BH13, BH15, BH16).
- Shoulder – Sandy GRAVEL, Grey brown up to 100mm thick (encountered in BH1, BH2, BH9, BH10, BH12, BH17, BH18, BH19, BH20).
- Road Pavement – Asphaltic Spray Seal, 25mm thick (encountered in BH3, BH5, BH8, BH11).

Beneath the surfacing was generally a SAND, Silty SAND or a Silty/Clayey Gravelly SAND with the exception of BH4 and BH6 where a Sandy CLAY with minor gravel was encountered.

The encountered ground conditions are consistent with weathered derivatives of the published geology.

3.2 GROUNDWATER

Perched groundwater was encountered in two of the boreholes (BH1 and BH8) at between approximately 1.5m BGL.

Groundwater is known to fluctuate due to local and regional factors including, but not limited to, irrigation, precipitation events, site topography, seasonal changes, well pumping and periods of wet or dry weather. Therefore, subsurface water conditions at other times may be different from those described in this report.

3.3 LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the boreholes to assess the soil classification and properties. The following tests were undertaken:

- Atterberg Limit
- Particle Size Distribution (PSD)
- California Bearing Ratio (CBR)
- Proctor Compaction
- Aggressivity Suite (pH, Sulphate and Chloride)

Results of the laboratory tests are included in **Appendix C** and summarised below in **Table 3.1** and **Table 3.2**:

Table 3.1: Summary of Laboratory Classification Test Data

Borehole	Depth m	Gravel %	Sand %	Fines %	LL %	PL %	PI %	LS %
BH4	0.5	13	45	42	41	18	23	11.5
BH5	0.7	14	52	34	26	14	12	8.5

Borehole	Depth m	Gravel %	Sand %	Fines %	LL %	PL %	PI %	LS %
BH7	0.6	36	47	27	33	14	19	10.5
BH14	0.9	20	39	41	48	22	26	13.5
BH17	0.8	31	44	25	24	12	12	8.0

Table 3.2: Summary of CBR Test Data

Borehole	Depth m	Optimum Moisture Content %	Standard Maximum Dry Density t/m^3	CBR %
BH4	0.5	12.5	1.91	8
BH5	0.7	9.0	2.02	8
BH7	0.6	8.5	2.07	5
BH14	0.9	14.5	1.79	16
BH17	0.8	8.0	2.11	20

CBR test samples were compacted to approximately 100% Standard Dry Density, at approximately their optimum moisture content (OMC) and soaked for 4 days under a surcharge loading of 4.5kg, prior to testing.

Table 3.3 Summary of Aggressivity Test Data

Borehole	Depth m	pH	Sulphate mg/kg	Chloride
BH4	0.5	5.9	<10	190
BH5	0.7	6.2	70	10
BH7	0.6	6.0	10	380
BH14	0.9	8.4	90	<10
BH17	0.8	5.9	<10	50

4 PAVEMENT DESIGN

4.1 PAVEMENT DESIGN

The existing pavement encountered was either a thin layer of low-quality pavement gravel on the shoulder areas or a spray seal, both were installed over the existing (mostly) sandy subgrade with no sub-base or basecourse present. It is therefore recommended that a simple overlay pavement be adopted with select material imported to raise the existing ground to the new subgrade level, where required, in the widening areas. This will provide a consistent subgrade surface and will minimise costs by minimising the need to remove material from site.

If a box out pavement is required to balance earthworks volumes or keep pavement levels close to existing levels then the below pavement would also be appropriate and excavated material could be reused as fill material, provided it meets the specification as defined in **Section 5.1** below.

The laboratory testing indicates a design CBR value of 5% is appropriate for the site.

Based upon the author's experience and the anticipated heavy traffic loads during (50 heavy vehicles per day) and after construction (5 heavy vehicles per day) along with typical rural light vehicle loadings, a design traffic loading of $4x10^5$ Equivalent Standard Axles (ESA) has been adopted.

Pavement design has been undertaken in accordance with Austroads Guide AGPT02-17and it is recommended that the existing pavement is overlain by a granular pavement as shown in **Table 4.1** below. The existing pavement shall be treated as specified in **Section 5.2.**

Table 4.1: Pavement Design

Road	Design ESA	Design CBR (%)	Total Thickness	Wearing Course Thickness (1) (mm)	Basecourse Thickness (mm)	Subbase Thickness (mm)
Blue Springs Road	$4x10^5$	5	350	30 (AC10) Normal Duty	150	170

Notes:
1. A 10mm Primer Seal shall be applied prior to the asphalt wearing course.

It is recommended that the full pavement construction be extended for a minimum of 1m outside the running lane, as this will prevent spreading of the asphalt, causing premature rutting in the wheel paths.

4.2 WEARING COURSE OPTIONS

An asphalt wearing course has been recommended because of the volume of heavy vehicle traffic that will use the road in the initial 1-2 years during the construction period. Although not recommended, if a spray seal is preferred, a 14/7mm Double Seal, with S20E Polymer Modified Binder (PMB) could be considered to help minimise damage from the heavy vehicle loading during solar farm construction; however, the surface may still need repairs after construction, especially on slow speed corners on the north bound lane.

A split surfacing option of asphalt at the Cope Road junction and the site access turn, with spray seal elsewhere could also be considered.

Where a spray seal option is preferred, sub-base thickness shall be increased to 200mm, to compensate for the loss of the load spreading contribution of the asphalt.

4.3 SOIL AGGRESSIVITY ASSESSMENT

Soil aggressivity testing in accordance with AS2159-2009 has identified the site as Non-aggressive to Concrete and Non-aggressive to Steel.

5 PAVEMENT CONSTRUCTION

5.1 PAVEMENT MATERIALS

Table 5.1 below shows the material specification and compaction requirements for the various pavement layers in the above design.

Table 5.1: Pavement Materials Specification

Layer	Material Specification	Compaction Requirement
AC Wearing Course	Dense Graded Asphalt Class 450 or Similar (RMS Spec R116)	As per suppliers' recommendations
Granular Basecourse	RMS Spec 3051 or IPWEA Minimum Soaked CBR 80%	Minimum 98% MMDD[1]
Granular Subbase	RMS Spec 3051 or IPWEA Minimum Soaked CBR 30%	Minimum 95% MMDD[1]
Select Subgrade	Minimum Soaked CBR of 8%	100% SMDD[2]

Notes:
1. Modified Maximum Dry Density
2. Standard Maximum Dry Density

5.2 SUBGRADE PREPARATION

Subgrade preparation should be carried out in general accordance with the following methodology:

- Strip and segregate spray seal, topsoil, existing vegetation and subgrade material and stockpile for re-use. In this regard, the existing spray seal material could be blended with subgrade material and reused as select material for the new pavement;
- Further excavate to design subgrade level, as required, allowing for provision of a select layer as required.
- Rip and moisture recondition the upper 300 mm of the exposed subgrade to a moisture content between 3% dry and 1% wet of OMC, and compact it at least to 100% SMDD;
- Roll the subgrade surface with at least six passes of a minimum 12T deadweight roller.
- The final compacted surface shall be proof rolled by a fully laden water truck, or similar, under observation from a suitably experienced geotechnical engineer to identify any soft or hard spots or deleterious material that shall be removed.
- Unsuitable materials shall be over-excavated and replaced with select or better material.
- Where required, place additional filling in near horizontal layers no thicker than 300 mm (loose thickness) and compact to the density ratio indicated above. Moisture contents of the subgrade and additional filling should be maintained within 3% dry and 1% wet of the optimum moisture content; and
- Protect the area after subgrade preparation to maintain moisture content close to the equilibrium, as far as practicable.

In-situ density testing shall be carried out in accordance with AS3798:2007.

5.3 PAVEMENT DRAINAGE

The above pavement designs assume that adequate drainage is provided to prevent water from verges or adjacent areas entering the sides of the pavement layers. Table drains with a base a minimum of 200mm below the bottom of the subbase layer are recommended.

All pavement layers shall be installed with adequate cross fall (minimum 2%), to prevent runoff ponding on the surface.

It is recommended that the full pavement construction be extended for a minimum of 1m outside the running lane, as this will minimise water ingress

All green verges shall be profiled such that they shed water into the table drain or away from the road, rather than allowing it to pond beside the road.

6 REFERENCES

AS 3798 (2007), Guidelines on earthworks for commercial and residential developments, Standards Australia, 2007

AGPT02-17, Guide to Pavement Technology Part 2: Pavement Structural Design, Austroads Ltd, 2017

AGPT04K-18, Guide to Pavement Technology Part 4K: Selection and Design of Sprayed Seals, Austroads Ltd, 2019

IPWEA (NSW) (2010), Specification for Supply of Recycled Material for Pavements, Earthworks,

Transport for NSW, QA Specification 3051 – Granular Pavement Base and Subbase Materials

Transport for NSW, QA Specification R116 – Dense Graded Asphalt

APPENDIX A – FIGURES

VICINITY MAP

NOT TO SCALE

NOTE:
BASE MAPPING AND VICINITY MAP CREATED FROM LAYERS COMPILED BY ESRI PRODUCTS AND 2022 MICROSOFT CORPORATION.
COORDINATE SYSTEM: WGS 1984 UTM ZONE 55S

LEGEND

SOIL BORING

N

0 900m 1800m

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20225666.001A

DRAWN BY: pband

CHECKED BY: P. Band

DATE: 05-05-2022

EXPLORATION LOCATION PLAN AND VICINITY MAP

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

FIGURE 1

GIS FILE PATH: \\azrgisstorp01\working_clients_Automated_Exploration Plans\20225666.001A_StubboSolarFarm_20220505_pband\MXD\
GIS FILE NAME: 20225666.001A_ELP_11x17_2021_20220505_0036_pb
PLOTTED: 5/5/2022 12:37:33 AM BY: PBAND

APPENDIX B – BOREHOLE LOGS

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

BORING LOG BH1

FIELD EXPLORATION

Latitude: -32.30374°
Longitude: 149.60413°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		Sandy GRAVEL (GM): grayish brown, dry, sub-angular to sub-rounded gravel, coarse grained sand.			
		Silty SAND with Clay and Gravel (SM): grey mottled orange, coarse grained sand			
0.5		**SAND with trace Clay and Gravel (SP)**: orange, moist			Clay and gravel content increasing with depth.
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was encountered at 1.5m
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH1

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH2

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.30175°
Longitude: 149.60437°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		Sandy GRAVEL (GM): gray brown, dry, coarse grained gravel med to coarse grained sands			
		Gravelly SAND (GM): light brown, moist, rootlets present at 0.25m			increasing clay content
0.5					
1.0		**Gravelly SAND with Clay (GM)**: orangy red, moist, coarse grained sand			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH2

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH3

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.29991°
Longitude: 149.60527°
Location Offset: Edge of Blue Springs Road
Surface Condition: Asphalt

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		ASPHALT			
		Gravelly SAND (SP): light brown, moist, light brown, some silt and clay, dry to moist. .			
0.5		**Clayey SAND with Gravel (SC)**: light brown and pink, dry to moist, fine to medium grained sand, increasing clay content with depth, rootlets present			
1.0					
1.5					

The boring was terminated at approximately 1 m. below ground level. The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH3

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH4

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.29766°
Longitude: 149.60650°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		TOPSOIL			
		Sandy CLAY with Gravel (CL): light to dark brown, moist			
0.5					Increasing clay content, becomming orange to light brown
					PSD, CBR, Atterberg Limit and moisture content tests
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH4

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

BORING LOG BH5

FIELD EXPLORATION

Latitude: -32.29540°
Longitude: 149.60690°
Location Offset: Edge of Blue Springs Road
Surface Condition: Asphalt

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0.5		**ASPHALT** **Gravelly SAND with Silt (GP)**: light orange to brown, fine to medium grained sand, sub-angular to sub-rounded gravels.			PSD, CBR, Atterberg Limit and moisture content tests
1.0		The boring was terminated at approximately 1 m. below ground level. The boring was backfilled with auger cuttings on 22 March, 2022.			
1.5					

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH5

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH6

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.29316°
Longitude: 149.60647°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		TOPSOIL			
		Sandy CLAY with Gravel (CL): light to dark brown, dry to moist			
0.5					Increasing clay content, becommimng dark red brown. becomming moist.
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH6

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH7

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.29093°
Longitude: 149.60590°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		TOPSOIL			
		SAND with Gravel (SP): light brown, dry to moist, Light brown, medium to coarse grained sand, some gravel, dry to moist.			
		Gravelly SAND with Silt and Clay (GP): red, moist, fine to medium grained sand			
0.5					PSD, CBR, Atterberg Limit and moisture content tests
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH7

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH8

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.28871°
Longitude: 149.60550°
Location Offset: Edge of Blue Springs Road
Surface Condition: Asphalt

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		ASPHALT			
		Gravelly SAND with Silt (GP-GM): light brown to orange, dry, medium grained			
0.5		**Silty SAND with Clay and Gravel (SM)**: brown, dry to moist			
1.0		**Silty SAND with Clay and Gravel (SM)**: brown and red, moist			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
▽ Groundwater encountered at 1.5m
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH8

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH9

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.28675°
Longitude: 149.60631°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		GRAVEL (GM): grayish brown, Roadbase			
		Gravelly Silty SAND (GP): orange to red, dry			
0.5		**Gravelly Silty SAND with Clay (GP)**: orange to red			
1.0		**SAND with Clay and Gravel (SP)**: orange to pink			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH9

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

BORING LOG BH10

FIELD EXPLORATION

Latitude: -32.28485°
Longitude: 149.60726°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		GRAVEL (GM): light brown to grey, Roadbase			
		Silty SAND with trace Gravel (SM): brown, dry to moist, rootlets present			
0.5		**Clayey Silty SAND (SP-SC)**: red, dry to moist			
1.0		**Clayey Silty SAND (SP-SC)**: light red to pink, dry to moist			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH10

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH11

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.28313°
Longitude: 149.60787°
Location Offset: Edge of Blue Springs Road
Surface Condition: Asphalt

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		ASPHALT			
		Gravelly SAND (GP): red, dry			
		Silty SAND with Clay (SM): light brown, dry to moist, medium grained sand			
0.5					
		Silty SAND with Clay (SP): dark orange/red to brown, medium grained sand			
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH11

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH12

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.28097°
Longitude: 149.60830°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0		**Sandy GRAVEL (GM)**: dry, Roadbase			
		SAND with Clay and Gravel (SP): orange to red, dry, medium grained sand			
0.5					
1.0					
1.5					

The boring was terminated at approximately 1 m. below ground level. The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH12

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH13

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.27859°
Longitude: 149.60847°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		TOPSOIL			
		Silty Gravelly SAND (GP): light brown, dry			trace clay
0.5		**SAND with Clay (SP)**: red, moist			
		Sandy CLAY (CH): dark red to brown, moist			
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH13

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH14

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.27624°
Longitude: 149.60846°
Location Offset: Edge of Blue Springs Road
Surface Condition: Asphalt

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		GRAVEL: Roadbase			
		Gravelly Silty SAND (GP-GM): light brown, dry, medium grained sand			
0.5					trace clay. Dry to moist.
1.0					PSD, CBR, Atterberg Limit and moisture content tests
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH14

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH15

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.27395°
Longitude: 149.60847°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
		TOPSOIL			
		Gravelly SAND with Clay (GP): light brown to orange,, dry to moist, medium grained sand			
0.5					
1.0		**SAND with Clay (SP)**: light grey to brown, dry			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH15

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH16

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.27146°
Longitude: 149.60879°
Location Offset: Blue Springs Road
Surface Condition: Grass

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0.0		**TOPSOIL**			
		Gravelly SAND with Clay (GP): light to mid brown, dry to moist			
0.5					Lighter brown, trace gravel
1.0					
1.5					

The boring was terminated at approximately 1 m. below ground level. The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH16

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH17

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.26879°
Longitude: 149.60928°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0		**GRAVEL**: Roadbase.			
		Silty Gravelly SAND with Clay (GP-GM): light brown, dry, fine to medium grained sand			
0.5					PSD, CBR, Atterberg Limit and moisture content tests
1.0					Trace gravel
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH17

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH18

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.26579°
Longitude: 149.60889°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0.0		**GRAVEL**: Roadbase.			
		Gravelly SAND with Clay (GP): medium brown, dry to moist			
0.5					Increasing clay content. Becomming orange to red colour.
1.0		**SAND with Clay (SP)**: light grey, dry to moist			
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH18

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH19

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.26322°
Longitude: 149.60908°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0		**GRAVEL**: Roadbase.			
		SAND with Clay (SP): light brown, dry to moist, coarse grained sands			
0.5					becomming dark brown. Inceasing clay content.
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH19

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

BORING LOG BH20

Date Begin - End:	22/3/22	**Drilling Company:**	DTC
Logged By:	MF	**Drill Crew:**	DTC
Hor.-Vert. Datum:	mAHD	**Drilling Equipment:**	5T Excavator
Inclination:	-90 degrees	**Drilling Method:**	Solid Flight Auger
Weather:	Not Available	**Bore Diameter:**	300mm mm. O.D.

FIELD EXPLORATION

Latitude: -32.26033°
Longitude: 149.60965°
Location Offset: Blue Springs Road
Surface Condition: Gravel

Depth (metres)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/152 mm.	Drill Notes / Remarks
0.0		**GRAVEL with Sand**: light brown, Roadbase			
		Silty SAND with Clay and Gravel (SM): light brown, dry			
0.5					Increasing clay content.
1.0					
1.5					

The boring was terminated at approximately 1.5 m. below ground level.
The boring was backfilled with auger cuttings on 22 March, 2022.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20225666.001A
DRAWN BY: CM
CHECKED BY: PB
DATE:

BORING LOG BH20

Stubbo Solar Farm
Blue Springs Road
Stubbo, NSW

APPENDIX C – LABORATORY TEST RESULTS

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

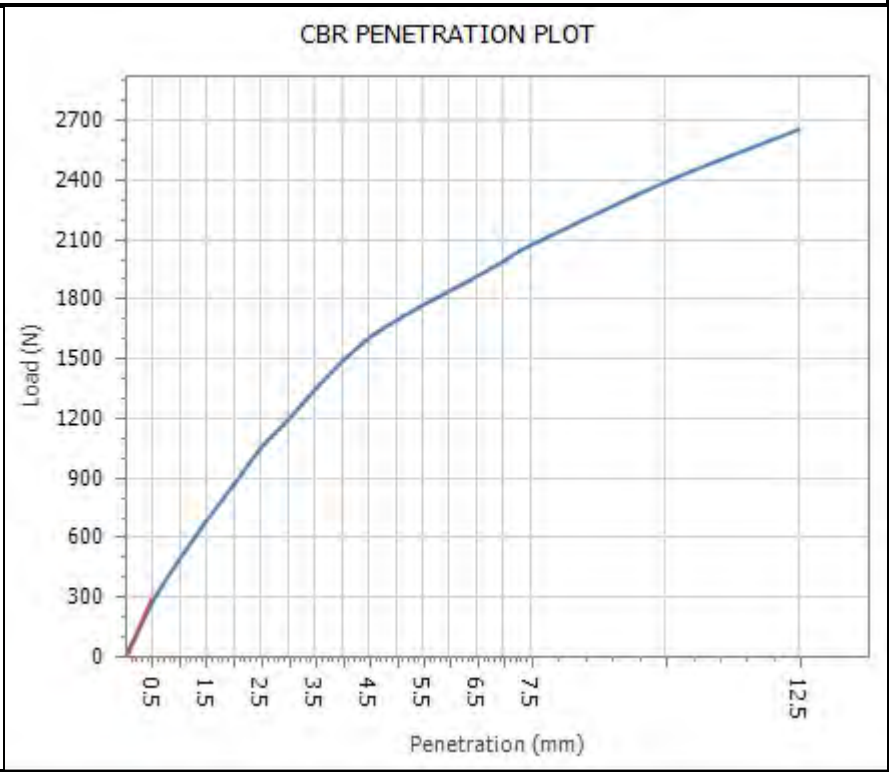
Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43731-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 1 of 5

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1			
Sample Number	10823/S/172139	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/4
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	26/04/2022	Depth/Level	m	0.5m
Material Source	Insitu	Material Limit Start		-
Material Type	Insitu	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Brown Gravelly CLAY			

Maximum Dry Density (t/m³):	1.91
Optimum Moisture Content (%):	12.5
Field Moisture Content (%):	12.8
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.90
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	12.6
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	1.90
Total Curing Time (hrs)	72
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	14.9
Moisture (remainder) After Soak (%)	14.3
CBR Swell (%):	0.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**8**



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

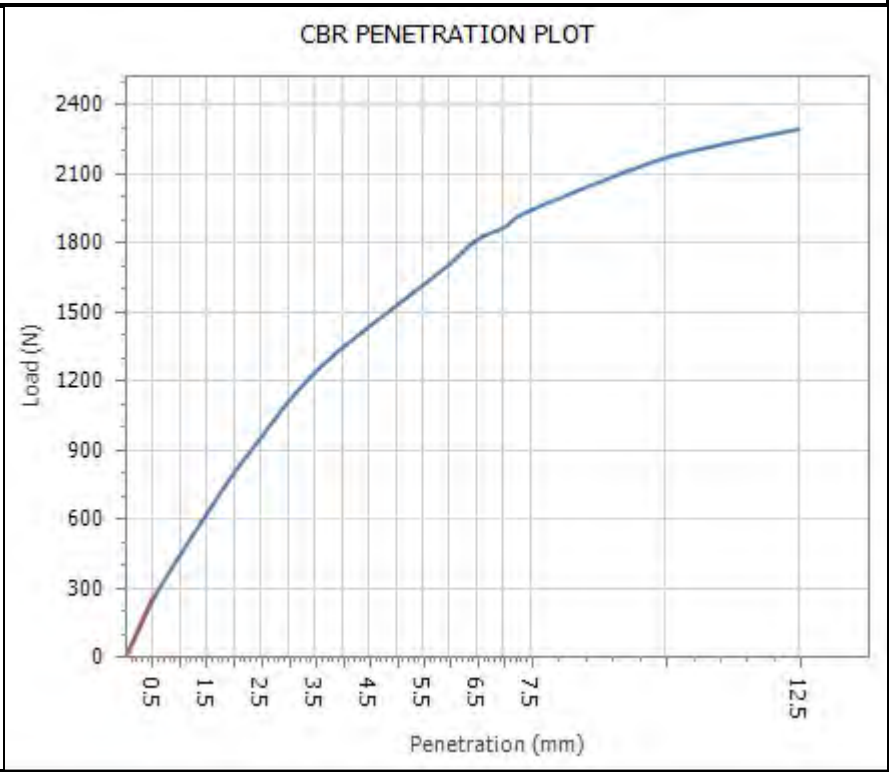
Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43731-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 2 of 5

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1			
Sample Number	10823/S/172140	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/5
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	26/04/2022	Depth/Level	m	0.7m
Material Source	Insitu	Material Limit Start		-
Material Type	Insitu	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Brown Gravelly CLAY			

Maximum Dry Density (t/m³):	2.02
Optimum Moisture Content (%):	9.0
Field Moisture Content (%):	4.6
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	2.02
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	8.9
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	2.00
Total Curing Time (hrs)	75
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	13.5
Moisture (remainder) After Soak (%)	11.3
CBR Swell (%):	1.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**8**



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

CALIFORNIA BEARING RATIO REPORT

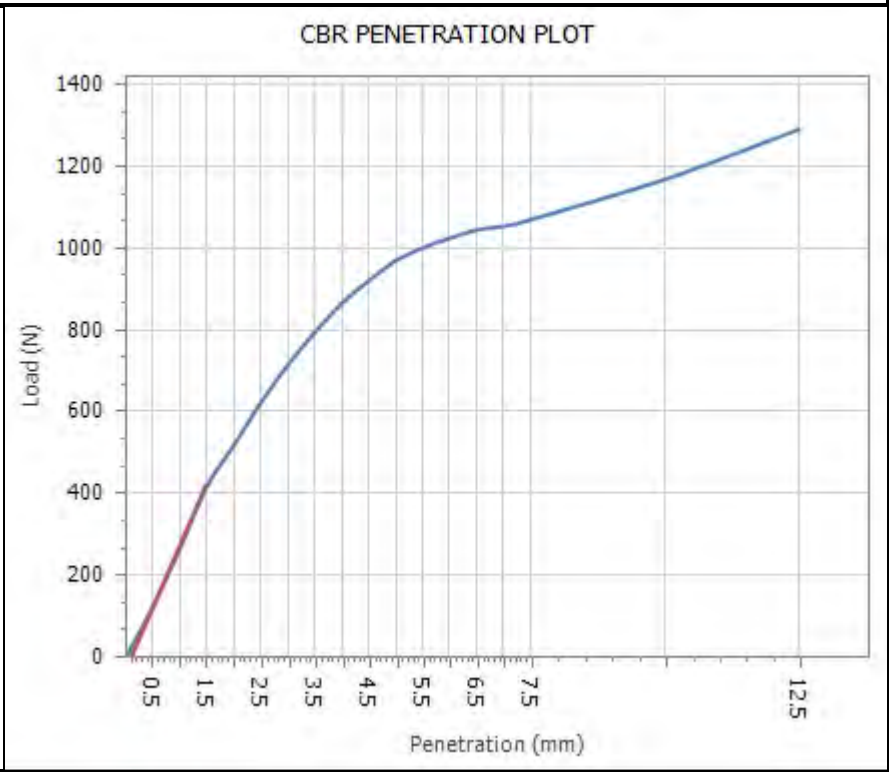
Client:	Construction Sciences Newcastle	Report Number:	10823/R/43731-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 3 of 5

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1

		Sample Location		
Sample Number	10823/S/172141	Borehole	No.	BH/7
Sampling Method	Tested As Received	Chainage	m	
Date Sampled	23/03/2022	Offset C/L	m	
Sampled By	Alex Matthew	Depth/Level	m	0.6m
Date Tested	26/04/2022			
Material Source	Insitu	Material Limit Start		-
Material Type	Insitu	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown Gravelly CLAY

Maximum Dry Density (t/m³):	2.07
Optimum Moisture Content (%):	8.5
Field Moisture Content (%):	5.1
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	2.08
Placement Dry Density Ratio (%):	100.5
Placement Moisture Content (%):	8.4
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	2.05
Total Curing Time (hrs)	71
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	23.9
Moisture (remainder) After Soak (%)	20.0
CBR Swell (%):	2.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**5.0**



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

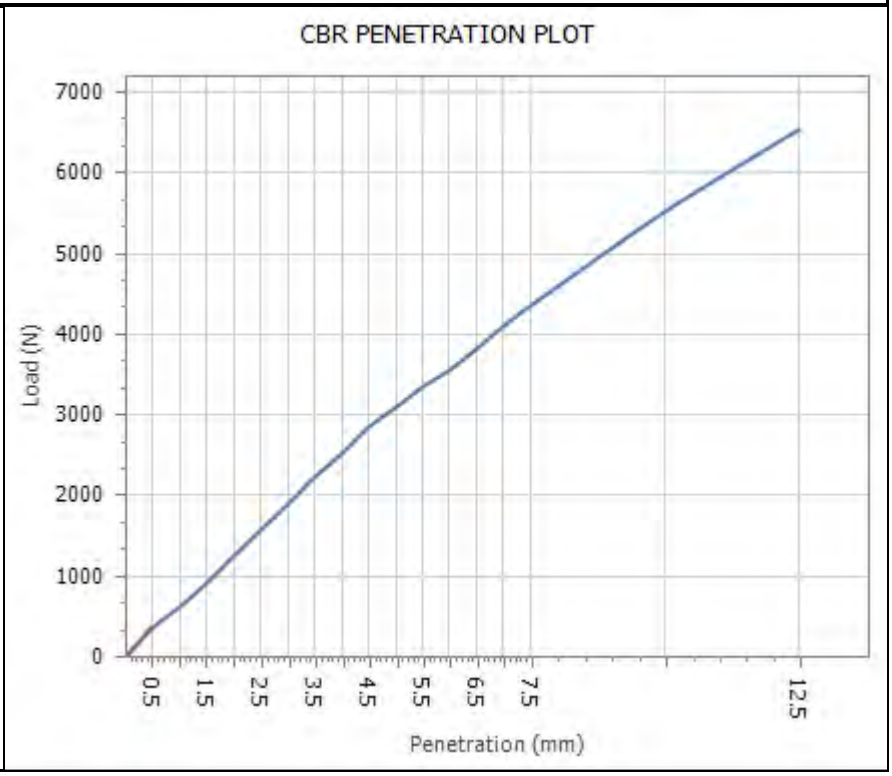
Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43731-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 4 of 5

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1			
Sample Number	10823/S/172142	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/14
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	26/04/2022	Depth/Level	m	0.9m
Material Source	Insitu	Material Limit Start		-
Material Type	Insitu	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Brown Gravelly CLAY			

Maximum Dry Density (t/m³):	1.79
Optimum Moisture Content (%):	14.5
Field Moisture Content (%):	11.5
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.79
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	14.3
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	1.79
Total Curing Time (hrs)	71
Liquid Limit Method	Estimation.
Moisture (top 30mm) After Soak (%)	10.4
Moisture (remainder) After Soak (%)	9.5
CBR Swell (%):	0.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**16**



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

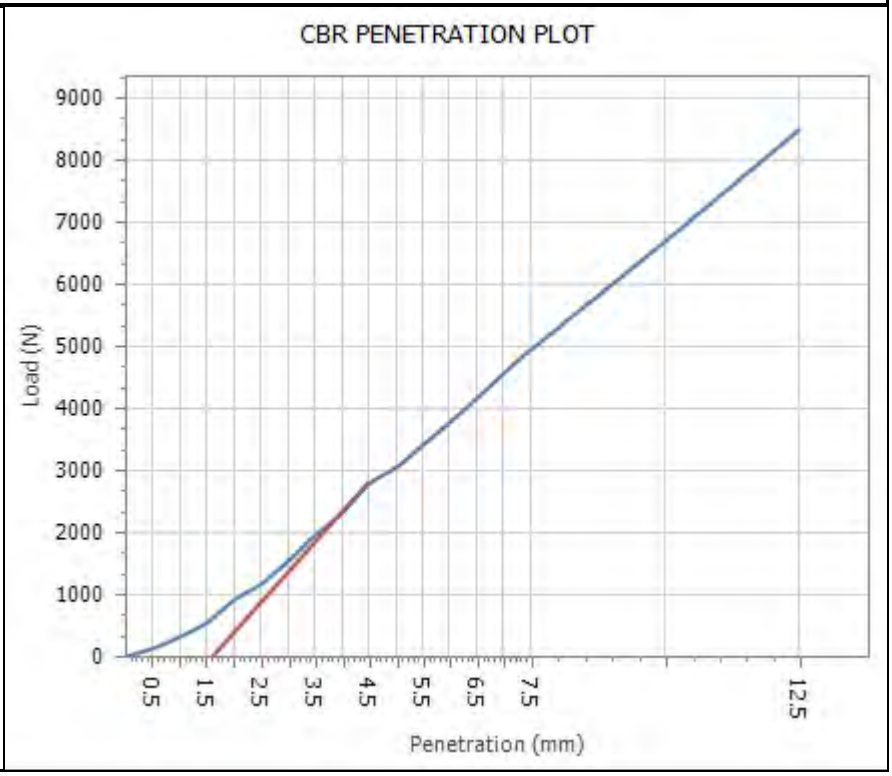
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43731-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 5 of 5

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1

		Sample Location		
Sample Number	10823/S/172143	Borehole	No.	BH/17
Sampling Method	Tested As Received	Chainage	m	
Date Sampled	23/03/2022	Offset C/L	m	
Sampled By	Alex Matthew	Depth/Level	m	0.8m
Date Tested	26/04/2022			
Material Source	Insitu	Material Limit Start		-
Material Type	Insitu	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Brown Sandy CLAY			

Maximum Dry Density (t/m³):	2.11
Optimum Moisture Content (%):	8.0
Field Moisture Content (%):	4.4
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	2.10
Placement Dry Density Ratio (%):	99.5
Placement Moisture Content (%):	8.3
Placement Moisture Ratio (%):	101.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	2.10
Total Curing Time (hrs)	71
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	10.0
Moisture (remainder) After Soak (%)	8.9
CBR Swell (%):	0.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**20**



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

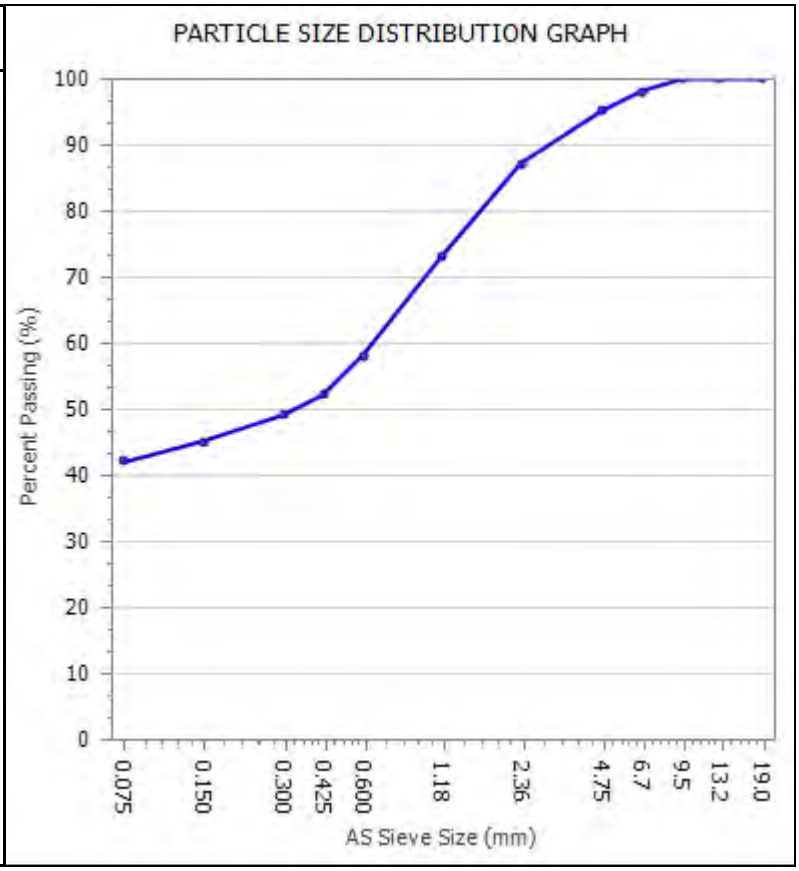
PARTICLE SIZE DISTRIBUTION REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43734-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 1 of 5

Test Procedures:	AS1289.3.6.1

Sample Number	10823/S/172139	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/4
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	19/04/2022	Depth/Level	m	0.5m
Material Source	Insitu	Material Type	Insitu	

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
19.0		**100**	
13.2		**100**	
9.5		**100**	
6.7		**98**	
4.75		**95**	
2.36		**87**	
1.18		**73**	
0.600		**58**	
0.425		**52**	
0.300		**49**	
0.150		**45**	
0.075		**42**	



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W9Rep Rev 2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

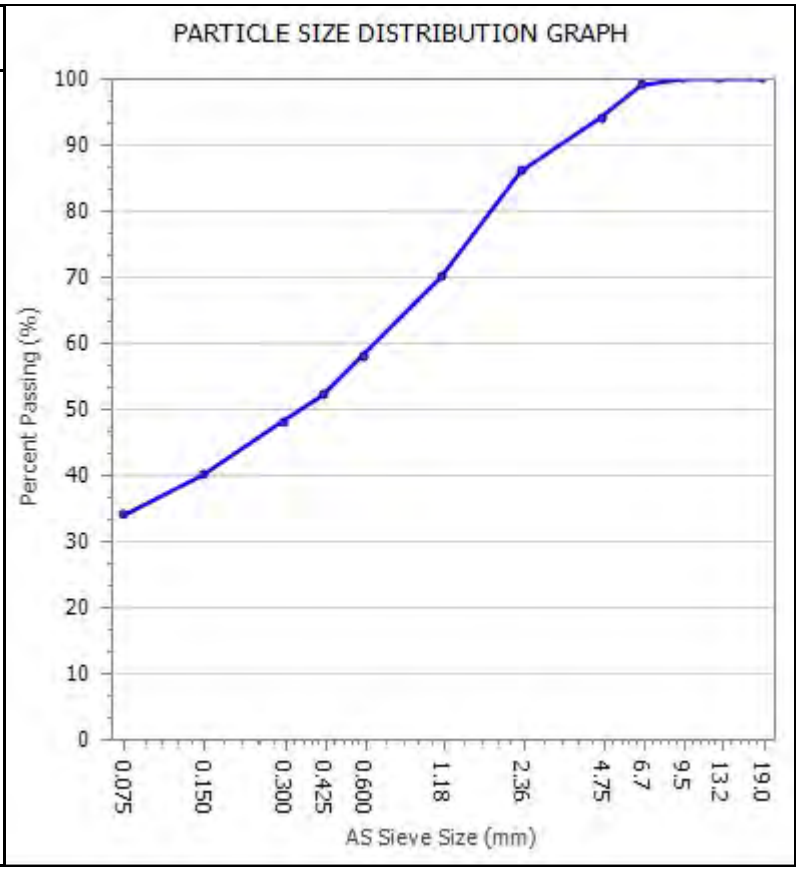
PARTICLE SIZE DISTRIBUTION REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43734-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 2 of 5

Test Procedures:	AS1289.3.6.1

Sample Number	10823/S/172140	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/5
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	19/04/2022	Depth/Level	m	0.7m
Material Source	Insitu	Material Type	Insitu	

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
19.0		**100**	
13.2		**100**	
9.5		**100**	
6.7		**99**	
4.75		**94**	
2.36		**86**	
1.18		**70**	
0.600		**58**	
0.425		**52**	
0.300		**48**	
0.150		**40**	
0.075		**34**	



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W9Rep Rev 2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

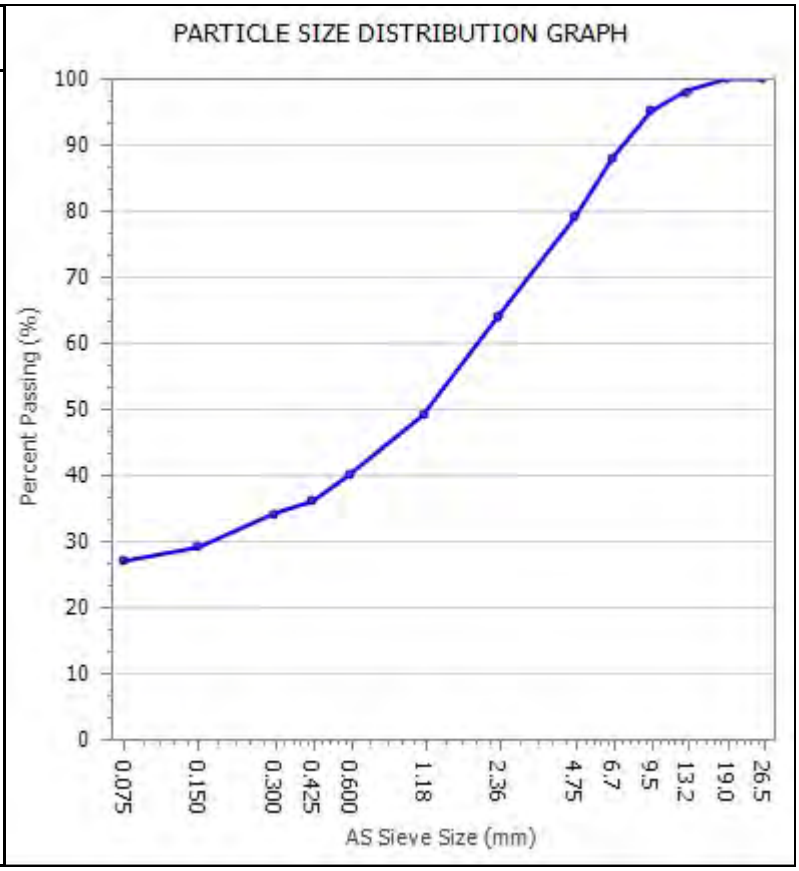
PARTICLE SIZE DISTRIBUTION REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43734-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 3 of 5

Test Procedures:	AS1289.3.6.1

		Sample Location		
Sample Number	10823/S/172141	Borehole	No.	BH/7
Sampling Method	Tested As Received	Chainage	m	
Date Sampled	23/03/2022	Offset C/L	m	
Sampled By	Alex Matthew	Depth/Level	m	0.6m
Date Tested	19/04/2022	Material Type	Insitu	
Material Source	Insitu			

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
26.5		**100**	
19.0		**100**	
13.2		**98**	
9.5		**95**	
6.7		**88**	
4.75		**79**	
2.36		**64**	
1.18		**49**	
0.600		**40**	
0.425		**36**	
0.300		**34**	
0.150		**29**	
0.075		**27**	



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W9Rep Rev 2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

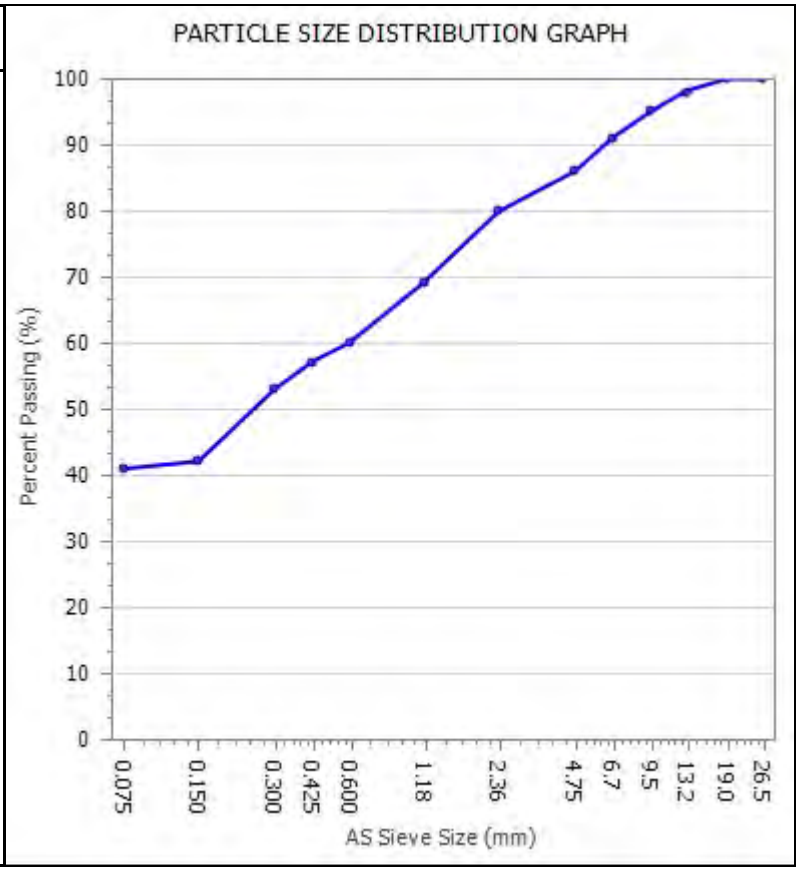
PARTICLE SIZE DISTRIBUTION REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43734-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 4 of 5

Test Procedures: AS1289.3.6.1

Sample Number	10823/S/172142	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/14
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	19/04/2022	Depth/Level	m	0.9m
Material Source	Insitu	Material Type	Insitu	

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
26.5		**100**	
19.0		**100**	
13.2		**98**	
9.5		**95**	
6.7		**91**	
4.75		**86**	
2.36		**80**	
1.18		**69**	
0.600		**60**	
0.425		**57**	
0.300		**53**	
0.150		**42**	
0.075		**41**	



Remarks: Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W9Rep Rev 2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

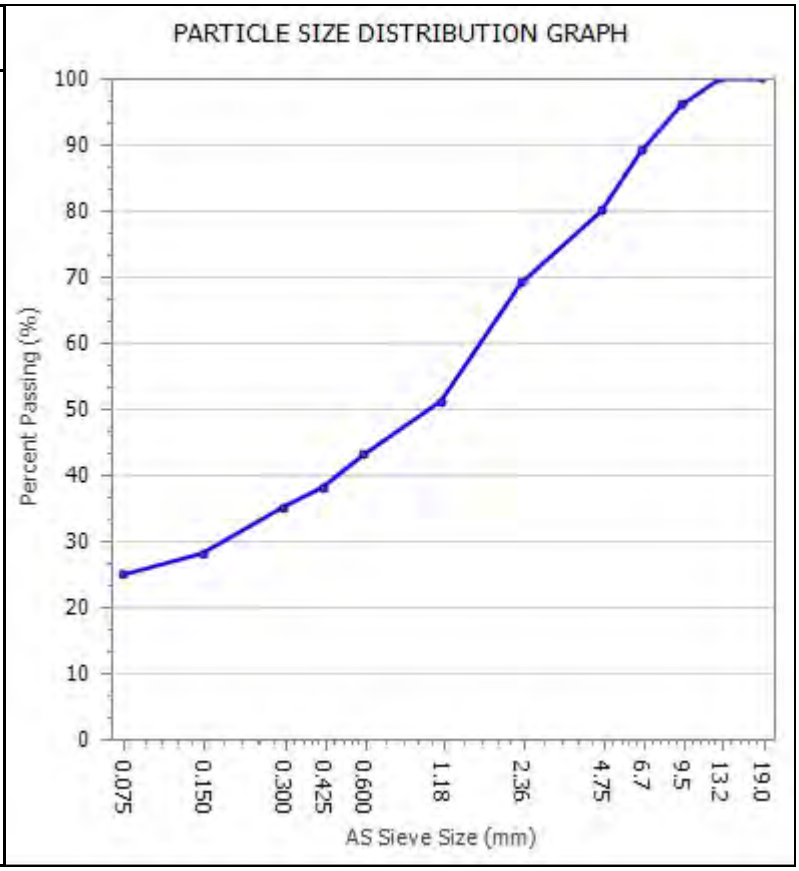
PARTICLE SIZE DISTRIBUTION REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43734-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	27/04/2022 Page 5 of 5

Test Procedures:	AS1289.3.6.1

Sample Number	10823/S/172143	Sample Location		
Sampling Method	Tested As Received	Borehole	No.	BH/17
Date Sampled	23/03/2022	Chainage	m	
Sampled By	Alex Matthew	Offset C/L	m	
Date Tested	19/04/2022	Depth/Level	m	0.8m
Material Source	Insitu	Material Type	Insitu	

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
19.0		**100**	
13.2		**100**	
9.5		**96**	
6.7		**89**	
4.75		**80**	
2.36		**69**	
1.18		**51**	
0.600		**43**	
0.425		**38**	
0.300		**35**	
0.150		**28**	
0.075		**25**	



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W9Rep Rev 2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

MOISTURE CONTENT REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43738-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	28/04/2022 Page 1 of 1

Test Procedures:	AS1289.2.1.1

Sample Number		10823/S/172139	10823/S/172140	10823/S/172141	10823/S/172142
ID / Client ID		-	-	-	-
Lot Number		Solar Farm (Accor)	Solar Farm (Accor)	Solar Farm (Accor)	Solar Farm (Accor)
Date / Time Sampled		23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sampling Method		Tested As Received	Tested As Received	Tested As Received	Tested As Received
Sampled By		Alex Matthew	Alex Matthew	Alex Matthew	Alex Matthew
Tested By		Aaron Miles	Aaron Miles	Aaron Miles	Aaron Miles
Date Tested		28/04/2022	28/04/2022	13/04/2022	13/04/2022
Material Source		Insitu	Insitu	Insitu	Insitu
Material Type		Insitu	Insitu	Insitu	Insitu
Borehole	No.	BH/4	BH/5	BH/7	BH/14
Chainage	m				
Offset C/L	m				
Depth/Level	m	0.5m	0.7m	0.6m	0.9m
Moisture Content (%)		**17.1**	**4.7**	**5.1**	**11.5**

Sample Number		10823/S/172143
ID / Client ID		-
Lot Number		Solar Farm (Accor)
Date / Time Sampled		23/03/2022
Sampling Method		Tested As Received
Sampled By		Alex Matthew
Tested By		Aaron Miles
Date Tested		28/04/2022
Material Source		Insitu
Material Type		Insitu
Borehole	No.	BH/17
Chainage	m	
Offset C/L	m	
Depth/Level	m	0.8m
Moisture Content (%)		**4.4**

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W20Rep Rev 3

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43776-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	3/05/2022 Page 1 of 5

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1		
Sample Number	10823/S/172139	Sample Location	
Sampling Method	Tested As Received	Borehole No.	BH/4
Date Sampled	23/03/2022	Chainage m	
Sampled By	Alex Matthew	Offset C/L m	
Date Tested	28/04/2022	Depth/Level m	0.5m
Att. Drying Method	Oven Dried	Material Source	Insitu
Atterberg Preparation	Dry Sieved	Material Type	Insitu
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Gravelly CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**41**	
Plastic Limit (%)		**18**	
Plasticity Index (%)		**23**	
Linear Shrinkage (%)		**11.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 250.2mm / -		

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W11bRep Rev 1

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43776-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	3/05/2022 Page 2 of 5

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1		
Sample Number	10823/S/172140	Sample Location	
Sampling Method	Tested As Received	Borehole No.	BH/5
Date Sampled	23/03/2022	Chainage m	
Sampled By	Alex Matthew	Offset C/L m	
Date Tested	28/04/2022	Depth/Level m	0.7m
Att. Drying Method	Oven Dried	Material Source	Insitu
Atterberg Preparation	Dry Sieved	Material Type	Insitu
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Gravelly CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**26**	
Plastic Limit (%)		**14**	
Plasticity Index (%)		**12**	
Linear Shrinkage (%)		**8.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 250.2mm / -		

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W11bRep Rev 1

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43776-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	3/05/2022 Page 3 of 5

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1		
Sample Number	10823/S/172141	Sample Location	
Sampling Method	Tested As Received	Borehole No.	BH/7
Date Sampled	23/03/2022	Chainage m	
Sampled By	Alex Matthew	Offset C/L m	
Date Tested	19/04/2022	Depth/Level m	0.6m
Att. Drying Method	Oven Dried	Material Source	Insitu
Atterberg Preparation	Dry Sieved	Material Type	Insitu
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Gravelly CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**33**	
Plastic Limit (%)		**14**	
Plasticity Index (%)		**19**	
Linear Shrinkage (%)		**10.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 250.2mm / -		

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W11bRep Rev 1

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43776-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	3/05/2022 Page 4 of 5

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1		
Sample Number	10823/S/172142	Sample Location	
Sampling Method	Tested As Received	Borehole No.	BH/14
Date Sampled	23/03/2022	Chainage m	
Sampled By	Alex Matthew	Offset C/L m	
Date Tested	19/04/2022	Depth/Level m	0.9m
Att. Drying Method	Oven Dried	Material Source	Insitu
Atterberg Preparation	Dry Sieved	Material Type	Insitu
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Gravelly CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**48**	
Plastic Limit (%)		**22**	
Plasticity Index (%)		**26**	
Linear Shrinkage (%)		**13.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 250.2mm / -		

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W11bRep Rev 1

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
Unit 1, 36 Hawke Drive,
Woolgoolga NSW 2456

Laboratory: **Coffs Coast Laboratory**
Phone: 02 5621 8200
Fax: 02 6654 0261
Email: CoffsHarbour@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences Newcastle	Report Number:	10823/R/43776-1
Client Address:	1/12 Callistemon Close, Warabrook	Project Number:	10823/P/877
Project:	KLEINFELDER	Lot Number:	Solar Farm (Accor)
Location:	Various (supplied from Newcastle CS)	Internal Test Request:	10823/T/20813
Component:	Stubbo Solar Farm (Accor)	Client Reference/s:	Project No. 20225666
Area Description:	Solar farm infrastructure	Report Date / Page:	3/05/2022 Page 5 of 5

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1		
Sample Number	10823/S/172143	Sample Location	
Sampling Method	Tested As Received	Borehole No.	BH/17
Date Sampled	23/03/2022	Chainage m	
Sampled By	Alex Matthew	Offset C/L m	
Date Tested	19/04/2022	Depth/Level m	0.8m
Att. Drying Method	Oven Dried	Material Source	Insitu
Atterberg Preparation	Dry Sieved	Material Type	Insitu
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Sandy CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**24**	
Plastic Limit (%)		**12**	
Plasticity Index (%)		**12**	
Linear Shrinkage (%)		**8.0**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 250.2mm / -		

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 10823

Approved Signatory: Zane Lasker
Form ID: W11bRep Rev 1

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2211850**	Page	: 1 of 2
Client	: **KLEINFELDER AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: M Ferguson	Contact	: Gregory Gommers
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 20225666	Date Samples Received	: 05-Apr-2022 14:25
Order number	: ----	Date Analysis Commenced	: 06-Apr-2022
C-O-C number	: ----	Issue Date	: 08-Apr-2022 17:06
Sampler	: Megan Ferguson		
Site	: Stubbo Solar Farm		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**BH4**	**BH5**	**BH7**	**BH14**	**BH17**
			Sampling date / time	22-Mar-2022 00:00	22-Mar-2022 00:00	22-Mar-2022 00:00	22-Mar-2022 00:00	22-Mar-2022 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2211850-001**	**ES2211850-002**	**ES2211850-003**	**ES2211850-004**	**ES2211850-005**
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.9**	**6.2**	**6.0**	**8.4**	**5.9**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**10.7**	**4.6**	**6.7**	**9.8**	**1.9**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	**70**	**10**	**90**	<10
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**190**	**10**	**380**	<10	**50**

Appendix C Roadside Hazard Risk Assessment Worksheet

Group	Measure	Item	Reference
General road characteristics	Terrain (flat, rolling, mountainous)	A	Plans
	Environment (urban, rural)	B	Plans
	Operating speed (70 km/h, 80 km/h, 90 km/h, 110 km/h)	C	Plans
	Divided road? (yes/no)	D	Plans
	Number of lanes in the direction of travel	E	Plans
	Lane width (m)	F	Plans
	Design AADT (veh/day)	G	Plans
	Length of road segment (m)	H	Plans
Particular road characteristics	Chainage where roadside is assessed	I	Plans
	Side of travelled way (verge/left or median/right)	J	Plans
	Grade (%) (upgrade positive)	K	Plans
	Lateral width of area 6V:1H or flatter adjacent travel lane (i.e. shoulder + verge + batter [if 6H:1V or flatter])		Plans
	Curve radius (m) (Use 2000 m if straight)	L	Plans
	Curve direction (left/right in the direction of travel)	M	Plans
Background hazard characteristics	Description	N	Plans
	Lateral distance to the background hazards from the edge of lane (m) (Refer to Figure B.10)	O	Plans
Isolated hazard characteristics	Description	P	Plans
	Length of the hazard (m)	Q	Plans
	Average distance between isolated hazards (m)	R	Plans
	Lateral distance to the isolated hazards from the edge of lane (m) (Refer to Figure B.10)	S	Plans
Exposure	Base exposure (encr/km/yr)	T	Figure B.1 or Figure B.2
	Number of lanes factor	U	Table B.1 or Table B.2
	Lane width factor	V	Table B.1, Table B.2 or Table B.3
	Terrain factor	W	Table B.1, Table B.2 or Table B.3
	Grade factor	X	Figure B.3
	Curve correction factor	Y	Figure B.4
	Exposure (encr/km/yr)	Z	Product T to Y
Likelihood	Likelihood for background hazards (considering curve radius)	AA	Figure B.6, Figure B.7 or Figure B.8
	Modification factor for likelihood if the isolated hazards shield the background hazards (Use 1.00 if shielding does not exist.)	AB	1-(Q+18)/MIN(R,H)
	Modified likelihood for background hazards	AC	AA*AB
	Likelihood of impacts with isolated (point) hazards (based on being continuous)	AD	Figure B.6, Figure B.7 or Figure B.8
	Likelihood of impacts with isolated hazards	AE	AD*(Q+18)/MIN(R,H)
	Likelihood of a rollover	AF	Equation A2
Severity (Trauma Index)	Trauma Index for background hazards (operating speed of 110 km/h)	AH	Table B.4 to Table B.7
	Trauma Index for background hazards at the appropriate operating speed	AJ	Appendix B.4.5
	Trauma Index for isolated hazards (operating speed of 110 km/h)	AK	Table B.8 and Table B.9
	Trauma Index for isolated hazards at the appropriate operating speed	AL	Appendix B.4.5
	Trauma Index for a rollover	AM	0.63
Risk Score	Calculate Risk Score (product of the exposure, likelihood and Trauma Index) for background hazards	AP	Z*AC*AJ
	Calculate Risk Score (product of the exposure, likelihood and Trauma Index) for isolated hazards	AQ	Z*AE*AL
	Calculate Risk Score (product of the exposure, likelihood and Trauma Index) for rollover events	AR	Z*AF*AM
	Combined Risk Score	**AS**	**AP+AQ+AR**

AGRD Disclaimer - Reference AGRD Part 6, Page 34

The use of a NRRIT between 1.5 and 2.0 is considered to be reasonable initially, until better information, is obtained from the corridor safety vision and associated acceptable roadside cross-sections. A jurisdiction is free to choose any NRRIT.

Appendix B2
General arrangement drawings

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ACOR CONSULTANTS
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 1

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	Project No.		Dwg. No.	Issue
GGC	NSW212453		C105-001	A

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client: UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title: GENERAL ARRANGEMENT PLAN SHEET 2

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	**Project No.**		**Dwg. No.**	**Issue**
GGC	NSW212453		C105-002	A

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client: UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title: GENERAL ARRANGEMENT PLAN
SHEET 3

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22

Designed	Project No.	Dwg. No.	Issue
GGC	NSW212453	C105-003	A

LEGEND
ROAD CONTROL LINE
DESIGN ROADWAY
EXISTING SURVEY
EXISTING UNSEALED PAVEMENT
EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
ROAD / DRIVEWAY CONTROL LABEL
KERB / EDGE OF DRIVEWAY CONTROL LABEL
DESIGN CONTOURS - MAJOR
DESIGN CONTOURS - MINOR
EXISTING CONTOURS
EXISTING BOUNDARY
EXISTING ELECTRICAL OVERHEAD LINE
EXISTING COMMUNICATIONS LINE
EXISTING STORMWATER LINE
NEW STORMWATER PIPE AND HEADWALL
EXISTING STORMWATER CULVERT EXTENDED
EXISTING CULVERTS AND HEADWALLS RETAINED
EXISTING TREE
PROPOSED SIGN
LINEMARKING TAG
LOT 13
DP 248716
LOT 14
DP 248716
FROM GULGONG
Remove barrier on the inside of curve
EXTEND TWIN CELL Ø450mm CLASS 4 CULVERT UPSTREAM AND DOWNSTREAM
1x2.44m UNITS AT 0.8% GRADE.
INSTALL PRECAST HEADWALL AND DUMPED ROCK SCOUR PROTECTION.
ADJUST ROADSIDE BATTER TO SUIT.
INSTALL EZY GUARD SAFETY BARRIER
FROM CH1040 TO CH1140 INCLUDING MSKT END
TERMINALS (OR APPROVED EQUIVALENT)
LOT 14
DP 248716
TO BUNGABA
BLUE SPRINGS ROAD
INSTALL NEW SINGLE CELL Ø375mm CLASS 4 RCP.
CULVERT LENGTH 5x2.44m UNITS AT 1% GRADE.
INSTALL PRECAST HEADWALL AND DUMPED ROCK SCOUR PROTECTION.
ADJUST ROADSIDE BATTER TO SUIT.
UPSTREAM INVERT RL460.05
DOWNSTREAM INVERT RL459.93
INSTALL EZY GUARD SAFETY BARRIER
FROM CH980 TO CH1160 INCLUDING MSKT END
TERMINALS (OR APPROVED EQUIVALENT)
LOT 163
DP 750765
Retain Barrier on outside of curve. Extent will be reduced
ADJOINS TO C104-003
ADJOINS TO C104-005
DIAL BEFORE YOU DIG
www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 4

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	Project No.		Dwg No.	Issue
GGC	NSW212453		C105-004	A

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG
www.1100.com.au

DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS
ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 5

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22

Designed	Project No.	Dwg. No.	Issue
GGC	NSW212453	C105-005	A


LEGEND
ROAD CONTROL LINE
DESIGN ROADWAY
EXISTING SURVEY
EXISTING UNSEALED PAVEMENT
EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
MCX ROAD / DRIVEWAY CONTROL LABEL
MKX KERB / EDGE OF DRIVEWAY CONTROL LABEL
DESIGN CONTOURS - MAJOR
DESIGN CONTOURS - MINOR
EXISTING CONTOURS
EXISTING BOUNDARY
EXISTING ELECTRICAL OVERHEAD LINE
EXISTING COMMUNICATIONS LINE
EXISTING STORMWATER LINE
NEW STORMWATER PIPE AND HEADWALL
EXISTING STORMWATER CULVERT EXTENDED
EXISTING CULVERTS AND HEADWALLS RETAINED
EXISTING TREE
PROPOSED SIGN
BB LINEMARKING TAG
Retain Barrier on outside of curve. Extent will be reduced
LOT 16
DP 1210629
INSTALL EZY GUARD SAFETY BARRIER FROM CH1750 TO CH1910 INCLUDING MSKT END TERMINALS (OR APPROVED EQUIVALENT)
FROM GULGONG
TO BUNGABA
ADJOINS TO C104-005
ADJOINS TO C104-007
BLUE SPRINGS ROAD
MC10
DV7-1
DV7-2
DV7-3
DV7-4
DV8-1
DV8-2
DV8-3
DV8-4
E1
BB
W1-3(L)
W8-2
D4-6
TC 1767.30
1720
1740
1760
1780
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
2080
EXTEND EXISTING TWIN CELL Ø600mm CLASS 4 CULVERT UPSTREAM AND DOWNSTREAM 1x2.44m UNITS AT 3.0% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT.
EXTEND EXISTING SINGLE CELL Ø600mm CLASS 4 CULVERT UPSTREAM 1x2.44m UNITS AT 0.5% GRADE. INSTALL PRECAST HEADWALL AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT.
LOT 196
DP 750746
LOT 195
DP 750746

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client: UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title: GENERAL ARRANGEMENT PLAN
SHEET 6

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22

Designed	Project No.	Dwg. No.	Issue
GGC	NSW212453	C105-006	A

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client: UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title: GENERAL ARRANGEMENT PLAN SHEET 7

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	Project No.		Dwg. No.	Issue
GGC	NSW212453		C105-007	A

LEGEND
ROAD CONTROL LINE
DESIGN ROADWAY
EXISTING SURVEY
EXISTING UNSEALED PAVEMENT
EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
MCX
ROAD / DRIVEWAY CONTROL LABEL
MKX
KERB / EDGE OF DRIVEWAY CONTROL LABEL
86
DESIGN CONTOURS - MAJOR
DESIGN CONTOURS - MINOR
EXISTING CONTOURS
EXISTING BOUNDARY
EX/OHE
EXISTING ELECTRICAL OVERHEAD LINE
EX/C
EXISTING COMMUNICATIONS LINE
EXISTING STORMWATER LINE
NEW STORMWATER PIPE AND HEADWALL
EXISTING STORMWATER CULVERT EXTENDED
EXISTING CULVERTS AND HEADWALLS RETAINED
EXISTING TREE
PROPOSED SIGN
BB
LINEMARKING TAG
LOT 16
DP 1210629
FROM GULGONG
2460
2480
2500
2520
2540
2560
2580
2600
2620
2640
TC 2655.74
2660
2680
2700
2720
CT 2732.23
2740
2760
2780
2800
2820
2840
TO BUNGABA
ADJOINS TO C104-007
ADJOINS TO C104-009
EXTEND EXISTING SINGLE CELL Ø525mm CLASS 4 CULVERT UPSTREAM AND DOWNSTREAM 1x2.4m UNITS AT 0.5% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT.
DV13-1
DV13-2
DV13-3
DV13-4
DV14-1
DV14-2
DV14-3
DV14-4
E1
E1
BB
MC10
EXTEND EXISTING SINGLE CELL Ø450mm CLASS 4 CULVERT UPSTREAM AND DOWNSTREAM 1x2.4m UNITS AT 4.4% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT.
BLUE SPRINGS ROAD
INSTALL EZY GUARD SAFETY BARRIER FROM CH2605 TO CH2810 INCLUDING MSKT END TERMINALS (OR APPROVED EQUIVALENT)
Remove Barrier. Treat curve with RPMS, Guideposts.
LOT 31
DP 750765
LOT 194
DP 750765

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

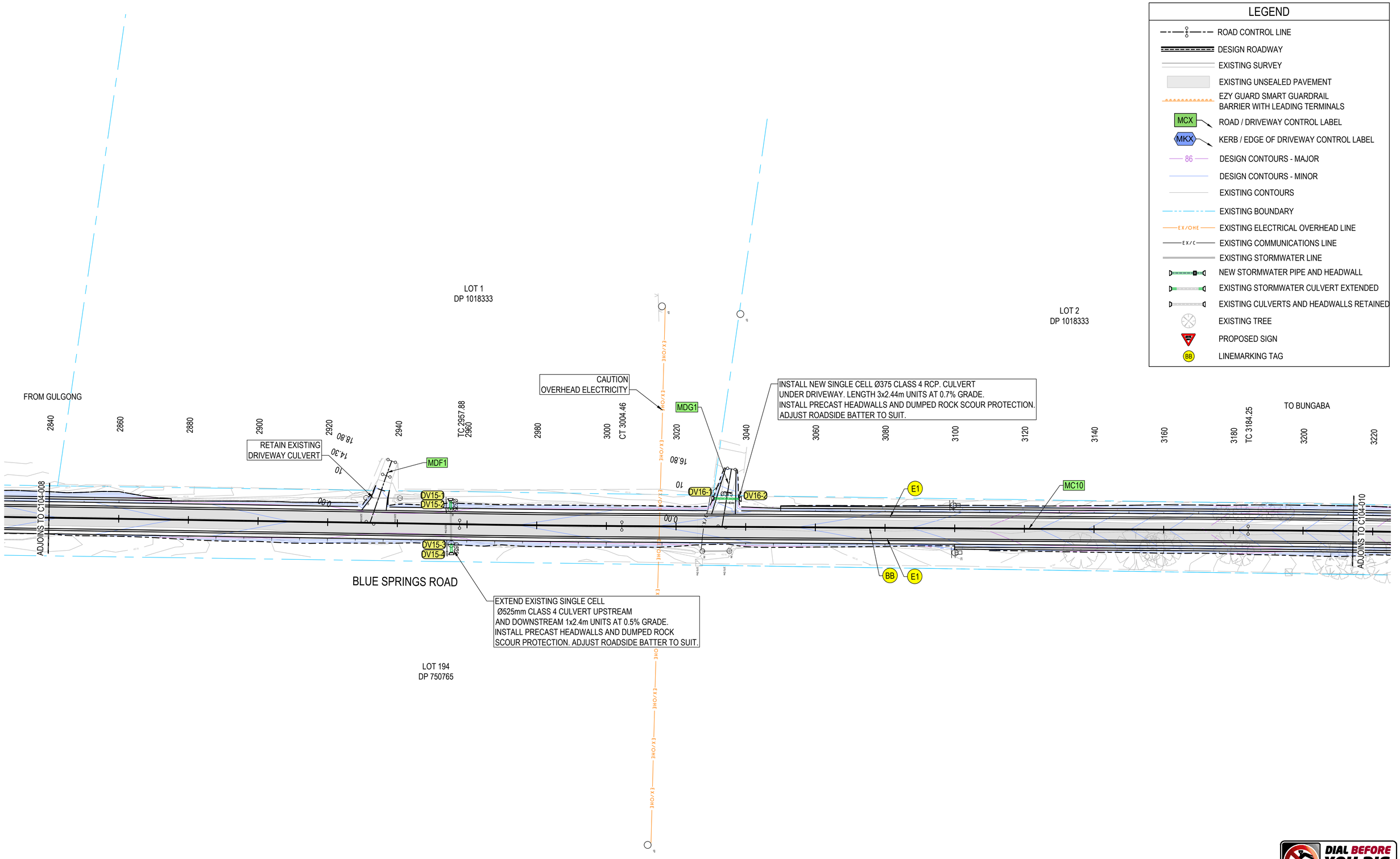
UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS
ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 8

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	Project No.		Dwg. No.	Issue
GGC	NSW212453		C105-008	A



DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

1cm at full size 10cm 20cm

North

Client
UPC\AC RENEWABLES AUSTRALIA

Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 9

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	Project No.		Dwg. No.	Issue
GGC	NSW212453		C105-009	A

192.168.2.5\Drawings\Projects\NSW\NSW212453\Drawings\ACAD\XDrawings\NSW212453-SHT-SXC-105-009.dwg
Apr 21, 2022 - 4:57pm

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG
www.1100.com.au

DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 10

Drawn	Date	Scale (A1)	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22

Designed	Project No.	Dwg. No.	Issue
GGC	NSW212453	C105-010	A

\\192.168.2.1\Synergy\Projects\NSW21\NSW212453\D
Apr 21, 2022 - 4:57pm

LEGEND

- ROAD CONTROL LINE
- DESIGN ROADWAY
- EXISTING SURVEY
- EXISTING UNSEALED PAVEMENT
- EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
- MCX — ROAD / DRIVEWAY CONTROL LABEL
- MKX — KERB / EDGE OF DRIVEWAY CONTROL LABEL
- 86 — DESIGN CONTOURS - MAJOR
- DESIGN CONTOURS - MINOR
- EXISTING CONTOURS
- EXISTING BOUNDARY
- EX/OHE — EXISTING ELECTRICAL OVERHEAD LINE
- EX/C — EXISTING COMMUNICATIONS LINE
- EXISTING STORMWATER LINE
- NEW STORMWATER PIPE AND HEADWALL
- EXISTING STORMWATER CULVERT EXTENDED
- EXISTING CULVERTS AND HEADWALLS RETAINED
- EXISTING TREE
- PROPOSED SIGN
- BB — LINEMARKING TAG

DIAL BEFORE YOU DIG www.1100.com.au

DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

1cm at full size 0 10cm 20cm

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

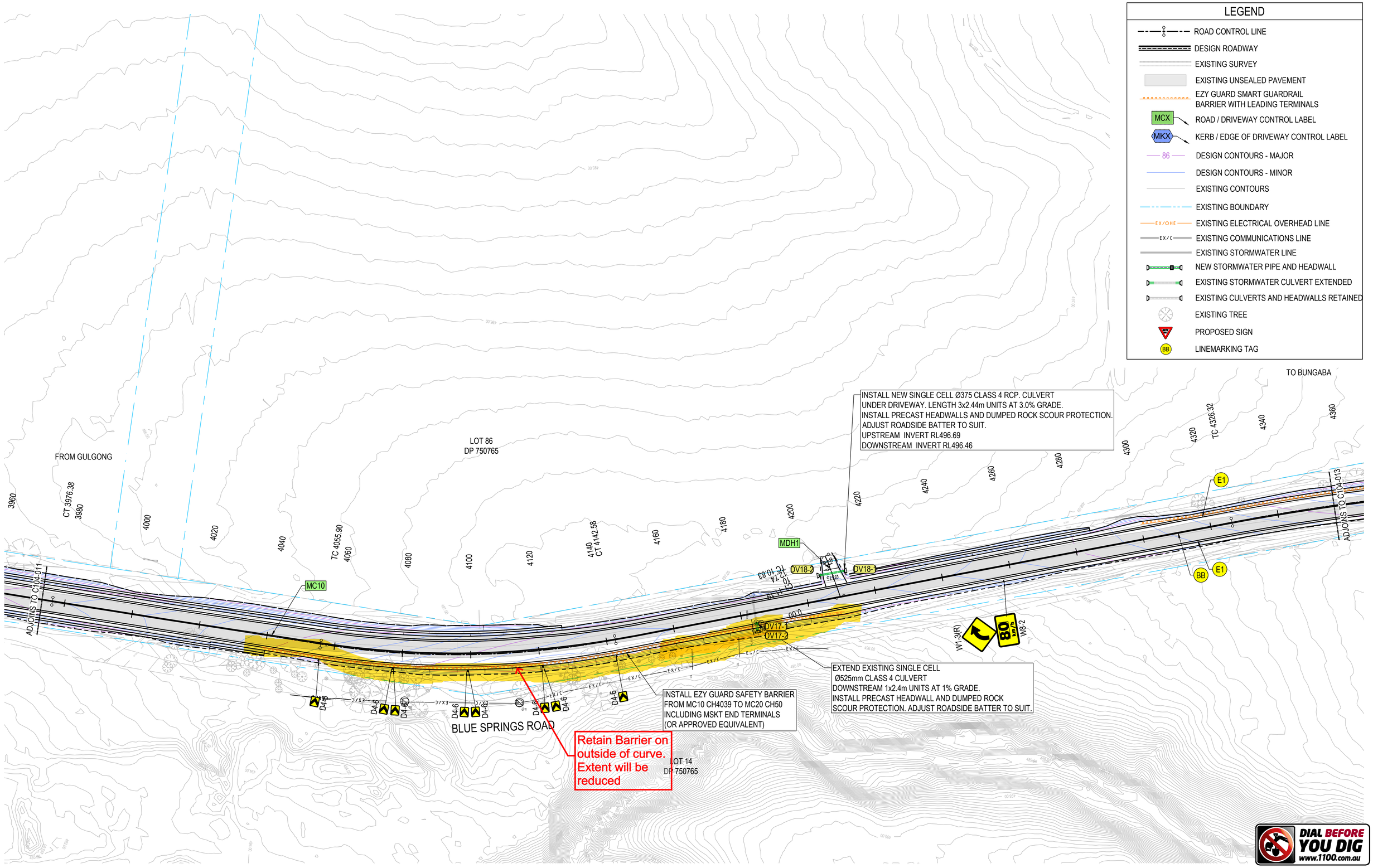
ACOR CONSULTANTS
ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 11

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	**Project No.**		**Dwg. No.**	**Issue**
GGC	NSW212453		C105-011	A

\\192.168.2.1\Synergy\Projects\NSW21\NSW212453\Drawi...
Apr 21, 2022 - 4:58pm



DETAILED DESIGN

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

0 1cm at full size 10cm 20cm

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 12

Drawn	Date	Scale	A1	Q.A. Check	Date
MDM	April 22	1:500		GPC	22.04.22
Designed	Project No.			Dwg. No.	Issue
GGC	NSW212453			C105-012	A

Apr 21, 2022 - 4:58pm


SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD
FROM GULGONG
TO BUNGABA
ADJOINS TO C104-012
LOT 25
DP 502960
LOT 24
DP 502960
LOT 14
DP 750765
INSTALL EZY GUARD SAFETY BARRIER FROM MC10 CH4039 TO MC20 CH50 INCLUDING MSKT END TERMINALS (OR APPROVED EQUIVALENT)
FINAL INTERSECTION AND ACCESS ROAD DESIGN TO BE CONFIRMED
INSTALL EZY GUARD SAFETY BARRIER FROM MC20 CH50 TO MC10 CH4560 INCLUDING MSKT END TERMINALS (OR APPROVED EQUIVALENT)
Remove Barrier. Treat curve with RPMS, Guideposts.
INSTALL NEW SINGLE CELL Ø375 CLASS 4 RCP. CULVERT UNDER DRIVEWAY. LENGTH 4x2.44m UNITS AT 1.0% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION.ADJUST ROADSIDE BATTER TO SUIT. UPSTREAM INVERT RL502.14 DOWNSTREAM INVERT RL502.04
REFER TO SHEET C106-711 FOR INTERSECTION DETAIL PLAN
INSTALL NEW SINGLE CELL Ø375 CLASS 4 RCP. CULVERT UNDER DRIVEWAY. LENGTH 3x2.44m UNITS AT 1.6% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT. UPSTREAM INVERT RL499.24 DOWNSTREAM INVERT RL499.12
EXTEND EXISTING TWIN CELL Ø525 CLASS 4 CULVERT UPSTREAM AND DOWNSTREAM 1x2.4m. LENGTH 3x2.44m UNITS AT 1.47% GRADE. INSTALL PRECAST HEADWALLS AND DUMPED ROCK SCOUR PROTECTION. ADJUST ROADSIDE BATTER TO SUIT.
MAKE SMOOTH CONNECTION WITH EXISTING PAVEMENT. ENSURE MAX 1% CHANGE IN GRADE. REFER TO DRAWING C106.201 FOR PAVEMENT DETAIL.
LIMIT OF WORKS
MC10
MC20
MDK1
MDJ1
DV19-1
DV19-2
DV20-1
DV20-2
DV21-1
DV21-2
DV22-1
DV22-2
DV22-3
DV22-4
TB
C1
E1
BB
R-12
GIVE WAY
4360
4380
4400
4420
4440
4460
4480
4500
4520
CT 4538.88
4540
4560
4580
4600
4620
4640
4660
4680
4700
4720
4740
LEGEND
ROAD CONTROL LINE
DESIGN ROADWAY
EXISTING SURVEY
EXISTING UNSEALED PAVEMENT
EZY GUARD SMART GUARDRAIL BARRIER WITH LEADING TERMINALS
ROAD / DRIVEWAY CONTROL LABEL
KERB / EDGE OF DRIVEWAY CONTROL LABEL
DESIGN CONTOURS - MAJOR
DESIGN CONTOURS - MINOR
EXISTING CONTOURS
EXISTING BOUNDARY
EXISTING ELECTRICAL OVERHEAD LINE
EXISTING COMMUNICATIONS LINE
EXISTING STORMWATER LINE
NEW STORMWATER PIPE AND HEADWALL
EXISTING STORMWATER CULVERT EXTENDED
EXISTING CULVERTS AND HEADWALLS RETAINED
EXISTING TREE
PROPOSED SIGN
LINEMARKING TAG
DIAL BEFORE YOU DIG
www.1100.com.au

DETAILED DESIGN

Issue	Description	Date	Drawn	Approved
A	ISSUED FOR 50% DETAILED DESIGN	22.04.22	MDM	GPC

North

Client
UPC\AC RENEWABLES AUSTRALIA
Suite 2, Level 2, 15 Castray Esplanade
Battery Point, TAS, 7004

UPC\AC Renewables AUSTRALIA

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
STUBBO SOLAR FARM ACCESS ROAD
BLUE SPRINGS ROAD, STUBBO

Drawing Title
GENERAL ARRANGEMENT PLAN
SHEET 13

Drawn	Date	Scale A1	Q.A. Check	Date
MDM	April 22	1:500	GPC	22.04.22
Designed	**Project No.**		**Dwg. No.**	**Issue**
GGC	NSW212453		C105-013	A

Appendix C
Stubbo Solar Farm Traffic Management Monitoring Requirements

Table B - Traffic Management Plan: Management and Monitoring Measures

Aspect	Potential problems	Performance criteria	Mitigation and control measures	Monitoring requirements	Responsibility	Timing	Frequency
Heavy vehicle movements	Number of vehicles exceed DC approval	Maximum limit of 60 heavy vehicle movements a day	Heavy vehicles will be denied site entry if limit has been exceeded	Count and record number of vehicle movements	UPC\AC	Duration of construction	Daily
Over-dimensional (OD) vehicle movements	Number of vehicles exceed DC approval	Maximum limit of 20 OD vehicle movements a day	OD vehicles will be denied site entry if limit has been exceeded	Count and record number of vehicle movements	UPC\AC	Duration of construction	Daily
	Number of vehicles exceed DC approval	Maximum length of any vehicles (excluding OD vehicles) is 26m	Vehicles (excluding OD vehicles) will be denied site entry their length exceeds 26m	Measure vehicle length	UPC\AC	Duration of construction	Daily
Soil and/or debris on public road	Road have excess build up of dirt	Minimise exposed soil areas	Where practicable, vegetation clearing activities should be staged, so that areas of exposed soil are minimised	Check cleared areas for evidence of erosion	UPC\AC	Duration of construction	Daily
Condition of road	Traffic use causes damage to road	Damaged road is left unrepaired	Emergency repair and/or maintenance is required	Check for evidence of damage	UPC\AC	Duration of construction	Monthly
Weather conditions	Conditions make driving hazardous	Vehicles should not be travelling in unsafe conditions	Consider options to reduce driver risk such as temporarily halting vehicle movements, re-routing, etc.	Check weather forecast and on-site conditions	UPC\AC	Duration of construction	Daily
Driver behaviour	Poor driver behaviour leads to incidents, accidents or near misses	No accidents	Encouraging good driver practice and reinforcing those messages during project meetings	Count and record number of incidents, accidents and near misses	UPC\AC	Duration of construction	Daily
	Vehicles have excessive mud or dirt	Dirt transferred from the site onto the external road network to be minimised	Vehicles exiting the site are to be cleaned so that excessive mud and dirt is not transferred to external roads	Vehicles exiting the site are to be inspected (and cleaned as required)	Vehicle driver	Duration of construction	Daily
Access tracks and laydown areas	Dust	Dust should not impact off-site receptors	Pave haul roads and other areas with gravel or impervious sealant, wet down tracks on windy days	Inspect the site for dust generation	UPC\AC	Duration of construction	At least daily
	Soil on paved roads	No off-site roads to be contaminated with tracked mud and or dirt	Install wheel wash and rumble grid Manually wash vehicle wheels Increase road cleaning frequency	Inspect off-site roads for tracked mud and dirt			
Stockpiles and bare slopes	Erosion	No sediment-laden stormwater discharged off-site	Minimise exposure to run-off and action of wind and ensure stabilisation measures are effective	Check effectiveness of stabilisation measures	UPC\AC	Duration of construction	Weekly
Drains and waterways	New drainage lines not controlled	No sediment-laden stormwater discharged off-site	Install appropriate sediment controls on new drainage lines	Check drainage lines for sediment controls	UPC\AC	Duration of construction	At least once every two days in areas where earth-moving is occurring. Weekly elsewhere
	Sediment-laden stormwater contamination of waterways	No sediment-laden stormwater discharged off-site	Avoid or control erosion on the site as per the procedures in Section 7	Check for localised erosion on site and rectify as soon as is practicable. Monitor erosion and sediment control measures to ensure they are functioning adequately	UPC\AC	Duration of construction	Once a week (as a minimum) Immediately following rainfall events that cause run-off
			Replace or repair damaged drains, redesign ineffective drains, relocate incorrectly placed drains	Check integrity and effectiveness of drains	UPC\AC	Duration of construction	Weekly
Stream crossings and culverts	Unstable	No unstable crossings	Stop use until installation has been redesigned	Check integrity and stability of stream crossings	UPC\AC	Duration of construction	When in use, but no less than weekly
Settlement basins, bunds, sediment fences, filters and screens	Sediments not effectively removed	No sediment-laden stormwater discharged off-site	Maintain the effectiveness of control measures as per the procedures in Section 6	Monitor sediment levels in water holding areas and sediment fencing, check for integrity of bunds and other control structures	UPC\AC	Duration of construction	Once a week (as a minimum) Immediately following rainfall events that cause run-off

Table B - Traffic Management Plan: Management and Monitoring Measures

			Sediment and erosion controls take many forms and one or a combination of controls may be appropriate for a given circumstance. The management controls should be in accordance with the measures described in *Managing Urban Stormwater: Soils and Construction*				
			Any excess contaminated stormwater and process waste water that cannot be reused on-site will be disposed of in accordance with the *Managing Urban Stormwater: Soils and Construction*	Undertake visual inspections for turbidity downstream of any discharge points	UPC\AC	Duration of construction	Hourly when discharging
Chemical storage areas	Spills and contamination	No release of fuels or chemicals to land or water	Locate storage and refuelling areas 50m from sensitive area such as waterways, wetlands and native vegetation	Check location for distances	UPC\AC	Prior to construction	As necessary
			In the event of discovery of contaminants, stop work, remediate and dispose of contaminants as necessary	Inspect the site for contamination	UPC\AC	Duration of construction	Continual
			Maintenance and refuelling areas adequately bunded	Check integrity and adequacy of bunding	UPC\AC	Duration of construction	Weekly
Placement of infrastructue	Infrastructure impacts stream	No infrastructure to be placed within 20 m of any Strahler 3 or above order streams	Ensure infrastructure is placed at 20 m or greater from any Strahler 3 or above order streams	Check location for distances	UPC\AC	Prior to construction	Continual

Appendix D
MWRC s138 Permit

MID-WESTERN REGIONAL COUNCIL
PO Box 156, MUDGEE NSW 2850
86 Market Street, Mudgee | 109 Herbert Street, Gulgong | 77 Louee Street, Rylstone
T 1300 765 002 or 02 6378 2850 | F 02 6378 2815
E council@midwestern.nsw.gov.au

Section 138 No. S138.0022/2023

Issued under the *Roads Act 1993* Section 138

Our Ref:	S138.0022/2023

Applicant:	Acen Stubbo Solar Farm Pty Ltd Level 2 Suite 2 15 Castray Esplanade BATTERY POINT TAS 7004

Owner:	Mr Matthew J Cosgrove
Subject Land:	MacHaven Gracelands 465 Blue Springs Road STUBBO NSW 2852 Lot 86 DP 750765 Lot 25 DP 502960 Lot 68 DP 750765 Lot 4 DP 502956 Lot 69 DP 750765 Lot 59 DP 750765 Lot 60 DP 750765 Lot 146 DP 750765 Lot 1 DP 525593 EP 44589

Description of Development	
Type of Work:	Works Within Road Reserve
Description	Driveway construction, Stormwater connection Pavement work, including kerb & guttering Dig up or disturb the surface of a public road Remove or interfere with a structure, work or tree on a public road Connect a road (whether public or private) to a classified road

Plans and Specifications Approved	List has been attached below

Certifying Authority	**Mid-Western Regional Council** **P O Box 156** **MUDGEE NSW 2850** **Telephone: 02 6378 2850**
Certificate:	I certify that the work if completed in accordance with these plans and specifications will comply with the requirements of S138 of the *Roads Act 1993.*
Signature	..... Don Cottee Development Control Engineer
Date of Endorsement	10 August 2022

MID-WESTERN REGIONAL COUNCIL
PO Box 156, MUDGEE NSW 2850
86 Market Street, Mudgee | 109 Herbert Street, Gulgong | 77 Louee Street, Rylstone
T 1300 765 002 or 02 6378 2850 | F 02 6378 2815
E council@midwestern.nsw.gov.au

S138.0022/2023

10 August 2022

ROAD WORKS APPROVAL AUTHORITY

WORKS ADDRESS: MacHaven Gracelands 465 Blue Springs Road STUBBO NSW 2852
Lot 86 DP 750765 Lot 25 DP 502960 Lot 68 DP 750765
Lot 4 DP 502956 Lot 69 DP 750765 Lot 59 DP 750765
Lot 60 DP 750765 Lot 146 DP 750765 Lot 1 DP 525593
EP 44589

Development Application No:

Construction Certificate No:

Approval is hereby granted under Section 138 of the Roads Act 1993 for works in connection with the property access, subject to the following conditions;

PRIOR TO COMMENCEMENT OF ROAD UPGRADE WORKS

1. The following is to be provided, prior to the commencement of any works and is to be maintained in an effective and operational condition for the duration of the work:

   a) Mid-Western Regional Council is to be given at least two days' notice of the intention to commence works.
   b) A site supervisor is to be nominated by the applicant.
   c) A Traffic Management Plan (TMP) completed by a "Certified Person" for implementation during the works is to be submitted to Mid-Western Regional Council prior to the commencement of works.
   d) Soil and Water Management Plan (SWMP) for the Development is to be prepared and submitted to council and this must comply with the requirements and Guidelines set out by Landcom as outlined in the latest edition of "Soils and Construction- Managing Stormwater.
   e) Appropriate dust control measures;
   f) Construction equipment and materials shall be contained wholly within the site unless approval to use the road reserve has been obtained;
   g) Toilet facilities are to be provided on the work site at the rate of one toilet for every 20 persons or part of 20 persons employed at the site.
   h) Works that has to be carried out due to this proposed development must be carried out as per the consent condition issued by DPIE

The following matters need to be addressed by the owner/applicant and/or principal contractor at the applicable stages of the project:

Mid-Western Regional Council (MWRC) is to be notified 24 hours prior to each inspection.

The following inspections are required by the Roads Authority;

INSPECTIONS REQUIRED

Mid-Western Regional Council (MWRC) is to be notified 24 hours prior to each inspection.

1. The following inspections and test results are required by, and must be provided to, the Principal Certifying Authority;

    - Installation of all erosion and sedimentation control measures
    - Installation of stormwater infrastructure prior to backfilling
    - Test results of sub-base and base course material proposed prior to placing, certified by design engineer
    - Proof rolling witb minimum 15T roller or 15,000 litre water tank of sub-grade, sub-base and base with minimum deflection
    - Establishment of line and level for kerb and gutter placement where applicable
    - Road pavement construction including submission of all satisfactory survey conformance and compaction test reports in accordance with AUS-SPEC acceptance of compacted layers C242.17 and C242.18 for sub-base and base layers maximum 150mm depth using random test locations as per RTA Q4 – certified by design engineer
    - Visual inspection of road pavement to confirm consistency of pavement prior to bitumen sealing
    - All records following pavement surfacing including primer seal and asphalt details as specified in AUS-SPEC – certified by design engineer
    - Final visual inspection of road pavement surfacing on completion
    - Installation of form work and steel prior to pouring concrete including submission of design engineer certified material reports
    - Final inspection of all completed works prior to handover to council.
    - ALL QA documentation should be sent through progressively to Council's email address council@midwestern.nsw.gov.au with all required referencing details

GENERAL

1. Where it is proposed to import fill, the material shall be free of hazardous materials and contamination and be classified as VENM or ENM under the guidelines of the NSW Environmental Protection Authority by a qualified Geotechnical Engineer.

2. Runoff and erosion controls is to be installed prior to clearing and incorporate;

    - Diversion of uncontaminated upsite runoff around cleared and/or disturbed areas and areas to be cleared and/or disturbed
    - Sediment control fences at the downslopes perimeter of the cleared and/or disturbed are to prevent sediment and other debris escaping from the land to pollute any stream or water body

- Maintenance of all erosion control measures at maximum operational capacity until the land is effectively rehabilitated and stabilised beyond the completion of construction
- Any soil/water retention structures are to be constructed prior to the bulk stripping of topsoil to ensure sediment from the disturbed site is captured.
- As soon as possible the disturbed surfaces due to construction activities must be covered and Table drains and swales must be turfed
- High erosion areas, including batters must be stabilised within 7 days of completing of works and might have to be earlier if directed by superintendent
- After each rainfall event applicant must rang council's development engineer/certifier to carryout joint inspection along with site supervisor to ensure that sediment control structures require any repair/reinstatement if there is any damage to sediment control structures
- All sediment traps are to be in place at the end of work each day

3. All works are to be carried out in a workmanlike manner and in accordance with technical and performance requirements of relevant and applicable Codes, Standards, Council's Development Control Plan and AUS-SPEC #1.

4 If any aboriginal artefacts are uncovered or identified during construction earthworks, such work is to cease immediately and the local aboriginal community and National Parks and Wildlife Service are to be notified.

(Note: *A suitably qualified person is required to be present during earthworks to identify whether any artefacts were uncovered*).

5 Any necessary alterations to, or relocations of, public utility services to be carried out at no cost to council and in accordance with the requirements of the relevant authority including the provision of easements over existing and proposed public infrastructure.

6 The applicants shall, at their own expense, engage a registered surveyor to relocate any survey mark that may be disturbed by the development or any associated work. Any information regarding relocation should be supplied to the Land Titles Office and Council.

7 Any damage caused to existing Council's infrastructure must be repaired immediately at the Contractor's expense to the satisfaction of Council.

8 If any assets of any authorities get damaged or requires alternation/relocation due to this proposed development, then the respective authorities must be contacted/consulted prior carrying out those works.

9 The contractor / owner must arrange an inspection by contacting Council's Development Directorate between 8:00am and 4:30pm Monday to Friday, giving at least twenty-four (24) hours notice. Failure to have the work inspected may result in the access being removed and reconstructed at the contractor / owner's expense.

CONSTRUCTION – ROADS, KERB AND GUTTER

10. Construction of the roads are to be undertaken generally in accordance with the approved Drawings, Engineering Design and AUS-SPEC #1 & 2.

11. A Traffic Control Plan showing proposed traffic signposting around the construction site in accordance with AS 1742.3 and RMS Manual for Traffic Control at Worksites current at the time of construction is to be provided to Council for approval prior to any works

commencing on Ulan, Cope road and Blue Spring Road. The plan must be prepared and certified by a person holding the appropriate RMS accreditation.

Approved barriers and safety fencing must be placed and maintained around all excavation works at all times. Council accepts no responsibility and the Contractor will be held liable for any claims for damages or injury that may result from the works.

12. All traffic control including setup and removal of traffic control devices and/or regulation of traffic is to be carried out by persons suitably accredited by RMS. The developer/contractor must produce upon request evidence that all staff involved in the above have such accreditation.

13. All required earthworks for roads associated with the subdivision must have compaction testing in compliance with RMS Q4 and AUS-SPEC.

14. All earthworks, filling, building, driveways or other works, are to be designed and constructed (including stormwater drainage if necessary) so that at no time will any ponding or damage caused by stormwater occur on adjoining land as a result of this development.

15. Road pavements shall be designed by a suitable qualified engineer in accordance with AUSTROADS procedures. Materials and testing requirements shall comply with those set out in AUS-SPEC Construction Specification with sample locations selected as RMS Specification Q4.

16. The developer is to construct/upgarde the roads, such that they have the following characteristics in accordance with the modified consent:

Blue spring road Upgrade

Item	**Requirement**
Full Road Pavement Width	*Sealed road as per approved plan (including verge)* *Marking and signage must be in accordance with MUTCD/Approved Dwg/Referenced document of AUS-SPEC*
Seal	Two-coat flush seal -14/7 mm (Double/ Double) as required
Safety Barriers	In accordance with AGRD (geometric design and part 6 - road side design and safety barriers)
Batter Slope	Is to be in accordance with AGRD (batter rounding is desirable)
Kerb & Gutter	Roll back concrete kerb & gutter as per Austroad Guide to Road Design (where applicable)

Cope Road/Blue spring road intersection Upgrade

Item	**Requirement**
Full Road Pavement Width	Upgrade intersection and this must incorporate BAL and BAR as per Austroad Guide to Road Design
Seal	Two-coat flush seal -14/7 mm (Double/ Double) as required

Batter Slope	In accordance to AGRD
Kerb & Gutter	Roll back concrete kerb & gutter as per Austroad Guide to Road Design (where applicable)

17. Street signs necessitated by this road upgrade works are to be installed in accordance with AUS-SPEC #1 and Council standards.

18. Where applicable, all electrical, telecommunication, sewer and water service crossings are to be perpendicular to the road centreline and performed prior to the addition of base course and installation of kerb and gutter.

CONSTRUCTION – VEHICLE ACCESS CROSSING

From chaninge0+00 to chainage 4+620 all the existing access must be upgraded in accordance with council's access to property policy for rural road and must be sealed with bitumen at least 15m minimum from the new edge of the pavement or up to property boundary and must incorporate suitable drainage infrastructure and must ensure that the existing road side drainage lines and its capacity is not compromised.

19. All service connections should cross the road perpendicular to the road centerline.

CONSTRUCTION – STORMWATER

20. All road crossing is to be constructed using Reinforced Concrete Pipe (RCP) and inlet and outlet point must have suitable provision to control erosion and scouring to council's satisfaction. This is applicable to all drainage structures required along driveway.

21. At the completion of construction Council requires lodgment of a Quality Register in with all of the QA documentation in accordance with AUS-SPEC requirements

Records to be included as applicable

- Material Certification and Material Test Reports (Sub base, Base course, Water, Sewer, Stormwater, Bitumen etc for supplied materials)
- Concrete mix Details (Concrete Register/ Concrete Test Results required)
- Bitumen Sealing Reports/Records
- Earthworks/Civil Test Reports e.g. compaction tests - (Coordinates and RL required for each test required to be shown on a dwg)
- Dimensional and Tolerance Records (Survey Conformance Reports)
- Inspection Documentation (Development Engineer Inspections, ITPs, Lot Identification)
- Non-conformance reports (Major non-conformances not detailed on council inspections)
- Copy of final inspection report from Council's Development Engineer

22 Following the completion of road upgrade works, one set of Works As Executed (WAE) Drawings in PDF format, AutoCAD compatible files in DWG format, MapInfo files (MGA GDA94 Zone 55/56) and completed Asset Data Template spreadsheets in MS Excel format, are to be submitted to Council. All Works As Executed plans shall bear the consulting engineer's or consulting surveyor's certification stating that all information shown in the plans are accurate.

General Responsibilities of the Applicant and/or the Principal Contractor

It is the responsibility of either or both of these parties to:

- Provide for the overall supervision and quality of the works.

- Advise Council offices regarding:
    1. Any foreseeable hazard arising from the premises that has the potential to harm the health or safety of the Council officers when on the work site, and
    2. The assessment of any risk that has not been eliminated, and
    3. The measures taken to control any such risks, and
    4. Any measures that may need to be taken by Council officers to control any such risk while on the work site.

- Obey with any lawful instruction of the Principal Certifying Authorities representative.

- Notify Council when a required inspection has been missed.

- The provision and maintenance of all site signage as required by legislation, including but not limited to:
    1. A sign indicating the name and telephone number (both during and outside working hours) of the Principal Contractor, and
    2. The name and phone number of the Principal Certifying Authority.

Approved plans and specification:

DRAWING NUMBER	DESCRIPTION
C101-001	COVER SHEET AND LOCALITY PLAN
C101-002	DRAWING INDEX
C101-101	CONSTRUCTION NOTES AND DETAILS - SHEET 1
C101-102	CONSTRUCTION DETAILS
C101-201	KEY PLAN
C103-001	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 1
C103-002	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 2
C103-003	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 3
C103-004	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 4
C103-005	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 5
C103-006	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 6
C103-007	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 7
C103-008	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 8
C103-009	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 9
C103-010	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 10
C103-011	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 11
C103-012	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 12
C103-013	SOIL EROSION AND SEDIMENT CONTROL PLANS - SHEET 13
C103-101	SOIL EROSION AND SEDIMENT CONTROL - NOTES AND DETAILS
C105-001	GENERAL ARRANGEMENT PLAN - SHEET 1
C105-002	GENERAL ARRANGEMENT PLAN - SHEET 2
C105-003	GENERAL ARRANGEMENT PLAN - SHEET 3
C105-004	GENERAL ARRANGEMENT PLAN - SHEET 4
C105-005	GENERAL ARRANGEMENT PLAN - SHEET 5
C105-006	GENERAL ARRANGEMENT PLAN - SHEET 6
C105-007	GENERAL ARRANGEMENT PLAN - SHEET 7
C105-008	GENERAL ARRANGEMENT PLAN - SHEET 8
C105-009	GENERAL ARRANGEMENT PLAN - SHEET 9
C105-010	GENERAL ARRANGEMENT PLAN - SHEET 10
C105-011	GENERAL ARRANGEMENT PLAN - SHEET 11
C105-012	GENERAL ARRANGEMENT PLAN - SHEET 12
C105-013	GENERAL ARRANGEMENT PLAN - SHEET 13
C106-101	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 1
C106-102	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 2
C106-103	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 3
C106-104	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 4
C106-105	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 5
C106-106	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 6
C106-107	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 7
C106-108	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 8
C106-109	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 9
C106-110	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 10
C106-111	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 11
C106-112	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 12
C106-113	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 13
C106-114	ROAD LONGITUDINAL SECTIONS (MC10) - SHEET 14
C106-121	ROAD LONGITUDINAL SECTIONS - (MDB1), (MC20) AND (MC40)
C106-201	TYPICAL ROAD CROSS SECTIONS
C106-301	ROAD CROSS SECTIONS (MC00)
C106-401	ROAD CROSS SECTIONS (MC10) - SHEET 1
C106-402	ROAD CROSS SECTIONS (MC10) - SHEET 2
C106-403	ROAD CROSS SECTIONS (MC10) - SHEET 3
C106-404	ROAD CROSS SECTIONS (MC10) - SHEET 4
C106-405	ROAD CROSS SECTIONS (MC10) - SHEET 5
C106-406	ROAD CROSS SECTIONS (MC10) - SHEET 6
C106-407	ROAD CROSS SECTIONS (MC10) - SHEET 7
C106-408	ROAD CROSS SECTIONS (MC10) - SHEET 8
C106-409	ROAD CROSS SECTIONS (MC10) - SHEET 9
C106-410	ROAD CROSS SECTIONS (MC10) - SHEET 10
C106-411	ROAD CROSS SECTIONS (MC10) - SHEET 11
C106-412	ROAD CROSS SECTIONS (MC10) - SHEET 12

DRAWING NUMBER	DESCRIPTION
C106-413	ROAD CROSS SECTIONS (MC10) - SHEET 13
C106-414	ROAD CROSS SECTIONS (MC10) - SHEET 14
C106-415	ROAD CROSS SECTIONS (MC10) - SHEET 15
C106-416	ROAD CROSS SECTIONS (MC10) - SHEET 16
C106-417	ROAD CROSS SECTIONS (MC10) - SHEET 17
C106-418	ROAD CROSS SECTIONS (MC10) - SHEET 18
C106-419	ROAD CROSS SECTIONS (MC10) - SHEET 19
C106-420	ROAD CROSS SECTIONS (MC10) - SHEET 20
C106-421	ROAD CROSS SECTIONS (MC10) - SHEET 21
C106-422	ROAD CROSS SECTIONS (MC10) - SHEET 22
C106-423	ROAD CROSS SECTIONS (MC10) - SHEET 23
C106-424	ROAD CROSS SECTIONS (MC10) - SHEET 24
C106-425	ROAD CROSS SECTIONS (MC10) - SHEET 25
C106-426	ROAD CROSS SECTIONS (MC10) - SHEET 26
C106-427	ROAD CROSS SECTIONS (MC10) - SHEET 27
C106-428	ROAD CROSS SECTIONS (MC10) - SHEET 28
C106-429	ROAD CROSS SECTIONS (MC10) - SHEET 29
C106-430	ROAD CROSS SECTIONS (MC10) - SHEET 30
C106-431	ROAD CROSS SECTIONS (MC10) - SHEET 31
C106-432	ROAD CROSS SECTIONS (MC10) - SHEET 32
C106-433	ROAD CROSS SECTIONS (MC10) - SHEET 33
C106-434	ROAD CROSS SECTIONS (MC10) - SHEET 34
C106-435	ROAD CROSS SECTIONS (MC10) - SHEET 35
C106-436	ROAD CROSS SECTIONS (MC10) - SHEET 36
C106-437	ROAD CROSS SECTIONS (MC10) - SHEET 37
C106-438	ROAD CROSS SECTIONS (MC10) - SHEET 38
C106-439	ROAD CROSS SECTIONS (MC10) - SHEET 39
C106-440	ROAD CROSS SECTIONS (MC10) - SHEET 40
C106-701	KERB RETURN PLAN (MK0A), (MK0B) AND (MKB1), (MKB2)
C106-702	KERB RETURN PROFILES (MK0A) - SHEET 1
C106-703	KERB RETURN PROFILES (MK0A) - SHEET 2
C106-704	KERB RETURN PROFILES (MK0A) - SHEET 3
C106-705	KERB RETURN PROFILES(MK0B) - SHEET 1
C106-706	KERB RETURN PROFILES (MK0B) - SHEET 2
C106-707	KERB RETURN PROFILES (MKB1) AND (MKB2)
C106-708	KERB RETURN PLAN (MK4A) AND (MK4B)
C106-709	KERB RETURN PROFILES (MK4A) - SHEET 1
C106-710	KERB RETURN PROFILES (MK4B) - SHEET 2
C106-711	KERB RETURN PLAN (MK2A) AND (MK2B)
C106-712	KERB RETURN PROFILES (MK2A)
C106-713	KERB RETURN PROFILES (MK2B)
C107-001	DRIVEWAY PROFILES - SHEET 1
C107-002	DRIVEWAY PROFILES - SHEET 2
C107-003	DRIVEWAY PROFILES - SHEET 3
C107-004	DRIVEWAY PROFILES - SHEET 4
C108-001	VEGETATION REMOVAL PLAN - SHEET 1
C108-002	VEGETATION REMOVAL PLAN - SHEET 2
C108-003	VEGETATION REMOVAL PLAN - SHEET 3
C108-004	VEGETATION REMOVAL PLAN - SHEET 4
C108-005	VEGETATION REMOVAL PLAN - SHEET 5
C108-006	VEGETATION REMOVAL PLAN - SHEET 6
C108-007	VEGETATION REMOVAL PLAN - SHEET 7
C108-008	VEGETATION REMOVAL PLAN - SHEET 8
C108-009	VEGETATION REMOVAL PLAN - SHEET 9
C108-010	VEGETATION REMOVAL PLAN - SHEET 10
C108-011	VEGETATION REMOVAL PLAN - SHEET 11
C108-012	VEGETATION REMOVAL PLAN - SHEET 12
C108-013	VEGETATION REMOVAL PLAN - SHEET 13
C109-001	SETOUT INFORMATION - SHEET 1
C109-002	SETOUT INFORMATION - SHEET 2
C109-003	SETOUT INFORMATION - SHEET 3

Appendix E
Consultation Register

Stubbo Solar Farm - Consultation Register

Entity	Date	Type of contact	Contact name	Topic of engagement	Details	Agreed outcome(s) (if any)
ACEN	8/06/2022	Written submission	Tim Greenaway	Request for TMP approval from TfNSW	ACEN submission requesting approval for the Traffic Management Plan – Stage 1	ACEN to revise TMP
TfNSW	12/09/2022	Written response	Karl Okorn	TMP approval	TfNSW reqests additional information	ACEN to provide revised TMP

Appendix F
Conmplaints Register

Stubbo Solar Farm - Complaints Register

No.	Date	Time	Complaint made by	Complainant contact details (if provided)	Complaint received by	Nature of complaint	How/when the issue was resolved	Complaint status (open/closed)	Measures to avoid recurrence (if any)	Responsibility