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Title of the Report

STORMWATER MANAGEMENT PLAN

Goyder Renewables Zone Project
Stormwater Management Plan

Green Light Contractors Elecnor Group

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Abbreviations, acronyms and initialisms

Abbreviation	Description
AEP	Annual Exceedance Probability (the likelihood of the occurrence of a given flood event – e.g. 5% AEP)
ARI	Annual Return Interval (the statistical return interval of a given flood event – e.g. 20-year ARI)
CEMP	Construction Environmental Management Plan
DA	Development Application: 422/V009/20 R1; approval decision date: 7th June 2021
DEM	Digital Elevation Model (a digital representation of the land's surface)
DIT	South Australian Department of Infrastructure and Transport
DTM	Digital Terrain Model (a digital representation of the features at the land's surface)
EC	Electrical Conductivity (a proxy for salinity)
EPA	South Australian Environment Protection Authority
EPC	Engineering-Procurement-Construction
FFA	Flood Frequency Analysis
GDE	Groundwater Dependent Ecosystems
GRZ	Goyder Renewable Zone
ha	Hectares
IFD	Intensity-Frequency-Duration (modelled rainfall statistics for any location across Australia)
IWMP	Integrated Water Management Plan
kV	kilovolt
m	Metres
Ma	Million years ago
MAR	Managed Aquifer Recharge
MDB	Murray Darling Basin
ML	Megalitres (1,000,000 litres)
MW	Mega-Watt
MWh	Mega-Watt hour
NEOEN	NEOEN Australia Pty Ltd
NSW	New South Wales
OHTL	Overhead Transmission Line
OMP	Operational Management Plan
PCER	Pollution Control Equipment Register
PPA	Power Purchase Agreements
PV	Photo-voltaic
SA	South Australia
SARIG	South Australian Research Information Gateway

Abbreviation	Description
SEDMP	Soil, Erosion and Drainage Management Plan
SMA	SA Stormwater Management Authority
SRTM	Shuttle Radar Topography Mission
SWL	Standing water level
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
WAA	Water Affecting Activity
WAP	Water Allocation Plan
WTGs	Wind Turbine Generators
WMP	Water Management Plan

1. Introduction

1.1. Project description

1.1.1. Overview

The Goyder South Hybrid Renewable Energy Facility, to be developed south of Burra (Figure 1-1), is a hybrid power station comprising up to 1,200MW of wind generation, up to 600MW of solar PV generation and up to 900MW/1,800MWh of battery storage. The proposed connection point near Robertstown means that the project's large-scale battery would be in an ideal position to inject emergency power and fault current into the South Australian grid in the event of a fault impacting the proposed SA-NSW interconnector and enable the continued stable operation of the South Australian grid in any subsequent separation from the NSW grid.

The Goyder South Hybrid Renewable Energy Facility proposal comprises:

- A wind farm of up to 163 turbines with a capacity of up to 1200MW, a maximum hub height of 160m, a maximum blade length of 80m and an overall maximum height (tip height) of 240m
- A solar farm (across two sites) of up to 3000 ha of solar panels with a capacity of up to 600MW
- An energy storage facility (lithium-ion battery) with a capacity of up to 900MW/1,800MWh (2 hours)
- Associated infrastructure for connection to the electricity grid including three substations, access tracks, underground connection cabling and transmission lines
- Permanent operations and maintenance compounds
- Temporary construction compounds for both wind and solar components, including concrete batching plants
- A number of meteorological masts (in addition to those already on the site) to record wind speed and other meteorological data, both pre- and post- construction.

Neoen Australia Pty Ltd has sought Development Authorisation for the Goyder South Hybrid Renewable Energy Facility (Goyder South) pursuant to section 49 of the Development Act 1993 (SA). Approval was issued by the South Australian Minister for Planning and Local Government and Planning, dated 3 March 2021 (updated: 7th June, 2021), with 41 conditions. Neoen is also submitting applications under the relevant legislation as a concurrent process with the Development Application to address all regulatory requirements for the project.

The project has been divided into three separate stages, each comprising 400MW wind, 200MW solar and 300MW/600MWh storage. The size and composition of each stage depends on the size and type of the demand from electricity customers. This will be communicated through approved engineering plans prior to site works commencing for each stage. Given the scale of the project stages, the development timeframes will be structured on a 'rolling' basis with construction of the entire project be completed within 12 years from the date of the approval. Within each stage construction will be undertaken as sub-stages focused on the key components of the project:

- Sub-Stage A – Wind farm and ancillary infrastructure
- Sub-Stage B – Solar farm and ancillary infrastructure

- Sub-Stage C – Battery energy storage facility and ancillary infrastructure
- Sub-Stage D – Transmission lines
- Sub-Stage E – Balance of works.

Green Light Contractors (The Contractor) have been engaged as the Contractor to carry out the Goyder Wind Farm aspect of this development, being Sub-Stage A of Stage 1. These works will be divided into two stages (1A and 1B), 38 and 37 turbines respectively.

The proposed Goyder South development area covers approximately 30,000 hectares (ha), with the area extending from its most northern point located 5 km south of Burra, to approximately 27 km south and terminating approximately 5 km north of Robertstown, SA (Figure 1-1). This stormwater management plan (SMP) has been developed to cover the Goyder South Project, Stage 1, Sub-Stage A and will be updated as needed to incorporate elements of the other stages in the future.

1.1.2. Construction activities and timeframe

The Goyder South Project extends across the Worlds End Valley and will comprise construction of the following to form part of the larger Goyder South Hybrid Renewable Energy Project:

- Wind turbine generators (WTGs)
- Solar panel sites
- Substations
- Overhead transmission line

In addition, there would be a number of facilities needed to support the construction phase of the Project which include:

- Two wind construction compounds co-located with the western and eastern substations
- Two solar construction compounds located within the Bright and Worlds End solar areas
- Construction compounds including an office, staff amenities and carparking facilities as well as storage and laydown areas
- Wind construction compounds which would include an option for a temporary batching plant facility
- Laydown areas required at the base of each turbine
- One temporary concrete batching plant (located at the eastern and western ends of the wind construction compounds.

Figure 1-2 shows the general infrastructure layout of Goyder South. The locations of these sites are based on the following critical factors, as summarised by NEOEN (2020) Development Application Package, below. Each is further described in the sections below and additional details can be referred to in NEOEN (2020):

- Clearly established, excellent wind and solar resources in the region
- Suitable topography for both wind power (high elevation areas) and solar power (flat elevation areas with minimal flood risk)
- Appropriate existing land uses including having marginal agricultural viability and supporting mixed land use

- Proximity to the national electricity grid infrastructure at Robertstown substation and the proposed EnergyConnect interconnector with NSW
- Strong support from landowners, neighbours and the Regional Council of Goyder
- Accessibility for construction and on-going maintenance
- Large project scale and low density of dwellings, enabling generous setbacks from dwellings and sensitive ecological areas

WIND TURBINE GENERATORS

A total of 75 WTGs will be constructed (35 WTGs during the Stage 1A works and 40 during Stage 1B of the Goyder South Project) with a generating capacity of 4 to 8 megawatt (MW) each, along the western and eastern ridgelines of the Project area and will trend south towards the town of Robertstown, SA. However, it is noted that an additional 88 WTGs will be constructed during future stages of the project to establish the larger Goyder South Hybrid Renewable Energy Facility, which will comprise a total of 163 WTGs with approximately 1,200 MW of generating capacity. The WTGs will be constructed up to 240 m (maximum) height and will be secured with concrete footings (raft-style) and/ or buried pile-type rock anchors that are up to 26 m in diameter.

SOLAR SITES

Two solar sites will also be constructed during the Goyder South Project with a generating capacity of up to 600 MW. These sites will consist of a northern solar site that is located on marginal cropping/ grazing land in the centre of the Worlds End Valley and the western side of the Worlds End Highway, and a southern solar site that is proposed to be located further south, to the east of the eastern ridgeline that runs through the town of Bright, SA. These will be developed over Stage 1B.

SUBSTATIONS

A total of three 'collector' substations will be established in close proximity to the two solar sites and the WTGs, including within the ranges of the western portion of the Project area, on the eastern side of the Project area near Worlds End Highway and adjacent to the southern solar site. The three substations will be connected by overhead transmission lines.

OVERHEAD TRANSMISSION LINE

An overhead transmission line will be constructed to connect the three substations at Goyder South with the grid substation located at Robertstown, and later to the NSW interconnector substation. The transmission line will comprise a double-circuit of 275 kilovolts (kV) at up to 47 m height, within a 15 x 15 m footprint and approximately 400 m distance and will connect both the Goyder South and (later) extended to connect the Goyder North project areas to the grid substations.

PROJECT TIMEFRAME

The Goyder South Project will be constructed in three separate stages, which will each comprise the requirements below and be undertaken in accordance with timing that is required for General Electric (as the Engineering-Procurement-Construction (EPC) Contractor) to secure Power Purchase Agreements (PPA) to sell electricity that is generated from the site:

- 400 MW wind power
- 200 MW solar.

NEOEN (2020) envisage that the development timeframes for the stages above will be structured on a 'rolling basis' as follows, assuming a 3-year construction timeframe for each stage to provide contingency for unforeseen delays:

- 3 years to substantially commence Stage 1 (from the date of approval)
- 6 years to complete Stage 1 (from the date of approval)
- 3 years to substantially commence Stage 2 (from the date of construction commencement of Stage 1)
- 3 years to complete Stage 2 (from the date of construction commencement of Stage 2
- 3 years to substantially commence Stage 3 (from the date of construction commencement of Stage 2)
- 3 years to complete Stage 3 (from the date of construction commencement of Stage 3).

Based on the above, a potential 12-year timeframe to complete the Goyder South works (from the date of approval) has been estimated.

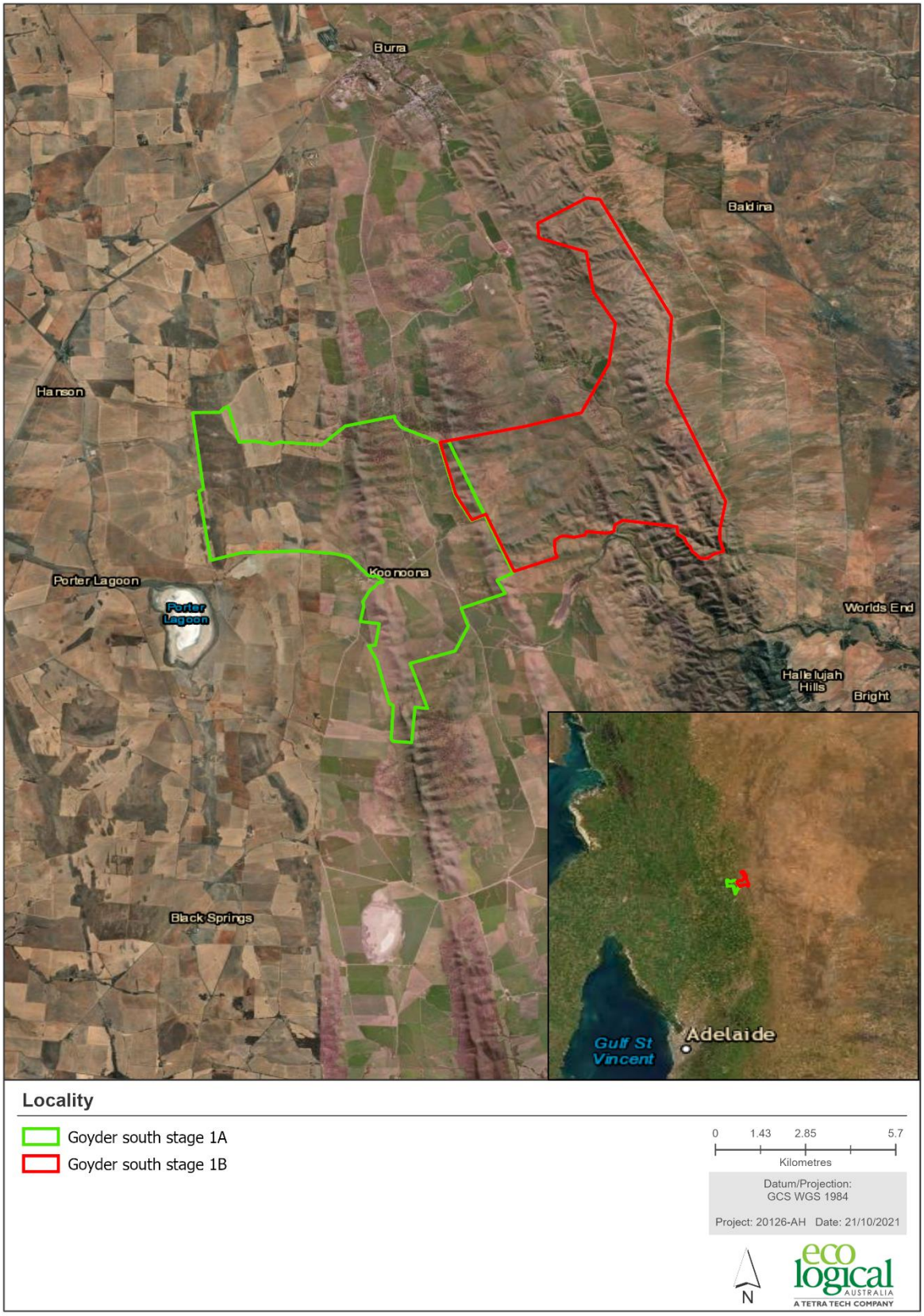

Figure 1-1: Locality map

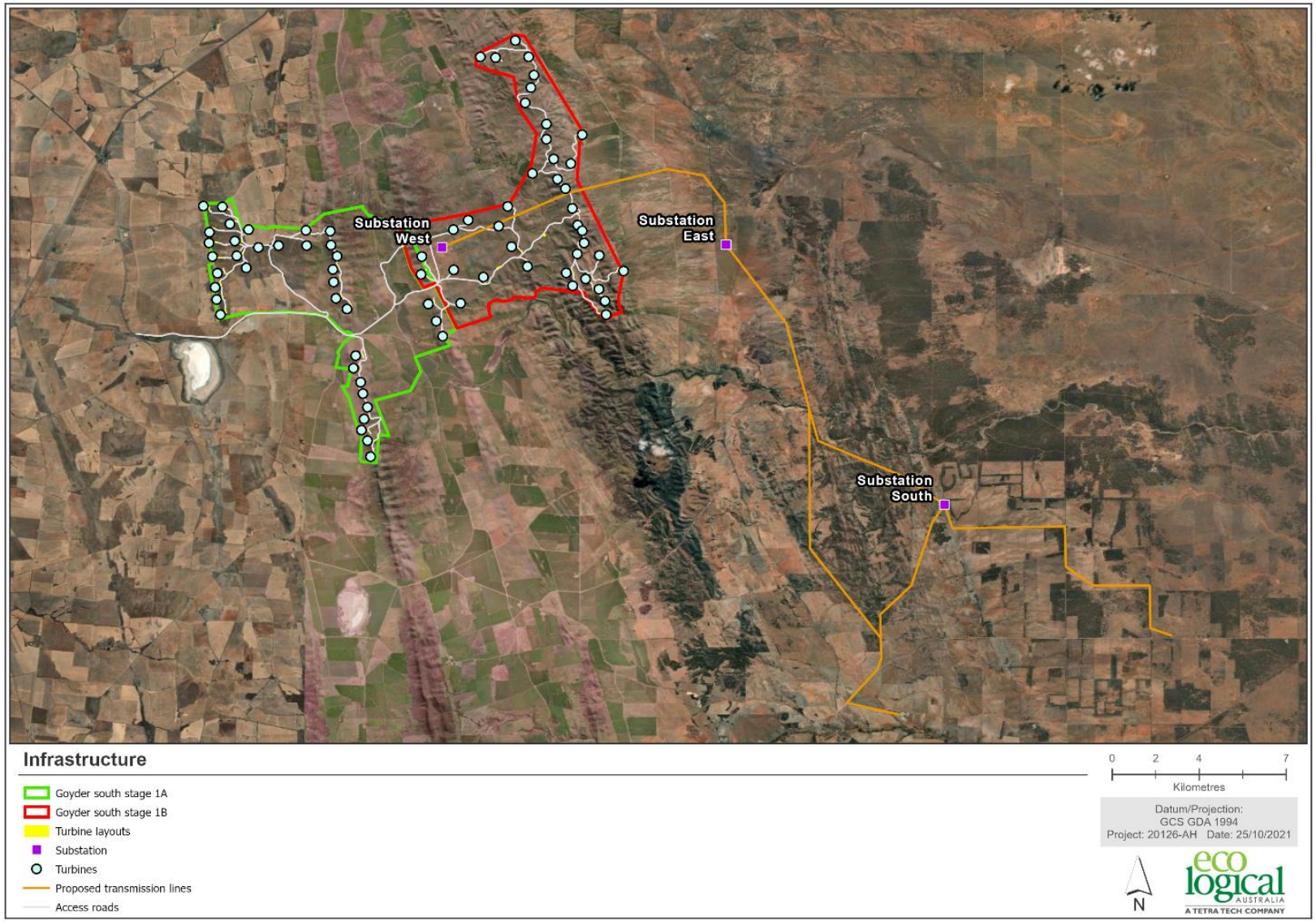

Figure 1-2: Goyder South Project WTG, solar site and substation

1.2. Purpose and objective of this plan

The purpose of SMP is to ensure that stormwater management is addressed on a catchment basis to develop a multi-objective approach to management of stormwater for the area. This SMP contains the following:

- An identification of objectives and outcomes for management of stormwater in the catchment
- An identification of strategies to meet specified management objectives for the catchment
- A definition of the area to which the plan applies
- A description of all known existing stormwater assets, including identification of current condition and ownership, where known
- An identification of stormwater management problems and opportunities for achieving outcomes for public and environmental benefit in the catchment.

The key objectives of this SMP are to identify potential impacts of the Project on the existing hydrological and hydrogeological environment and detail management measures and site procedures to be implemented to minimise such impacts. The following will be undertaken to achieve this:

- Ensure appropriate measures are implemented to address relevant conditions of approval, as detailed within Section 2.3 of this Plan.
- Ensure appropriate measures are implemented during construction to manage and minimise impacts to water.
- Ensure monitoring programs are implemented during construction (where required) to verify that water impacts are being minimised.
- Ensure corrective actions and contingency measures are implemented during construction when triggered.

Specific on-site management measures identified in this plan will be incorporated into site documents, including the construction environmental management plan (CEMP), where relevant. These site-specific documents will be prepared for construction activities and will detail the on-ground management measures to be implemented. Construction personnel will be required to undertake works in accordance with the mitigation measures identified in these documents.

2. Environmental requirements

2.1. Legislation and regulatory guidelines

The following South Australian legislation and regulatory guidelines has been undertaken, that are relevant to the Project:

- *Environment Protection Act 1993.*
- *Environment Protection Regulations 2009*.
- *Environment Protection (Water Quality) Policy 2015*.
- *Landscape South Australia Act 2019* (replacing the *Natural Resources Management Act 2004*)
- Stormwater Pollution Prevention, Code of practice for the building and construction industry.
- EPA guidelines (EPA 396/10) – Water quality, dredging and Earthworks Drainage.
- EPA guideline 1093/21 Environmental Management of dewatering during construction activities.
- Guidelines for separation distances (EPA) 2007.
- Air and Water Quality Guideline – Concrete Batching (EPA 427/16 March 2016).
- Earthworks drainage authorisation (section 7(6) of schedule 1 of the Environment Protection Act 1993).
- Approvals may be required for actions/activities that impact on water catchments (Landscape Act, 2019).
- EPA licensing.
- Local Government (Stormwater Management) Amendment Act 2007.
- Stormwater Management Planning Guidelines (SMA) 2007.
- Urban Stormwater Management Policy for South Australia (Government of South Australia) 2005.
- Guidelines for Urban Stormwater Management (Planning SA) 2003.
- Stormwater pollution prevention (EPA) 1999.

2.2. Environment Protection (Water Quality) Policy

NEOEN are committed to the values of the Environmental Protection (Water Quality) Policy 2015, which provides the structure for regulation and management of water quality in South Australian inland surface waters and groundwater. The main objective of the Water Quality Policy is linked to the Environment Protection Act 1993 (the Act):

"...to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment while having regard to the principles of ecologically sustainable development"

The Policy specifically provides support to the Act in terms of:

- what constitutes environmental harm (section 5 in the Act)?
- what are the general environmental duty requirements (section 25 in the Act)?
- what are the mandatory provisions which constitute offences (section 34 in the Act)?

The policy also:

- declares environmental values for the protection of streams, rivers, oceans and groundwater.

- encourages better management of wastewater by:
    - avoiding its production
    - eliminating, or reducing it
    - recycling and re-using it
    - treating it to reduce potential harm to the environment
- promotes best practice environmental management.
- allows for discharge limits for particular activities to be established.

2.2.1. National Water Quality Guidelines

The Policy refers to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) as part of the guidance regarding the general environmental duty. In this context, the ANZECC guidelines are used as trigger values for aquatic ecosystems and primary industries. These trigger values indicate where the receiving environment is potentially at risk of being harmed and so a site-specific investigation may be required to assess the risk and/or evaluate options for environmental performance improvement.

Under the Environmental Protection (Water Quality) Policy 2015, the primary environmental value in the Project area will be the aquatic ecosystems associated with permanent pools and the perennial Burra Creek in this region (*see* Section 3.7). For the purposes of this policy, a trigger value for waters is activated if a trigger value for an indicator (specified in Chapter 3 of ANZECC, 2000) has been reached or exceeded for a chemical substance or a characteristic. In the case of a minimum level specified for a characteristic (e.g. pH), this applies if that minimum value has not been reached.

Table 2-1 details the environmental protection measures that are relevant to water, specifically the Water Quality Protection measures and the water-related Soil Management, Erosion and Sediment Control measures, specifically as they relate to current legislation and policies as listed above and as documented in Appendix B of the Goyder South Development Application Package submitted during June 2020.

2.3. Conditions of Approval

The Goyder South Hybrid Renewables Energy Facility (DA # 422/V009/20) was granted conditional approval on 3rd March, 2021 and included 36 conditions, including four that specifically relate to, or refer to, water management. These are reproduced in Table 2-2, below. In addition, four Environment Protection Agency (EPA) advisory notes cross-reference and validate the noted approval conditions and are also reproduced in Table 2-2 for reference.

This Stormwater Management Plan (SMP) specifically provides material required to support the Construction Environmental Management Plan (CEMP), with particular reference to stormwater management and water quality matters.

2.4. Commitments to Minimising Impacts

NEOEN has committed to undertaking actions in order to minimise impacts on the environment and community. Of direct relevance to this SMP, NEOEN has committed to complying with the DA conditions and preparation of a CEMP to address a range of construction impact issues and an Operational Management Plan (OMP) to address on-going impact management issues.

Table 2-1: Environmental protection measures relevant to water

Potential impact	Key tasks	Control / Action
Impact to the natural movement of surface water and groundwater affecting availability to flora, fauna and local communities and landowners. Impacts to water quality that may affect aquatic fauna, decrease the aesthetic value of a watercourse or water body and/ or damage transport infrastructure.	• Site establishment and set up • Topsoil stripping and vegetation removal • Water provision and management • Aggregate storage and stockpiles • Temporary storage of chemicals, spoil and equipment • Concrete mixing • Construction traffic movement	A Water Management Plan will be prepared prior to any construction and operation activities, with particular attention to siting and operation of the concrete batching plant. Ensure any conditions/obligations relating to a Permit for surface or groundwater extraction is complied with. Chemical testing of any identified water source should be carried out to determine the suitability of water for any secondary use, such as mixing concrete or for dust suppression. Consideration to stormwater drainage control will be given when establishing any construction site. The following objectives will be considered: • Limit site access to designated routes and controlled areas • Locate and secure all stockpile areas away from watercourses and water flow paths • Ensure that all the stormwater drainage controls are in place before site clearing works begin • Assess the impact of the proposed stormwater drainage systems on adjacent properties • Consideration existing underground services when establishing the access tracks and construction site and provide protection where required. • Construction of access road networks may alter surface drainage paths. Drainage controls should be installed to mitigate potential effects, taking into consideration ephemeral watercourses • Minimise areas of vegetation clearing to areas identified for clearance as part of the scheme. Control surface run-off entering and leaving the work area: • Existing natural drainage paths and stormwater facilities must not be blocked or restricted • Runoff from unsealed areas at construction sites must not enter stormwater drains or natural drainage lines • Stormwater should be diverted around stockpiles • Incorporate existing retaining structures (e.g. farm dams, natural bunds) into drainage designs.

Potential impact	Key tasks	Control / Action
Reduction in quality of water resources	Wastewater management	All construction sites must incorporate a wastewater management system and effectively operate the system in respect of any wastewater generated at the site. Regular inspection and maintenance of the system is necessary. Wastewater generated at the premises must not be discharged into any waters or onto land in a place from which it is reasonably likely to enter any waters (including by processes such as seepage or infiltration or carriage by wind, rain, or by the rising of the groundwater table). Any settling ponds should be lined with an impervious liner capable of containing all contaminants found in the water they are designed to collect. Concrete agitator bowls and chutes must not be washed out to the stormwater system or roadways. A wastewater collection and recycling system should be designed to collect contaminated water from: • agitator washout • truck washing • yard washdown • contaminated stormwater • concrete batching area • slump stand.
Long-term effects to water quality arising from the development of the project.	Tidy and make good work areas	Cleared areas are to be stabilised / rehabilitated promptly and where possible to enhance the natural value of these areas.
Release of unsuitable substances to the terrestrial or water environment	Erosion control	Preparation of plans detailing erosion and sediment control techniques to be applied for the construction, operation and decommissioning phases of the concrete batch plant sites.
The soil characteristics are likely to be subject to soil erosion by water and potentially wind if ground is disturbed.	Site establishment and setup	• Soil erosion and generation should be minimised during construction. • A Soil, Erosion and Drainage Management Plan (SEDMP) should be prepared. • Erosion and sedimentation control devices to be installed prior to commencement of any construction/works. • Where feasible and practicable, there should be incorporation of existing and developed retaining structures (e.g. existing farm dams, bunds) to constrain movement of water off-site.
Damage to topsoil and subsoil.	Topsoil stripping and vegetation removal.	Erosion and Sediment Control (ESC) Plans should be developed for each site that include the following: • Maps showing the areas to be stripped and left in situ.

Potential impact	Key tasks	Control / Action
		• Minimise areas of vegetation loss to areas identified for clearance as part of the scheme. • The appropriate method for stripping, stockpiling, respreading and ameliorating the soils. • The location of soil stockpiles and content (e.g. Topsoil type A subsoil type B). • Schedules of volumes for each material. • Expected after-use for each soil whether topsoil to be used on site, used or sold off site, or subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture. • Identification of person responsible for supervising soil management. Soil should be handled in stable and safe conditions of weather and soil moisture and using suitable machinery in an appropriate way. Soil that is wet or very moist (wetter than the plastic limit) should be allowed to dry further. Use tracked equipment wherever possible to reduce compaction. Confine movement of trucks or dumpers to designated temporary haul routes. Multiple handling of soil materials increases the risk of damage to soil structure so should be minimised. Avoid stripping topsoil for reuse too deeply so that subsoil becomes incorporated, thereby reducing fertility. Do not remove topsoil from below the spread of any trees to be retained.
Soil erosion can contaminate watercourses, lead to loss of vegetation, impact on aquatic fauna, decrease the aesthetic value of a watercourse, reduce the agricultural capacity of land and can damage transport infrastructure.	• Water provision and management • Aggregate storage and stockpiles • Concrete mixing	Implement controls to prevent and minimise the risk of any sediment from earthworks entering the stormwater system. Areas of exposed soil, including stockpiles, should be protected from erosion, or ensure that suitable control measures are in place to prevent any mobilised soil being transported off site. Locate stockpiles away from watercourses and not in drainage lines. Stormwater should be diverted around stockpiles. Any dewatering on site is to be undertaken in a manner which prevents sediment entering stormwater drains and water courses. Use sediment curtains, cofferdams, or similar, to prevent suspended sediment movement during construction in water-prone areas or areas likely to be inundated. Maintain all sediment control and stormwater drainage devices at all times.
Long term effects arising from the development of the project.	Tidy and make good work areas	All stockpiles resulting from the concrete batching works will be removed from site and/or be used in road or hardstand capping where possible.

Potential impact	Key tasks	Control / Action
		The access tracks width will be reduced to approximately 5 metres. Topsoil will be spread over exposed batters and vegetation will be reinstated. The reinstatement works will be undertaken as soon as practicable after the completion of earthworks. Cleared/excavated areas to be stabilised/rehabilitated promptly and where possible to enhance the natural value of these areas. Temporary or permanent measures will be implemented either to help with the revegetation process or to provide additional protection against erosion. On steep slopes erosion control matting will be used to provide interim protection until the vegetation cover is fully established. Any contour banks will be managed and maintained to optimise water retention on slopes.
Long term impacts from degraded soil and vegetation conditions leading to exacerbated erosion and cycle of deterioration	Decommissioning and reinstatement of site.	A site decommissioning plan is to be prepared to ensure all sites are remediated and rehabilitated to original condition (or better) post removal of temporary batch plant.

Table 2-2: Conditions of Approval that relate to water (highlighted BOLD)

Approval condition (page)*	Content	Reason	Where considered in this Plan
6 (4)	A **Construction Environmental Management Plan (CEMP)** shall be provided to the reasonable satisfaction of the Minister for Planning and Local Government prior to the commencement of site works*. Construction of the development must be in accordance with the approved CEMP, which as a minimum shall include specific management measures for the following aspects: • Noise and vibration • Air quality and dust • Native flora and fauna • Aboriginal and European heritage • Weeds and pests • Traffic and access • **Erosion and stormwater management** • Site rehabilitation (post construction) • Storage and handling of hazardous substances • **Water quality** • Fire risk • Contamination • Public safety (including access arrangements along the Heysen Trail) • Emergency response planning • Complaints handling and management The **CEMP** shall include the following sub-plans: • Dust Management Plan • Construction Soil Erosion and Drainage Management Plan • **Stormwater Management Plan** • *Waste Management Plan* • Rehabilitation Management Plan (post construction) * Each stage of the development would generally comprise 400MW of wind generation capacity, 200MW of solar generation capacity and 300MW/600MWh of battery storage capacity (and associated transmission lines and other infrastructure).	*To manage construction impacts during site works and building work*	This SMP presents information relating to erosion and stormwater management. Water quality is considered in Section 3.5.3 and potential contaminants in Section 4.4.

Approval condition (page)*	Content	Reason	Where considered in this Plan
10 (5)	A Stormwater Management Plan for the solar farms shall be submitted to the reasonable satisfaction of the Minister for Planning and Local Government, prior to the commencement of construction.	*To ensure that storm water and overland flows are managed.*	This Plan
35 (10)	The applicant shall ensure that all stormwater generated by the proposal and associated road upgrades is appropriately collected and disposed of without entering or jeopardising the safety of the adjacent arterial road network.	*To ensure the Worlds End Highway, Goyder Highway and Barrier Highway and associated traffic routes and transport modes can operate safely and efficiently during the construction of the development.*	
36 (10)	No stormwater from this development shall be permitted to discharge on-surface to the adjacent roads. In addition, any existing drainage of the adjacent roads shall be accommodated in the development and any alterations to road drainage infrastructure as a result of this development are to be at the expense of the applicant.		
EPA note n. (12)	The applicant is reminded of its general environmental duty, as required by section 25 of the *Environment Protection Act 1993,* to take all reasonable and practicable measures to ensure that the activities on the whole site, including during construction, do not pollute the environment in a way which causes or may cause environmental harm.		
EPA note o. (12)	An environmental authorisation in the form of a licence is required for the activity of concrete batching. The applicant is required to contact the Environment Protection Authority before acting on this approval to ascertain licensing requirements.		
EPA note p. (12)	A licence may be refused where the applicant has failed to comply with any conditions of development approval imposed at the direction of the Environment Protection Authority.		
EPA note q. (12)	As part of the licence application, the Environment Protection Authority is likely to require the submission of a completed Construction Environmental Management Plan (CEMP) for the construction phase of the project to ensure appropriate management of environmental issues. The CEMP (or subordinate plans) will need to include a layout plan of the proposed concrete batching plant and crushing and grinding activities (including such details of raw material storage, mixing and delivery areas, wastewater treatment facilities, bunding, waste areas etc.). The CEMP will also incorporate a Soil Erosion and Drainage Management Plan (SEDMP) prepared in accordance with the *Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry,* available at: http://www.epa.sa.gov.au/files/47790 bccopl.pdf The CEMP will need to be prepared to the reasonable satisfaction of the Environment Protection Authority.		

* note that the condition numbering in the Decision Notification Form is non-sequential, with repeated numbers on different pages

3. Existing environment

3.1. Topography and landscape

The Project area is located in the Northern Ranges portion of the South Australian area of the Murray Darling Basin (MDB), specifically within the Eastern Mount Lofty Ranges. The region mainly comprises hills and slopes that form a transitional zone between cropping land to the west and pastoral land to the east and supports extensive natural grasslands and open grassy woodlands that host mallee and riparian woodlands within the drainages and plains between the rises (SA MDB NRM Board, 2015; NEOEN, 2020).

The Project area largely straddles the Central Catchment of Burra Creek, which rises north of Mount Bryan and flows south to Worlds End where it swings east towards Morgan and the Murray River. The lower reaches, below Worlds End, are essentially floodout plains and lack a defined drainage (Deane, et al., 2008).

Burra Creek is a large stream in the northern Mount Lofty Ranges. It rises north of Burra and flows in a south-easterly direction, where it ultimately connects to the River Murray to the east of Morgan. Flows generally disappear underground in the lower reaches of the creek but have occasionally extended to the river during exceptional flooding periods in the past. The major land uses are sheep grazing and cereal cropping in the upper catchment, with minor areas used for lucerne, irrigated cropping, rural residential, orchards and recreation. Native vegetation occurs mostly along the hills, gorges and gullies in the catchment.

The available topographic data for the region indicates that the Project area consists of hillside slopes with grades of over 5% and watercourses with longitudinal gradients of up to 2% slope (Southfront, 2021). Based on a digital terrain model (DTM) of the Project area and Shuttle Radar Topography Mission (SRTM) data, elevation is highest along the ridgelines located in the north-western and south-eastern portions of the Project area and are north-south trending, reaching approximately 638 metres above sea level (measured in reference to the Australian Height Datum; mAHD). Elevation reduces to approximately 328 mAHD in the lower lying plains that exist between the ridgelines and along Burra Creek in the Burra Creek Catchment, that intersects the eastern side of the Project area (Southfront, 2021). Figure 3-1 presents a topographic map for the Project.

Information to compile a digital elevation model (DEM) of the topography of the project area was sourced from 1 second DEM from NSW Government Spatial Services (ELVIS, 2021).

The DEM was used as input to ESRI's ArcHydro Toolset to create an overall catchment (called a watershed in ArcHydro) and sub-catchments (catchments in ArcHydro). Figure 3-2 shows catchments created by ArcHydro which intersect Goyder South Stage 1A & 1B area. So, any development within Goyder South Stage 1A & 1B can potentially affect the quality and regime of runoff generated within these catchments. The total area of these 26 catchments is equal to 315 km^2.

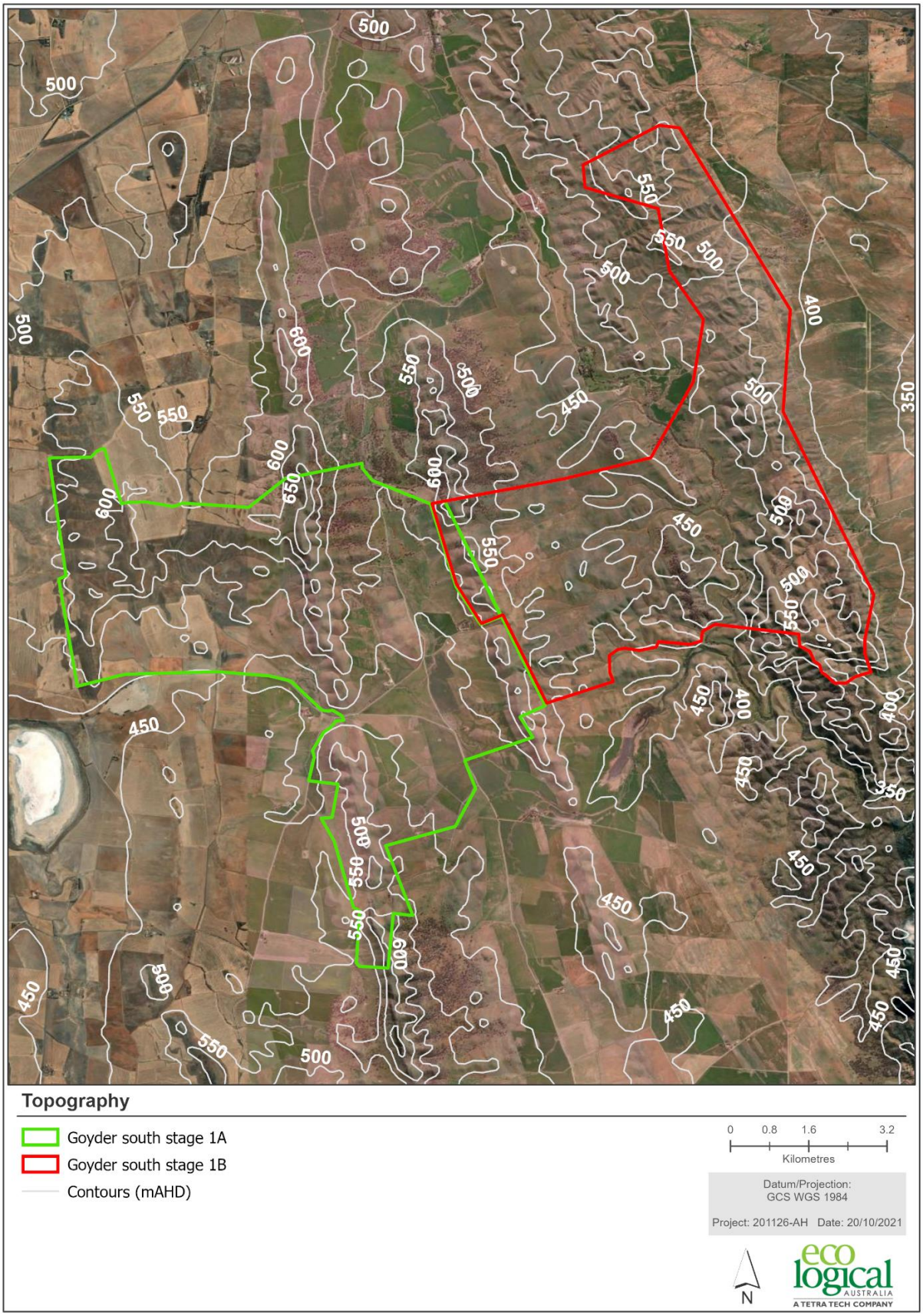

Figure 3-1: Topographic map

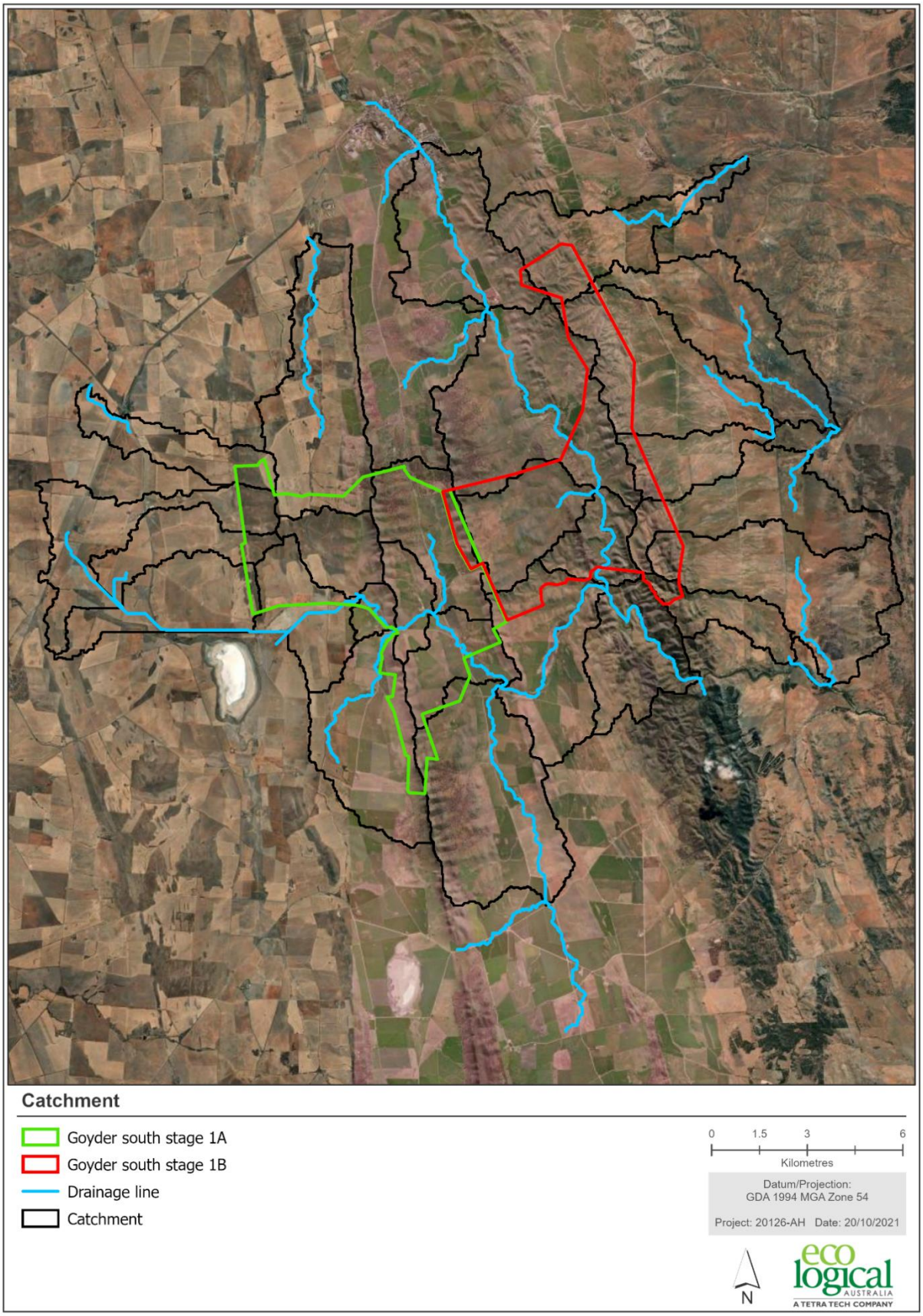

Figure 3-2: Catchments (created by ArcHydro) potentially affected by the project

3.2. Geology

The central Burra Catchment is characterised by a series of three parallel, north-south trending ridge lines that form part of the Mount Lofty Ranges. The Burra Creek extends from the north-west to the south-east, bisecting the eastern side of the Goyder South Stage 1B area, and aligns with a major north-south trending fault to the east of the ranges. The creek is largely fault controlled in the region and is incised into fine grained rocks of the Saddleworth Formation with ridgelines comprised of Gilbert Range Quartzite and Auburn/ Nackara Dolomite. The ridges create sub-catchment areas that contribute surface water flow to Burra Creek.

The region contains extensive areas of locally formed outwash sediments and gravel layers that are present within outwash fans and creek flats and are generally clayey in composition, with interbedded layers of clay and gravel materials.

3.3. Soils and Catchment Character

The Project area comprises hills and slopes containing shallow soils that have been formed on basement rock, grading to plains and gentle slopes containing soils that have been formed from outwash of sediments that have also been derived from basement rock (SA MDB NRM Board, 2015; NEOEN, 2020).

The Project area comprises the following four main soil groups (Figure 3-4):

- Calcareous loams on rock (A),
- Loam over clay on rock (D),
- Cracking clay soils (E), and
- Shallow soils on rock (L).

The deeper soils are highly erodible and significant erosion is evident in the region. Due to the nature of the soils, the relatively high slopes, significant soil erodibility and low rainfall conditions in the region, there is limited potential for the land in this region to be utilised for cropping activities.

Table 3-1 presents key characteristics of the four main soil groups listed above, based on the South Australian classification system presented in DWLBC (2009) *The Soils of Southern South Australia*. Figure 3-4 presents the identified soil types and groups in the immediate Project area.

Table 3-1: Soil group descriptions (sourced from DWLBC, 2009)

Soil group	Description
A	Calcareous loams on rock: Very common in low rainfall districts (annual average rainfall is 400 mm). Soil profiles are gradational to uniform and calcareous throughout.
D	Loam over clay on rock: Texture-contrast and characterised by red-brown subsoil that is alkaline and generally calcareous. Topsoil is typically 10 to 40 cm thick and hardsetting or firm, ranging from loamy sand to clay loam. Increased potential for erosion.
E	Cracking clay soils: Soil profiles are clayey and exhibit shrink-swell behaviour upon drying and wetting. Large cracks form within the soils when dry. Soils contain shear planes (slickensides) and/ or lenticular peds. Resistant to wind and sheet water erosion.
L	Shallow soils on rock: Variable thickness stony sandy loam to clay loam grading to hard or weathered basement rock, usually within 50 cm.

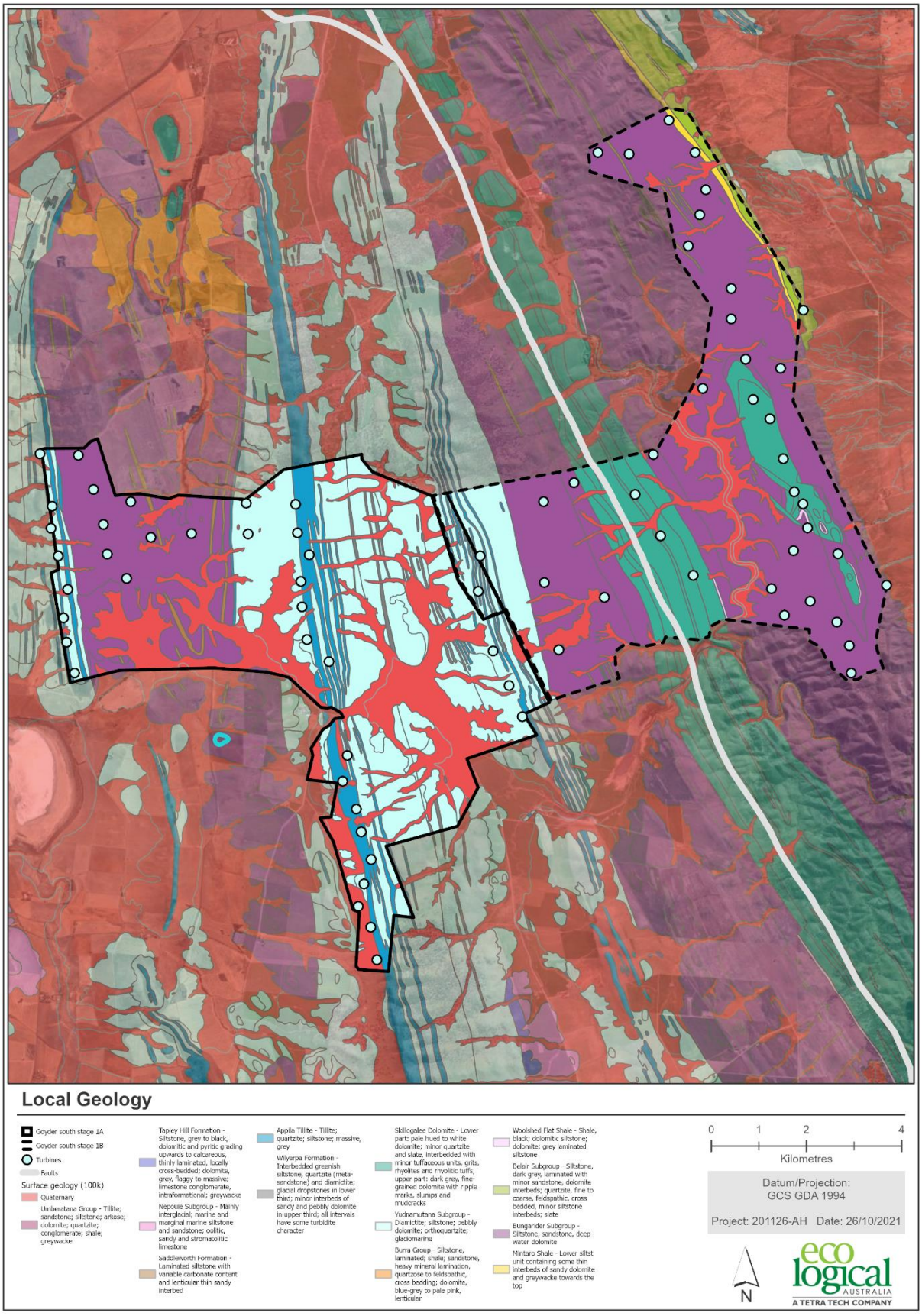

Figure 3-3 Simplified geology of the Goyder South project area

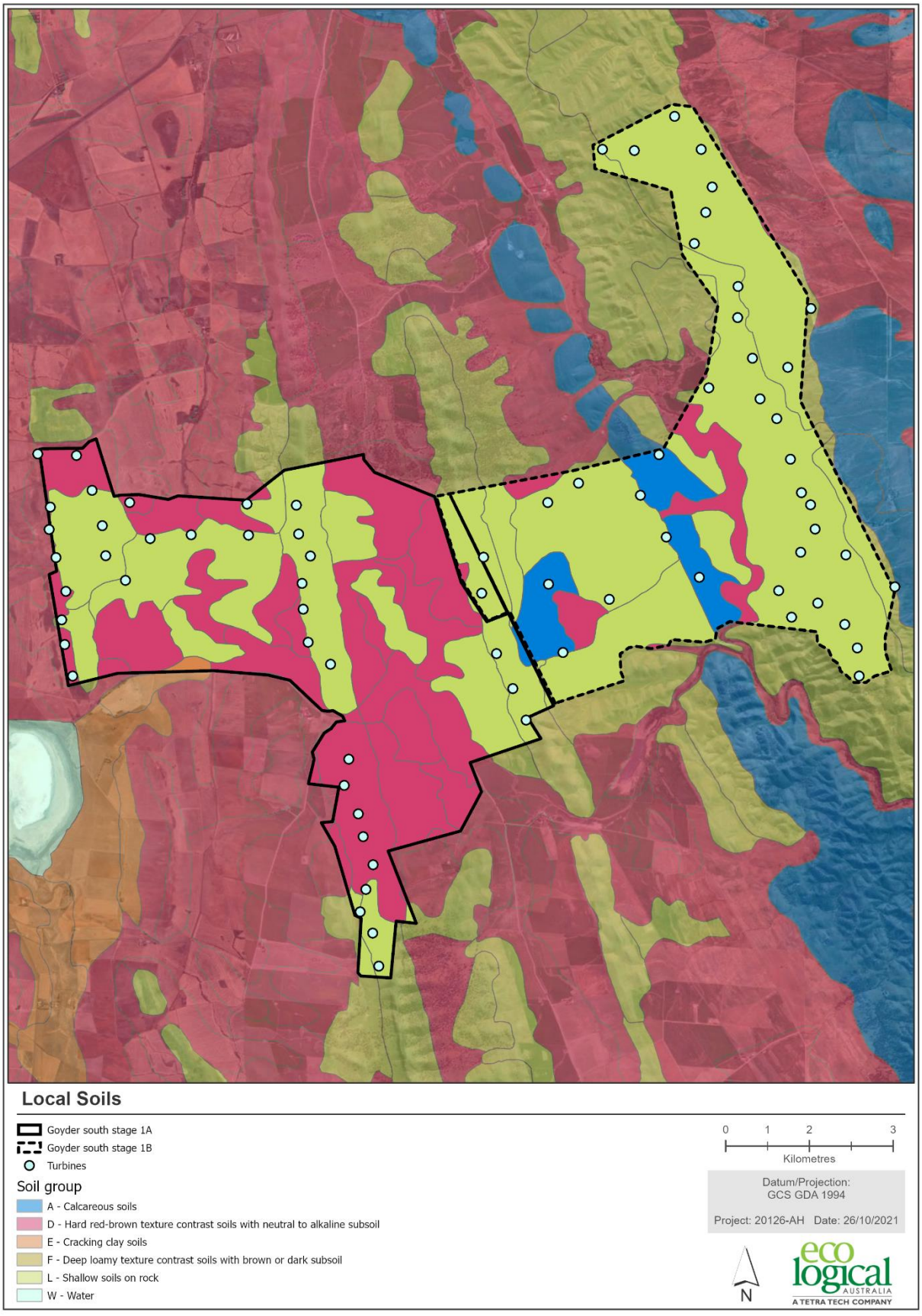

Figure 3-4: Regional soil types within the Goyder South project area

3.4. Receiving environment condition

The receiving environment and/ or sensitive receptors that are relevant to the Goyder South Project area consist of the following downstream receivers:

- Ecological features (biodiversity and habitat values) within:
    - Burra Creek
    - Hopkins Creek (tributary to Burra Creek) and conservation park
    - Logan Creek (tributary to Burra Creek)
    - Burra Gorge (Worlds End Gorge) permanent pools and springs
    - Other permanent pools (Figure 3-5) (including Mosey's property)
- Third-party groundwater users.

The locations of these sensitive receptors are presented in Figure 3-5 (surface water) and are the focus of mitigation actions under this SMP.

Currently, the land within the Project area is wholly located within the Regional Council of Goyder and is privately owned and utilised for dryland cropping and grazing. As previously discussed in Section 3.2, the nature of the soils and the dry conditions in the region do not support agricultural land use, therefore a greater proportion of the land is being transitioned from cropping to pastoral grazing usage.

Major infrastructure in the region includes the Barrier Highway, the Burra-Morgan Highway (Goyder Highway) and the Worlds End Highway. Additionally, a number of areas exist as 'paper' roads, which consist of government-held land where roads have not been constructed to date.

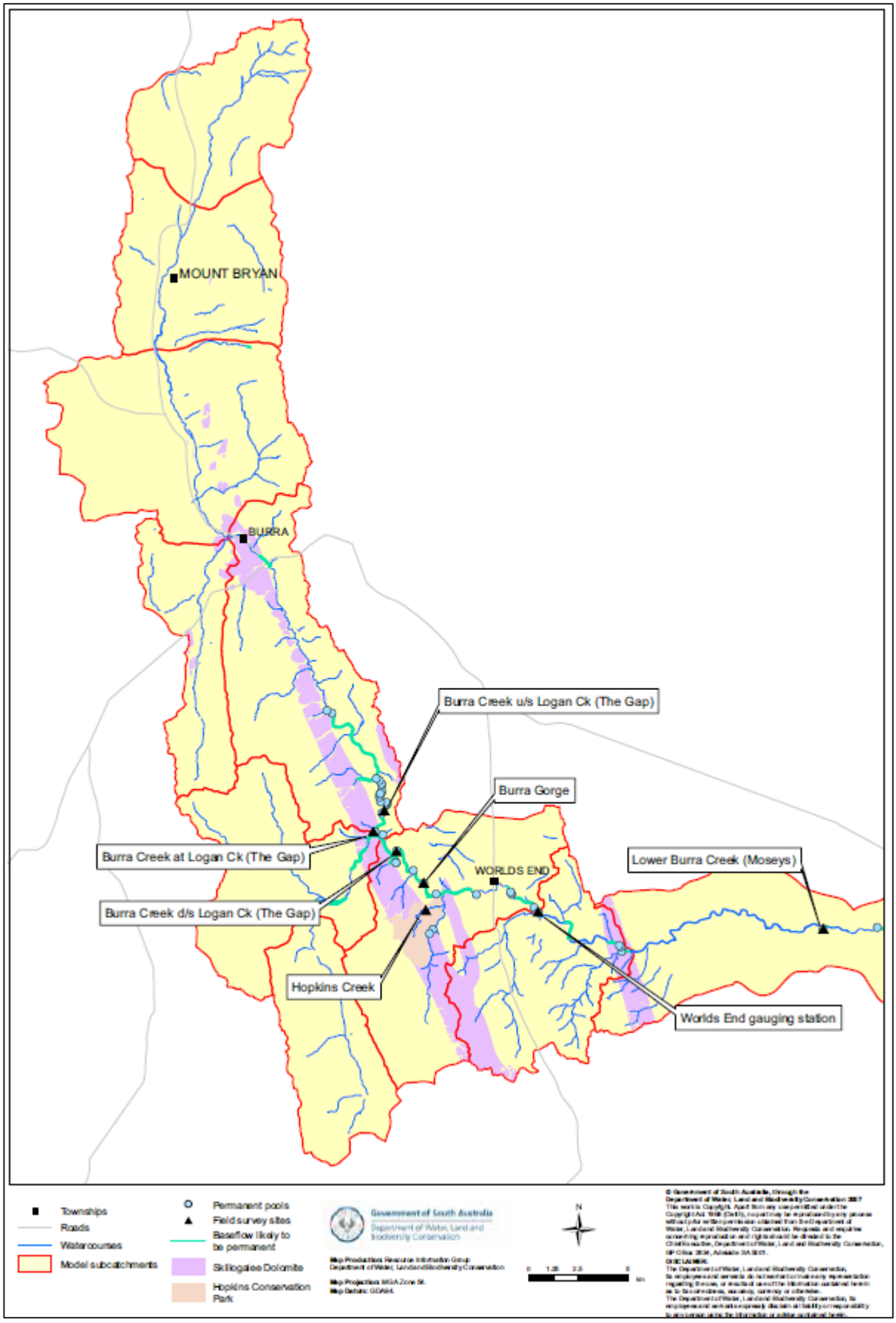

Figure 3-5: Locations of major surface water features and permanent pools (sourced from Deane, et al., 2008)

3.5. Catchment Hydrology

3.5.1. Climate

The region experiences a Mediterranean climate with hot, dry summers and cool, relatively wet winters. The Project area is located on the edge of Goyder's Line (marking the northern extent of reliable agricultural land; roughly the 300 mm isohyet), within the rain shadow of the Mount Lofty Ranges and, therefore, shows a marked reduction in rainfall compared to areas located to the west (NEOEN, 2020).

3.5.1.1. Rainfall

Long-term (since 1900) average rainfall for the region has been relatively constant but punctuated by gradual drying trends followed by a few years of extreme rainfall (Figure 3-6).

Interpolated SILO rainfall data for the region since 1900, indicates the average annual rainfall across the Burra Creek Catchment is between 400 and 500 mm from the top of the catchment to Logan Creek, and decreases with distance towards the east, i.e. to 300 to 400 mm between Logan Creek and Worlds End and 200 to 300 mm between Worlds End and the Murray River (NEOEN, 2020) (Figure 3-7).

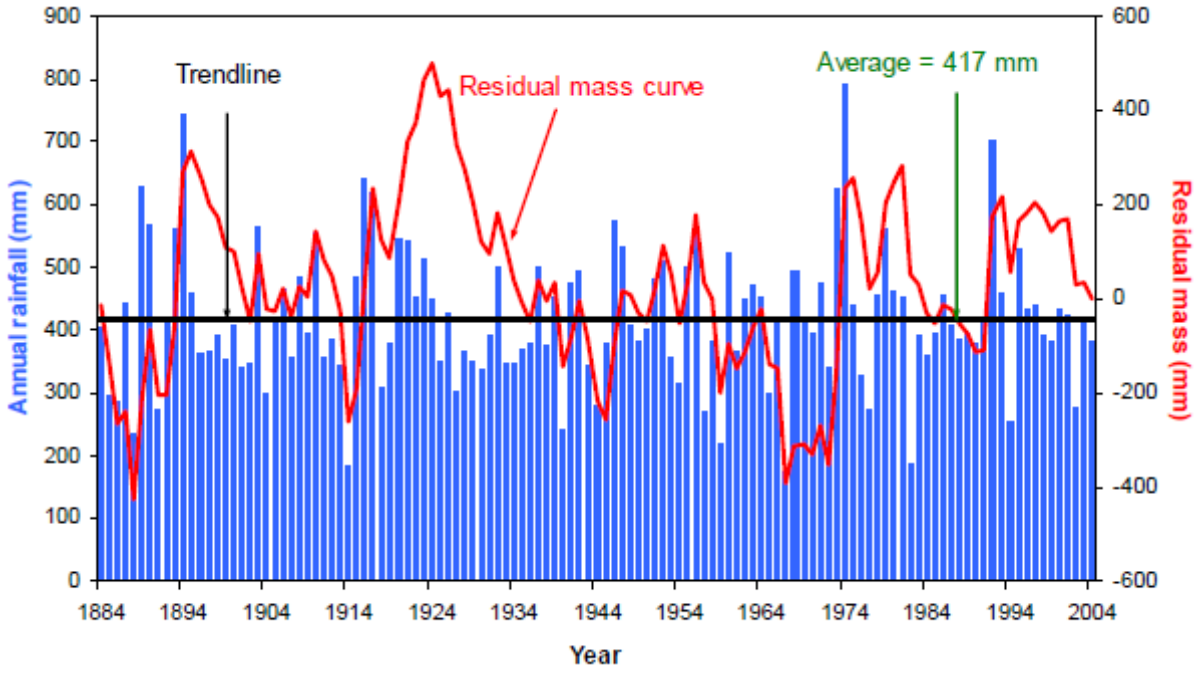

Figure 3-6: Annual rainfall and cumulative rainfall departure (CRD) for Burra Creek Catchment (Deane, et al., 2008)

3.5.1.2. Evaporation

Daily evaporation and average monthly PET were investigated as this data will be required for any probable water balance and water quality (MUSIC) modelling, respectively, in the future if/when required. To provide this data, solar exposure was converted to evaporation using a conversion factor of 0.408 (FAO, 1998). The solar exposure was sourced from SILO for the location equivalent to Farrell Flat weather BoM station (latitude -33.83, longitude 138.79).

The daily and monthly evaporation is shown in Figure 3-8 and Figure 3-9, respectively, which give an average annual evaporation of 2,553 mm.

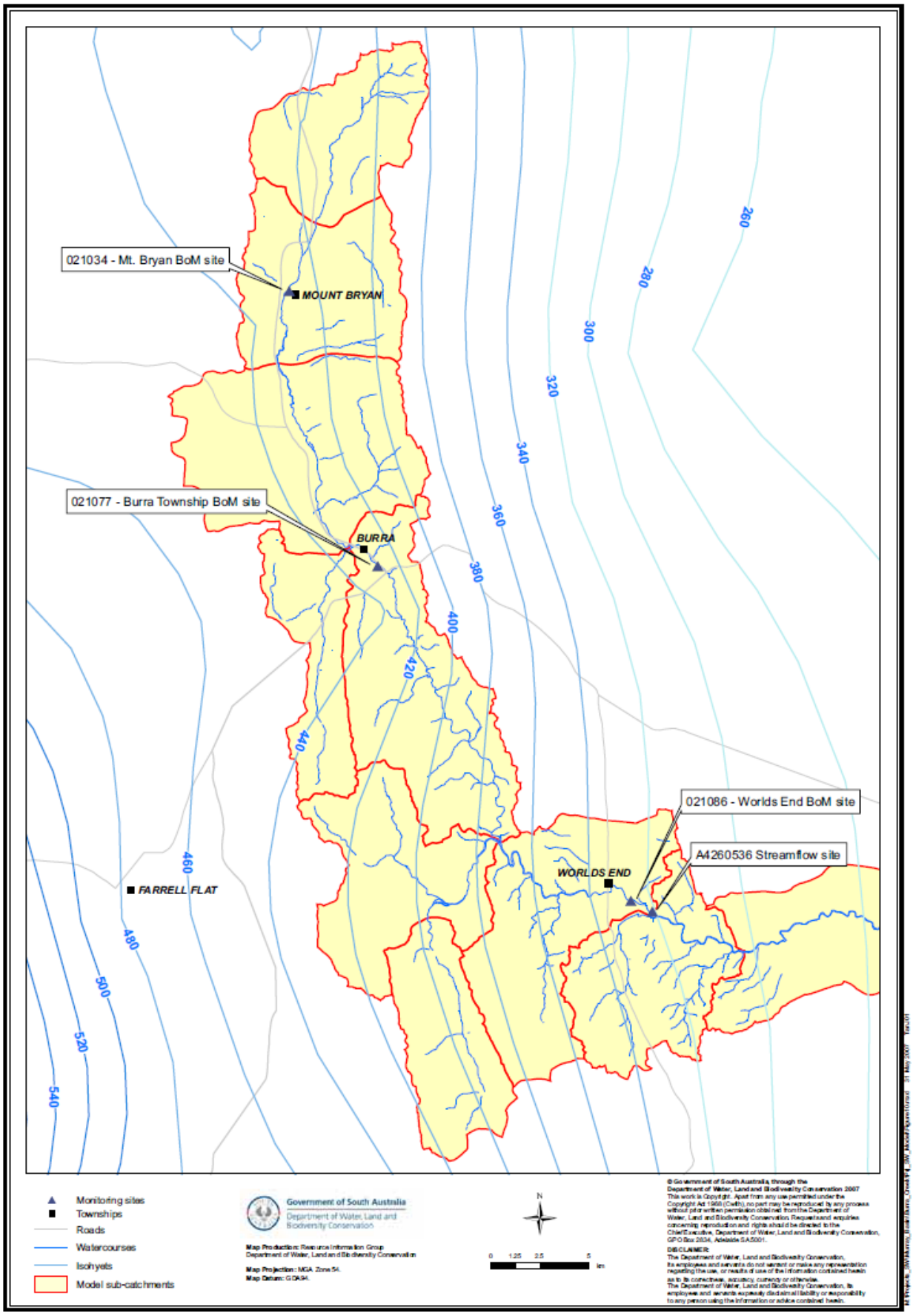

Figure 3-7: Rainfall isohyets and Bureau of Meteorology Weather Stations in Burra Creek (Deane, et al., 2008)

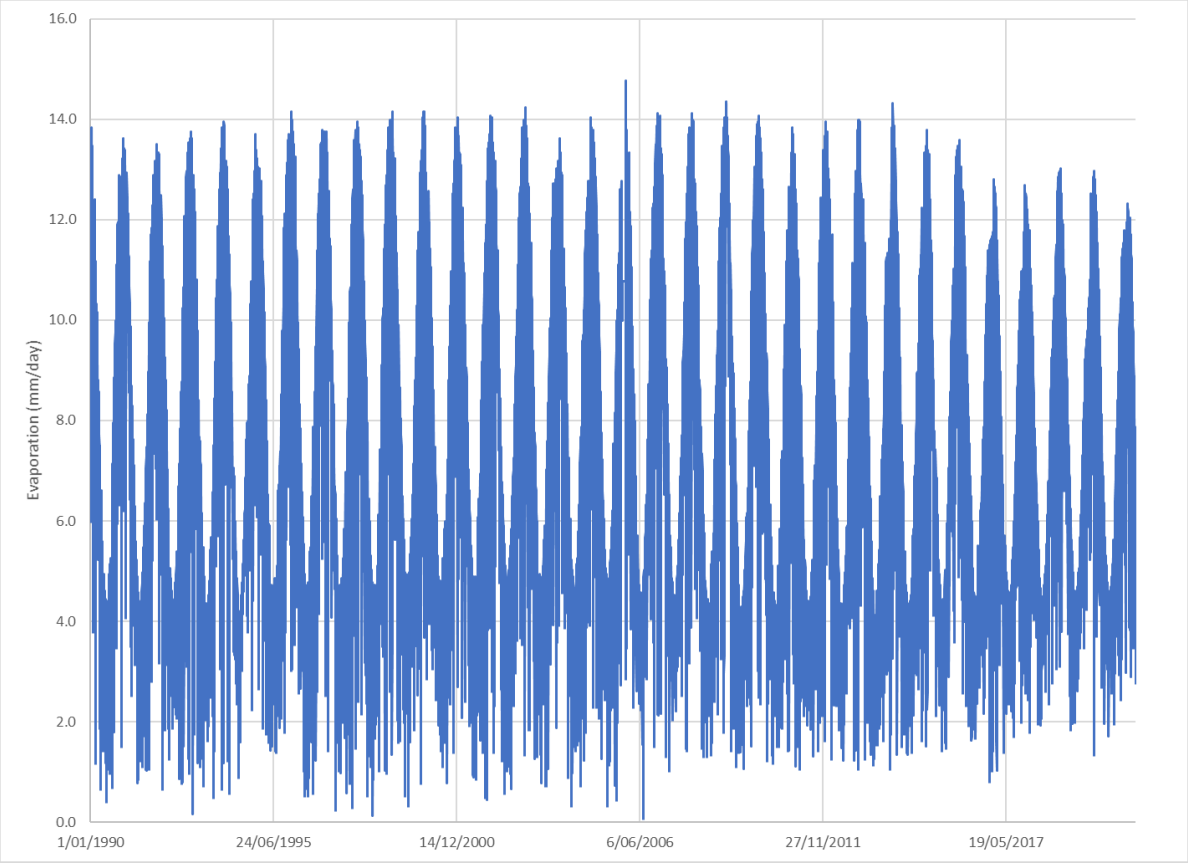

Figure 3-8: Daily evaporation for the location equivalent to Farrell Flat weather BoM

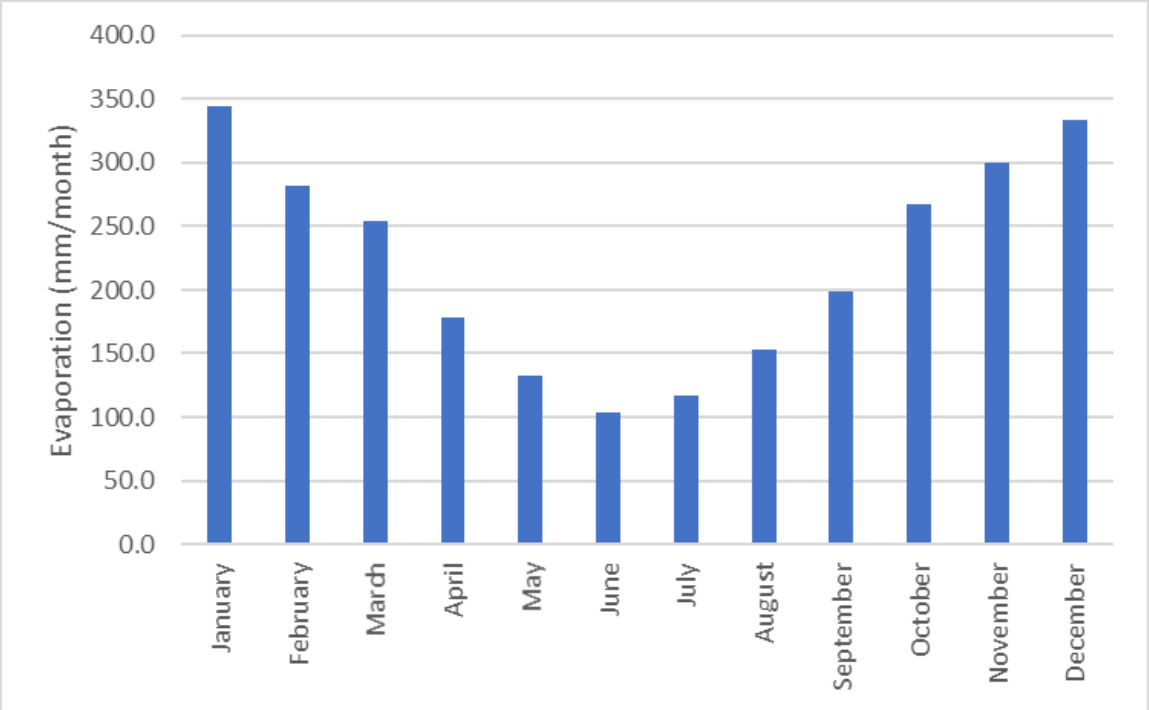

Figure 3-9: Monthly evaporation for the location equivalent to Farrell Flat weather BoM station

3.5.1.3. Future climate

Climate change modelling suggests that regional conditions will become increasingly hotter and drier over time, causing an increase in drought periods that may potentially affect water resources and biodiversity in the region (DEWNR Technical Report July 2016/08 Non-prescribed Surface Water Resources Assessment South Australian Murray-Darling Basin Natural Resources Management Region; NEOEN, 2020).

Current climate change projections for the region indicate increasing rainfall intensity as temperatures rise, with increased intensities of 4.3%, 10% and 17% by 2030, 2060 and 2090, respectively. These increases will likely result in increased peak stream flows, with the magnitude of the increase in peak flows generally higher than the increase in rainfall intensity by a factor of 2-3, dependent on preceding conditions. Modelled flows under a current 1% AEP event (1 in 100-year ARI) may increase to close to a historic 0.2% AEP event (1 in 500-year event). Consideration of significantly increased peak flows should be incorporated into any future hydrological modelling for the Project Area.

3.5.2. Streamflow records

Flow in South Australian streams generally occurs mostly during the winter and spring months, with extended periods of no flow during summer, resulting in mean flows for these months being close to zero (e.g. Savadamuthu 2002; Heneker 2003).

The Burra Creek catchment extends approximately 40 km north of the project site, includes the township of Burra as well as the surrounding farmland and pastures. A river gauging site exists on the Burra Creek at Worlds End (A4260536). The total catchment area to Worlds End flow gauge was calculated to be 535 km^2 (Southfront, 2021).

The “Burra Creek at the Worlds End” (A4260536) streamflow station (latitude -33.84 and longitude 139.08) is located approximately 10 km downstream of the project site and recent streamflow records are available for 36 years (1974 to 2009).

Flow at this gauged site show a steadily decreasing reduction of daily flow, punctuated by extreme events (Figure 3-10). This data can be consolidated to provide monthly and annual statistics as presented in Figure 3-11 and Figure 3-12, respectively. No flow is recorded for multiple years to occur from January through June and mean flows for all months across the data record is close to zero (Figure 3-11).

Variability in flow is illustrated by comparison of average monthly mean and median flows (Figure 3-13) and shows a strong skew towards intermittent extreme flow events. Daily flows varied from 0.6 ML/day seen in 2003, to 10.9 ML/day in 1993. Annual flow ranged from 611 ML in 2003 to over 40,000 ML in 1974.

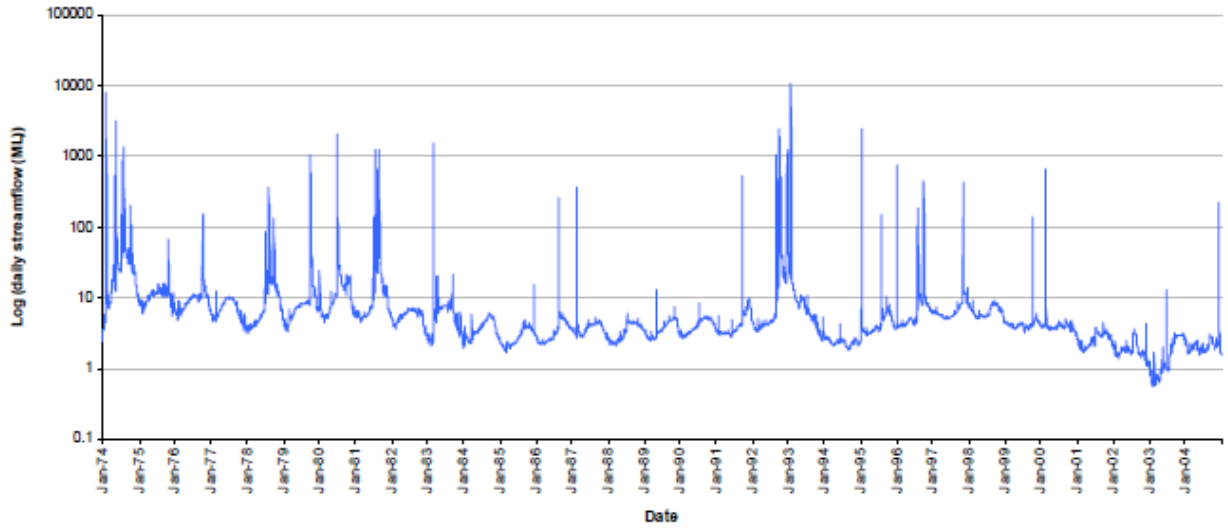

Figure 3-10 Daily flow records from 1974 to 2005 for Burra Creek at Worlds End (Gauge A4260536)

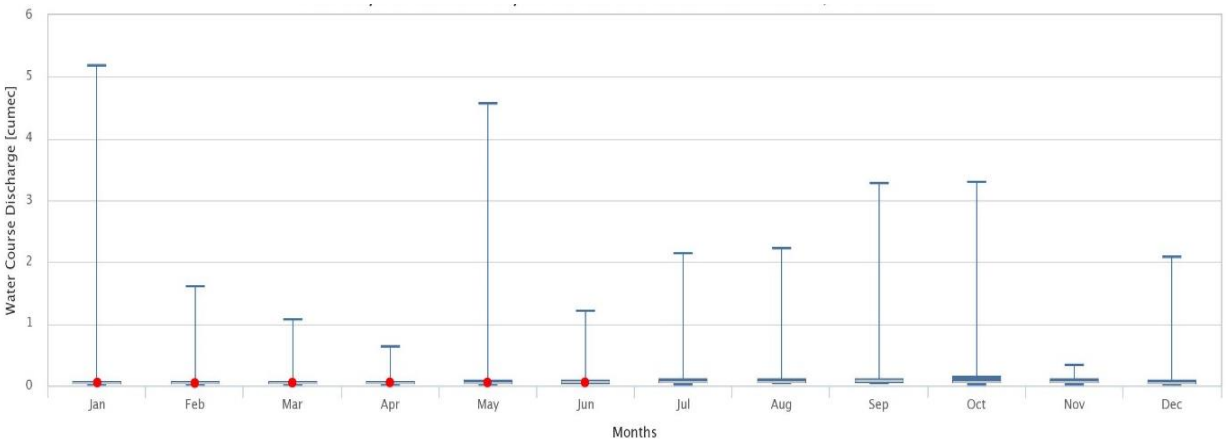

Figure 3-11: Monthly mean statistical analysis of discharge (m³/s) at Worlds End streamflow gauge (BOM, 2021)

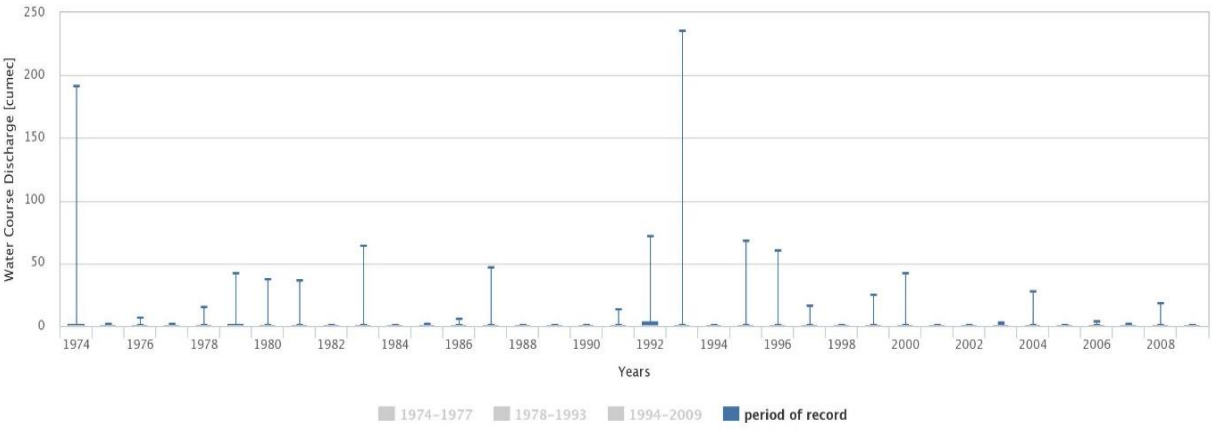

Figure 3-12: Yearly statistical analysis of discharge (m³/s) at Worlds End streamflow gauge (BOM, 2021)

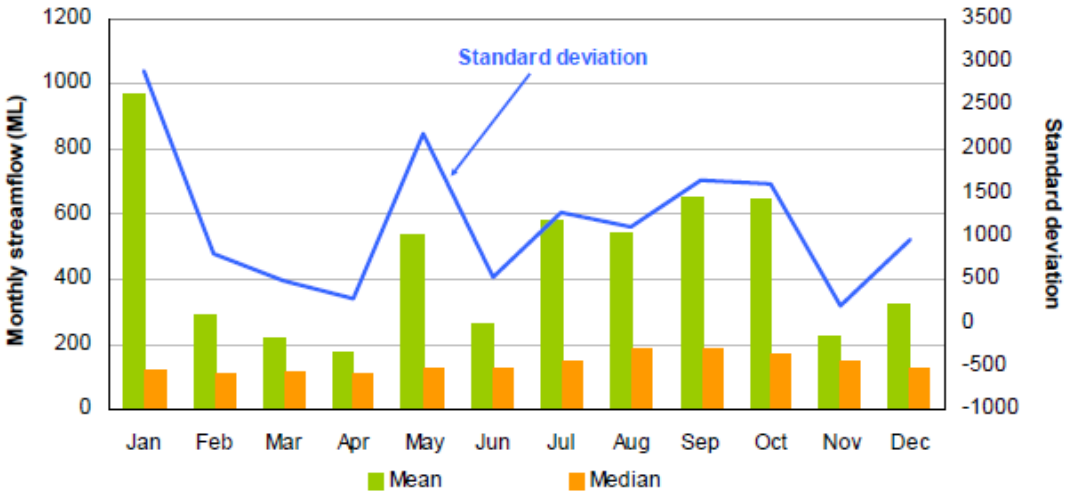

Figure 3-13 Median, mean and standard deviation of the mean monthly flow (1974-2004) for Burra Creek Catchment (Deane, et al., 2008)

3.5.3. Surface water quality

Surface water quality in the Burra Creek catchment is highly variable and very dependent on flow (Deane, et al., 2008; Water Technology, 2021). As part of a preliminary assessment of the impacts of water resource development on Burra Creek Catchment (Deane, e al., 2008), a daily time step surface water model was constructed using the WaterCress modelling platform to evaluate changes to catchment hydrology (i.e. resulting from farm dam development), and any resulting impacts on flow regime. During the assessment, salinity was opportunistically measured at the Worlds End gauging site.

Statistics summarising the salinity data, and a subset of these recorded during steady baseflow conditions, are presented in Table 3-2. Whilst opportunistic, the data does, however, indicate the highly variable baseline levels of salinity within the system.

Table 3-2 Summary statistics of Burra Creek salinity data from 1974 to 2004 (DWLBC, 2018)

Statistic	EC (µS/cm) all samples	EC (µS/cm) samples taken at steady baseflows
Number of samples	167	63
Mean	4,871	4,993
Median	5,000	5,100
Maximum	9,000	5,800
Minimum	956	3,571

Observed streamflow salinity concentrations are closely related to discharge volumes, in particular the relative contributions to the total flow from direct surface runoff and groundwater baseflow. Due to this fact, it is not possible to use data based purely on observation date to determine any trend, as the reading may be artificially reduced due to a major streamflow event occurring immediately prior to the reading.

By filtering the readings through inspection of streamflow data to include only those collected during apparent steady baseflow conditions, Deane, et al. (2008) analysed trends in baseflow salinity over the data collection period, and a slightly increasing trend is apparent in Figure 3-14. The saw-tooth pattern reflects the influence of recharge on the dolomite aquifer, which is the source for the groundwater base-flow and the freshening due to high streamflow events. Over the same period, daily streamflow reduced, particularly during drier months, in large part due to the increasing prevalence of farm dams (Deane, et al., 2008) and this reduction in runoff reaching the creeks likely contributes to the rising salinity trend over the same period.

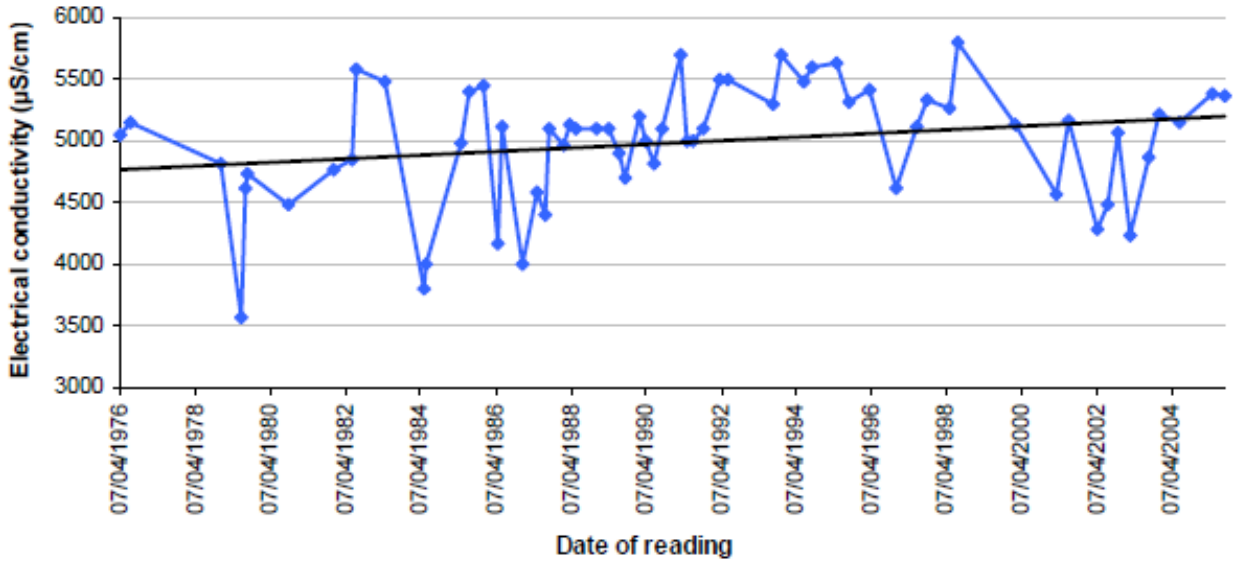

Figure 3-14 Salinity concentrations and trends in baseflow on Burra Creek between 1974 and 2004.

3.5.3.1. Base flow

Baseflow is theoretically defined as that part of the surface streamflow attributed to groundwater discharge to streams. The Burra Creek catchment supports extensive areas of continuous permanent surface water, which extends for 17 km along the creek from south of Burra township to Burra Gorge and consists of numerous deep pools connected by year-round flow. Perennial flow through these reaches is maintained by continuous groundwater discharge from the Skillogalee Dolomite.

This groundwater contribution is of particular interest as annual baseflow volumes are seemingly not closely linked to climatic conditions. For example, during the period 1984–90 mean annual flow was 1490 ML, but this corresponds to a period of below average rainfall and limited surface runoff. Baseflow discharge during this six-year period showed no sign of decreasing and contributed on average 1200 ML/y (87%) of streamflow (Figure 3-15).

The mean monthly flows in Burra Creek (Figure 3-13) deviate considerably from this pattern, indicating the significant influence of large storm events on the generally low volumes of runoff within the catchment. Median monthly flows demonstrate a more typical pattern but are almost entirely due to the perennial baseflow. Although the mean monthly streamflow indicates a highly variable surface flow system, in contrast the median monthly flow volumes indicate that the baseflow conditions provide a relatively constant and stable year-round environment compared to other streams in the Mount Lofty

Ranges. The relatively high median flows across all months (Figure 3-13) are evidence of the importance of the baseflow contribution to the annual catchment surface water budget (Deane, et al., 2008).

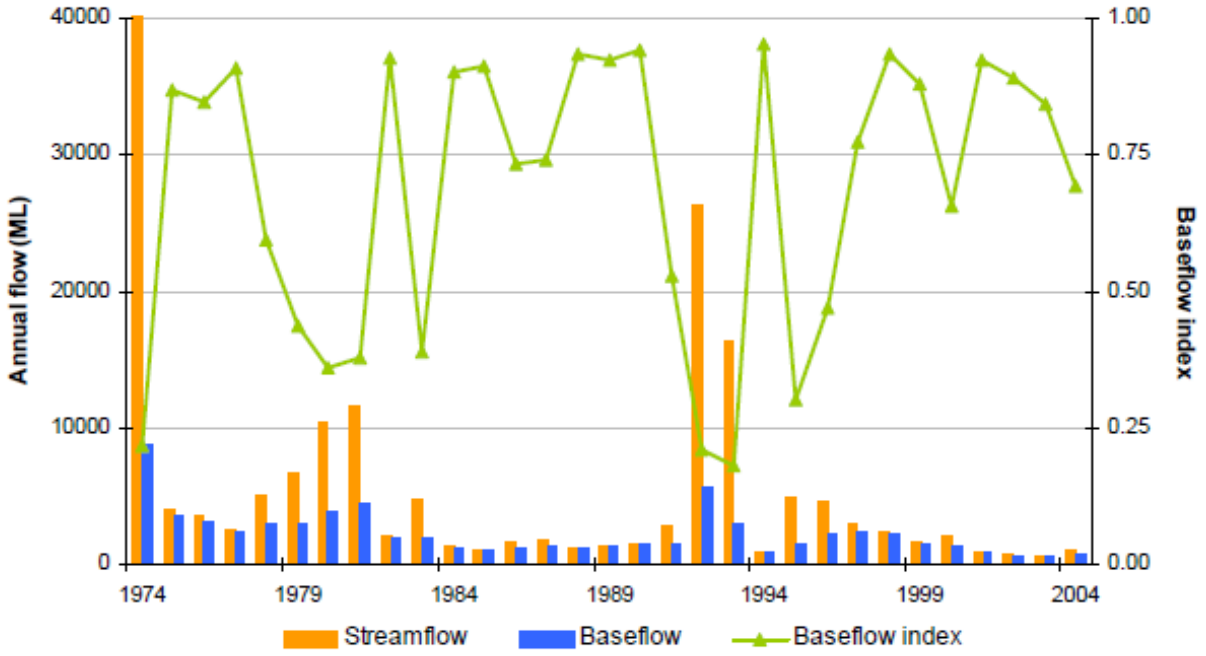

Figure 3-15 Annual streamflow, baseflow and baseflow indices at World End (Deane, et al., 2008)

Deane, et al. (2008) analysed the annual streamflow and estimated baseflow volumes, deriving a baseflow index (the percentage of total streamflow attributed to baseflow) for the Burra Catchment from data from the Worlds End stream gauge. Baseflow indices range from ~20% in extreme rainfall (and discharge) years such as 1974 and 1992–93 to over 90% during low annual discharge years such as 1994 and 2001–02. When total streamflow and baseflow for the entire period are summed together as single volumes, the baseflow index is 40%, but the average annual baseflow index is 70%, highlighting the reliance of the creek on baseflow to persist in the great majority of years. Highest monthly baseflows broadly reflect the highest streamflow months, with August, September and October dominating. This reflects increasing recharge of the source aquifer during these months, which has implications for the management of water resources in the catchment, as care must be taken to determine an appropriate level of streamflow upon which to base a permissible surface water yield to allow adequate recharge to "top-up" the dolomite aquifer to maintain discharge during dry months.

If most of the streamflow from November through April is effectively groundwater, then the potential for double allocation of the same volume of water must be addressed. Seasonal variations in baseflow can therefore be attributed to increases in the watertable following the high rainfall winter season and the seasonal changes in evapotranspiration rate. Deane, et al. (2008) showed that in many, if not most, years the baseflow contribution is a very significant proportion of total streamflow and the magnitude of groundwater discharge, and hence baseflow, is a function of the relative water level within the aquifer (and hence the volumes of both precipitation and streamflow received in the preceding period).

3.6. Water Resources

The major water resources that are relevant to the project area comprise the following surface water and groundwater resources:

- Burra Creek, located along the eastern extent of the Project area within the Burra Creek catchment
- Burra Gorge (Worlds End Gorge)
- Logan Creek, a tributary to Burra Creek
- the Murray River
- Groundwater resources within the fractured rock aquifers and Murray Darling Basin sedimentary aquifer in the region.

Further details on these water resources are provided in the sections below.

3.6.1. Surface water development

The Burra Creek, located within the Burra Creek catchment, is perennial in nature and forms one of the most significant water courses in the Project area and extends from north of Mount Bryan to the south towards Worlds End, before diverting to the east where it is likely that streamflow discharges to the Murray River approximately 60 km east of the Project (NEOEN, 2020). The creek line is fault controlled and follows a major north-south trending fault line that is present to the east of the central range (DWLBC, 2008). The parallel ridgelines form several sub-catchments that contribute to flow to at Burra Creek. Logan Creek exists within this area and forms a tributary to Burra Creek upstream of Burra Gorge, through a gap in the ranges (DWLBC, 2008). Figure 3-5 presents the major surface water features that are relevant to the Project.

Stretches of the Burra Creek Central Catchment are perennial, with significant baseflow derived from groundwater in the underlying Skillogalee Dolomite maintaining permanent pools through the Project area. Burra Gorge (also known as Worlds End Gorge) occurs just south of Stage 1B and is an area of high environmental and cultural value and a popular recreational site (Deane, et al., 2008)

The Burra Creek predominantly receives flow during winter-spring rainfall events, however large volumes of water may be received during summer storms when rainfall events are of short duration (Deane et al. 2006; NEOEN, 2020). The Burra Creek system receives permanent baseflow from the underlying groundwater system in the Skillogalee Dolomite, which causes the creek to be perennial, i.e. flow is not only seasonal. Burra Gorge (known as Worlds End Gorge) is located immediately south of the Goyder South Project area and contains permanent surface water pools that provide valuable aquatic habitat and baseflow reaches. Further, several other sites extending for 17 km along the creek from south of the Burra township to Burra Gorge also contain permanent pools (Figure 3-5).

The Project area is not located within a prescribed water resources area, i.e. there is low competition for resources with low consumptive use and use of the water resource is uncapped or has not been fully allocated. However, increasingly drying climatic conditions pose natural limits on surface water development for agricultural and commercial applications and, generally, alternative supplies including groundwater resources are required to provide water security in the region (Deane, et al., 2008). However, surface water development historically and currently occurs in the region, predominantly through use of farm dams as well as via in-stream diversion structures and (potentially) flood irrigation.

3.6.1.1. Farm dams

The over-development of farm dams at unsustainable levels presents a significant threat to surface water resources and downstream users in the region by causing hydrological impacts that may include delays in the onset of streamflow and reductions in the natural volume and duration of streamflow patterns (DWLBC, 2008). This may subsequently cause ecological impacts to organisms that link phases of their life to the natural timing of flow events, as well as the exacerbation of processes such as siltation of waterholes or other aquatic habitat, overgrowth of reeds in channels and/ or loss of riparian vegetation, which may result in a loss of aquatic biodiversity or habitat and major watercourse management issues (DWLBC, 2008).

The placement of dams on a watercourse requires the dam to be filled before allowing flow to pass downstream, therefore if overflow does not occur then all streamflow is captured in the dam. Increased water storages in the region further increases the time between significant streamflow events. A desktop study of the number of farm dams in the Burra Creek catchment was undertaken by DWLBC (2008), with a total of 609 dams identified, representing 985 ML storage capacity and approximately one dam per square kilometre. The identified dams are considered to provide stock water supply, with an average storage capacity of 1.6 ML and more than 95% of the dams at < 5 megalitres (ML) in size and holding 77% of the total potential storage volume. No irrigation dams were identified, however the study considered that some flood irrigation activities may potentially be undertaken within areas towards the centre of the catchment.

Surface water modelling undertaken by Deane, et al. (2008) study indicated that farm dams showed a major impact on streamflow, except during extreme (high rainfall) years. A total of 70% of surface runoff was estimated to be intercepted by dams in the region during low rainfall years and increases to 95% when based on the quick flow gauged data only. The model findings provided evidence that dams may delay the onset of streamflow and while dam storage remained within the SA MDB NRM Board's criteria for dam storage (i.e. 30% of average winter runoff, estimated at 1,289 ML/year at the time of the study) at least two sub-catchments showed exceedances of this level (Deane, et al., 2008).

3.7. Ecosystem values

The defining ecological feature of the Project area is the perennial central catchment of Burra Creek, which contains numerous large, deep and permanent waterholes, connected by continuous baseflow (Figure 3-5). Both features, but particularly the longitudinal extent of the permanent baseflow, are effectively unique in semi-arid South Australia and therefore of intrinsic conservation value, supporting communities of groundwater-dependent ecosystems (GDEs).

Excluding these extensive permanent reaches, the broad ecological character of the Burra Creek Catchment, including its associated tributaries, however, is that of a semi-arid ephemeral stream ecosystem. Streamflow patterns in such river systems are generally highly episodic. For the Burra Creek Catchment, little reliable seasonality is evident in the surface runoff flow record, and the relative flow contribution of extreme events is clearly apparent in the monthly mean flows.

Despite its variability when contrasted to baseflow, surface runoff is still highly important for the riverine system. The ecological significance of surface runoff can be considered within the catchment both as the sole source of aquatic habitat in the ephemeral reaches, and by the manner in which it modifies conditions within the perennially flowing reaches. Both factors influence the ecology at catchment scale.

3.8. Water Affecting Activities Permits

The Northern and Yorke region has a diverse landscape with many wetlands and mostly ephemeral watercourses used for purposes such as stock watering, as well as habitats for many plants and animals, including small fish. When access through a wetland or watercourse is required, a crossing may need to be constructed and it is important to plan and construct a crossing properly so that the structure is sound and operates correctly with minimal impact on the watercourse or wetland, and the surrounding land.

Watercourse crossings and culverts can impact on existing water users and the environment (water-dependent ecosystems), hence construction or modifications to these structures must be managed in a way that balances existing needs with those for new development.

If there were no controls for the construction or modification of water course crossings the following could result:

- Erosion and siltation issues both upstream and downstream
- Interrupted flows to downstream users
- Obstruction to fish passage and migration of other aquatic organisms
- Water logging, salinity and acid sulphate soil issues, both in stream and to adjacent land
- Flooding and habitat loss
- Poorly constructed crossing resulting in risk to safety.

Before constructing a watercourse crossing, therefore, it is necessary to get approval under either the Landscape South Australia Act 2019 or the Planning, Development and Infrastructure Act 2016. Water Affecting Activity (WAA) Permits are only granted following consideration of the following criteria that align with the principles and policies of the Northern and Yorke Landscape Board (2020):

- Appropriate positioning to ensure fish passage is possible.
- Scour pool protection and/ or headwall protection to prevent erosion.

- Adequate culvert or pipe size.
- Correct positioning of culverts or pipes to maintain flow and prevent erosion or flooding.
- Suitable site selection (e.g. straight stream section).
- Expert advice should be sought if there is any evidence of groundwater issues, (e.g. water logging, or acid sulphate soils) or in instances where significant erosion is an issue.
- Cut-off drains to trap silt and sediment from road run off.
- Appropriate causeway or crossing height.

WAA applications therefore include the necessary information to allow the Board to assess the proposed crossing and take guidance from Landscape SA on all technical matters. Permits stipulate specific locations, activities and constraints and have set time limits on the activities. Regulation is overseen by the Northern and Yorke Landscape Board and Landscape SA. Applications must describe current recommended practice being proposed for any affecting activities.

Water affecting activities include: water diversion; building of a structure in a waterway; drain age of water to a waterway; deposition or removal of material into or from a waterway and destruction of vegetation growing in a waterway. These are prescribed in Section 104 of the *Landscape SA Act 2019*.

4. Stormwater Management Approach

In order to achieve the purpose of this SMP (Section 1.2), this section:

- sets out the objectives for managing stormwater in the catchment,
- identifies actions (both structural and non-structural) required to manage stormwater to achieve beneficial outcomes and meet the specified objectives, and
- provides a justification for any proposed catchment studies, works, measures or actions.

4.1. Objectives

The objectives are to provide goals for the management of stormwater in the catchment. Hence, the objectives are to set goals for:

- An acceptable level of protection of the community and both private and public assets from flooding
- Management of the quality of runoff and effect on the receiving waters, both terrestrial and marine where relevant
- Extent of beneficial use of stormwater runoff
- Desirable end-state values for watercourses and riparian ecosystems
- Desirable planning outcomes associated with new development, open space, recreation and amenity
- Sustainable management of stormwater infrastructure, including maintenance.

4.1.1. Receiving Waters Environmental Values

Environmental values are those that the community place on the environmental services. The strategy underpinning the determination of the environmental values is the National Water Quality Management Strategy (NWQMS).

The main objective of the strategy is to ensure the health of water bodies and waterways nationally. Primary objectives are (but not limited to):

- To ensure the water quality monitoring of waterways and regulation for the discharging of pollutants into waterways adheres to the agreed water quality objectives
- Provide a strategic direction for the management of all watercourses as well as protecting ecosystems and not compromising the economic wellbeing of the community
- Prioritise actions for environmental management which will ultimately lead to improved water quality.

Deane, et al. (2008) outlined the potential impacts of development on Burra Creek Catchment. They identified that the two components of streamflow (direct runoff and baseflow) exert distinctly different influences on the aquatic ecology through their separate flow regimes and water quality characteristics.

Baseflow from groundwater discharges support permanent in-stream and riparian habitat with supplies of moderate water quality. Relatively constant discharge maintains the baseline conditions. Although anecdotal evidence and streamflow data suggest that recent baseflow levels have decreased to the lowest on record, uncertainties over the data quality mean that this cannot currently be confirmed. Protection of this flow characteristic in the central catchment is critical to maintaining the permanent habitat but is largely a question of sustainable groundwater use.

In contrast to the virtually constant baseflow, streamflow due to surface runoff processes is highly variable, and supports the diverse hydrologic and geomorphic processes that are required to maintain stream habitat in good condition. Modelling indicates that the catchment is under significant hydrological stress in the low flow range and the median flow volume has more than halved across all flow seasons. Other deviations to the flow regime include a decrease in the number of freshes. The environmental benefit of these flow bands would be the provision of good quality, albeit temporary, flowing freshwater habitat, and through producing increases in the diversity and extent of permanent wetted habitat as well as helping to ameliorate the salinity of the perennial system.

The Burra catchment thus supports extensive areas of continuous permanent surface water, extending for 17 km along the creek from south of Burra township to Burra Gorge and consisting of numerous deep pools connected by year-round flow (Figure 3-5). Perennial flow through the reach is maintained by permanent groundwater discharge referred to as baseflow.

The extent of this permanent aquatic habitat is effectively unique in semi-arid South Australia and is therefore of intrinsic value. These features are considered key biodiversity assets in the catchment, with the permanent pools providing refugia for water dependent organisms that can then disperse out into the landscape when high flow events occur. These Burra Creek pools are ecologically significant for their potential ability to support different suites of species as water level, flow and water quality change. These sites are significant in the landscape as a source of water for birds, reptiles and mammals and as influence(s) on migration paths and feeding ranges (Water Technology, 2021).

4.1.2. EPA Aquatic Ecosystem Condition Reports

The Environment Protection Authority coordinates a state-wide monitoring, evaluation and reporting program for the condition of South Australian aquatic ecosystems. This is useful as general information, for State of the Environment Reporting and for supporting environmental decision making by government, industry and the community. This online tool is a map gateway where data and Aquatic Ecosystem Condition Reports can be found.

The Burra Creek monitoring site was located at the end of the track off World's End Gorge Road, about three kilometres west of Worlds End. The creek was given a Fair rating because the site sampled showed moderate changes in ecosystem structure and some changes to the way the ecosystem functions. There was considerable evidence of human disturbance, including nutrient enrichment and fine sediment deposition, although the creek still provided an important habitat for some rare macroinvertebrate species. Burra Creek provides habitat for a damselfly that has only been collected from other parts of the River Murray catchment in South Australia, and a rarely collected dytiscid beetle (https://www.waterconnect.sa.gov.au/Systems/EPAWQ/SitePages/Map.aspx).

4.2. Stormwater

4.2.1. Burra Stormwater Management Plan

A stormwater management plan (SMP) was developed by Water Technology (2021) for the township of Burra and used to investigate ways to alleviate existing stormwater and flooding problems to provide protection for public and private assets. The township of Burra has experienced flooding since settlement in the 19th century, and this has become more apparent over recent years. Flooding events

have been known to cause inundation and property damage, disruption to road and private infrastructure, including the main business district of Burra.

Whilst the Burra SMP focusses on a plan for the township, the purpose of the SMP as outlined by the Stormwater Management Authority (SMA) is to manage stormwater on a total catchment basis and hence this study provides significant information on the Burra Catchment in the region of this development and hence provides relevant contextual information for this SMP.

The Burra SMP also highlights the environmental values agreed between the Regional Council of Goyder Steering Committee and the local community and consistent with the National Water Quality Management Strategy (Agriculture and Resource Management Council of Australia and New Zealand, 1994). These values are illustrated in Table 4-1 (Water Technology, 2021).

Table 4-1 Surface watercourses environmental values for Burra Creek

Environmental Values	Supporting Details
Aquatic Ecosystems	Supporting pristine or modified **Aquatic Ecosystems – HD (see below)**
	Highly disturbed systems (**HD**). These are degraded systems likely to have lower levels of naturalness. These systems may still retain some ecological or conservation values that require protecting. Targets for these systems are likely to be less stringent and may be aimed at remediation and recovery or retaining a functional but highly modified ecosystem that supports other environmental values also assigned to it (e.g. primary industries).
Primary Industries	**Irrigating** crops such as vines, lucerne, etc
	Water for **farm use** such as in fruit packing or milking sheds, etc
	Stock watering
Recreation & Aesthetics	**Secondary recreation** with indirect contact with water such as boating, canoeing or sailing
	Visual appreciation with no contact with water such as picnicking, bushwalking, sightseeing
Cultural & Spiritual	**Cultural and spiritual** values including the cultural values of traditional owners

4.2.2. Existing and Proposed Stormwater Infrastructure

Several watercourses cross the proposed road infrastructure. The majority are minor in nature, consisting of small streams from hillside slopes. The exception is Burra Creek which runs in a north – south direction in the eastern portion of the Stage 1A area and reaches approximately 30 to 40 metres wide in sections with capacity to convey significant flows (>10ML/day) in large rainfall events.

Currently, the only stormwater infrastructure across the Project area is the culvert that crosses Burra Creek at one location, as indicated Figure 4-1.

Hydraulic modelling (Southfront, 2021) across the Project area indicates stream heights in excess of 3.5 m would occur at this location during 5% AEP events. This represents a local peak flow of 140 m^3/s. Modelling indicates that 54 culverts would be required where surface water will cross proposed access road infrastructure. Only nine of these locations are predicted to experience flood depths greater than 1 m, although nearly half would reach more than 0.5 m.

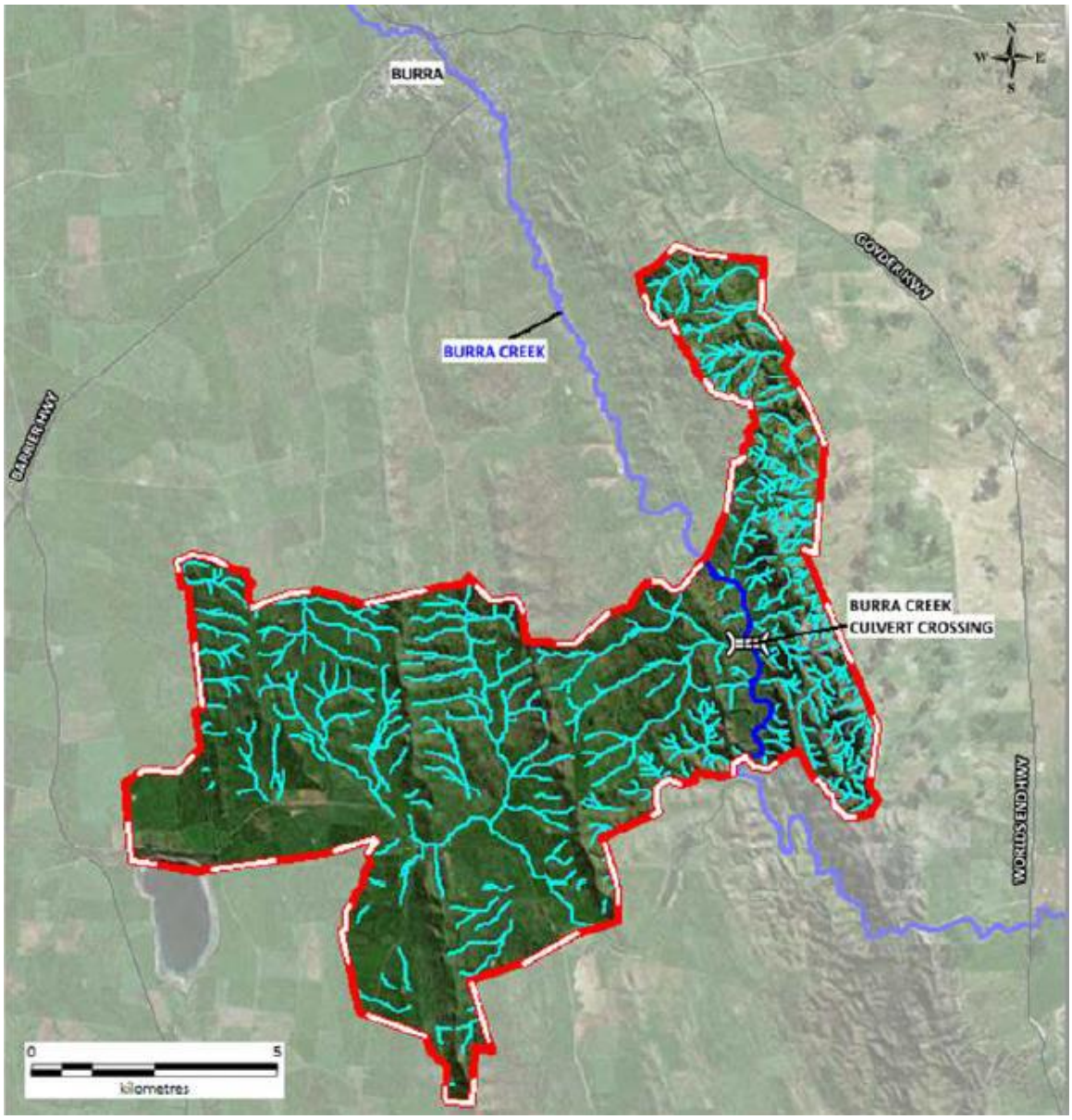

Figure 4-1 Goyder South drainage and existing culvert crossing on Burra Creek (Southfront, 2021)

4.2.3. Identification of Problems and Opportunities

This SMP is to provide a template for more consistent management of stormwater that is aimed at addressing problems and capitalising on opportunities for providing a range of benefits. The problems and opportunities to be identified are to include:

- The potential for flooding within the catchment
- The nature and impact of flooding on properties and the potential for economic loss and environmental impact
- The positive and negative impacts of future development on flooding
- Stormwater quality issues within streams and receiving waters both within the catchment and downstream from the catchment
- Opportunities for better managing flood risk (where such risk is identified), including non-structural flood mitigation measures such as flood warning and preparedness and better integration between stormwater management and local council development plans
- Opportunities for stormwater use, including aquifer storage
- Opportunities for environmental enhancement in association with construction of stormwater infrastructure including managing stormwater to enhance water dependent ecosystems where feasible.

4.3. Flooding

4.3.1. WaterConnect Flood Awareness Map

The Department for Environment and Water (DEW) takes a leadership and coordination role for the planning of activities relating to flood in South Australia. This role is led by the Fire and Flood Management Branch within DEW. The Flood Awareness site has been designed to assist stakeholders and the wider public to learn about flood risk at their property or other places of interest.

WaterConnect Flood Awareness Map[1] shows the extents of flood studies carried out across the State. No flood studies have covered the project area, though three flood mapping studies of the River Murray have been carried out that would have a potential influence on the project area (Table 4-2). None of these three maps shows any flood impacts across the project area.

Table 4-2: Flood mapping carried out covering the project area

Flood study	Model input
Flood Mapping of the River Murray 2014	100,000 ML per day flow; 120,000 ML per day flow; 130,000 ML per day flow; 140,000 ML per day flow; 160,000 ML per day flow; 180,000 ML per day flow; 200,000 ML per day flow; 250,000 ML per day flow; 300,000 ML per day flow; 341,000 ML per day flow (1956)
High Flow Mapping of the River Murray	60,000 ML per day flow; 80,000 ML per day flow; 90,000 ML per day flow
River Murray Flood Extent 1956	1956 Flood Extent

4.3.2. Goyder Wind Farm Hydrological Study

Southfront (2021) has undertaken hydrological modelling for Elecnor Australia to determine culvert crossing requirements and to understand the existing behaviour of surface water in the region. Due to the number of creeks and watercourses in the region, such a hydrological and surface water assessment had been necessary to determine the size, location and quantity of culverts required at access road crossings.

A significant number of watercourses (more than 50) cross the proposed road infrastructure. The majority are minor in nature, consisting of small streams from hillside slopes. The exception is Burra Creek which runs in a north – south direction in the eastern portion of the study area. Aerial photography indicates Burra Creek is approximately 30 to 40 metres wide in most sections with capacity to convey significant flows in large rainfall events.

The digital terrain model (DTM at 1m grid spacing) of the project area supplied by Elecnor Australia has been utilised for two-dimensional flood modelling of the region. Outside the extent of the supplied DTM, the NASA Shuttle Radar Topography Mission (SRTM) data has been used to generate elevation contours and delineate catchment areas of the surrounding area. The SRTM data has a horizontal accuracy of 30 metres (vertical accuracy varies). Hydrological modelling was undertaken for Burra Creek and the local minor tributaries (within the wind farm study area) separately, using two different methods:

[1] Available from https://www.waterconnect.sa.gov.au/Systems/FAM/SitePages/Home.aspx

- For Burra Creek, RORB (RORB software for runoff routing - Civil Engineering | Monash) modelling was undertaken, validated by flood frequency analysis and Regional Flood Frequency Estimation (RFFE); and
- For the minor tributaries and watercourses within the study area, TUFLOW (www.tuflow.com) 'Rainfall on grid' modelling was used.

The flood response of the Burra Creek catchment was validated (and modelling parameters refined) by analysing the peak discharge at the Worlds End flow gauge using Flood Frequency Analysis (FFA). The Worlds End (A4260536) streamflow gauge has a period of available streamflow data of 36 years (1974 to 2009). Figure 4-2 displays the flood frequency analysis plot and the outcomes from the flood frequency analysis within this data set are shown in Table 4-3.

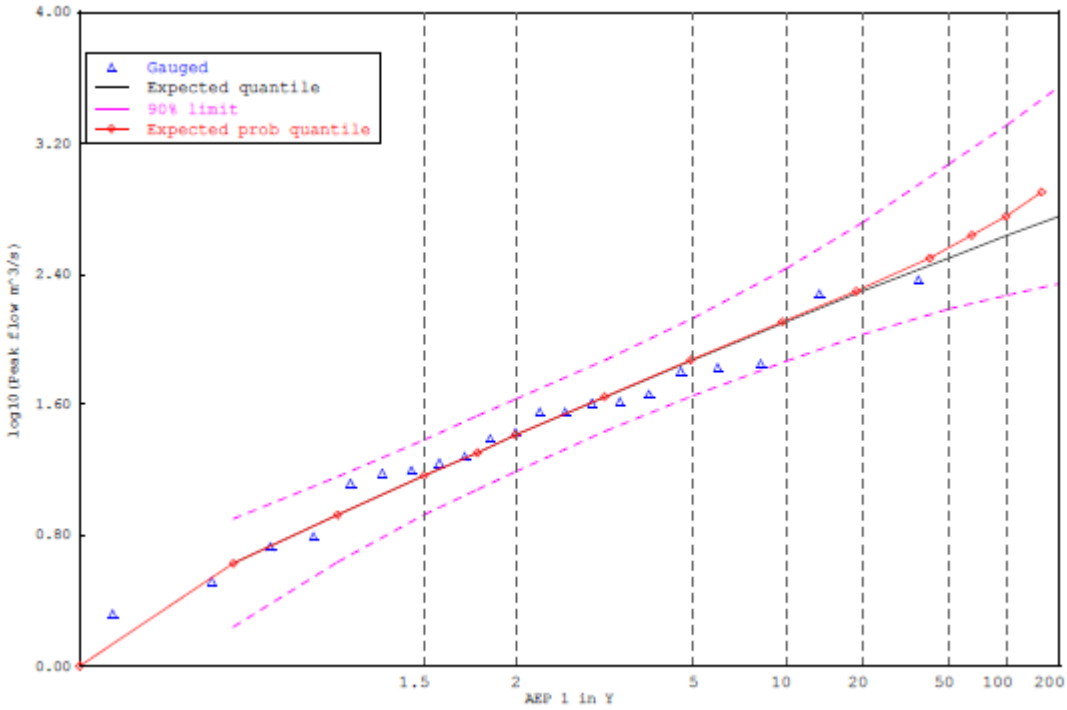

Figure 4-2: Flood frequency analysis at Burra Creek at Worlds End stream gauge

Table 4-3: Flood frequency analysis at Burra Creek at Worlds End stream gauge

AEP%	Expected flow (m^3/S)	Lower 90% quantile (m^3/S)	Upper 90% quantile (m^3/S)
10%	129	75	273
5%	199	107	522
2%	319	153	1,196
1%	434	188	2,070
0.5%	572	220	3,548
0.2%	796	255	7,209

Design rainfall Intensity-Frequency-Duration (IFD) data for the region was obtained from the Bureau of Meteorology website (2016 rainfall data). Data was obtained for Annual Exceedance Probabilities (AEPs) ranging from 63.2% to 0.5% and storm durations ranging from 5 minutes to 72 hours. A filtered set of the IFD depth data for the study area is summarised in Table 4-4.

Table 4-4: IFD Design Rainfall Depths (mm) at Burra Creek at Worlds End stream gauge

Duration (hr)	Annual Exceedance Probability (AEP)				
	0.2EY	10%	5%	2%	1%
1	20.1	24.3	29.3	36.5	42.5
1.5	22.8	27.6	33.1	41.2	48
2	24.9	30	36	44.7	52.1
3	28.1	33.8	40.4	50.1	58.3
4.5	31.7	38	45.4	56.1	65.2
6	34.6	41.4	49.3	60.9	70.7
9	39.3	46.8	55.6	68.5	79.4
12	43	51.2	60.7	74.6	86.3
18	48.9	58	68.7	84.2	97
24	53.5	63.4	74.9	91.6	105
30	57.3	67.8	80	97.6	112
36	60.4	71.5	84.3	103	118
48	65.5	77.5	91	111	126
72	72.5	85.4	100	121	138

4.3.2.1. Culvert Crossing Recommendations

Flood maps for the 5% AEP event (20-year annual return interval – ARI) were prepared and are presented in Appendix A of Southfront (2021) (also provided as Appendix A to this report). The maps show surface water depths and extents overlain on aerial photography and proposed wind farm infrastructure. It should be noted that no information on existing roadway culverts was available, so road embankments were removed to allow flow to pass through the road and not bank up extensively on the upstream side. If performance analysis of the existing roadway culverts is necessary, these can be applied in future iterations of the model, if necessary. This would require either construction drawings sourced from the local Council or detailed survey of the culverts.

Based on the flood model data, culvert locations were identified at points where surface water will cross the proposed access road infrastructure. A total of 54 locations were identified, each provided with a unique identifier, location coordinates, 5% AEP flow rate, and a maximum upstream flood depth extracted from the 2D flood model. Using this data, preliminary culvert sizes were provided for each location. Governing criteria for culvert sizes was to ensure conveyance of the 5% AEP flow and maintaining an upstream headwater depth similar to that of the existing depth. This will ensure flows will not 'build up' on the upstream side of the road, increasing velocities on the downstream side, potentially causing an erosion issue.

Culverts in order of size (largest to smallest) are described in Table 4-5. It should be noted that the Burra Creek Crossing (and some of the larger crossings) may require further hydraulic analysis, given their size and complexity. It is likely that a road deck/bridge (rather than culvert cells) may be more cost effective at these locations. Detailed hydraulic analysis was outside the scope of the Southfront study (2021).

Table 4-5: Proposed culvert locations and sizes (Southfront, 2021)

ID	Latitude	Longitude	Peak 5% AEP flow (m^3/S)	Max existing u/s flood depth (m)	Preliminary culvert size	Comment
C11	-33.7816	138.998	140	3.8	(5x) 3.6m x 3.0m RCBC	Burra Creek crossing
C44	**-33.8135**	**138.938**	**37**	**1.2**	**(5x) 2.4 x 1.8m RCBC**	Existing crossing - unknown culvert size. Full catchment not modelled.
C45	-33.8074	138.945	30	1.1	(4x) 2.4 x 1.8m RCBC	Existing crossing - unknown culvert size
C10	-33.7812	138.987	17	1.5	(2x) 2.4m x 1.8m RCBC	
C47	-33.8121	138.919	16	1.0	(2x) 2.4m x 1.8m RCBC	Existing crossing, road located within flow path, as per C48. See Section 4.2.
C48	-33.8104	138.918	16	1.0	(2x) 2.4m x 1.8m RCBC	Existing crossing, road located within flow path, as per C47. See Section 4.2.
C34	-33.7783	138.987	12	1.7	(2x) 2.1m x 1.5m RCBC	
C55	-33.8189	138.927	12	1.6	(2x) 2.1m x 1.5m RCBC	
C56	-33.811	138.894	8	0.3	(2x) 1.8m x 1.2m RCBC	
C8	-33.781	138.971	7	0.6	(2x) 1.8m x 1.2m RCBC	
C9	-33.7803	138.971	7	0.6	(2x) 1.8m x 1.2m RCBC	
C36	-33.7505	139.008	5.2	1.3	2.1m x 1.2m RCBC	
C21	-33.7212	138.995	5	0.3	2.1m x 1.2m RCBC	Combined floodplain location - consolidate
C22	-33.7209	138.995	5	0.3	2.1m x 1.2m RCBC	Combined floodplain location - consolidate to one crossing with C21, $3.5m^3/s$
C39	-33.7785	139.001	4.8	0.5	2.1m x 1.2m RCBC	Road located within channel longitudinal flow path, see Section 4.2.
C1	-33.7971	138.903	4.5	1.0	2.1m x 1.2m RCBC	Existing crossing - unknown culvert size
C28	-33.7927	139.009	4	1.1	2.1m x 1.2m RCBC	
C58	-33.8498	138.939	3.5	1.2	2.1m x 1.2m RCBC	
C30	-33.7964	139.022	3.05	0.9	2.1m x 1.2m RCBC	Road and wind tower located in flow path, see Section 4.2.
C19	-33.7277	138.995	3	1.0	1.8m x 1.2m RCBC	
C46	-33.8054	138.948	2.6	0.5	1.8m x 1.2m RCBC	Existing crossing - unknown culvert size
C32	-33.7993	138.973	2.5	1.0	1.5m x 1.2m RCBC	
C42	-33.8194	138.93	2.5	0.6	1.5m x 1.2m RCBC	Existing crossing - unknown culvert size
C43	-33.8186	138.93	2.5	0.6	1.5m x 1.2m RCBC	Existing crossing - unknown culvert size
C33	-33.799	138.971	2.45	0.5	1.5m x 1.2m RCBC	
C35	-33.7552	139.009	2.2	0.7	(2x) 0.9m RCP	
C24	-33.7154	138.992	2.1	0.7	(2x) 0.9m RCP	
C26	-33.7171	138.979	2.1	0.8	(2x) 0.9m RCP	
C59	-33.8508	138.938	1.75	1.2	(2x) 0.9m RCP	
C16	-33.76	138.998	1.6	0.9	(2x) 0.825m RCP	
C2	-33.7828	138.908	1.6	0.5	(2x) 0.825m RCP	

ID	Latitude	Longitude	Peak 5% AEP flow (m^3/S)	Max existing u/s flood depth (m)	Preliminary culver size	Comment
C25	-33.7153	138.984	1.6	0.5	(2x) 0.825m RCP	
C53	-33.7832	138.968	1.2	0.5	(2x) 675m RCP	
C24A	-33.7158	138.991	1.1	0.7	(2x) 675m RCP	
C57	-33.811	138.895	1.1	0.2	2 x 675m RCP	
C15	-33.7763	139.008	0.7	0.3	0.75m RCP	
C20	-33.7267	138.996	0.65	0.2	0.75m RCP	
C7	-33.7924	138.959	0.65	0.2	0.75m RCP	
C6	-33.7955	138.96	0.6	0.3	0.675m RCP	
C23	-33.72	138.994	0.5	0.2	0.6m RCP	
C4	-33.7771	138.887	0.4	0.2	0.6m RCP	
C54	-33.8069	138.963	0.4	0.2	0.525m RCP	
C41	-33.7929	138.889	0.33	0.2	0.525m RCP	
C13	-33.7797	139.012	0.3	0.2	0.525m RCP	
C5	-33.7986	138.963	0.3	0.2	0.525m RCP	
C31	-33.7908	138.988	0.25	0.2	0.525m RCP	
C37	-33.7514	139.008	0.23	0.2	0.525m RCP	
C40	-33.7806	138.977	0.2	0.2	0.525m RCP	
C38	-33.7526	139.009	0.15	0.2	0.45m RCP	
C14	-33.7744	139.011	0.14	0.2	0.45m RCP	
C3	-33.7822	138.917	0.12	0.4	0.45m RCP	
C50	-33.7989	139.016	0.12	0.2	0.45m RCP	
C51	-33.7982	139.015	0.12	0.2	0.45m RCP	
C52	-33.7408	138.999	0.1	0.2	0.45m RCP	

It should be noted that flood study outcomes can be potentially used to develop flood hazard overlay maps, using velocity – depth relationships as illustrated in Figure 4-3. This is normally carried out as part of postprocessing of flood studies.

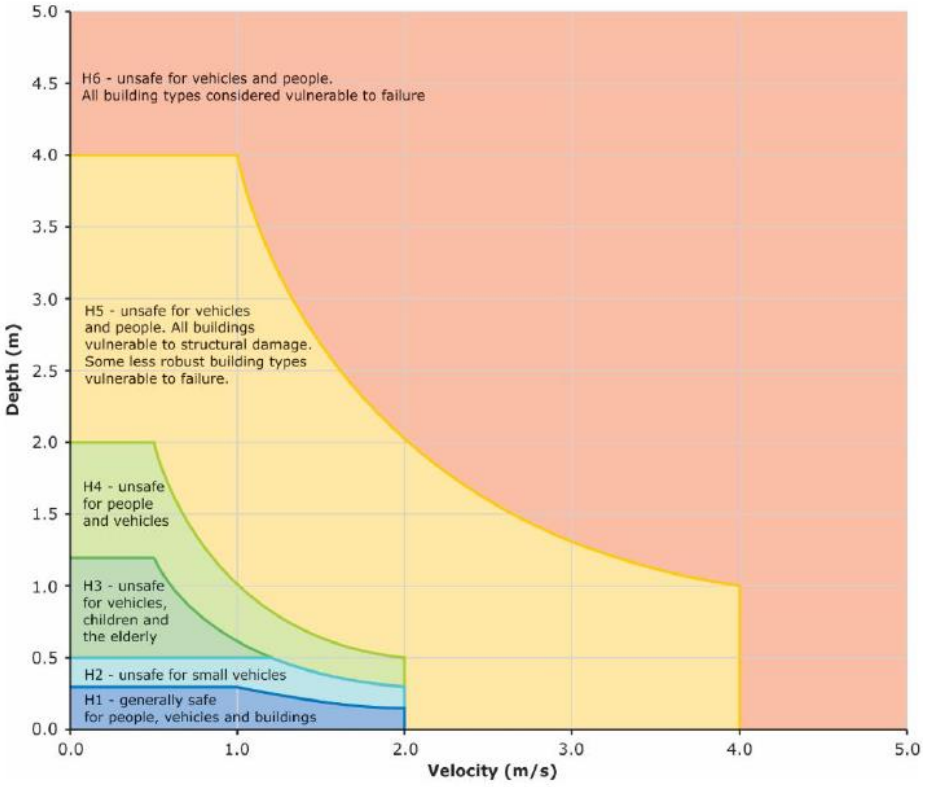

Figure 4-3: Combined flood hazard curves (Smith et al, 2014)

4.4. Water Discharged from Construction Areas

Uncontaminated stormwater from building roofs, roads and other paved areas, may be separated from the wastewater collection system and directed through a suitable interceptor or sediment collection system. This system should be designed and installed to ensure that only clean stormwater is discharged from the site. Regular inspection and maintenance of the system is necessary to avoid discharges of contaminated water from the site. These inspections and maintenance should be recorded in the pollution control equipment register (PCER). Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control, according to the EPA Guideline - Bunding and Spill Management (2007). Staff should be familiar with spill response and notification procedures.

4.4.1. Concrete Production

Potential pollutants in batching plant wastewater and stormwater include: cement, sand, aggregates, chemical admixtures, fuels and lubricants. The site should be designed and constructed such that clean stormwater, including roof runoff, is diverted away from contaminated areas and directed to the stormwater discharge system. Any liquids stored on site, including admixtures, fuels and lubricants, should be stored in accordance with EPA Guideline, Bunding and spill management (2007). Any underground storage tanks should be tested annually for integrity.

Contaminated stormwater and process wastewater should be captured and recycled. Concrete agitator bowls and chutes must never be washed out to the stormwater system or roadways. A wastewater collection and recycling system should be designed to collect contaminated water from:

- agitator washout
- truck washing
- yard washdown
- contaminated stormwater
- concrete batching area
- slump stand
- any other wastewater from the batching plant operation.

Process wastewater and contaminated stormwater collected from the entire site should be diverted to a settling pond, or series of ponds, such that the water can be reused in the concrete batching process. The settling pond or series of ponds should be lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect.

In general a high standard of yard and equipment maintenance will considerably reduce the potential for discharge of sediment to the wastewater collection and recycling system.

NEOEN has committed to a minimum 50m setback from water courses (including drainage lines) for concrete batch plants: NEOEN has adopted a 100m setback for the potential batch plants and all proposed permanent and temporary facilities.

4.4.2. Unplanned events

Accidental spills from the transport, storage and handling of hydrocarbons and chemicals can lead to a decrease in surface water quality, when present. A change in surface water quality has the potential to

impact on ecological receptors, as well as pastoralists or other members of the community that may use the water. The impacts will not occur without an unplanned event occurring.

The risk of surface water contamination during construction will be minimised by storage and handling of fuel and chemicals in accordance with relevant standards and guidelines and the implementation of procedures to contain and clean up spills should they occur. Hydrocarbon and chemical storage facilities will be designed in accordance with Australian Standards. Storage and transport of chemicals and hydrocarbons will be in accordance with relevant Australian Standards and bunded in accordance with EPA Bunding Guidelines.

The risk posed by accidental spills during construction or operation has been assessed as low.

4.5. Temporary Facilities Stormwater Management

As part of the Goyder South project, temporary construction facilities have been proposed. The temporary construction facilities will support the construction phase of Stage 1. This includes the temporary compound and laydown area facilities in the southwestern portion of Stage 1A on Springbank Road (Figure 4-4). This facility will include a construction compound (bench and facilities) and two laydown areas (Figure 4-5 and Figure 4-6). The temporary site facilities include a concrete batching plant, a laydown area and a site compound.

This section provides details on stormwater mitigation strategies and infrastructure arrangements for the temporary facilities. Detailed

4.5.1. Stormwater management strategies and mitigation options

4.5.1.1. Erosion and sediment control

Figure 4-6 indicates a concept design for an erosion and sediment control plan for the temporary facilities. It is proposed to install a sediment pond, level spreader and temporary silt fence during construction at the outlet of the batching plant. Regarding the laydown area, two lateral retention swales shall be installed to direct stormwater to two outlet points where two temporary silt fences installed. Given the functionalities of the site compound shown on Figure 4-5, one lateral swale shall be installed to direct stormwater run-off to one outlet where a temporary silt fence installed.

4.5.1.2. Pavement

Figure 4-7 shows pavement plan designed for the temporary facilities. All works will be completed in accordance with AS 3789. Proof rolling shall be compacted with a 12-tonne pat foot roller or fully loaded water cart or approved equivalent. Proof roll hold points to be conducted at subgrade and finished base course level. This ensures that the surface has the required slope to allow for surface run-off of water. Minimum site falls of 1% are to be achieved.

4.5.1.3. Earthwork

Figure 4-8 shows depth range of earthwork required for construction of the temporary facilities. Table 4-6 articulates cut and fill volumes estimated for the earthwork.

Table 4-6 Cut and fill volumes estimated for the temporary facilities components

Component	Total cut (m^3)	Total fill (m^3)	Total balance (m^3)	Excess of fill over cut (m^3)
Batching plant	-754.721	6677.428	5922.707	5922.707
Laydown area	-353.039	2345.320	1992.280	1992.280
Site compound	-662.596	2027.835	1365.239	1365.239

Given the large-scale nature of the earthwork, appropriate allowance to control dust and stormwater management at all times will be made. This will include development of short-term strategies adopted when extreme weather events arise during the course of the works. If dust management cannot be effectively managed onsite during windy events, works shall stop and suppression measures implemented. All earthworks to be undertaken under level 1 control fill (AS3789), with oversight from a geotechnical engineer.

4.5.2. Stormwater management infrastructure arrangements

Figure 4-9 shows design details of the stormwater management infrastructure arrangements proposed for the temporary facilities. The arrangements comprise:

- typical table drain,
- typical rock check installation,
- silt fence,
- hay bale barrier,
- retention swale,
- sedimentation pond,
- stormwater berm, and
- stormwater drainage level spreader.

Dust suppression measures shall be maintained to the satisfaction of the superintendent. All disturbed and unsealed areas shall be dampened and rolled to seal the surface to minimise dust. All erosion and sediment control devices and silt traps are to be installed prior to the commencement of construction activities. Top-soil stripped from construction areas to be stockpiled at a nominated site away from flow paths. All sediment control fences are to be constructed along contour where possible. Where sediment control fences are not constructed along contour return panels are to be incorporated at regular intervals not exceeding 20m. All silt traps are to be inspected weekly and after storms for structural damage or clogging. All silt will be removed to maintain silt trap storage capacity. Any damage will be repaired to the satisfaction of the superintendent. All stormwater run-offs will be diverted away from disturbed soil into intact native vegetation or stormwater drainage system. All final erosion prevention measures will be completed prior to the final handover inspection. Any changes to the erosion and sediment control plan shall be submitted and approved by the superintendent. Additional erosion controls may be required during construction as determined by the superintendent in consultation with the EPA. All erosion and sediment control measures to be undertaken to the satisfaction of the EPA, and in accordance with the EPA code of practice for the construction industry. The site will be managed such that not all surface vegetation is cleared in one operation. The site shall be progressively managed, and areas of vegetation shall remain to act as buffer strips to trap and reduce the risk of the risk of sediment

laden runoff. The sedimentation basin and silt traps shall be cleaned out when the accumulated sediment has reduced their capacity by 60%. This level shall be indicated by placing a mark on a riser. All SEDMP measures shall be maintained and monitored to ensure they are operating effectively. In particular, after each rain event measures shall be inspected to ascertain if repairs or upgrades are required. Sediment removed from basin and traps can be combined with topsoil stockpiles for later spreading. All site SEDMP measures shall be regularly monitored, maintained all site SEDMP measures shall be regularly monitored, maintained repaired and upgraded to suite changing site conditions and storm events.

All materials and workmanship shall be in accordance with the latest edition of the relevant Australian standards and other relevant codes as referenced in the technical specification. Any clearing work or any type of disturbance outside the limits of work shall not be undertaken unless approved by the construction supervisor. On completion of the works all unwanted materials, plant, equipment and temporary construction facilities shall be removed from the site; areas used during the course of the work are to be remediated, and the site is to be restored to a neat and tidy condition. All work areas should be smoothed and graded in a manner to conform to the appearance of the surrounding land.

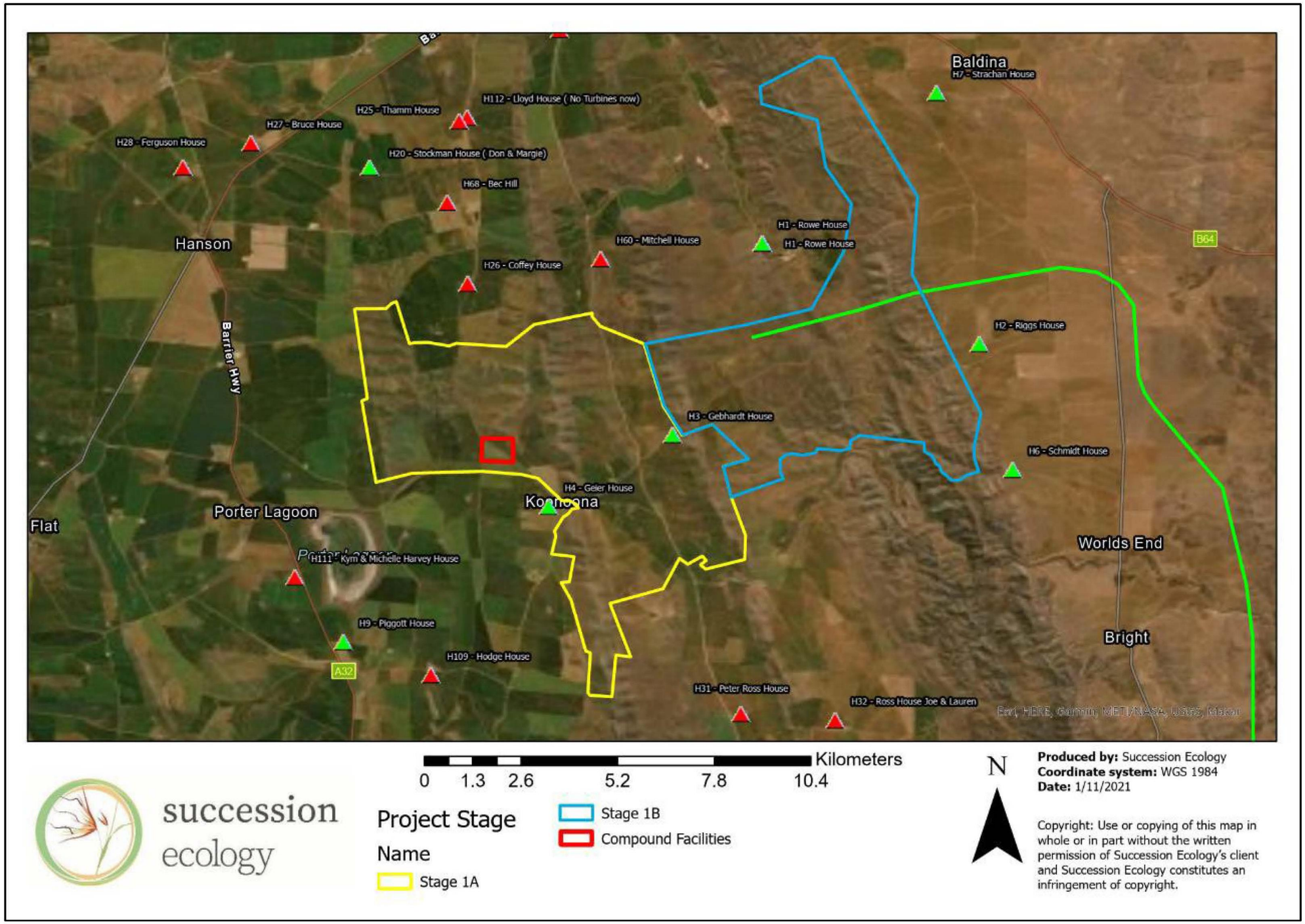

Figure 4-4 Temporary facilities location

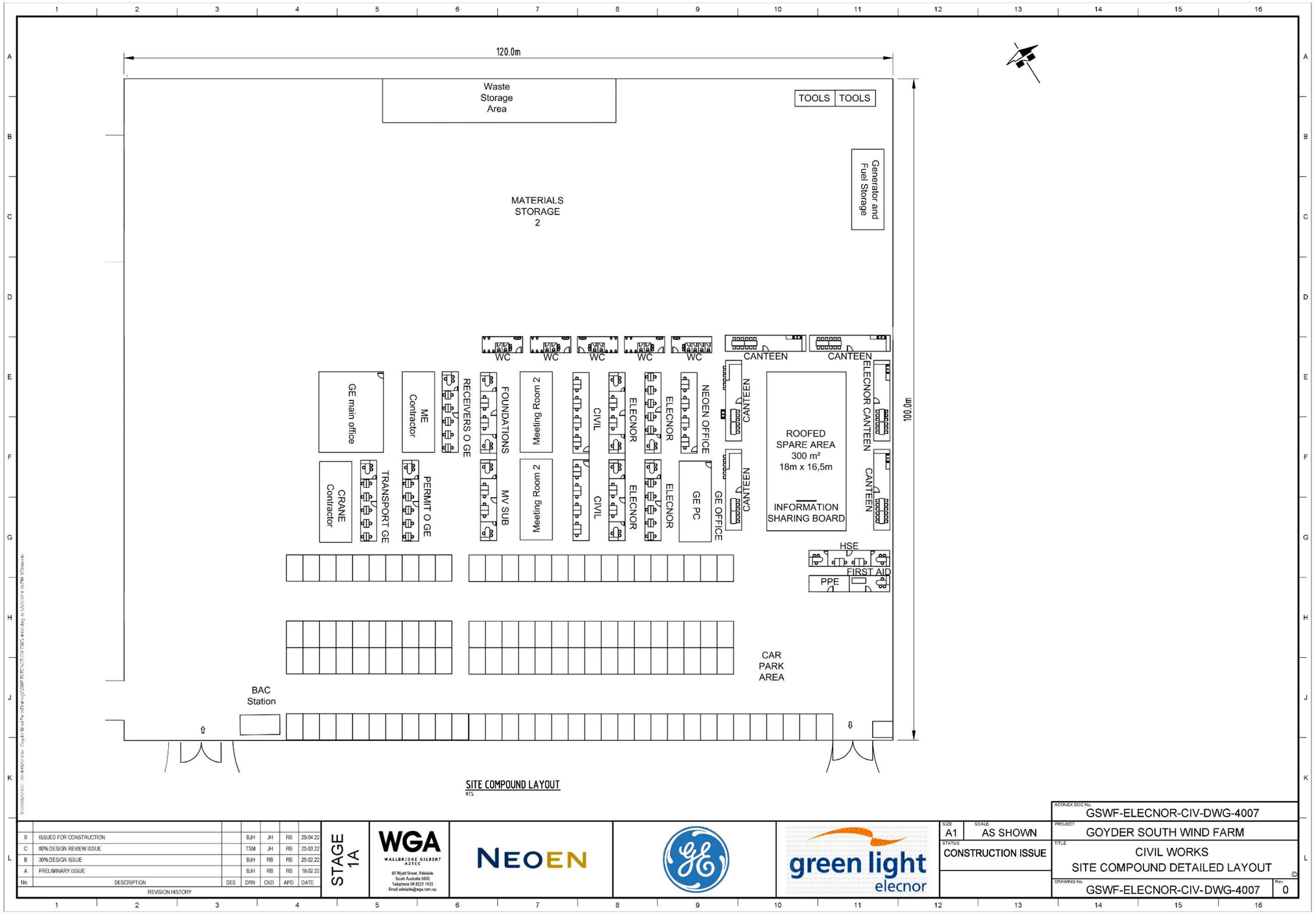

Figure 4-5 Compound and one Laydown area design and building profile

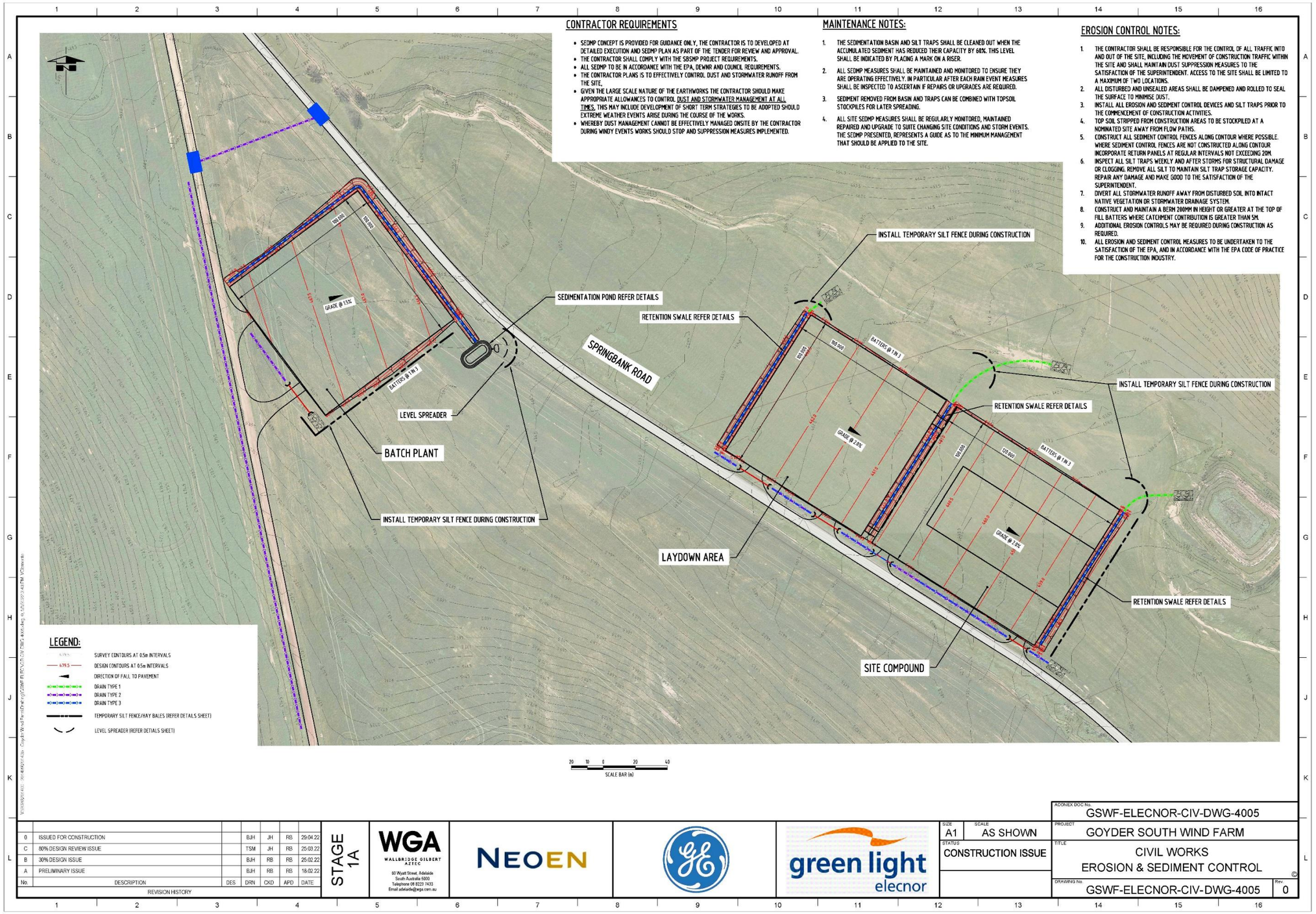

Figure 4-6 Erosion and sediment control plan of the temporary facilities

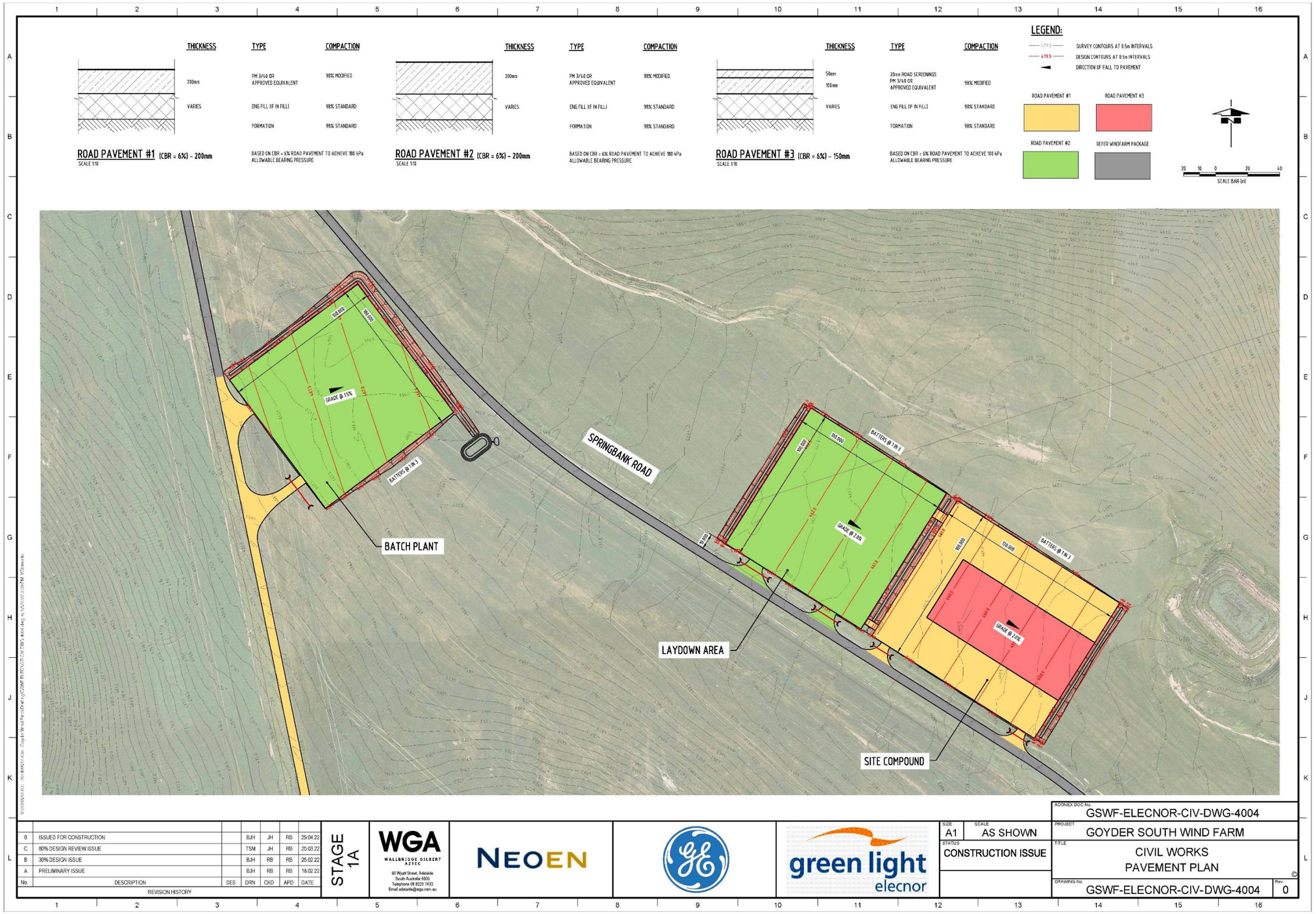

Figure 4-7 Pavement plan of the temporary facilities

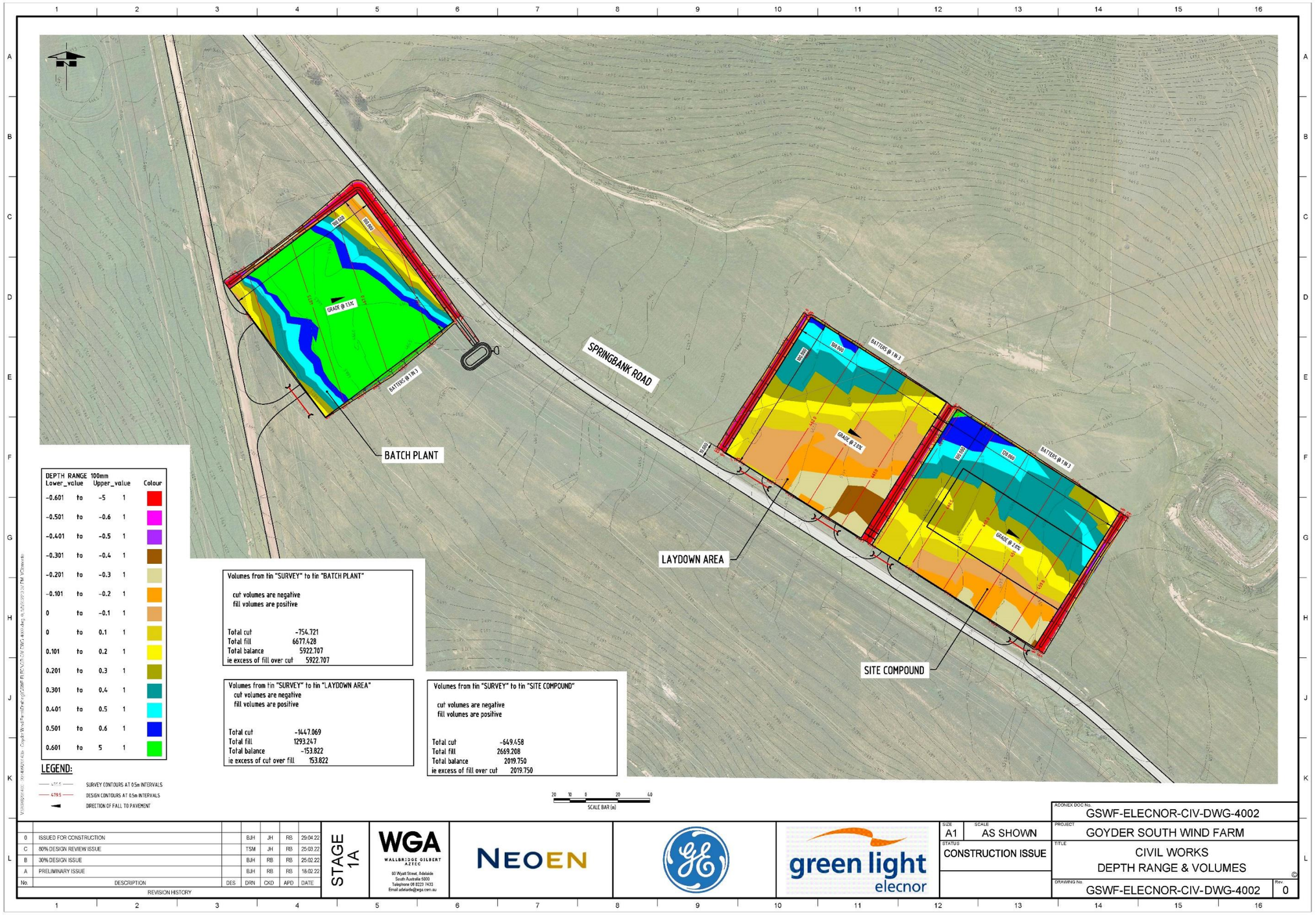

Figure 4-8 Depth range of earthwork for the temporary facilities

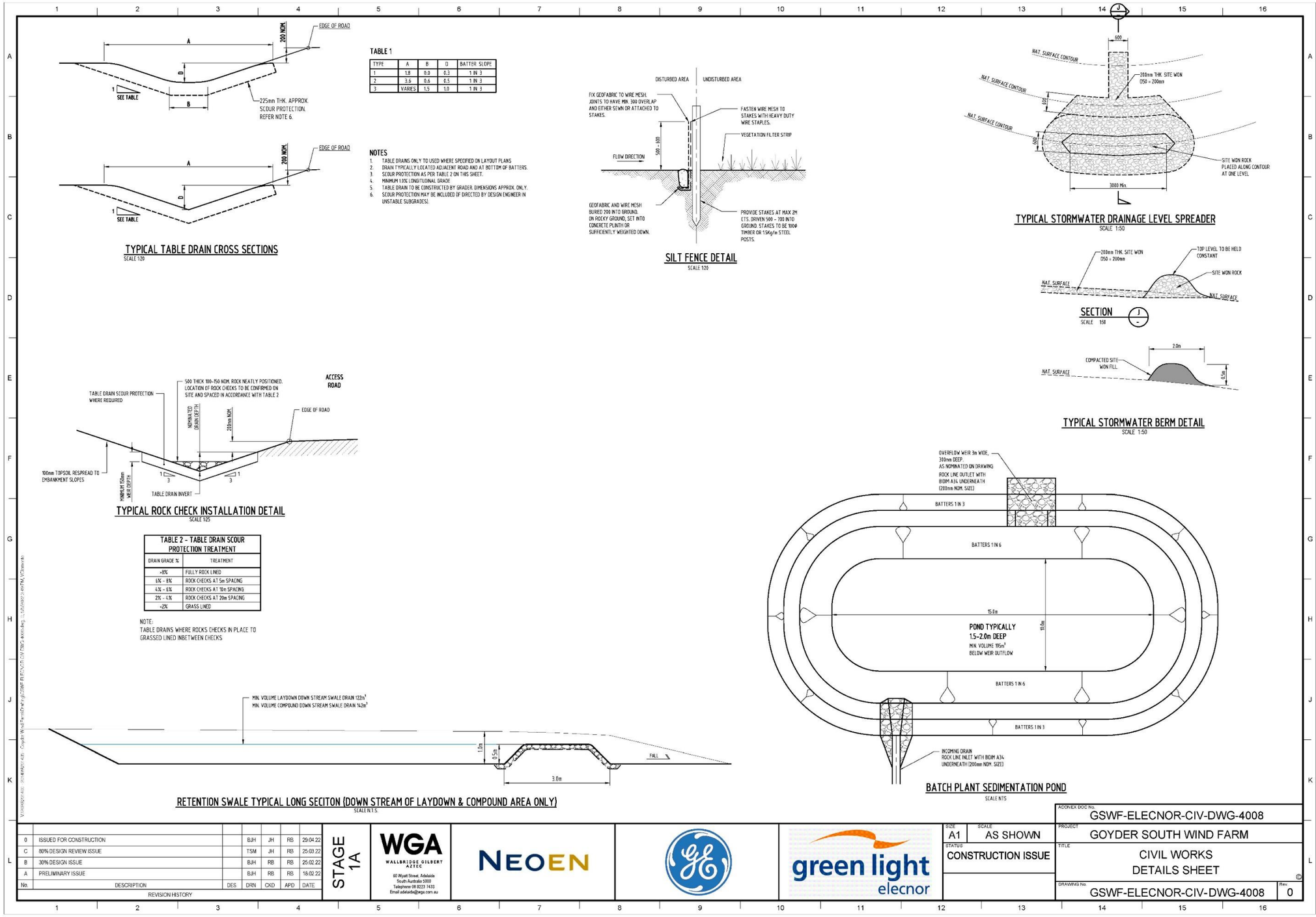

Figure 4-9 Design details of stormwater management arrangements for the temporary facilities

5. Stormwater Management Measures

Specific safeguards and management measures will be implemented to avoid, minimise or manage impacts on water and to address potential surface water impacts from the project. These are identified in Table 5-1. All surface water measures should be considered in the management of stormwater on a site-by-site basis. These measures should be read in conjunction with the Soil, Erosion and Drainage Management Plan (SEDMP) developed for the Project and sub-plans developed for each construction area.

Table 5-1 Surface water management measures

ID	Measure / Requirement	Responsibility	Area
General			
SW01	Training will be provided to all project personnel, including relevant sub-contractors, on surface water and soil management practices, and the requirements from this plan, through inductions, toolboxes and targeted training.	Contractor	All
SW02	Unless authorised otherwise by an environment protection licence, the requirements of the Environment Protection Act (1993) will be complied with.	Contractor	All
Stormwater management			
SW03	Works will minimise erosion and the generation and dispersion of sediment using suitable controls in accordance with the relevant requirements in the SA DIT (2021) Protecting Waterways Guidelines	Contractor	All
SW04	A Soil, Erosion and Drainage Management Plan (SEDMP) will be prepared for each construction area. Each SEDMP will: • apply the methods and principles provided in SA DIT (2021) Protecting Waterways Guidelines	Contractor	All
SW05	Suitably qualified erosion and sediment control professional(s) will be commissioned to: • oversee the development of SEDMPs • inspect and audit controls • train relevant staff • provide advice regarding erosion and sediment control.	Contractor	All
SW06	Stormwater management systems will be benchmarked to predicted stormwater discharge quality characteristics.	Contractor	All
SW07	Where practical, clean water will be diverted around or through construction areas. Runoff from clean water areas that cannot be diverted will be accounted for in the design of surface water management systems.	Contractor	All
SW08	Clean water diversions will be designed to minimise potential scour impacts in any adjoining watercourses.	Contractor	All
SW09	Works will be programmed to minimise the extent and duration of disturbance to vegetation where practicable. This will include minimising the time between clearing and site establishment earthworks, initial earthworks and commencement of subsequent ground stabilisation activities.	Contractor	All
SW10	All slopes that have been cut and/or filled as part of the construction works shall be appropriately stabilised in accordance with erosion and sediment control and other relevant sub-plans. Stabilisation, including rehabilitation, will be undertaken progressively where practicable.	Contractor	All
SW11	New landforms will maximise surface drainage to the natural environment.	Contractor	All

ID	Measure / Requirement	Responsibility	Area
SW12	Sediment basins will be designed and constructed in accordance with the methods recommended in SA DIT (2021) Protecting Waterways Guidelines. Sediment basins will have adequate capacity for at least a 5 day, 85th percentile rainfall event. Consideration shall be given to increasing basin size at locations where sufficient space is available and / or topography does not constrain the basin size.	Contractor	All
SW13	The following dewatering hierarchy will be used when stormwater is captured in sediment basins: • maximise water reuse on site (e.g. dust suppression and material preparation) • irrigation dewatering methods to adjacent lands, ensuring surface waters are not generated • active discharge based on risk assessment, where reuse and irrigation options are not appropriate.	Contractor	All
SW14	Sprinkler irrigation systems shall be installed at each basin for batch plant and dust suppression, on the spoil emplacement pads and at the crushing and screening plant.	Contractor	All
SW15	Standpipes will be considered for deployment at any operational (wetland) basins; at long-term (>12 months) sediment basins; and at high-risk short-term sediment basins.	Contractor	All
SW16	Regular inspection and maintenance of (as required) erosion and sediment controls and chemical storage will be undertaken	Contractor	All
Flooding			
SW17	Further consideration of flooding conditions and impacts, including flood modelling where necessary, will be undertaken to support future detailed design of both temporary and permanent works.	Contractor	All
SW18	Where possible, stockpiles will be located where they are not exposed to concentrated flood flow path. Flood flow is defined as the 5% Annual Exceedance Probability (AEP) flood event.	Contractor	All
SW19	Emergency flood response will be managed in accordance with the Emergency Management Plan.	Contractor	All
SW20	Protocols will be developed for use and storage of plant, equipment and materials in flood prone areas commensurate with the frequency of inundation	Contractor	All
Process and intercepted water management			
SW21	A process water management system will be established to manage water during construction and to supply water to construction activities. All surplus process water will be treated to meet the water quality levels as reported in Section 3.5.3 of this Plan and, unless an environmental protection licence authorises otherwise, in compliance with Section 25 of the EPA Act. Process water discharges to watercourses will be avoided.	Contractor	All
SW22	The process water system will be designed and constructed to minimise stormwater ingress into the system to reduce the volume of water that requires management.	Contractor	All
SW23	Where practical, the storage and handling of chemicals that have potential to contaminate the process water system will be undertaken in bunded areas.	Contractor	All

ID	Measure / Requirement	Responsibility	Area
SW24	The process water system will be designed to include the following system contingency measures: • any water treatment plants will be designed to minimise the risk of complete failure by staging treatment plants (i.e. a treatment plant may include two or more treatment systems in parallel) and providing contingency storage. • where possible, process water will be transferred to a nearby treatment plant. • any clean water storage tanks can be emptied and utilised to store untreated process water	Contractor	All
SW25	Surplus process water will not be discharged to the stormwater basins on site.	Contractor	All
SW26	Where practical, plant and equipment washdown will be undertaken in designated washdown bays or areas. If required, washdown water will be captured, treated and reused to minimise or avoid discharge to waterways.	Contractor	All
Wastewater			
SW27	A wastewater management system will be established to manage effluent and grey water from construction compounds and any accommodation camps. All wastewater will be treated to meet the water quality specifications provided in 3.5.3 of this Plan and unless an environmental protection licence authorises otherwise, in compliance with Section 25 of the EPA Act. Wastewater discharges to watercourses will be avoided. Any wastewater (sewage) systems will include emergency storage of untreated wastewater. The storage volume will be calculated at detailed design based on analysis of response times from regional waste management contractors to provide emergency trucking and offsite disposal options. Any wastewater treatment plants will be designed to operate during winter when sub-zero temperatures can persist for extended periods of time.	Contractor	All
SW28	Detailed design report and a commissioning report for the wastewater treatment plant will be submitted to the EPA.	Contractor	All
SW29	Any sewer systems will be designed to restrict stormwater ingress into the wastewater system.	Contractor	All
SW30	All wastewater produced (i.e. from showers, kitchens, laundries and toilets) will be directed to a wastewater treatment plant. All reticulation and storages will be designed to restrict stormwater and groundwater ingress into the wastewater system.	Contractor	All
SW31	Water efficient fittings will be used to minimise wastewater loads.	Contractor	All
Chemical control and spill management			
SW32	Emergency response to spills of oils and fuel, etc. will be managed in accordance with the Spill Response Procedure	Contractor	All
SW33	Construction vehicles and mechanical plant will be regularly maintained and checked for leakage of fuel and /or oils.	Contractor	All
SW34	Where possible, refuelling and maintenance of vehicles and mechanical plant will be undertaken at least 50m away from watercourses. A risk assessment that outlines suitable controls will be undertaken in the event that refuelling or maintenance is constrained to within 50m from a watercourse.	Contractor	All
SW35	Where practicable, activities that have potential to contaminate stormwater runoff will be isolated from the stormwater system by covering (i.e. by a building or roof) and/or bunding.	Contractor	All
SW36	Emergency spill kits will be kept onsite. The spill kit must be appropriately sized for the volume of substances in use. All staff would be made aware of the location of the spill kit and trained in its use.	Contractor	All

ID	Measure / Requirement	Responsibility	Area
SW37	Any fuels and chemicals stored across the Project area will be stored in bunded areas to prevent chemical spills or leakages in accordance with the relevant Australian Standards including: • ASNZS 4452:1997 The storage and handling of toxic substances, • AS1940 – 2017 The storage and handling of flammable and combustible liquids, and • Any areas to be used for long-term storage and handling (i.e. those at a site compound or dedicated fuel storage area) of hydrocarbons and chemicals will be enclosed with concrete bunds or other suitably sealed bunding.	Contractor	All
Access Roads			
SW38	Any existing access tracks that will no longer be required following the construction of the new access roads will be rehabilitated.	Contractor	All
SW39	All cut and fill batters will be stabilised as soon as practicable following construction.	Contractor	All
SW40	Roads surfaces will be constructed and maintained with aggregate material to reduce soil loss rates and water quality risks. The use of material that presents elevated water quality risks relative to other material available for road construction and maintenance will be avoided where practicable.	Contractor	All
SW41	Where practical access roads will grade to table drains that are designed and constructed to have non-erosive hydraulic capacity for the 5% AEP event. Transverse (or cross drainage) will also be constructed to have non-erosive hydraulic capacity for the 5% AEP.	Contractor	All
SW42	Temporary roads will be rehabilitated as soon as they are no longer needed.	Contractor	All
Accommodation Camps (if developed)			
SW43	Where practical, the following source controls for the accommodation camps will be applied: • the storage and handling of chemicals that have potential to contaminate the stormwater system will be undertaken in bunded areas. Any liquid waste stream will be disposed to an appropriate facility • landscaped areas will be predominately vegetated with endemic native vegetation • runoff from road and other hardstand areas will be treated in vegetated swales.	Contractor	All
SW44	Runoff from any accommodation camps will be managed by drainage systems that have a 20% AEP capacity. Overland flow paths will be provided as required.	Contractor	All
SW45	Runoff from accommodation camps will be treated in either sedimentation or bioretention basins (also referred to as raingardens). The most appropriate control will be established at detailed design with consideration of topography, soil conditions and other relevant factors.	Contractor	All
SW46	Low phosphorus products shall be used for washing activities controlled by site management (e.g. laundry services and canteens) and encouraged (via training) for general use.	Contractor	All
Works on waterfront land and instream works (watercourse diversions and crossings)			
SW47	Unless permitted by this approval, avoid carrying out of any development within 50 metres of any watercourse	Contractor	All
SW48	All instream works or development within 50 metres of any watercourse will be undertaken generally in accordance with the requirements in the SA DIT (2021) Protecting Waterways Guidelines	Contractor	All
SW49	Watercourse crossings will be constructed in accordance with the Northern and Yorke Landscape Board Water-Affecting Activities Control Policy (2020).	Contractor	All

ID	Measure / Requirement	Responsibility	Area
SW50	SEDMPs are to dictate the specific controls to be used on waterfront land. Typical measures include: • monitoring weather forecasts and taking appropriate action prior • minimising the extent of work and the amount of disturbance where possible • isolating work areas from natural flows where possible • stockpiles to be located outside of the waterfront area • use of temporary ground covers in areas of concentrated flow to minimise erosion of exposed soils during rainfall • completing and stabilising works as quickly as possible after works are complete.	Contractor	All
SW51	The disturbance area and extent to which soil and vegetation within the riparian zone are disturbed will be minimised where practicable.	Contractor	All
SW52	Direct access to the rivers and creeks by construction vehicles and mechanical plant will be minimised and permitted only within the limits of clearing and designated areas of disturbance	Contractor	All
SW53	Erosion control matting or other practical methods will be used in the riparian zone to minimise sediment entering the river channel and provision of protection against scouring and erosion of the river bed.	Contractor	All
SW54	Any watercourse that will be permanently diverted around permanent infrastructure will: • be a piped and/or surface drainage system • be designed and constructed to have non-erosive hydraulic capacity and be structurally sound for the 1% AEP event • have adequate scour protection at the system inlets and outlets. A risk assessment will be undertaken to identify risks associated with by-pass flows that may occur as a result of system blockage or an event greater than the design event.	Contractor	All
SW55	Where practical, any watercourse that will be temporarily diverted will; • be a piped and/or surface drainage system • be designed and constructed to have non-erosive hydraulic capacity and be structurally sound for a design event (that will be established by a risk assessment) • have adequate scour protection at the system inlets and outlets. A risk assessment will be undertaken to identify risks associated with by-pass flows that may occur as a result of system blockage or an event greater than the design event.	Contractor	All
SW56	Where practical, temporary watercourse diversions will seek to avoid increasing flow rates in adjoining watercourses	Contractor	All
SW57	Where practical, the permanent diversion of drainage lines or watercourses using contour drains will be avoided	Contractor	All
SW58	All culverts, bridges and service crossings will be designed by a suitably qualified professional in accordance with the relevant Austroads Guidelines or best practice methods	Contractor	All
SW59	Watercourses will be rehabilitated / reinstated in accordance with Rehabilitation Management Plan	Contractor	All
Monitoring			
SW60	If prescribed by any Environmental Protection Licences, a Surface Water Monitoring Program will be developed to establish the monitoring requirements to assess the quality of receiving waters	Contractor	All

ID	Measure / Requirement	Responsibility	Area
SW61	Rainfall forecasts will be monitored daily and the works planned, and the site works managed to minimise the potential impact of heavy rainfall and flood events. Prior to heavy rain events erosion and sediment controls will be reviewed and improved where necessary to minimise impacts.	Contractor	All
SW62	Erosion and sediment controls including clean water diversions will be inspected at least weekly (with maintenance and/or modifications made as necessary). Inspections and/or maintenance during wet-weather may be increased where necessary.	Contractor	All
SW63	A Trigger Action Response Plan (TARP) provides detail of the response actions that will be implemented in the event of an exceedance. This plan will be implemented.	Contractor	All

5.1. Risk and contingency

The key risk to the successful implementation of measures identified in Table 5-1 have been categorised based on the management measure stream. Table 5-2 outlines these risks and discusses contingency measures to implement mitigation actions.

Table 5-2 Contingency overview

Management measure stream	Risk	Contingency
Stormwater management	• stormwater management systems / controls not meeting predicted stormwater discharge quality characteristics • overtopping events • inadequate diversion of clean water or inclusion within system capacity • dewatering of captured stormwater	• design reviews • undertake monitoring in accordance with EP licencing • Implement TARP to identify investigate the exceedance mechanism • prior to heavy rain events erosion and sediment controls will be reviewed and improved where necessary to minimise impacts • seek advice from suitably qualified erosion and sediment control professional
Flooding	• flood areas not considered during detailed design	• design reviews • flood mapping extents to be reviewed during temporary and permanent designs • Emergency Management Plan
Wastewater	• wastewater treatment plant failure	• design reviews • wastewater system will include emergency storage of untreated wastewater. The storage volume will be calculated at detailed design based on analysis of response times from regional waste management contractors to provide emergency trucking and offsite disposal options. • all wastewater treatment plants will be designed to operate during winter when sub-zero temperatures can persist for extended periods of time. • undertake monitoring in accordance with EP licencing. Implement TARP to identify investigate the exceedance mechanism
Chemical control and spill management	• insufficient spill control materials (i.e. absorbent pads, spill socks, etc) • inadequate size of chemical storage area	• undertake spill response equipment inspections to confirm that spill kits are adequately stocked and distributed • conduct training / toolboxes on response to spills • inclusion of designated chemical storage areas through design for proposed storage quantities
Access Roads	• stormwater management systems / controls not meeting predicted	• design reviews

Management measure stream	Risk	Contingency
	stormwater discharge quality characteristics	• undertake monitoring in accordance with EP licencing. Implement TARP to identify investigate the exceedance mechanism
Accommodation Camps	• stormwater management systems / controls not meeting predicted stormwater discharge quality characteristics	• design reviews • undertake monitoring in accordance with EP licencing. Implement TARP to identify investigate the exceedance mechanism
Instream works (watercourse crossings)	• weather • inadequate staging of works	• design reviews • all culverts, bridges and service crossings will be designed by a suitably qualified professional in accordance with the relevant Austroads Guidelines or best practice methods • review and plan works according to weather • seek advice from suitably qualified erosion and sediment control professional • undertake monitoring in accordance with EP licencing. Implement TARP to identify investigate the exceedance mechanism
Monitoring	• data management / quality assurance	• monitoring and analysis of water quality data undertaken by trained professionals • calibration records • TARP training will be undertaken

6. Stormwater Management Options

This SMP is to develop a multi-objective approach to the management of stormwater in which:

- Flood risk to existing and future development is minimised
- Stormwater use opportunities are maximised
- Adverse impacts on watercourses and receiving waters are reduced; and
- Desirable development planning outcomes associated with open space, recreation and amenity are achieved.

6.1. Stormwater control strategy and methods

Potential erosion and sedimentation impact will be predicted, and in-turn managed, through the development of the Soil, Erosion and Drainage Management Plan (SEDMP). The SEDMP will be progressively developed as the Project proceeds through the Phases of development and will be applicable for the following works:

- vegetation clearing and initial site establishment
- construction and operation of:
    - unsealed access roads
    - WTG sites
    - Solar array sites
    - Battery emplacement sites
    - Transmission line corridor
    - accommodation camps
    - stockpile areas and emplacement areas
    - ancillary facilities including chemical storage and workshops.

Noting that no solar array sites, nor battery emplacement sites are proposed as part of Stage 1 of this project.

This plan will be designed by a suitably qualified person in consultation with construction personnel and the Project Soil Conservationist to guide staff on the appropriate controls for specific work stages. The SEDMP will be updated as required based on the progression of new areas of ground disturbance and changing site conditions.

The Environment team, through site inspections and consultation with construction personnel, will manage updates of the SEDMP.

The Project will implement the following stormwater control and treatment options:

- controls will be designed and bench-marked against predicted stormwater discharge characteristics, as identified in the Goyder Wind Farm Hydrological Study (Southfront, 2021), or up-dates (Appendix A)
- erosion and sediment controls will be installed and maintained to manage impacts to receiving environments including areas that do not trigger the need for sediment basins in compliance with the DIT Protecting Waterways Guideline (2021):
    - clean water diversions will be installed around disturbance areas and designed and inspected to minimise scour impacts to adjoining watercourses

  - sediment basins will be installed at 85th percentile 5-day rainfall event, consideration shall be given to increasing basin size at locations where sufficient space is available and / or topography does not constrain the basin size (i.e. construction pads, accommodation camps)
  - some work areas will be stabilised between the initial disturbance / works and prior to decommissioning to remove the reliance on sediment basins during this period
  - additional controls will be applied for both erosion control and sediment control to reduce reliance on the sediment basins
  - standpipes will be considered at permanent pools; at long-term (>12 months) sediment basins; and at high-risk short-term sediment basins
  - sprinkler irrigation systems will be installed at each basin, on the spoil emplacement pads and in any areas of rehabilitation.
- captured stormwater in sediment basins will use the following dewatering hierarchy:
  - maximise water reuse on site (i.e. use basin water in water carts, dust suppression)
  - irrigation dewatering methods to adjacent lands, ensuring surface waters are not generated
  - active discharge based on risk assessment, where reuse and irrigation options are not appropriate.
- locating stockpiles away from waterways and severe flood areas where possible.

These measures will be planned, designed and detailed in the progressive SEDMP as described above. Review and modifications of options, made possible on the basis of evolving design and construction elements, will be discussed with the relevant stakeholders prior to any proposed changes.

Development of relevant, site-specific erosion and sediment control (ESC) plans will mitigate development impacts at the local scale.

6.2. Stormwater quality management options

The Project is situated where runoff drains to Burra Creek either directly or via its tributaries. This runoff is separated into sub-catchment regions, as shown in Figure 3-2, to identify where impacts may be occurring. These sub-catchments include named creeks that flow into Burra Creek and local unnamed drainage areas (Figure 3-2).

A runoff quality model should be developed to represent the catchment runoff and water quality runoff (total suspended solids) from the catchments and to complement the existing hydrologic model. The setup of the model should include existing, developed and mitigated conditions. As a result, mean annual flows from each of the catchments are to be modelled. An increase in runoff surrounding the Project footprint would be expected. This is expected to be localised and naturally ameliorated as flows combine with wider catchment runoff downstream from the Project.

Mean annual total suspended solids (TSS) loads from each of the developed sub-catchments are to be modelled to assess whether sediment runoff from the Project (prior to any mitigations) will be significant. Local impacts are expected due to the changing of land use from grazing land to gravel roads and construction pads: pre-Project (existing conditions) to post-Project (developed conditions). Assessment of runoff will guide any mitigation measures that may be required to minimise impacts.

Mitigation measures should be specified, where relevant, for potential impacts as they are identified, and used to manage water quality runoff from the Project. Mitigation options should be developed

specific to the areas that will potentially be impacted and will mostly consist of a sediment basin and swale that capture sediment runoff from the disturbed areas (e.g. roads and hardstands) before it reaches the downstream environment.

The implementation of the mitigation measures for water quality will also aid in the control of the quantity of water leaving the Project area for cleared areas, therefore allowing water to be discharged to the downstream environment in a controlled manner (with appropriate dispersion approaches to avoid concentration of flows). Upgrading of causeways to support trafficking of equipment to the Project must consider appropriate design solutions to ensure potential flood impacts are managed (i.e. do not alter flow paths).

These measures, coupled with appropriate monitoring should provide sufficient mitigation to the potential change in water quantity and quality expected from the proposed development into these key water areas.

Should changes in sediment runoff be observed outside acceptable ranges, additional mitigation options might be investigated, including:

1. Additional sediment fences.
2. Additional sediment basins.
3. Increased length of swale drains along the roadsides.
4. Distributed discharges and reduced velocities of discharges to deposit sediment as close to the source (road and hard stands) as possible.

Additional operational rules may need to be considered before or after large to extreme rainfall events to ensure sediment is retained on site (e.g. dredging of any sediment basins and re-excavation of swales prior to events to reduce re-suspension).

Furthermore, use of sediment curtains and/or cofferdams should be considered to prevent suspended sediment movement during any major construction within waterways or across areas likely to be inundated in extreme events. Figure 6-1 provides generic specifications for cofferdams. Figure 6-2, Figure 6-3 and Figure 6-4 show typical drawings and generic specifications for sediment curtains.

MATERIALS

EARTH FILL: NON-DISPERSIVE EARTH FREE OF ORGANIC DEBRIS. EMERSON'S AGGREGATE CLASS 6, 7 OR 8.

GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH (MINIMUM 'BIDIM' A34 OR EQUIVALENT).

INSTALLATION

1. PRIOR TO COMMENCING ANY WORKS, OBTAIN ALL NECESSARY APPROVALS AND PERMITS REQUIRED TO CONDUCT THE NECESSARY WORKS INCLUDING PERMITS FOR THE DISTURBANCE OF RIPARIAN AND AQUATIC VEGETATION, AND THE CONSTRUCTION OF ALL PERMANENT OR TEMPORARY INSTREAM BARRIERS AND INSTREAM SEDIMENT CONTROL MEASURES.

2. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

3. IF THERE IS FLOW WITHIN THE WATERCOURSE OR DRAINAGE CHANNEL AT THE TIME OF INSTALLATION OF THE COFFERDAM, THEN INSTALL APPROPRIATE DOWNSTREAM SEDIMENT CONTROL DEVICES AND/OR FLOW DIVERSION SYSTEMS PRIOR TO INSTALLATION OF THE DAM. SUCH MEASURES SHOULD ONLY BE INSTALLED IF CONSIDERED APPROPRIATE FOR THE LOCAL CONDITIONS, AND ONLY IF THEIR INSTALLATION IS JUDGED TO PROVIDE A NET OVERALL ENVIRONMENTAL BENEFIT.

4. TO THE MAXIMUM DEGREE PRACTICAL, CONSTRUCTION ACTIVITIES AND EQUIPMENT MUST NOT OPERATE WITHIN OPEN FLOWING WATERS.

5. ENSURE CLEARING AND EXCAVATION OF ACCESS PATHS AND THE BANKS AND BED OF THE WATERCOURSE ARE LIMITED TO THE MINIMUM PRACTICABLE.

6. IF DISPERSIVE, HIGHLY UNSTABLE, OR HIGHLY EROSIVE SOILS ARE EXPOSED, THEN PRIORITY MUST BE GIVEN TO THE PROMPT STABILISATION OF ALL SUCH AREAS.

7. REMOVE ANY CLEARED ORGANIC MATTER OR DEBRIS FROM THE CHANNEL AND DISPOSE OF IT PROPERLY. DO NOT USE ORGANIC MATTER OR DEBRIS TO BUILD THE COFFERDAM.

8. TO ASSIST IN THE EVENTUAL REMOVAL OF ALL MATERIALS USED IN THE CONSTRUCTION OF A TEMPORARY COFFERDAM, A PROTECTIVE LAYER OF GEOTEXTILE FILTER CLOTH (PREFERABLY IN THE FORM OF A SINGLE SHEET) SHOULD BE PLACED OVER THE CHANNEL PRIOR TO INSTALLATION OF THE COFFERDAM. IF MORE THAN ONE SHEET OF FABRIC IS REQUIRED, OVERLAP THE FABRIC BY AT LEAST 600mm.

9. IF THE COFFERDAM IS TO BE CONSTRUCTED OF FREE-STANDING COMPACTED FILL, THE SIDES OF THE COFFERDAM MUST BE NO STEEPER THAN 2:1 (H:V).

10. STABILISE ALL DISTURBED AREAS SUBJECT TO FLOWING WATER, INCLUDING FLOW BYPASS AND OVERFLOW AREAS, WITH ROCK OR OTHER SUITABLE MATERIALS IF EXPECTED FLOW VELOCITIES EXCEEDS THAT ALLOWABLE FOR THE IN-SITU MATERIAL. THE MINIMUM ROCK SIZE PLACED WITHIN THE MAIN CHANNEL SHALL BE 200mm.

MAINTENANCE

1. WHILE CONSTRUCTION WORKS CONTINUE ON THE SITE, INSPECT THE COFFERDAM PRIOR TO FORECAST RAINFALL, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER RUNOFF PRODUCING RAINFALL, OR OTHERWISE ON A WEEKLY BASIS.

2. ENSURE THAT COFFERDAM IS STABLE AND UNDAMAGED.

3. DISPOSE OF EXCESSIVE ACCUMULATIONS OF SEDIMENT OR DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

4. REPAIR ANY PLACES IN THE COFFERDAM THAT HAVE WEAKENED OR THAT HAVE BEEN SUBJECTED TO DAMAGE FROM STREAM FLOWS OR OVERTOPPING WATER.

5. IF A BYPASS FLOODWAY EXISTS, CHECK THAT THE FLOODWAY IS STABLE AND CAPABLE OF OPERATING AT ITS DESIGN CAPACITY.

REMOVAL

1. COFFERDAMS SHOULD BE REMOVED AS SOON AS POSSIBLE AFTER THEY ARE NO LONGER NEEDED.

2. IF EXCESSIVE SEDIMENT OR DEBRIS HAS COLLECTED UPSTREAM OF THE COFFERDAM, REMOVE SUCH MATERIAL BEFORE THE DAM IS REMOVED AND DISPOSE OF SUCH MATERIAL PROPERLY.

3. IF THERE IS FLOW WITHIN THE WATERCOURSE OR DRAINAGE CHANNEL AT THE TIME OF REMOVAL OF THE COFFERDAM, THEN INSTALL APPROPRIATE DOWNSTREAM SEDIMENT CONTROL DEVICES AND/OR FLOW DIVERSION SYSTEMS PRIOR TO REMOVAL OF THE DAM. SUCH MEASURES SHOULD ONLY INSTALLED IF CONSIDERED APPROPRIATE FOR THE LOCAL CONDITIONS, AND ONLY IF THEIR INSTALLATION IS JUDGED TO PROVIDE A NET OVERALL ENVIRONMENTAL BENEFIT.

4. ENSURE ANY CHANNEL WATER CONTAINED WITHIN THE ENCLOSED CHANNEL AREA IS SUITABLY TREATED BEFORE EITHER THE WATER IS DISCHARGED FROM THE ENCLOSURE OR THE COFFERDAMS ARE REMOVED.

5. ENSURE THE RELEASE OF SEDIMENT AND THE DAMAGE TO THE CHANNEL'S BED AND BANKS IS MINIMISED DURING REMOVAL OF THE COFFERDAMS.

6. REMOVE ALL CONSTRUCTION MATERIALS, SEDIMENT DEPOSITS AND DEBRIS AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. RESTORE THE WATERCOURSE CHANNEL TO ITS ORIGINAL CROSS-SECTION, AND SMOOTH AND APPROPRIATELY STABILISE AND/OR REVEGETATE ALL DISTURBED AREAS.

Drawn:	Date:		
GMW	Apr-10	Cofferdams (General)	Dam-01

Figure 6-1 Generic specifications of cofferdams (BPESC, 2021)

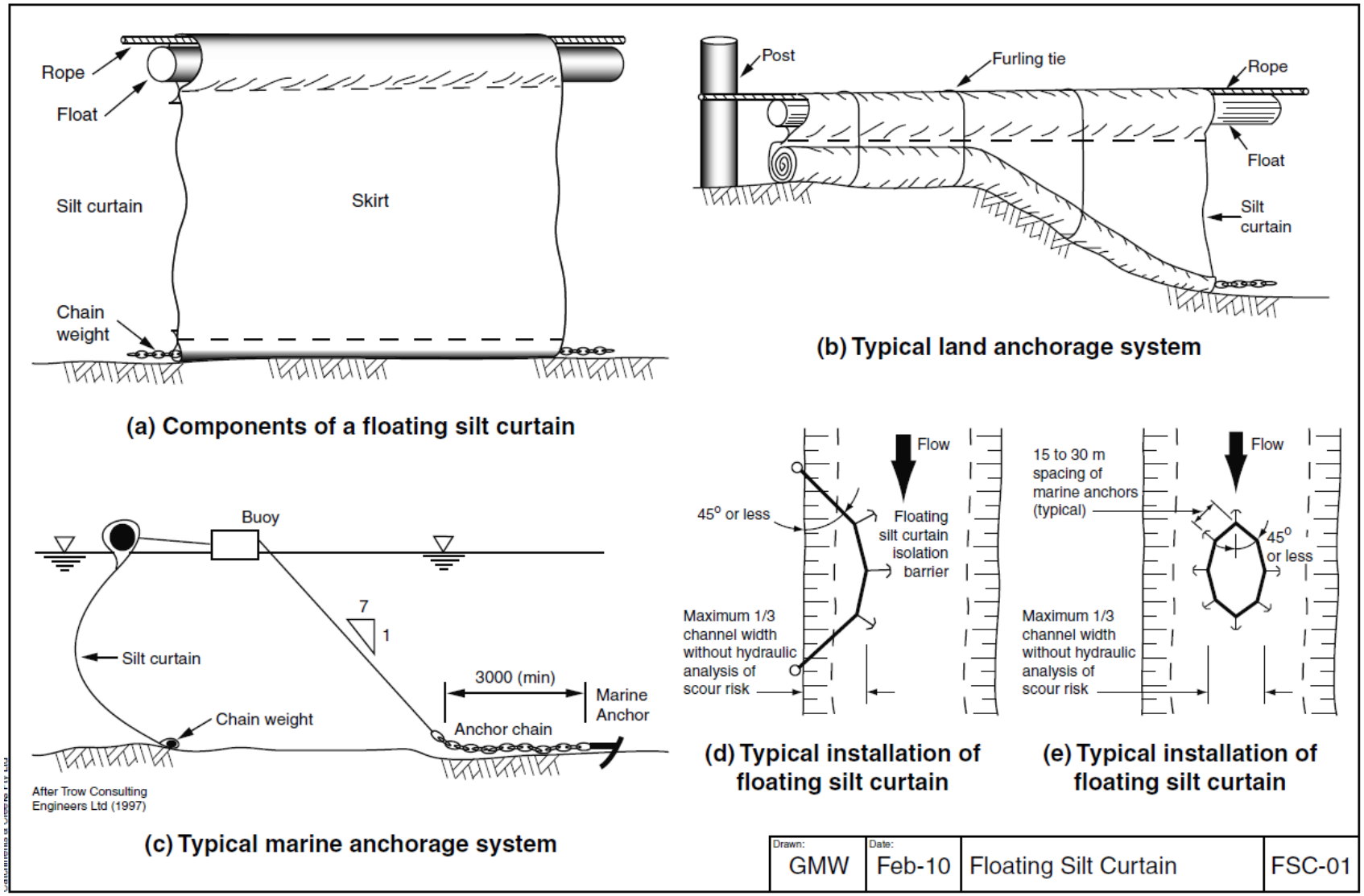

Figure 6-2 Typical drawings of sediment curtains (BPESC, 2021)

MATERIALS

SILT CURTAIN FABRIC: MANUFACTURED FROM A WOVEN GEOTEXTILE, CANVAS/TARP MATERIAL, OR A COMMERCIALLY AVAILABLE SILT CURTAIN SUCH AS NYLON REINFORCED POLYVINYL CHLORIDE (PVC) OR EQUIVALENT.

BALLAST CHAIN: 10 TO 13mm GALVANISED CHAIN WITH MINIMUM 1.9 TO 3.3kg/m WEIGHT.

LAND ANCHOR: MINIMUM 100mm DIAMETER TIMBER POST (OR EQUIVALENT).

MARINE ANCHOR: MINIMUM 5kg LIGHTWEIGHT (DANFORTH) TYPE ANCHOR WITH 10 TO 13mm NYLON TIE ROPE AND MINIMUM 3m LENGTH OF 8mm GALVANISED CONNECTING CHAIN.

INSTALLATION

1. PRIOR TO COMMENCING ANY WORKS, OBTAIN ALL NECESSARY APPROVALS AND PERMITS REQUIRED TO CONDUCT THE NECESSARY WORKS INCLUDING PERMITS FOR THE DISTURBANCE OF RIPARIAN AND AQUATIC VEGETATION, AND THE CONSTRUCTION OF ALL PERMANENT OR TEMPORARY INSTREAM BARRIERS AND INSTREAM SEDIMENT CONTROL MEASURES.

2. PRIOR TO THE INSTALLATION, CHECK WEATHER REPORTS FOR A SUITABLE WINDLESS, CALM DAY. DO NOT PROCEED WITH THE INSTALLATION UNLESS SAFE TO DO SO.

3. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

4. CLEAR THE IMMEDIATE LAUNCHING AREA OF ROCK AND DEBRIS. AVOID DISTURBING GROUNDCOVER VEGETATION.

5. LAYOUT A PLASTIC LAUNCHING PAD (SPILLWAY) AT RIGHT ANGLES TO THE WATERCOURSE BANK AND PEG OR ANCHOR IT DOWN. THIS IS TO PROTECT THE CURTAIN AND REDUCE FRICTION WHEN LAUNCHING.

6. UNFOLD THE CURTAIN IN AN OPEN AREA PRIOR TO ITS INSTALLATION. ENSURE THE BARRIER IS FABRICATED WITH SUFFICIENT DIMENSIONS TO BE IN GOOD CONTACT WITH THE BOTTOM OF THE CHANNEL. THE DEPTH OF THE BARRIER SHOULD BE APPROXIMATELY 10% GREATER THAN THE WATER DEPTH TO ENSURE IT RESTS ON THE BED.

7. IDEALLY, THE LENGTH OF THE BARRIER IS 10 TO 20% LONGER THAN THE MEASURED LENGTH OF THE PROPOSED ENCLOSURE.

8. UNFOLD THE FIRST CURTAIN PANEL ON THE SLIPWAY.

9. INSERT THE FLOATS BOTH ENDS FOR EASE OF INSTALLATION.

10. PULL THROUGH THE STEEL CHAIN IN THE BOTTOM SLEEVE USING THE DRAW CORD.

11. PULL THROUGH THE ROPE USING THE DRAW CORD.

12. PRIOR TO DEPLOYING THE BARRIER, GATHER UP THE CURTAIN AND TIE THE CURTAIN WITH LIGHTWEIGHT STRAPS OR ROPE EVERY 1 TO 1.5m. THE AIM OF THIS IS TO ENABLE THE CURTAIN TO BE SET IN PLACE IN THE WATER EASILY WITHOUT THE CURTAIN BEING DRAGGED ALONG THE CHANNEL BED.

13. SET THE UPSTREAM BANK ANCHOR POINT AND TIE OFF ONE END OF THE BARRIER, ENSURING NO WATER WILL BE ABLE TO FLOW INTO THE UPSTREAM END.

14. DEPLOY THE BARRIER FROM THE END OF A BOAT. FASTEN THE FREE END OF THE BARRIER TO THE DOWNSTREAM ANCHOR POINT, THEN ANCHOR THE BARRIER AT INTERMEDIATE POINTS.

15. TAPER THE ENDS OF THE BARRIER TO THE SHAPE OF THE SHORELINE, OTHERWISE TIE THE ENDS OF THE BARRIER WITH FURLING STRAPS SO THE DEPTH OF THE BARRIER CAN BE ADJUSTED TO THE SHAPE OF THE BANK.

16. AFTER THE BARRIER HAS BEEN ANCHORED, CHECK TO SEE THAT THE SKIRT IS NOT TWISTED AROUND THE FLOTATION UNITS. WHEN THE BARRIER IS PROPERLY DEPLOYED, CUT THE TIE ROPES AND LET THE BALLAST WEIGHTS SINK TO THE BED.

17. ENSURE THE SKIRT (AT MAXIMUM WATER LEVEL) IS FREE OF LARGE PLEATS THAT MAY COLLECT SEDIMENT CAUSING THE BARRIER TO BE PULLED UNDER THE WATER SURFACE.

MAINTENANCE

1. INSPECT THE SILT CURTAIN DAILY FOR DAMAGE.

2. ENSURE THE TOP OF THE BARRIER REMAINS ABOVE THE WATER SURFACE, AND THE CURTAIN IS FREE OF TEARS OR GAPS.

3. ENSURE THE BARRIER REMAINS IN THE SPECIFIED LOCATION.

4. CHECK FOR TURBIDITY LEAKS.

5. CHECK ALL ANCHOR POINTS.

6. REPAIR OR REPLACE ANY TORN SEGMENTS.

7. CHECK FOR SEDIMENT BUILD-UP ON THE BOTTOM OF THE SKIRT THAT MAY BEGIN TO PULL THE CURTAIN UNDER THE WATER.

8. DISPOSE OF ANY EXCESSIVE SEDIMENT OR DEBRIS DEPOSITS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

9. REPAIR ANY PLACES IN THE ISOLATION BARRIER THAT HAVE WEAKENED OR THAT HAVE BEEN SUBJECTED TO DAMAGE FROM INFLOWS OR OVERTOPPING WATER.

REMOVAL

1. THE SILT CURTAIN SHOULD BE REMOVED AS SOON AS POSSIBLE AFTER IT IS NO LONGER NEEDED.

2. IF EXCESSIVE SEDIMENT OR DEBRIS HAS COLLECTED AROUND THE BARRIER, THEN REMOVE SUCH MATERIAL BEFORE THE BARRIER IS REMOVED AND DISPOSE OF SUCH MATERIAL PROPERLY.

3. ENSURE THE CHANNEL WATER CONTAINED WITHIN THE ENCLOSURE HAS ACHIEVED A SUITABLE WATER QUALITY BEFORE REMOVING THE SILT CURTAIN.

4. ENSURE THE RELEASE OF SEDIMENT AND THE DAMAGE TO THE CHANNEL'S BED AND BANKS IS MINIMISED DURING REMOVAL OF THE SILT CURTAIN.

5. IF IT IS NOT FEASIBLE TO WAIT FOR ADEQUATE SETTLEMENT OF SUSPENDED SEDIMENTS, THEN WHERE PRACTICABLE, PUMP THE SEDIMENT-LADEN WATER TO AN OFF-STREAM DE-WATERING SEDIMENT CONTROL SYSTEM FOR TREATMENT. THIS TREATMENT AREA SHOULD IDEALLY BE LOCATED AT LEAST 50m FROM THE CHANNEL.

6. REMOVE ALL CONSTRUCTION MATERIALS, EXCESSIVE SEDIMENT DEPOSITS AND DEBRIS AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. RESTORE THE WATERCOURSE CHANNEL TO ITS ORIGINAL CROSS-SECTION, AND SMOOTH AND APPROPRIATELY STABILISE AND/OR REVEGETATE ALL DISTURBED AREAS.

Drawn:	Date:		
GMW	Feb-10	Floating Silt Curtain	FSC-02

Figure 6-3 Generic specifications of sediment curtains (BPESC, 2021)

MATERIALS

SILT CURTAIN FABRIC: MANUFACTURED FROM A WOVEN GEOTEXTILE, CANVAS/TARP MATERIAL, OR A COMMERCIALLY AVAILABLE SILT CURTAIN SUCH AS NYLON REINFORCED POLYVINYL CHLORIDE (PVC) OR EQUIVALENT.

BALLAST CHAIN: 10 TO 13mm GALVANISED CHAIN WITH MINIMUM 1.9 TO 3.3kg/m WEIGHT.

LAND ANCHOR: MINIMUM 100mm DIAMETER TIMBER POST (OR EQUIVALENT).

MARINE ANCHOR: MINIMUM 5kg LIGHTWEIGHT (DANFORTH) TYPE ANCHOR WITH 10 TO 13mm NYLON TIE ROPE AND MINIMUM 3m LENGTH OF 8mm GALVANISED CONNECTING CHAIN.

ALTERNATIVE LAND-BASED INSTALLATION PROCEDURE

1. UNFOLD THE FIRST CURTAIN PANEL ON THE SLIPWAY.

2. INSERT THE FLOATS BOTH ENDS FOR EASE OF INSTALLATION.

3. PULL THROUGH THE STEEL CHAIN IN THE BOTTOM SLEEVE USING THE DRAW CORD.

4. PULL THROUGH THE ROPE USING THE DRAW CORD.

5. PRIOR TO DEPLOYING THE BARRIER, GATHER UP THE CURTAIN AND TIE THE CURTAIN WITH LIGHTWEIGHT STRAPS OR ROPE EVERY 1 TO 1.5m. THE AIM OF THIS IS TO ENABLE THE CURTAIN TO BE SET IN PLACE IN THE WATER EASILY WITHOUT THE WEIGHTS BEING DRAGGED ALONG THE BOTTOM.

6. SET THE UPSTREAM BANK ANCHOR POINT AND TIE OFF ONE END OF THE BARRIER, ENSURING NO WATER WILL BE ABLE TO FLOW INTO THE UPSTREAM END.

7. INSTALL AN EXTRA LENGTH OF ROPE OR CABLE IN THE FINAL CURTAIN POSITION IN THE WATER.

8. TIE THE END OF THE CURTAIN ROPE TO THE EXTRA LENGTH ALREADY IN POSITION AND PULL THE CURTAIN INTO THE WATER STOPPING WHEN THE END OF THE FIRST SECTION OF CURTAIN IS STILL ON THE BANK.

9. UNFOLD THE SECOND SECTION OF CURTAIN ON THE SLIPWAY MAKING SURE THE CURTAIN IS CORRECTLY ORIENTATED WITH THE FIRST SECTION OF CURTAIN

10. INSERT THE FLOATS, CHAIN AND ROPE AS BEFORE.

11. USING THE DRAW CORD FROM THE FIRST SECTION, TIE UP THE ENDS USING THE EYELETS ALREADY IN THE CURTAIN.

12. GATHER UP THE CURTAIN AND TIE TOGETHER WITH TWINE OR THIN ROPE.

13. LAUNCH AS BEFORE.

14. CONTINUE UNTIL THE ENTIRE CURTAIN IS INSTALLED.

15. ANCHOR WELL TO SHORE ANCHORS.

16. USING A SUITABLE BOAT, MOVE ALONG THE CURTAIN AND CUT THE TIES HOLDING THE CHAIN AND CURTAIN AND ALLOW THE WEIGHTED END TO SINK.

17. ENSURE THE SKIRT (AT MAXIMUM WATER LEVEL) IS FREE OF LARGE PLEATS THAT MAY COLLECT SEDIMENT CAUSING THE BARRIER TO BE PULLED UNDER THE WATER SURFACE.

MAINTENANCE

1. INSPECT THE SILT CURTAIN DAILY FOR DAMAGE.

2. ENSURE THE TOP OF THE BARRIER REMAINS ABOVE THE WATER SURFACE, AND THE CURTAIN IS FREE OF TEARS OR GAPS.

3. ENSURE THE BARRIER REMAINS IN THE SPECIFIED LOCATION.

4. CHECK FOR TURBIDITY LEAKS.

5. CHECK ALL ANCHOR POINTS.

6. REPAIR OR REPLACE ANY TORN SEGMENTS.

7. CHECK FOR SEDIMENT BUILD-UP ON THE BOTTOM OF THE SKIRT THAT MAY BEGIN TO PULL THE CURTAIN UNDER THE WATER.

8. DISPOSE OF ANY EXCESSIVE SEDIMENT OR DEBRIS DEPOSITS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

9. REPAIR ANY PLACES IN THE ISOLATION BARRIER THAT HAVE WEAKENED OR THAT HAVE BEEN SUBJECTED TO DAMAGE FROM INFLOWS OR OVERTOPPING WATER.

REMOVAL

1. THE SILT CURTAIN SHOULD BE REMOVED AS SOON AS POSSIBLE AFTER IT IS NO LONGER NEEDED.

2. IF EXCESSIVE SEDIMENT OR DEBRIS HAS COLLECTED AROUND THE BARRIER, THEN REMOVE SUCH MATERIAL BEFORE THE BARRIER IS REMOVED AND DISPOSE OF SUCH MATERIAL PROPERLY.

3. ENSURE THE CHANNEL WATER CONTAINED WITHIN THE ENCLOSURE HAS ACHIEVED A SUITABLE WATER QUALITY BEFORE REMOVING THE SILT CURTAIN.

4. ENSURE THE RELEASE OF SEDIMENT AND THE DAMAGE TO THE CHANNEL'S BED AND BANKS IS MINIMISED DURING REMOVAL OF THE SILT CURTAIN.

5. IF IT IS NOT FEASIBLE TO WAIT FOR ADEQUATE SETTLEMENT OF SUSPENDED SEDIMENTS, THEN WHERE PRACTICABLE, PUMP THE SEDIMENT-LADEN WATER TO AN OFF-STREAM DE-WATERING SEDIMENT CONTROL SYSTEM FOR TREATMENT. THIS TREATMENT AREA SHOULD IDEALLY BE LOCATED AT LEAST 50m FROM THE CHANNEL.

6. REMOVE ALL CONSTRUCTION MATERIALS, EXCESSIVE SEDIMENT DEPOSITS AND DEBRIS AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. RESTORE THE WATERCOURSE CHANNEL TO ITS ORIGINAL CROSS-SECTION, AND SMOOTH AND APPROPRIATELY STABILISE AND/OR REVEGETATE ALL DISTURBED AREAS.

Drawn:	Date:		
GMW	Feb-10	Floating Silt Curtain (alt)	FSC-03

Figure 6-4 Generic specifications of alternative sediment curtains (BPESC, 2021)

6.3. Process water management

Opportunities for harvesting and reusing stormwater have been investigated for this SMP, particularly in relation to storing and reusing stormwater through managed aquifer recharge and recovery. Limited scope was determined, however, specifically considering the current River Murray Prescribed Watercourse Area controls on the development and use of surface water and groundwater resources. Opportunities do exist and these are explored below.

MANAGED AQUIFER RECHARGE (MAR)

MAR is the process of adding stormwater and/or treated wastewater to aquifers in a controlled environment. The purpose of MAR is to allow for the storage and extraction of reuse water for beneficial use, be this for amenity, horticultural or commercial use, or for providing alternative water resources particularly in extended dry periods. The use of MAR is preferred over storage in dams as the latter are prone to high evaporation rates and require significant and on-going maintenance and management to ensure no detrimental impacts to the landscape. As noted above (Section 3.6.1.1), farm dams are over-developed in the region and are not the preferred storage medium, though locally, existing dams may be requisitioned for use by the Project.

It would be difficult to determine the actual suitability of a Burra MAR scheme, however, without preliminary testing of existing and new bores. Given the available information indicates fractured rock aquifers and a fault line beneath the subsurface of the immediately surrounding (~2km) area, it is envisaged that difficulties would be encountered including:

- Low injection and extraction rates and volumes due to low yielding aquifer
- Clogging of fractures due to a highly weathered regolith
- Inadequate recovery of injected water due to dispersion of the injected waters in a fractured aquifer system (injected water may thus move beyond the zone of influence of pumping, hence not be able to be recovered).

WASTEWATER MANAGEMENT OPTIONS

Opportunities for stormwater reuse, however, would help to support the Government strategies described below (Water Technology, 2021):

- The South Australian Government's Stormwater Strategy (2011) has targets for the Greater Adelaide region as well as providing the basis for stormwater management in regional areas of the State. It supports the State Government's water security plan "Water for Good" (2009) target of harvesting 15 GL/year in regional areas by the year 2050.
- The Regional Council of Goyder (Council) and the community engaged Australian Water Environments (AWE) to develop an Integrated Water Management Plan (IWMP) for Burra (2012) with the aim of water-proofing the region. This is to be done by diversifying the availability of water resources via assessing the future water requirements of the region; identifying future potential water sources, including those created through stormwater capture and wastewater treatment and reuse; and identifying the appropriate strategies to secure water appropriately to enable future supply and demands.
- Council's Development Plan encourages development to be sited and designed to capture and re-use stormwater, where practical.
- Burra Creek is within SA Murray-Darling Basin region Prescribed Water Resources Area and the associated Water Allocation Plan (WAP) places controls on the development and use of surface

water and groundwater resources. Council will need to comply with the requirements of the WAP particularly in relation to pursuing any water harvesting activities from the Burra Creek or its tributaries

Due to significant constraints in the region, reuse would require further investigations and is unlikely to provide significant beneficial options. The major constraints include the variable nature of the local aquifers limiting the use of MAR and that Burra Creek is already a water-stressed system and surface water management through stormwater reuse is likely to exacerbate this condition.

6.4. Flood mitigation options

The fundamental objective of flood mitigation options is to ensure non-worsening conditions of the landscape following development. To develop flood mitigation options, this SMP has considered risk issues and opportunities, including:

- The potential for flooding within the catchment
- The nature and impact of flooding on properties and the potential for economic loss and environmental impact
- The positive and negative impacts of future development on flooding
- Stormwater quality issues within streams and receiving waters both within the catchment and downstream from the catchment
- Opportunities for better managing flood risk (where such risk is identified).

This SMP assists with achieving improved protection from flooding by recommending general mitigation measures which should be considered as potential options in lieu of detailed flood studies to generate a finalised list of site-specific options. Options should include:

- Formulising drainage paths to limit flooding of properties
- Ensuring drainage infrastructure is appropriate for conveying flows (e.g. culvert capacities)
- Appropriate finished floor levels to prevent over bank flooding
- Reducing any restriction to flows caused by inefficient drainage systems
- Construction of stormwater infrastructure.

All infrastructure and particularly creek crossing developments will be discussed with Goyder Regional Council and maintenance and management procedures will be developed through erosion and sediment controls as appropriate to individual situations. Following experience in the region following major flood events in 2022 across the Eyre Peninsula (DIT, 2022), the preferred options will be to develop crossings that enable efficient and safe over-topping of crossings where feasible and practicable and by following guidelines stipulated in the corresponding Water Affecting Activities Permit (*see* Sections 3.8 and 6.7) issued by Northern and Yorke Landscape Board.

This SMP specifically considers all activities from pre-development through development. Post-development, some on-going maintenance, including sediment removal in internally draining areas and scour repairs at culvert inlets and outlets would likely continue to be required after significant flood events.

6.5. Implementation timeframe

A 3-phase program for implementing the recommended options has been developed (Table 6-1). To develop a detailed prioritized program and in accordance with the multi-objective approach to stormwater management, greater weighting should be placed on options that also provide

opportunities for stormwater reuse, and improvement to water quality, open space/local amenity, biodiversity and recreation.

Table 6-1 Overall implementation program of mitigation options

Option	Implementation phase		
	Pre-development	Under development	Post-development
Formulising drainage paths	x		
Reducing any restriction to flows caused by inefficient drainage systems	x		
Drainage maintenance			x
Appropriate finished floor levels	x	x	
Stormwater infrastructure	x	x	x
Stormwater quality devices (sediment basin and a swale)	x	x	x

6.6. Detailed design

The 100% design drawings have been completed for the Stage 1 Wind Farm area. These include provision of stormwater protection features and indicate the location and construction requirements for stormwater infrastructure.

Culvert design has taken the flow characteristics of the 5% AEP (20-year ARI) criteria modelling by Southfront (2021) and used these volume and velocity determinations to stipulate minimum culvert dimensions and construction attributes. The 5% AEP was chosen as the appropriate return frequency for design purposes in a landscape that is predominantly ephemeral and events that generate greater than 5% AEP flows would generally result in cessation of any construction activities and preservation of existing infrastructure only. Experience from significant events in 2021 and early 2022 to the west of the project area demonstrated that larger infrastructure designed for larger events also failed and resulted in significant downstream damage (DIT, 2022).

Use of infrastructure for 5% AEP events provides adequate stormwater flow during the majority of flood events to allow continued activities, whilst design to allow for over-topping in more extreme events mitigates the potential for increased damage caused by failure of larger infrastructure during extreme events (Lee Wallis, Goyder Regional Council, *pers. comm*. 2022).

6.7. Water Affecting Activities Permits

Water Affecting Activity (WAA) Permits have been granted for all relevant proposed crossings within the Stage 1 area and along the Overhead Transmission Line (OHTL) corridor. WAAs are required at all locations where a Strahler third order or higher creek line is to be traversed for access or construction purposes. WAAs are granted for activities on a landholder's property and hence are applied for on behalf of consenting landholders.

A total of twelve (12) WAA applications were required to cover the land parcels containing the wind farm, all access tracks and the OHTL corridor. As of July, 2022, eleven (11) have been granted, with the twelfth pending decision on a parcel of Crown Land along the proposed OHTL corridor. The permits allow for construction activities across twenty-six (26) 3rd order or higher crossings that are not already maintained by Council. An additional eight (8) crossings along public roads will also be utilised and may be up-graded where required. WAAs are not required for public roads where no substantive changes are planned (e.g. only grading and maintenance works planned). WAAs are also not required for road improvements across creeks that are less than 3rd order. The Stage 1 works require a total of fifty-five (55) crossings (39 1st and 2nd order and 16 3rd order and above); the OHTL requires thirty-four (34: 19 1st and 2nd order; 15 3rd order).

Four WAA permits were required to support activities within the Stage 1 Wind Farm areas. The permit applications included 100% design for all WTGs, permanent access tracks, temporary construction facilities and associated infrastructure (including culverts, drainage diversion channels, bunding and storage ponds (for temporary facilities only). The site and construction information provides constraints on the permitted activities. Any activities not detailed int eh application require further assessment and permitting.

An additional eight applications were bundled into two permits for the creek crossings for the OHTL. This reflected the reduced level of construction required for the temporary access and no permanent infrastructure requirements along this area.

Permits were granted for the erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a water course (Clause 104(4)(b) of the *Landscape South Australia Act 2019* concerning: buildings or structures, pump house, culvert, crossing point or fencing).

A summary of acquired WAA Permits is provided at Table 6-2.

Table 6-2 Summary of Water Affecting Activities' Permits for Stage 1 activities

WAA Permit #	Permit date	Land Parcels affected			
N21033	02/06/2022	H200100 S389			
N21034	02/06/2022	D12300 A2	F101459 A14	F101457 A12	F17596 A3
N21035	03/06/2022	D42727 Q1			
N21038	21/06/2022	H200800 S186	D46215 A344	H200800 S40	D46215 A344
N22001	11/07/2022	H200200 S21	H200200 S22		
N22002	14/07/2022	H200300 S157	H200300 167	H200300 S258	H200300 S39E
		F177073 A191	H200300 S33	H200300 S14	D120572 A302
		D62492 A100			

The following general conditions of consent apply to all granted WAA Permits:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow.
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified, and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

In addition:

1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the Native Vegetation Act 7991. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

All 100% Design Drawings have taken these principles into consideration during drafting.

Copies of the submitted application information are provided at Appendix B. Granted permits are provided at Appendix C.

6.8. Roles and responsibilities

It is the responsibility of all head contractors to:

- Ensure that responsibilities for implementation of the SMP are clearly identified.
- Ensure appropriate environmental expertise is available.
- Ensure staff and subcontractors are aware of their responsibilities through appropriate induction and training programs.
- Ensure the SMP is implemented and maintained as specified.

Specifically, the following responsibilities are identified:

6.8.1. Project Manager and/or Construction Manager

- Ensure that this Stormwater Management Plan (SMP) is communicated to relevant Project personnel daily and undertake site specific inductions.
- Ensure that all relevant aspects of this SMP are implemented by GLC personnel and Subcontractor personnel
- Ensure adequate resources are provided to ensure this SMP can be effectively implemented and maintained

6.8.2. HSE Manager

- Assist the Project Manager, Supervisors and Contractor representatives to implement this SMP
- Modify this SMP to meet any project specific contractual and legislative requirements
- Where modifications are made to this SMP an equivalent or higher level of health and safety MUST be achieved (e.g. in the event a client requires their system to be implemented and used)
- Monitor compliance with the SMP and report non-compliance to the Project Manager.

6.8.3. Supervisors

- Implement all relevant aspects of this SMP
- Identify and assess high risk construction areas when erosion or flood risk is identified.

6.8.4. Workers

- Comply with all relevant aspects of this SMP
- Do not put themselves or other at risk
- Report any erosion or drainage impacts immediately.

6.9. Inspections and Monitoring

Inspection and management measures should be documented as part of the records of implementation of the SMP and Weekly Site Reports and be made available to the contract manager. Reports should include details of rainfall; water quality testing (if required); the effectiveness of site management measures and any modifications proposed; and other matters which contribute to the level of performance of work practices.

Monitoring measures should include:

- Regular inspections and maintenance of all treatment devices on site.
- Checks that suitable site measures are in place prior to rain events.

- After each significant runoff event, inspection for damage or clogging by silt or debris and replacement or clean out as necessary.
- Ensure temporary drainage measures such as diversion channels are in place on site at the end of each day, particularly if rain is forecast.
- Ensure all EPA site licence conditions are complied with.
- On sensitive sites, where appropriate, or where required by contract or licence conditions, undertake water quality monitoring to effectively manage the site. Such monitoring should be undertaken simultaneously up-stream and down-stream of the site and include stream flow. Frequency of monitoring should be guided by the Transport SA (2002) Water Quality Monitoring Manual for Construction Sites.

6.10. Incidents, Auditing and reporting

If inspection and monitoring indicate a notable failure in the Sediment, Erosion and Drainage Control Program, the source of the failure should be investigated and remediation measures undertaken and procedures modified, as appropriate.

An environmental audit should be conducted annually to ensure that the plant is operating according to its environmental objectives and within legislative requirements. Implementing environmental complaint procedures and training staff to recognise and minimise environmental hazards are also good ways of achieving high standards of environmental compliance through continuous improvement. There may be benefits in providing integrated quality, safety and environmental management systems for the site, plant operation and delivery process.

6.11. Stormwater Management Outcomes

Provision of the management measures provided in Section 5, combined with site-specific SEDMPs (as defined in Section 6.1), will ensure that the project does not pose significant impact to water resources in the area.

Specifically, any stormwater discharge that interacts with project infrastructure will be monitored and not discharged to the natural environment unless at a quality that poses no environmental threat.

All waterway crossings will be designed to not impede the natural flow of the watercourse and will be designed to enable fish passage and minimal environmental disruption to the natural flow regime. No change to existing flood conditions will be achieved.

All infrastructure will be set-back a minimum of 30 metres from all watercourses and concrete batch plants will be set back a minimum of 50 metres.

Sites that may generate potential pollutants (such as the concrete plants and fuel dumps) will be contained and suitable retention structures built to diminish discharge to the natural environment to acceptable levels. All potential contaminants will be retained, stored and disposed of to a registered waste disposal site or treated to suitable quality prior to discharge.

7. References

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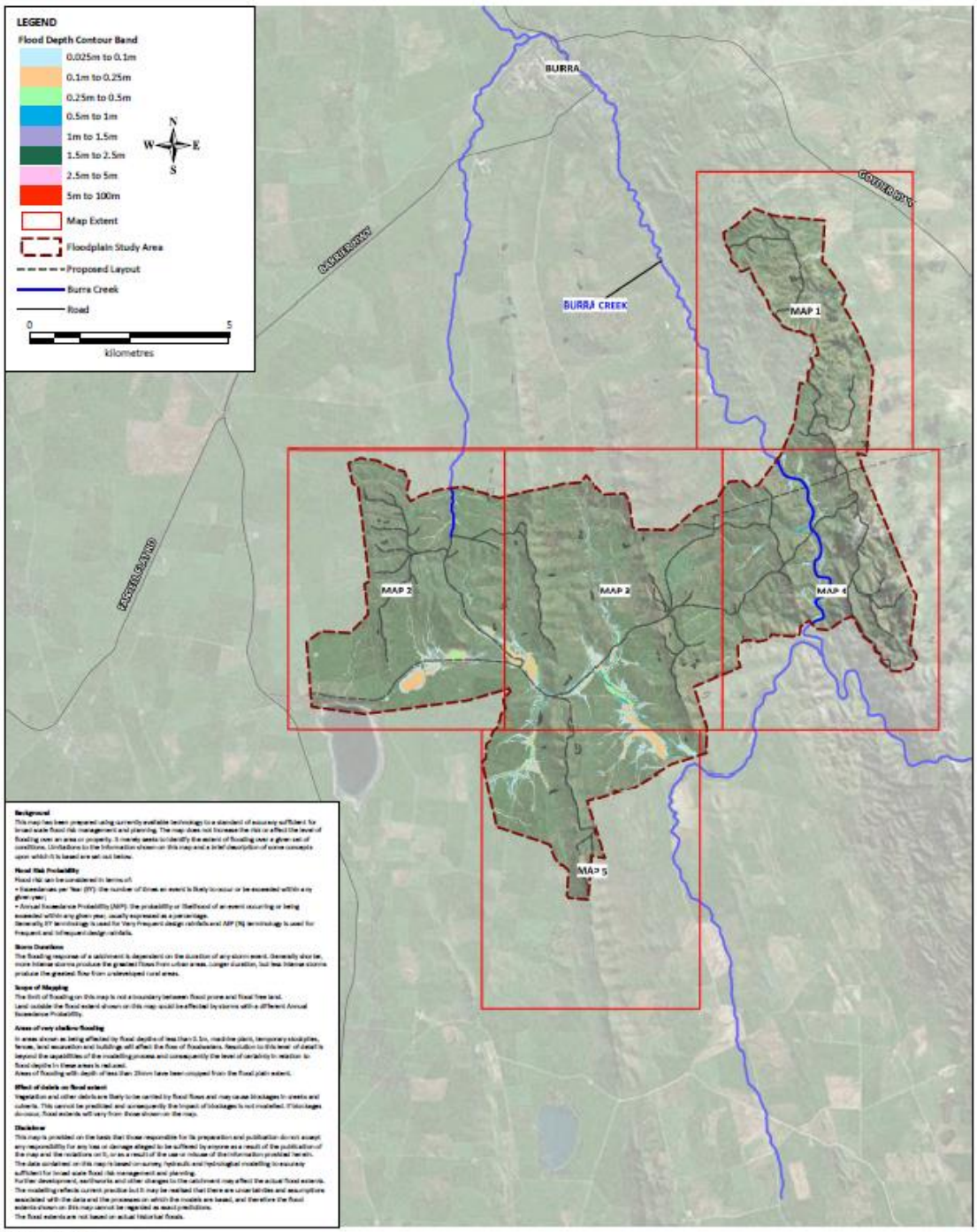
Appendix A Flood maps and provisional culvert locations



Copyright Southfront 2021

Data Sources:
Wind Farm Layout: Elecnor Australia
Flood Mapping: Southfront
Roads, Watercourses: DataSA
Aerial Imagery: Microsoft Bing

southfront

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

LOCATION PLAN AND MAP INDEX

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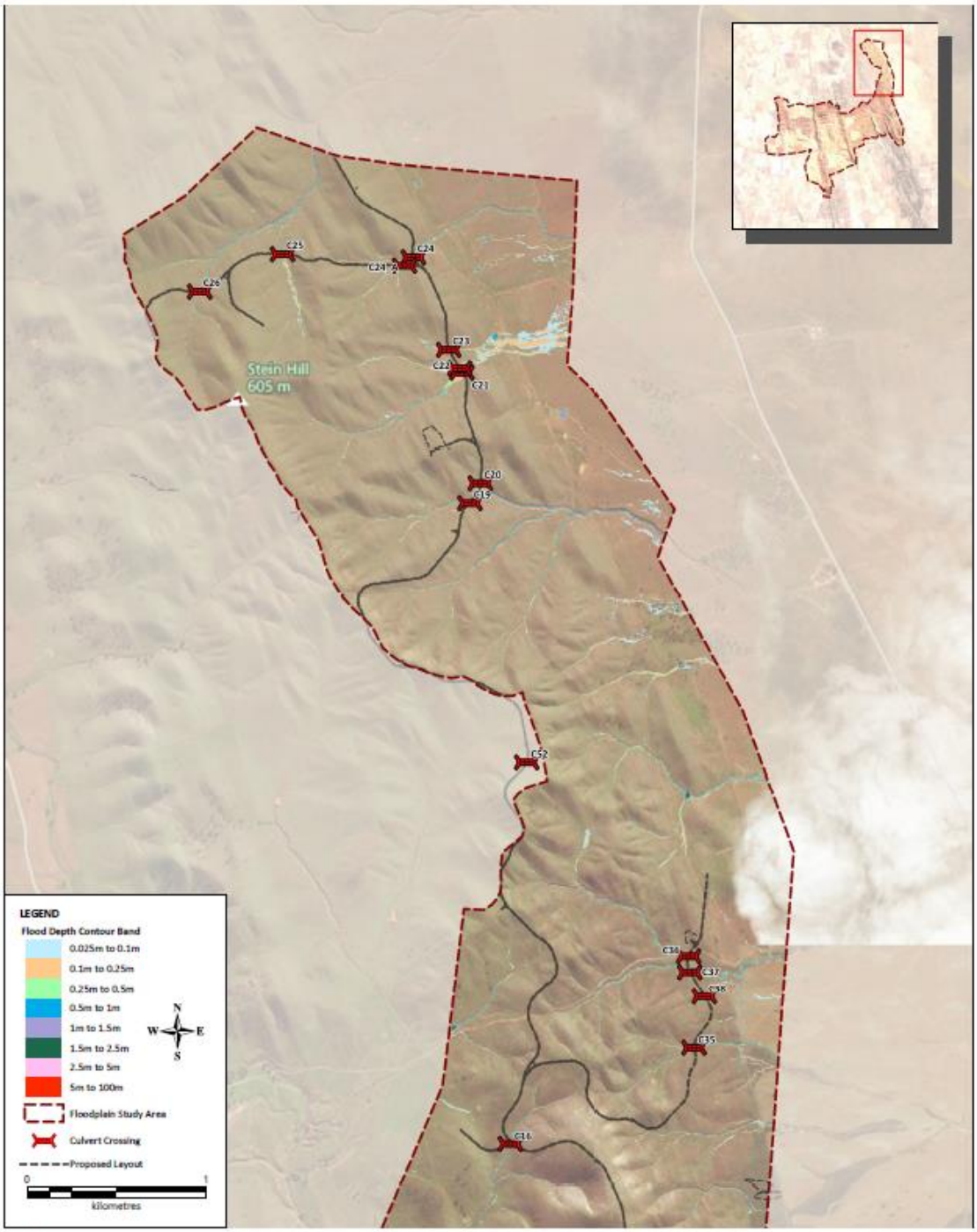

Data Sources:
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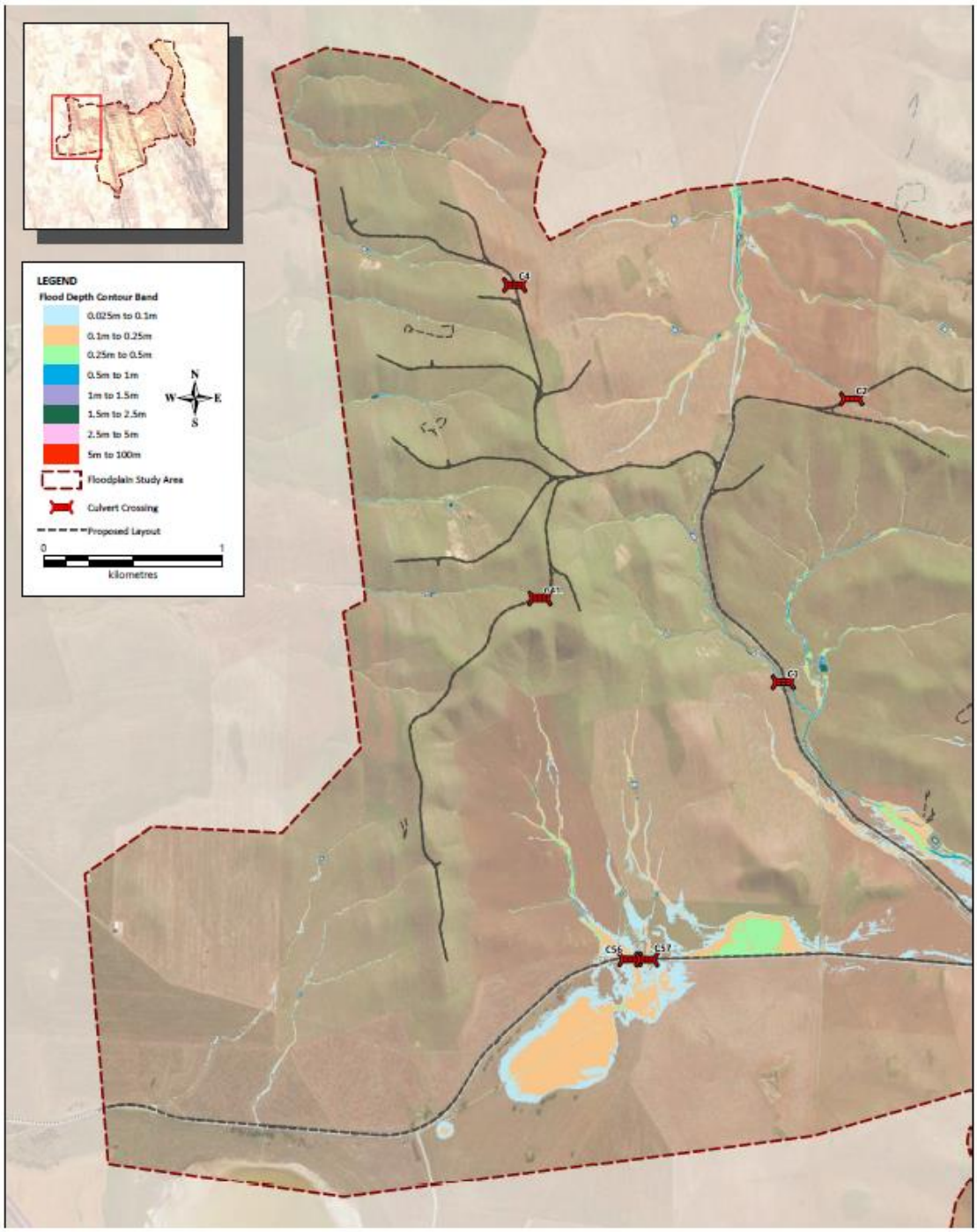
Flood Mapping: Southfront
Aerial Imagery: Microsoft Bing

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

5% AEP FLOOD DEPTH AND CULVERT CROSSING MAP 1

DRAFT ISSUE DATE: 24/09/2021



Data Sources:
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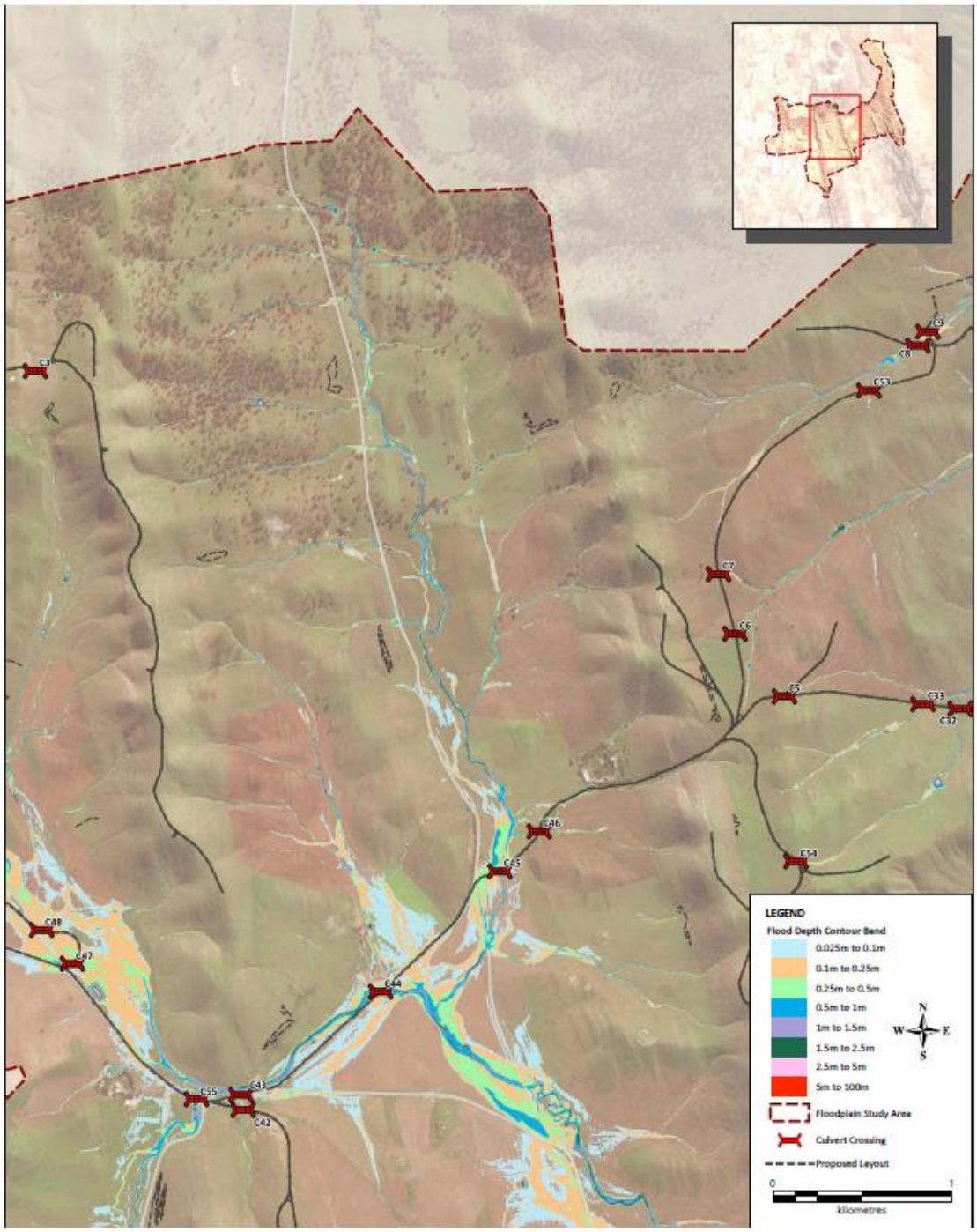
Flood Mapping: Southfront
Aerial Imagery: Microsoft Bing

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

5% AEP FLOOD DEPTH AND CULVERT CROSSING MAP 2

DRAFT ISSUE DATE: 24/09/2021



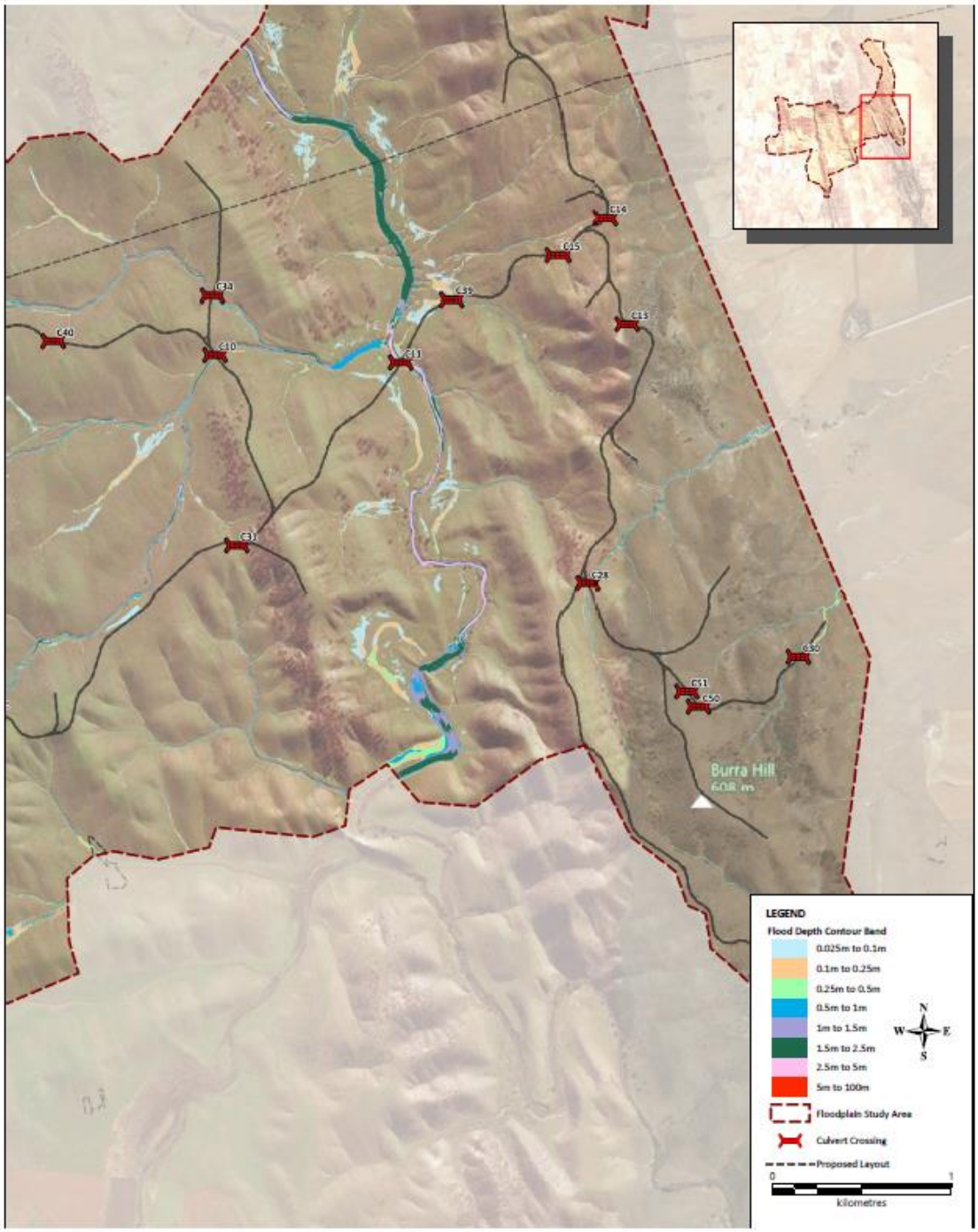
Data Sources:
Wind Farm Layout: Elecnor Australia
Flood Mapping: Southfront
Aerial Imagery: Microsoft Bing

southfront

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

5% AEP FLOOD DEPTH AND CULVERT CROSSING MAP 3

DRAFT ISSUE DATE: 24/09/2021



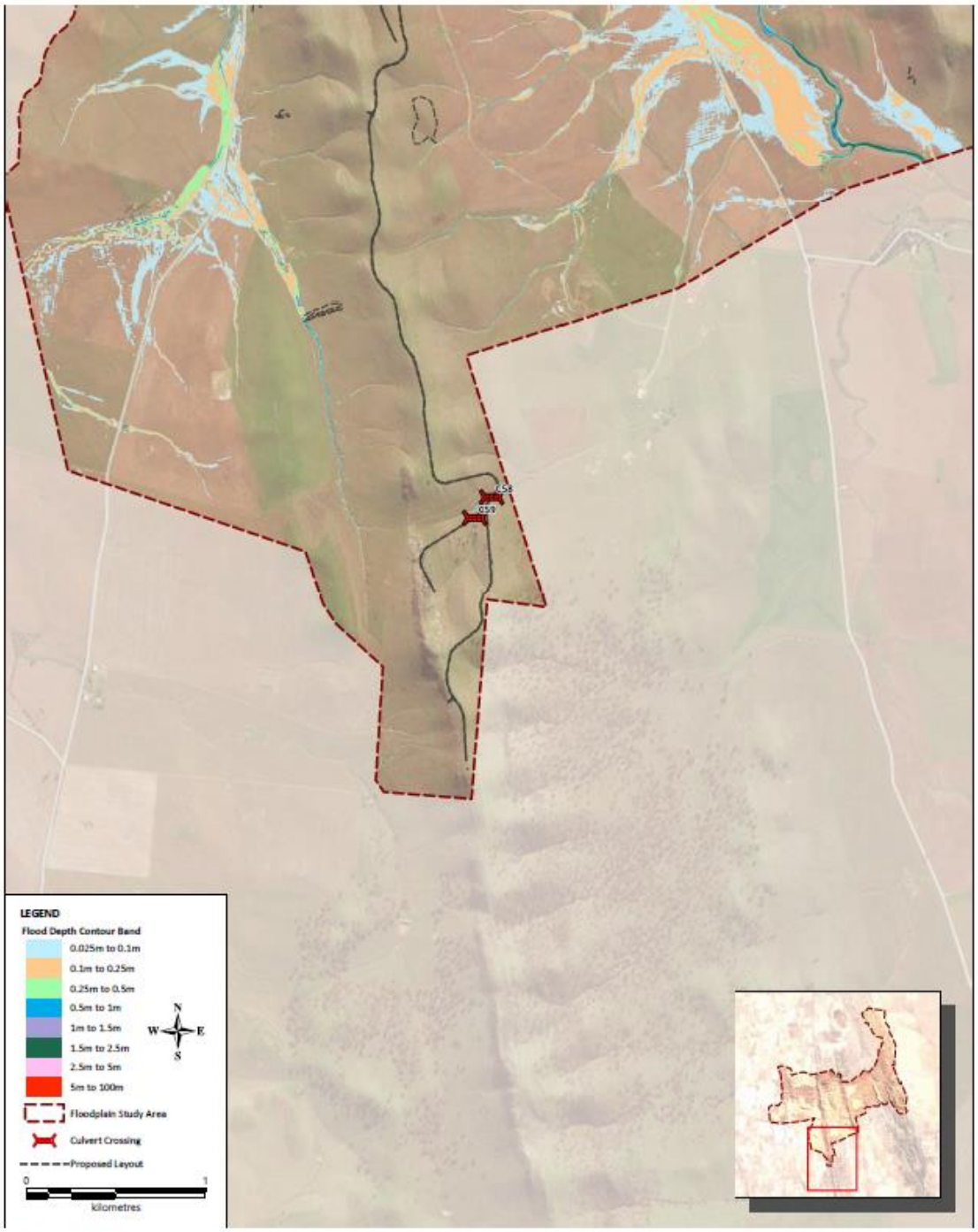
Data Sources:
Wind Farm Layout: Elecnor Australia
Flood Mapping: Southfront
Aerial Imagery: Microsoft Bing

southfront

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

5% AEP FLOOD DEPTH AND CULVERT CROSSING MAP 4

DRAFT ISSUE DATE: 24/09/2021



Data Sources:
Wind Farm Layout: Elecnor Australia
Flood Mapping: Southfront
Aerial Imagery: Microsoft Bing

ELECNOR AUSTRALIA
GOYDER WIND FARM HYDROLOGY STUDY

5% AEP FLOOD DEPTH AND CULVERT CROSSING MAP 5

DRAFT ISSUE DATE: 24/09/2021

Appendix B Water Affecting Activities: Application Information

Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Crossings – Land Ref #1 (Angus & Brooke and Don & Margie Stockman)

22nd March 2022

Crossings - Land Ref. # 1 (Angus & Brooke and Don & Margie Stockman)

Land Ref # 1 boundary
Parcel
Access track (AR)

5%AEP Max Depth
Value (m)
5.55
0.0

AR crossing on stream order 3 and above
AR crossing on stream order 1 and 2

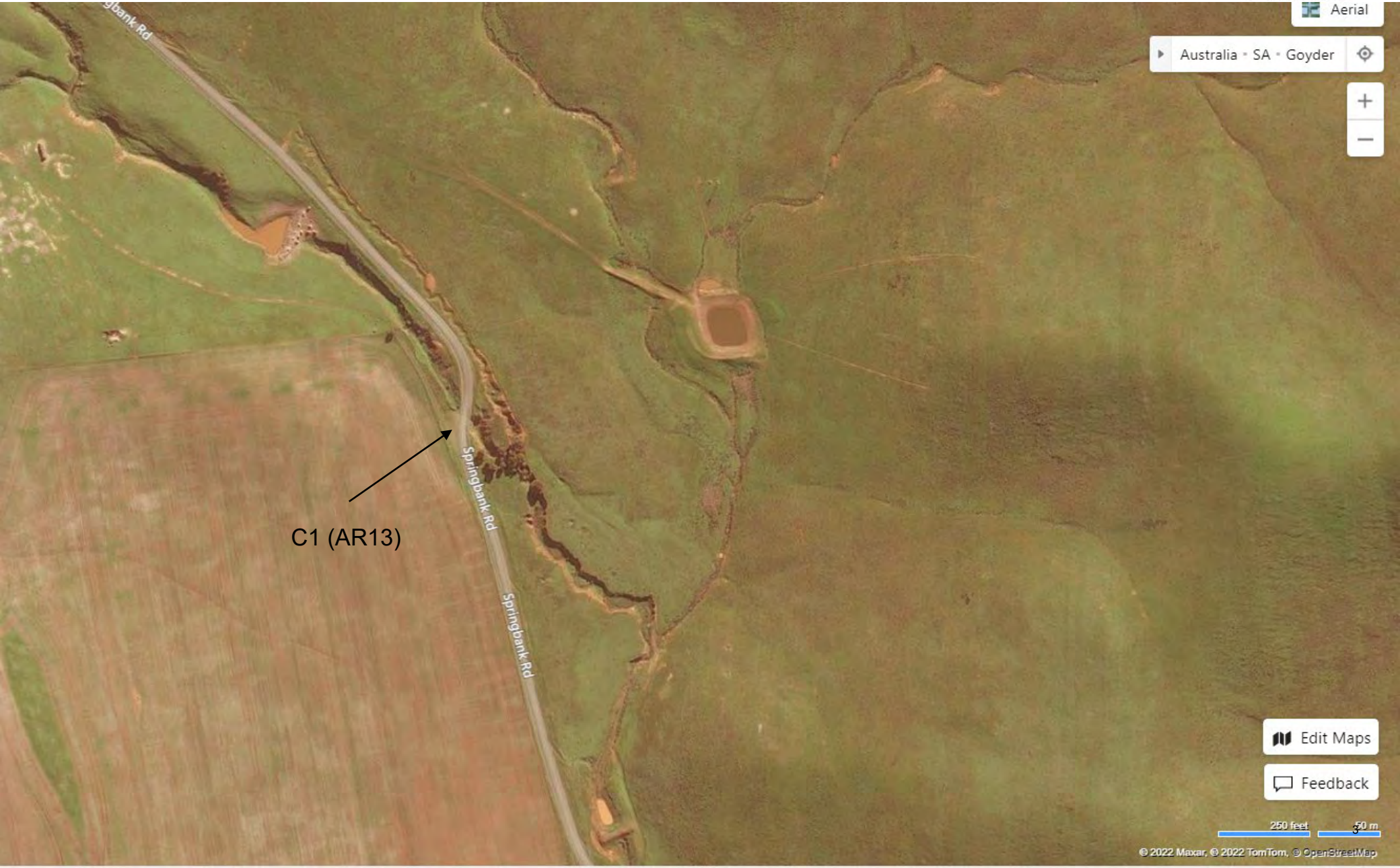
Contact: Angus Stockman
Phone: 0408 540 983
ab.stockman@bigpond.com

0 0.15 0.3 0.61
Kilometres

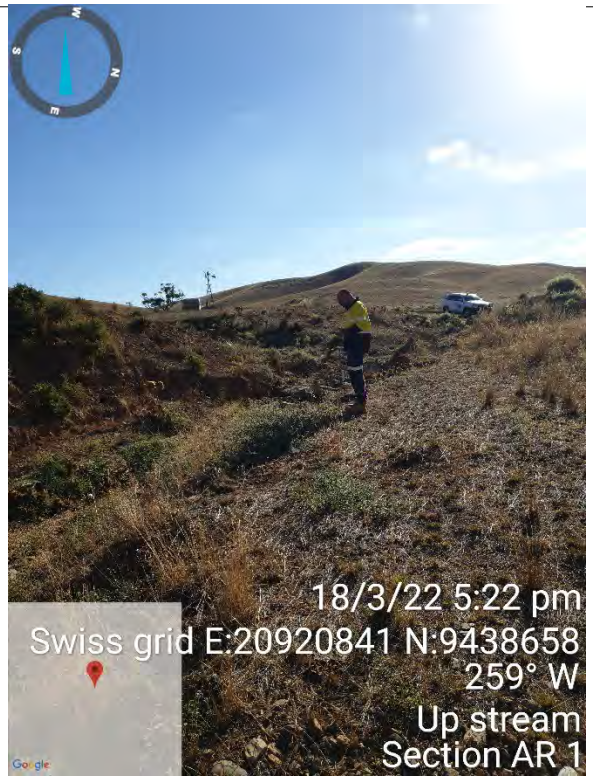
Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

eco logical AUSTRALIA
A TETRA TECH COMPANY


Springbank Rd
Springbank Rd
C1 (AR13)
Aerial
Australia • SA • Goyder
Edit Maps
Feedback
250 feet
50 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

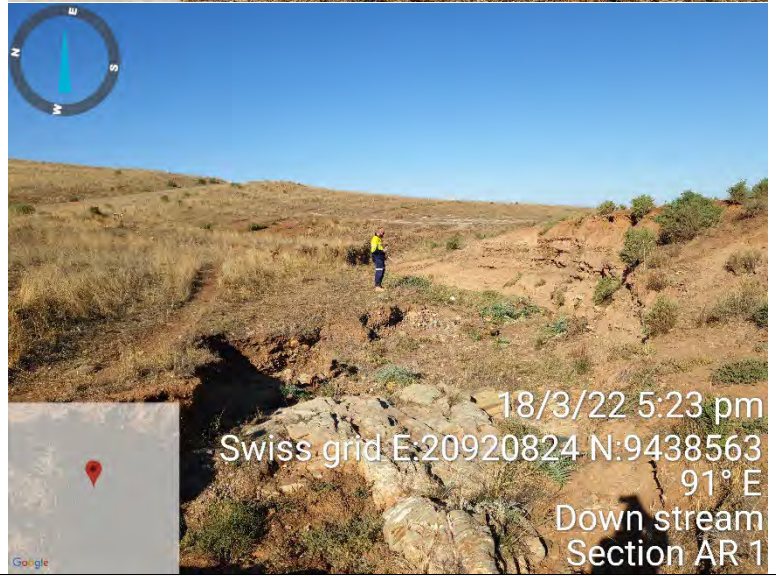
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C1 (AR13)



Road up-grade and
Culvert upgrade to (1) x 2.4x1.8m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts



Date: 22/03/2022

SUMMARY SPECIFICATIONS OF ACCESS TRACK CROSSINGS

ID	Latitude	Longitude	Creek order	Peak 5% AEP Flow (m^3/s)	Max depth (m)	Culvert size (m)	Landholder	Land ID	Parcel	Comments	AR_ID	Contact number
C1	-33.79706737	138.9034936	3	4.5	1.0	1x2.1x1.2_RCBC	Angus Stockman	1	H200100 S389	Existing crossing	13	0408 540 983

Roads RD-DK-C1 Installation of Stormwater Drainage

17 Appendix 1: Culvert Installation in Fill

Figure RD-DK-C1 17-1 Single and Multiple Box Culverts

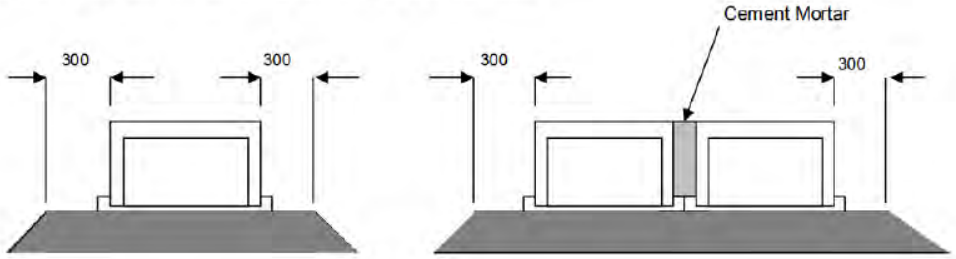


Figure RD-DK-C1 17-2 Multiple Pipes

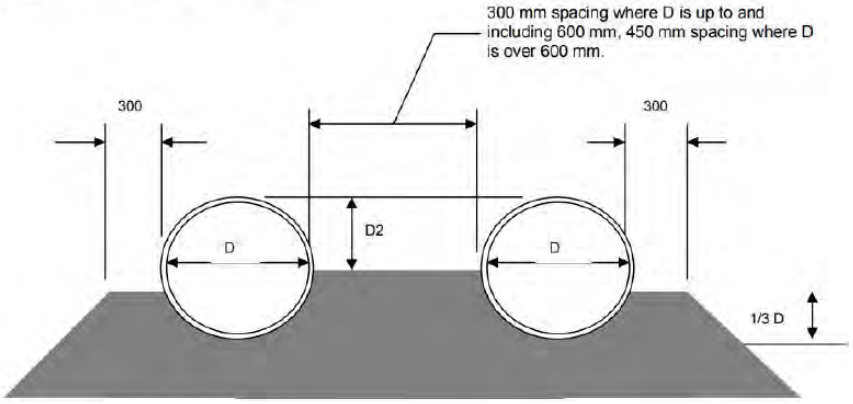
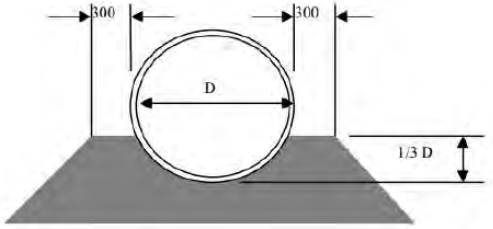
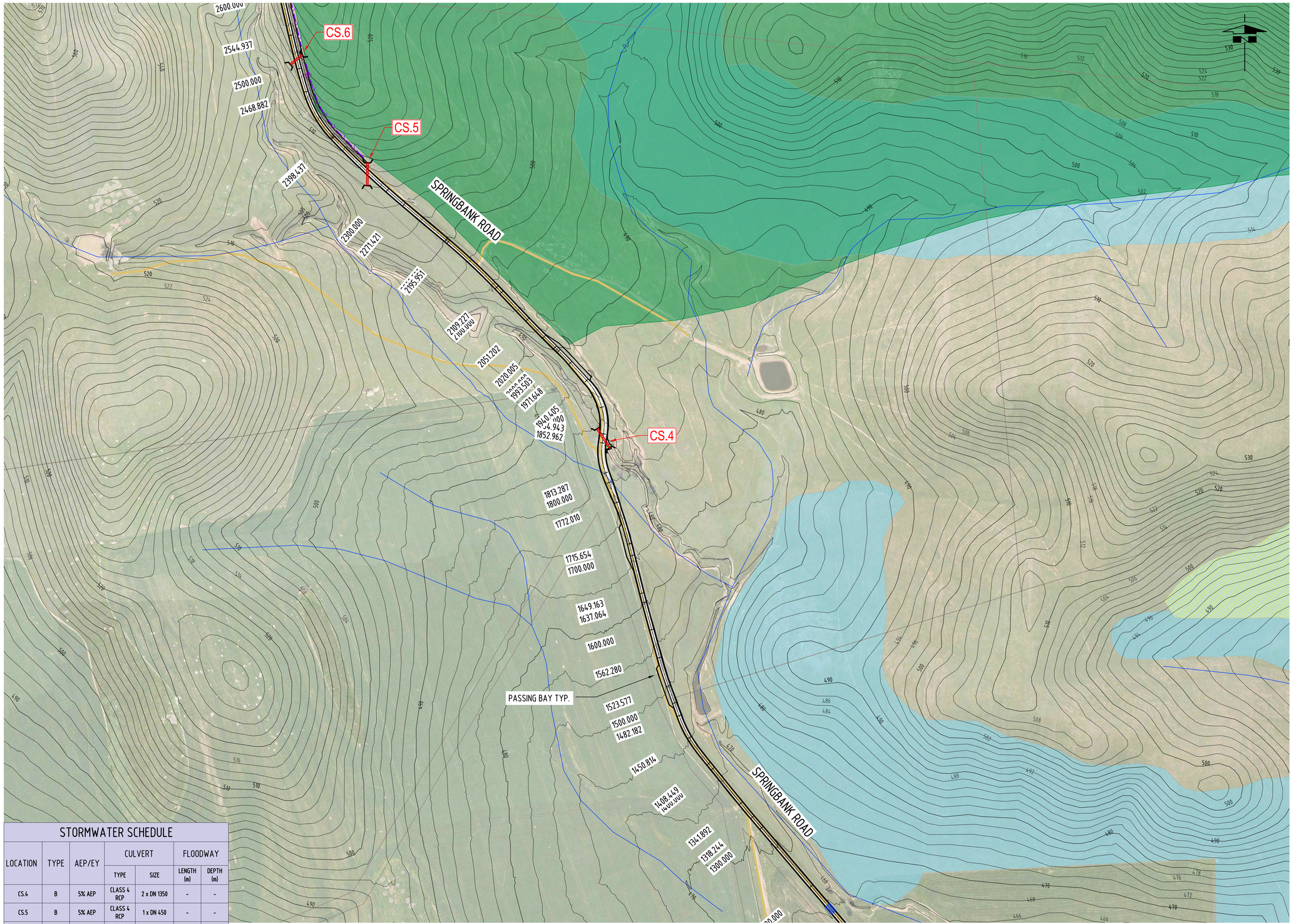


Figure RD-DK-C1 17-3 Single Pipes



NOTE:

1. Not to scale.
2. All dimensions in millimetres.
3. D = Internal pipe diameter.
4. Refer to specification for bedding and backfill requirements



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — PROPOSED WIND FARM ROAD
- NEW STORMWATER CULVERT
- FLOODWAY
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

50 25 0 50 100
SCALE BAR (m)

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
CS.4	B	5% AEP	CLASS 4 RCP	2 x DN 1350	-	-
CS.5	B	5% AEP	CLASS 4 RCP	1 x DN 450	-	-
CS.6	B	5% AEP	CLASS 4 RCP	1 x DN 450	-	-

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
0	ISSUED FOR CONSTRUCTION		TSM	JH	RB	05.05.22
C	80% DESIGN REVIEW ISSUE		TSM	JH	RB	25.03.22
B	30% DESIGN REVIEW RE-ISSUE		TSM	JH	RB	24.02.22
A	30% DESIGN REVIEW ISSUE		TSM	JH	RB	18.02.22

REVISION HISTORY

STAGE 1A

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

STATUS CONSTRUCTION ISSUE

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-1101

PROJECT GOYDER SOUTH WIND FARM

TITLE CIVIL WORKS - PHASE 1
LAYOUT PLAN - SHEET 2

DRAWING No. GSWF-ELECNOR-CIV-DWG-1101 | Rev. 0

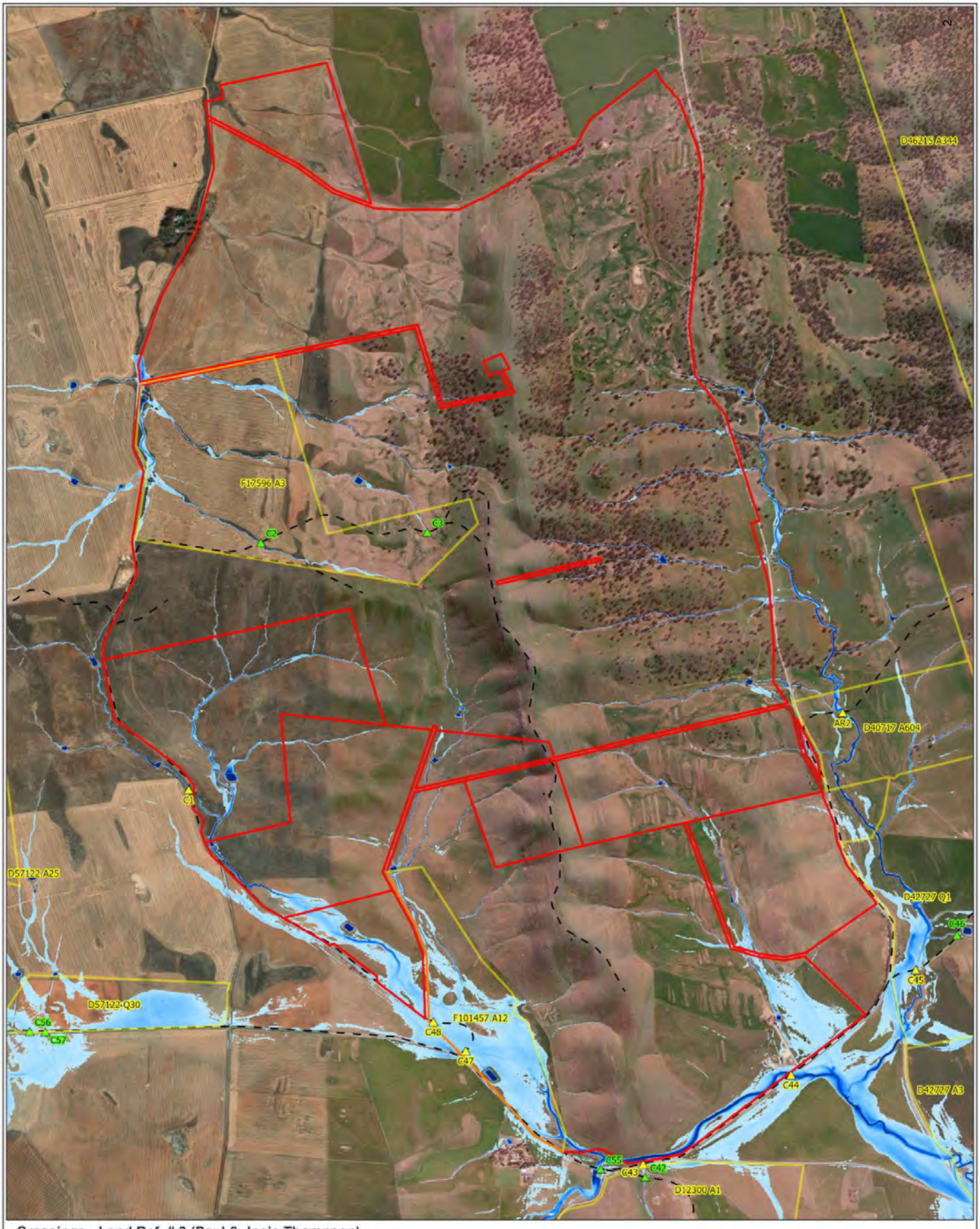
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Crossings – Land Ref #3
(Paul and & Josie Thompson)

22nd March 2022



Crossings - Land Ref. # 3 (Paul & Josie Thompson)

Land Ref # 3 boundary

Parcel

Access track (AR)

5%AEP Max Depth
Value (m)
5.55
0.0

AR crossing on stream order 3 and above

AR crossing on stream order 1 and 2

Contact: Paul Thompson
Phone: 0427 618 775
thommo@rbe.net.au

0 0.2 0.4 0.79
Kilometres

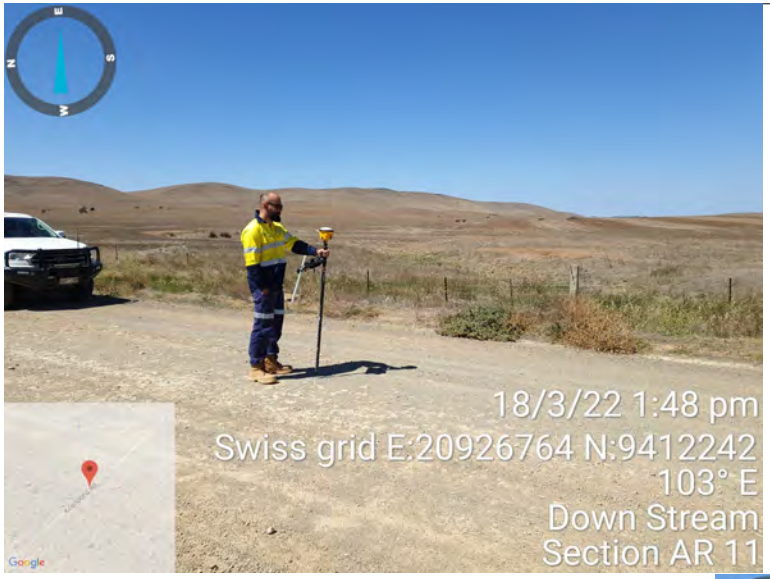
Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

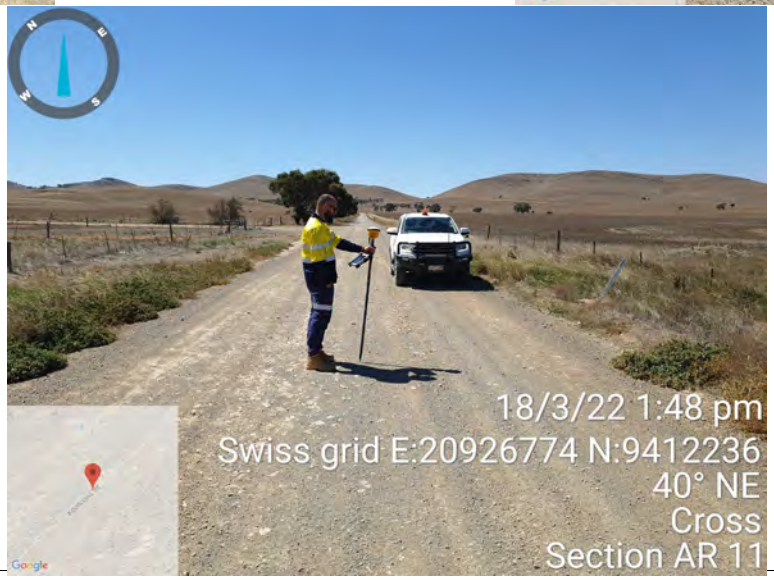
N

eco logical AUSTRALIA
A TETRA TECH COMPANY


Aerial
Koonoona Rd
Koonoona Rd
Koonoona Rd
C44 (AR11)
Edit Maps
Feedback
100 feet
25 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C43 & C44 (AR11)



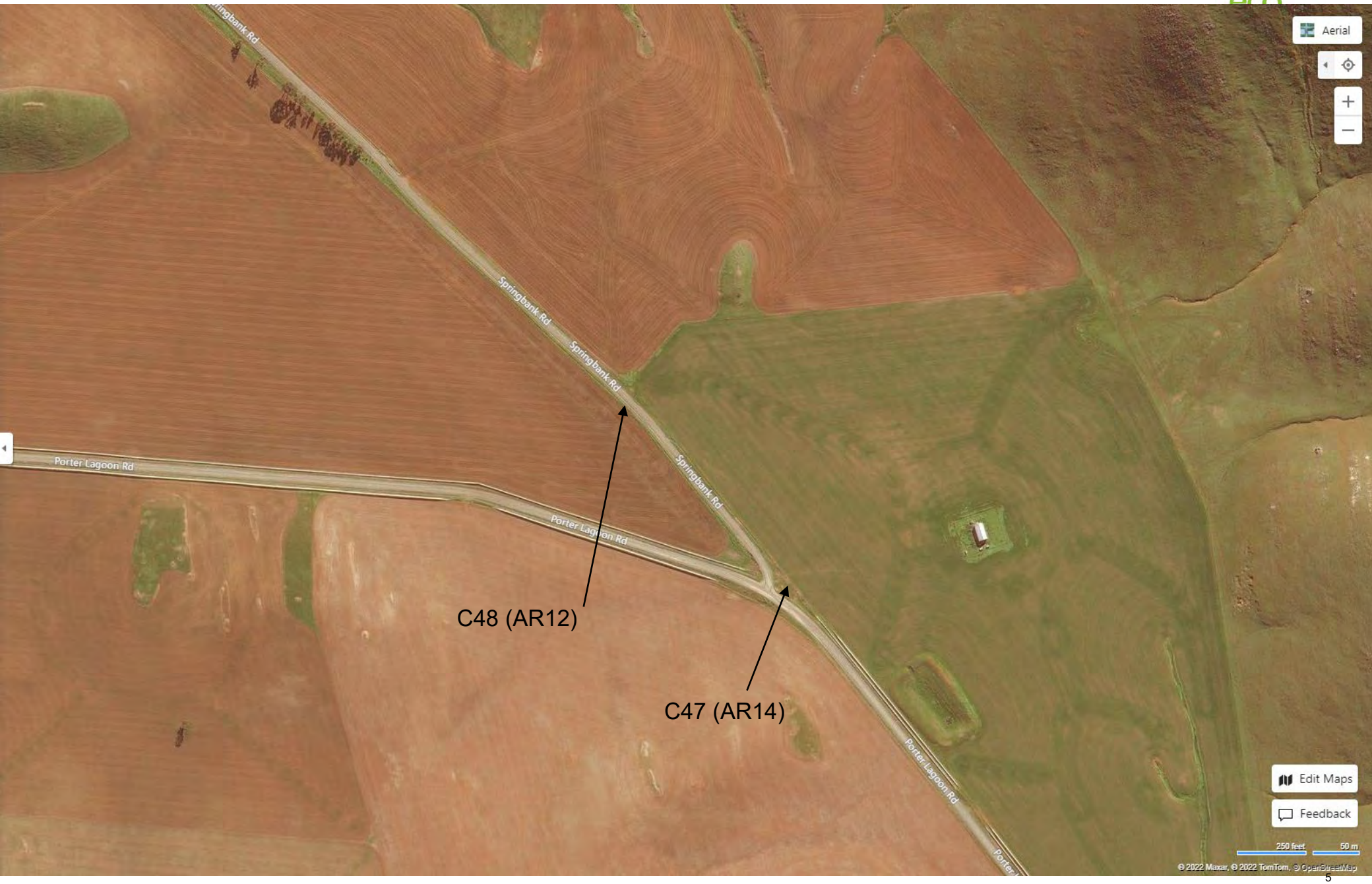


Road up-grade and
Culvert upgrade to (5) x 2.4x1.8m RCBCs

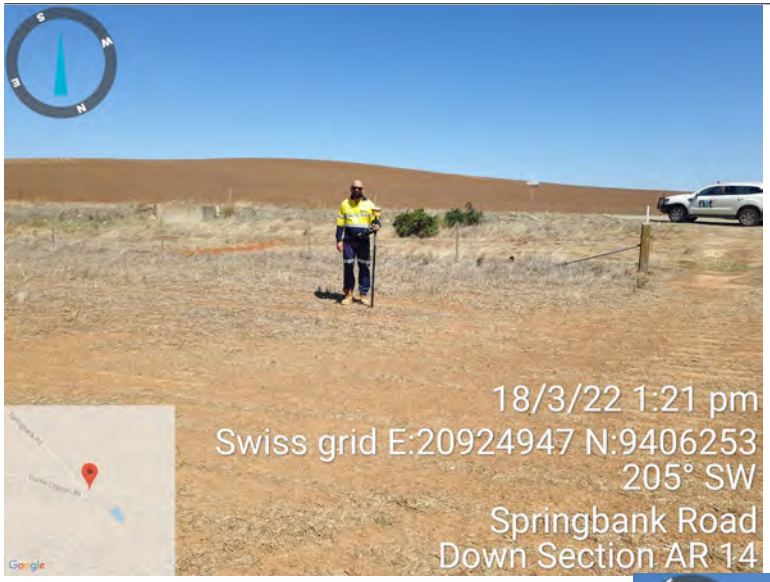
Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022


Springbank Rd
Springbank Rd
Springbank Rd
Porter Lagoon Rd
Porter Lagoon Rd
Porter Lagoon Rd
C48 (AR12)
C47 (AR14)
Aerial
Edit Maps
Feedback
250 feet
50 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

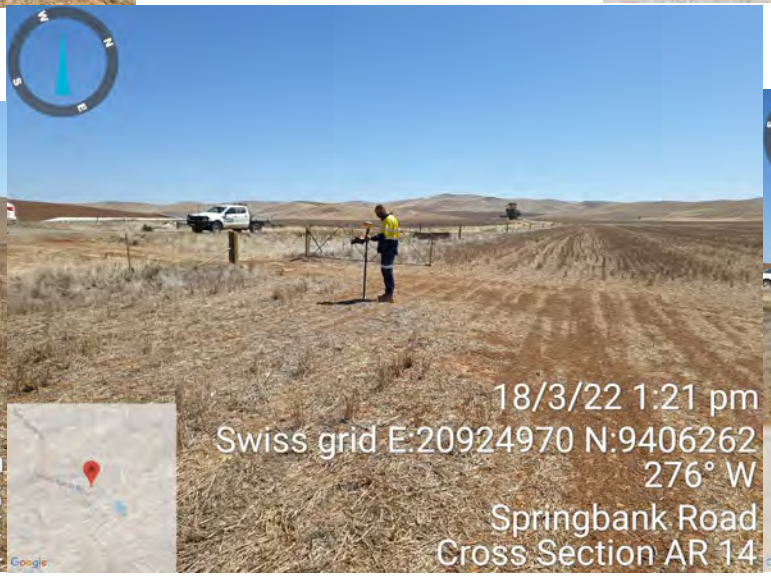
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C47 (AR14)



Road up-grade and
Culvert upgrade to (2) x
2.4x1.8m RCBCs

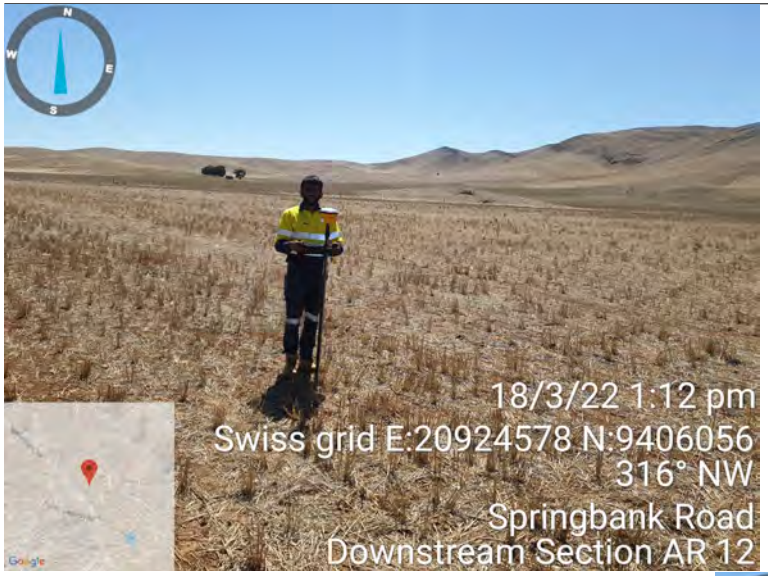
Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

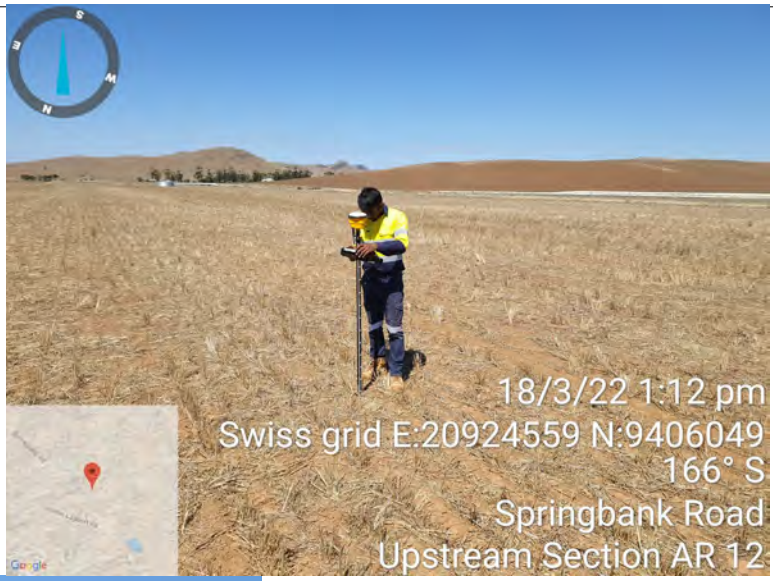
Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts



Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C48 (AR12)





Road up-grade and
Culvert upgrade to (2) x 2.4x1.8m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022

SUMMARY SPECIFICATIONS OF ACCESS TRACK CROSSINGS

ID	Latitude	Longitude	Creek order	Peak_5%_AEP Flow	Max_depth	Culvert_size	Landholder	Land ID	Parcel	Comments	AR_ID	Contact number
C43	-33.818633	138.929651	3	2.5	0.6	1x1.5x1.2_RCBC	Paul Thompson	3	D12300 A2	Flow over existing road	NO	0427 618 775
C44	-33.8135085	138.9381899	3	37	1.2	5x2.4x1.8_RCBC	Paul Thompson	3	F101459 A14	Existing crossing	11	0427 618 775
C47	-33.812097	138.919437	4	16	1.0	2x2.4x1.8_RCBC	Paul Thompson	3	F101457 A12	Existing crossing	14	0427 618 775
C48	-33.810425	138.917565	4	16	1.0	2x2.4x1.8_RCBC	Paul Thompson	3	F101457 A12	Existing crossing	12	0427 618 775
C2	-33.782832	138.907633	1	1.6	0.5	2x0.825m_RCP	Paul Thompson	3	F17596 A3			0427 618 775
C3	-33.782227	138.917215	1	0.12	0.4	0.45m_RCP	Paul Thompson	3	F17596 A3			0427 618 775

Roads RD-DK-C1 Installation of Stormwater Drainage

17 Appendix 1: Culvert Installation in Fill

Figure RD-DK-C1 17-1 Single and Multiple Box Culverts

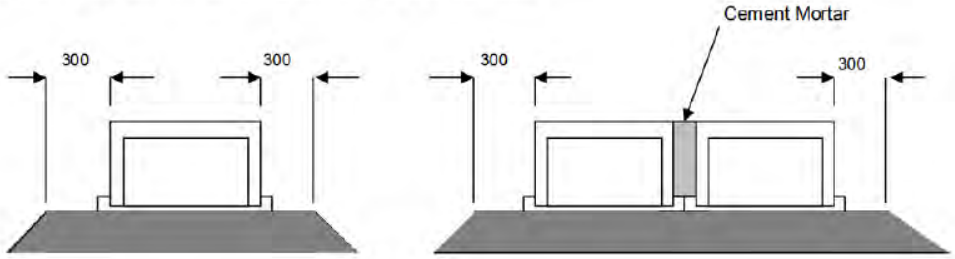


Figure RD-DK-C1 17-2 Multiple Pipes

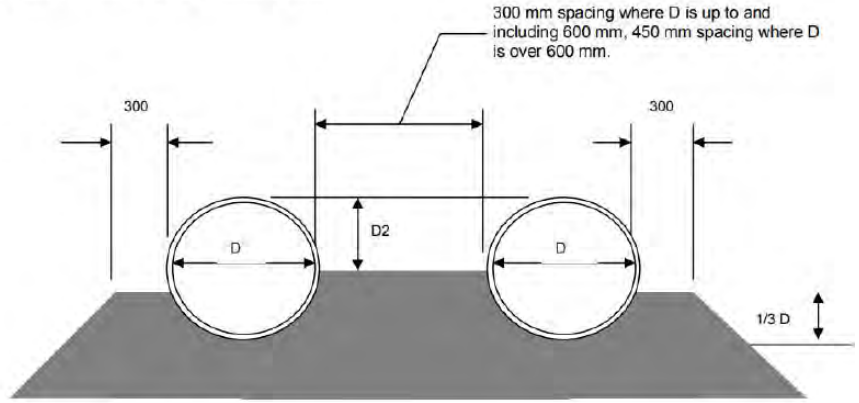
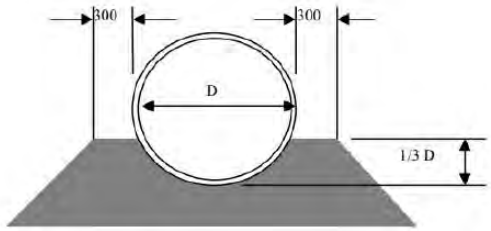
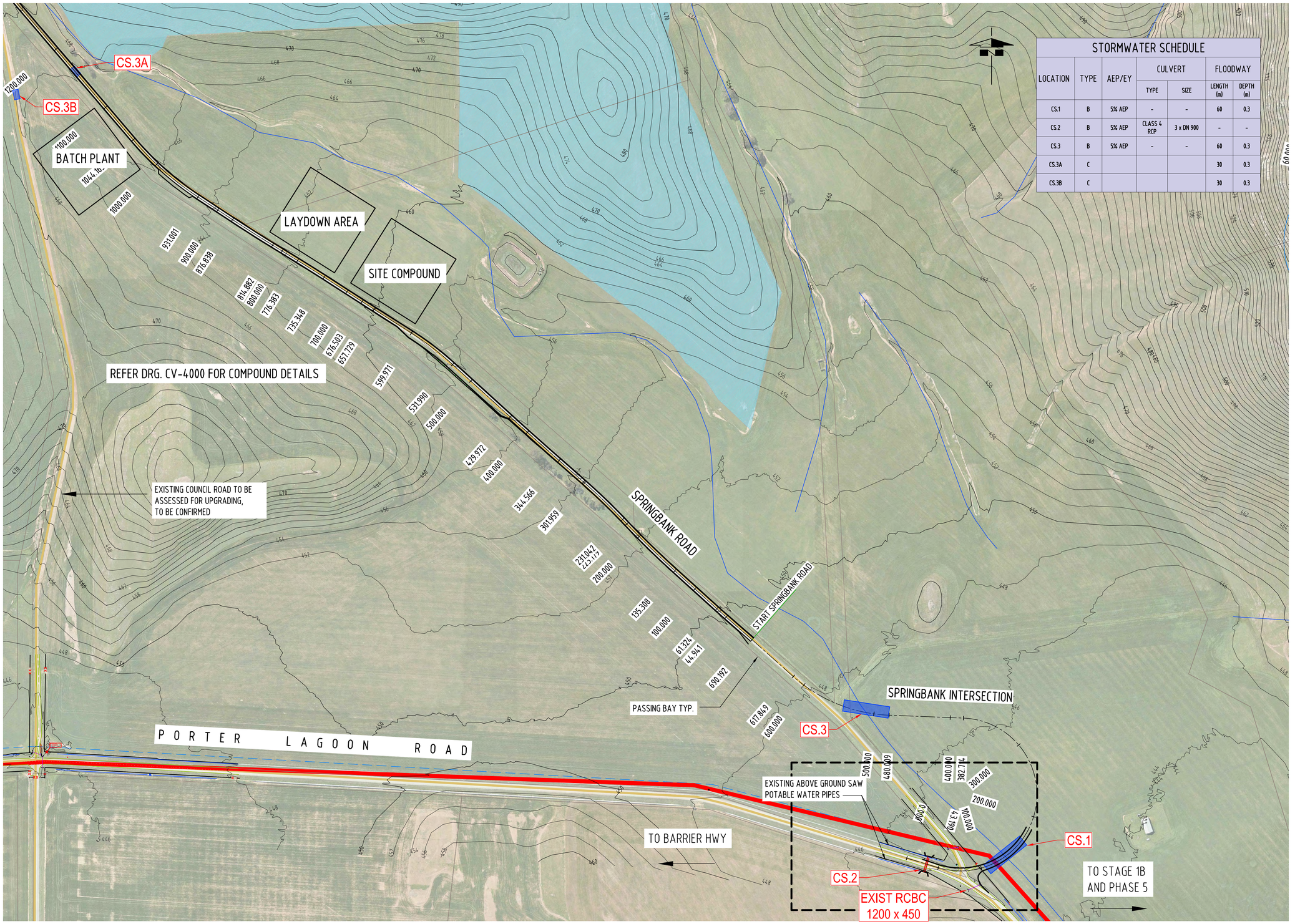


Figure RD-DK-C1 17-3 Single Pipes



NOTE:

1. Not to scale.
2. All dimensions in millimetres.
3. D = Internal pipe diameter.
4. Refer to specification for bedding and backfill requirements



REFER DRG. CV-8000 FOR INTERSECTION DETAILS

STORMWATER SCHEDULE						
LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
CS.1	B	5% AEP	-	-	60	0.3
CS.2	B	5% AEP	CLASS 4 RCP	3 x DN 900	-	-
CS.3	B	5% AEP	-	-	60	0.3
CS.3A	C				30	0.3
CS.3B	C				30	0.3

LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- SG001 — PROPOSED TURBINE LOCATION
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — PROPOSED WIND FARM ROAD
- NEW STORMWATER CULVERT
- FLOODWAY
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

50 25 0 50 100
SCALE BAR (m)

V:\2020\201400 - 201499\201435 - Goyder Wind Farm\Drafting\GSWF-ELECNOR-CIV-DWG-1100.dwg, 0, 6/5/2022 6:27 PM, tmullan

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
REVISION HISTORY						
0	ISSUED FOR CONSTRUCTION		TSM	JH	RB	05.05.22
C	80% DESIGN REVIEW ISSUE		TSM	JH	RB	25.03.22
B	30% DESIGN REVIEW RE-ISSUE		TSM	JH	RB	24.02.22
A	30% DESIGN REVIEW ISSUE		TSM	JH	RB	18.02.22

STAGE 1A

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

STATUS CONSTRUCTION ISSUE

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-1100

PROJECT GOYDER SOUTH WIND FARM

TITLE CIVIL WORKS - PHASE 1 LAYOUT PLAN - SHEET 1

DRAWING No. GSWF-ELECNOR-CIV-DWG-1100 | Rev. 0

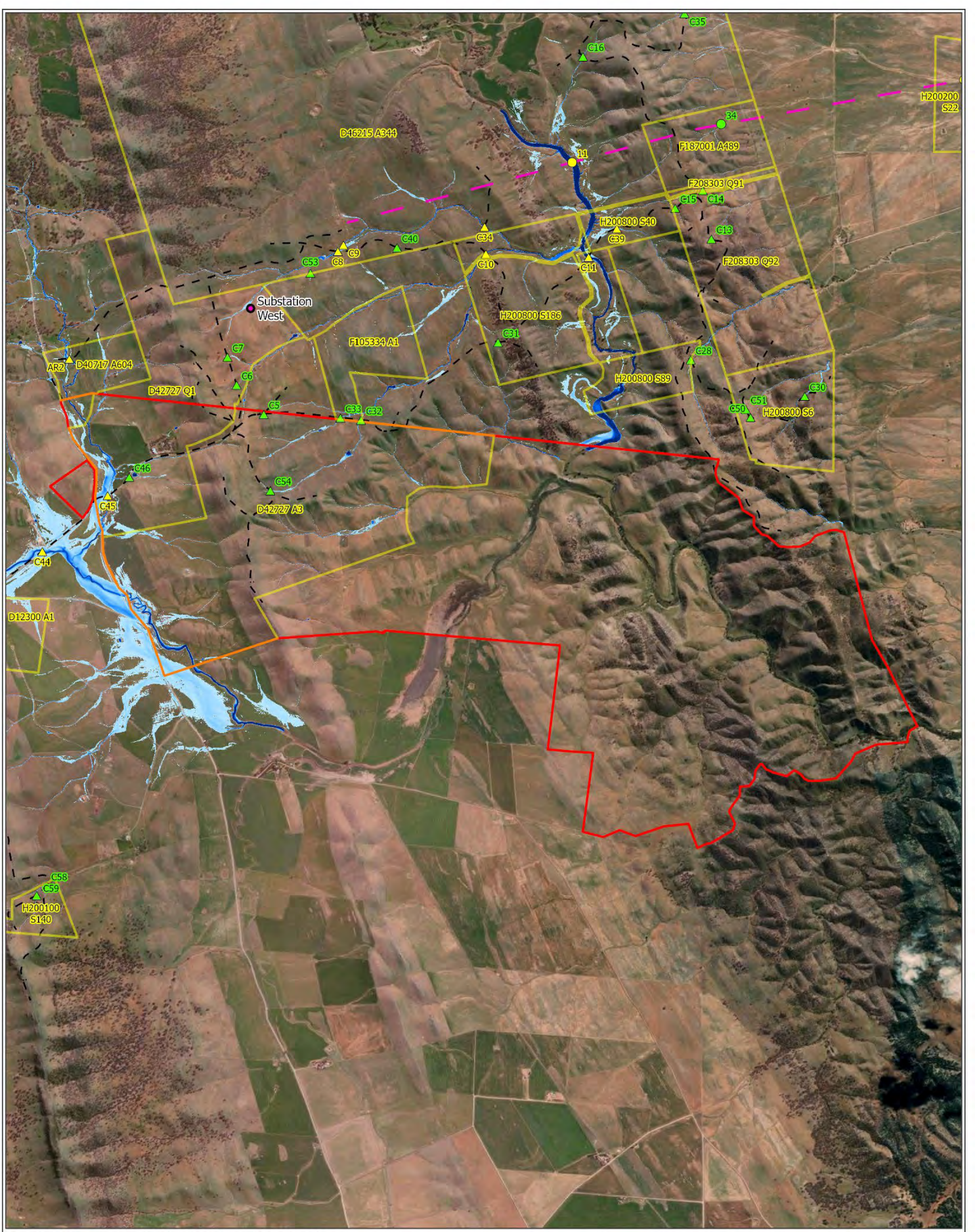
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Crossings – Land Ref #6 (David & J Gebhardt)

22nd March 2022



Crossings - Land Ref. # 6 (David & J Gebhardt)

- Land Ref # 6 boundary
- Parcel
- Access track (AR)
- Transmission line
- Substation

5%AEP Max Depth
Value (m)
5.55
0.0

- AR crossing on stream order 3 and above
- AR crossing on stream order 1 and 2
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: David Gebhardt
Phone: 0417 667 673
thegap101@gmail.com

0 0.38 0.76 1.52
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

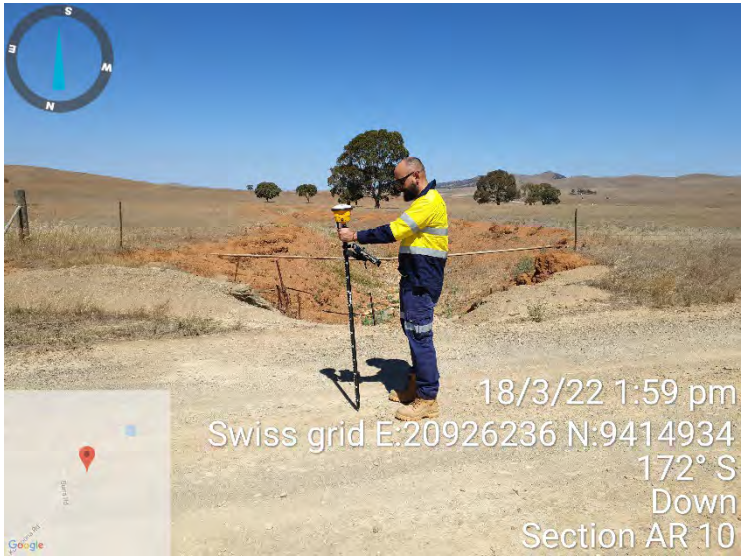

C45 (AR10)
Koonoona Rd
Burra Rd
Aerial
Australia • SA • Goyder
Edit Maps
Feedback
100 feet
25 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C45 (AR10)

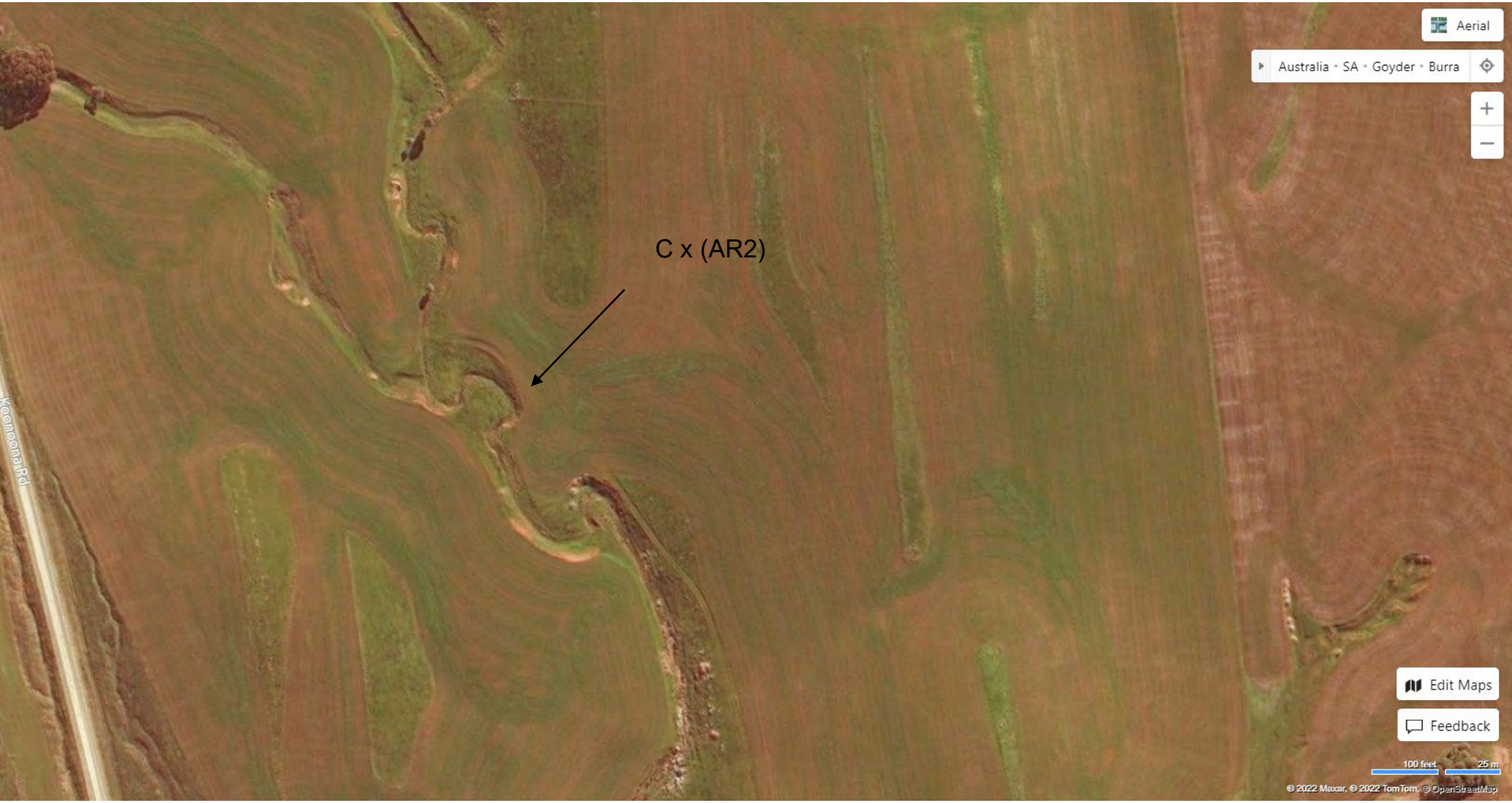
Road up-grade and
Culvert upgrade to (4) x 2.4x1.8m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts



Date: 22/03/2022


C x (AR2)
Aerial
Australia • SA • Goyder • Burra
Edit Maps
Feedback
100 feet
25 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C 6.7 (AR2)

Road up-grade and
Culvert upgrade to (2) x 2.4x1.8m RCBCs
*Subject to Change

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Note: No site access so photos were taken from road.

Date: 22/03/2022

SUMMARY SPECIFICATIONS OF ACCESS TRACK CROSSINGS

ID	Latitude	Longitude	Creek order	Peak 5% AEP Flow (m^3/s)	Max depth (m)	Culvert size (m)	Landholder	Land ID	Parcel	Comments	AR_ID	Contact number
AR2	-33.792619	138.941145	3		2.0	4x2.4x1.8_RCBC *subject to change	David Gebhardt	6	D40717 A604		2	0417 667 673
C45	-33.80748637	138.9453703	4	30	1.1	4x2.4x1.8_RCBC	David Gebhardt	6	D42727 Q1	Existing crossing	10	0417 667 673

Roads RD-DK-C1 Installation of Stormwater Drainage

17 Appendix 1: Culvert Installation in Fill

Figure RD-DK-C1 17-1 Single and Multiple Box Culverts

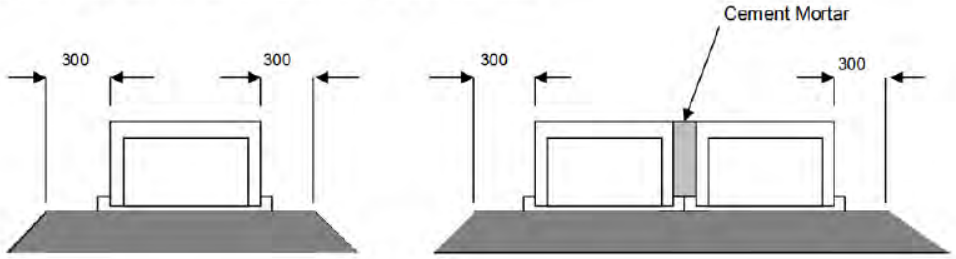


Figure RD-DK-C1 17-2 Multiple Pipes

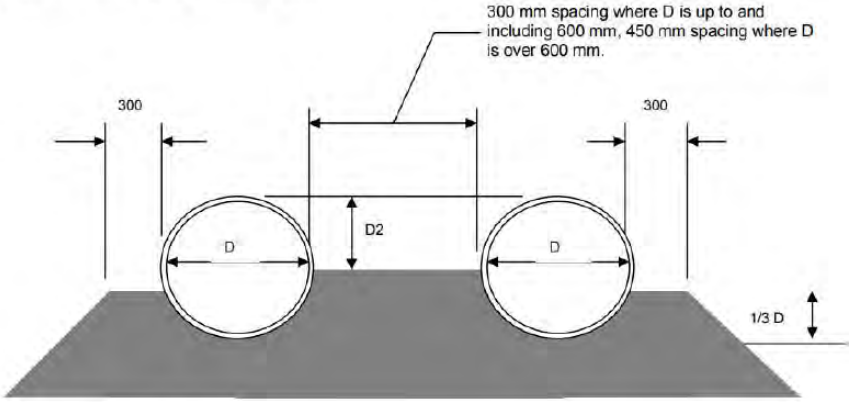
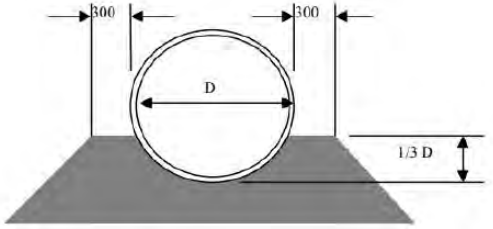
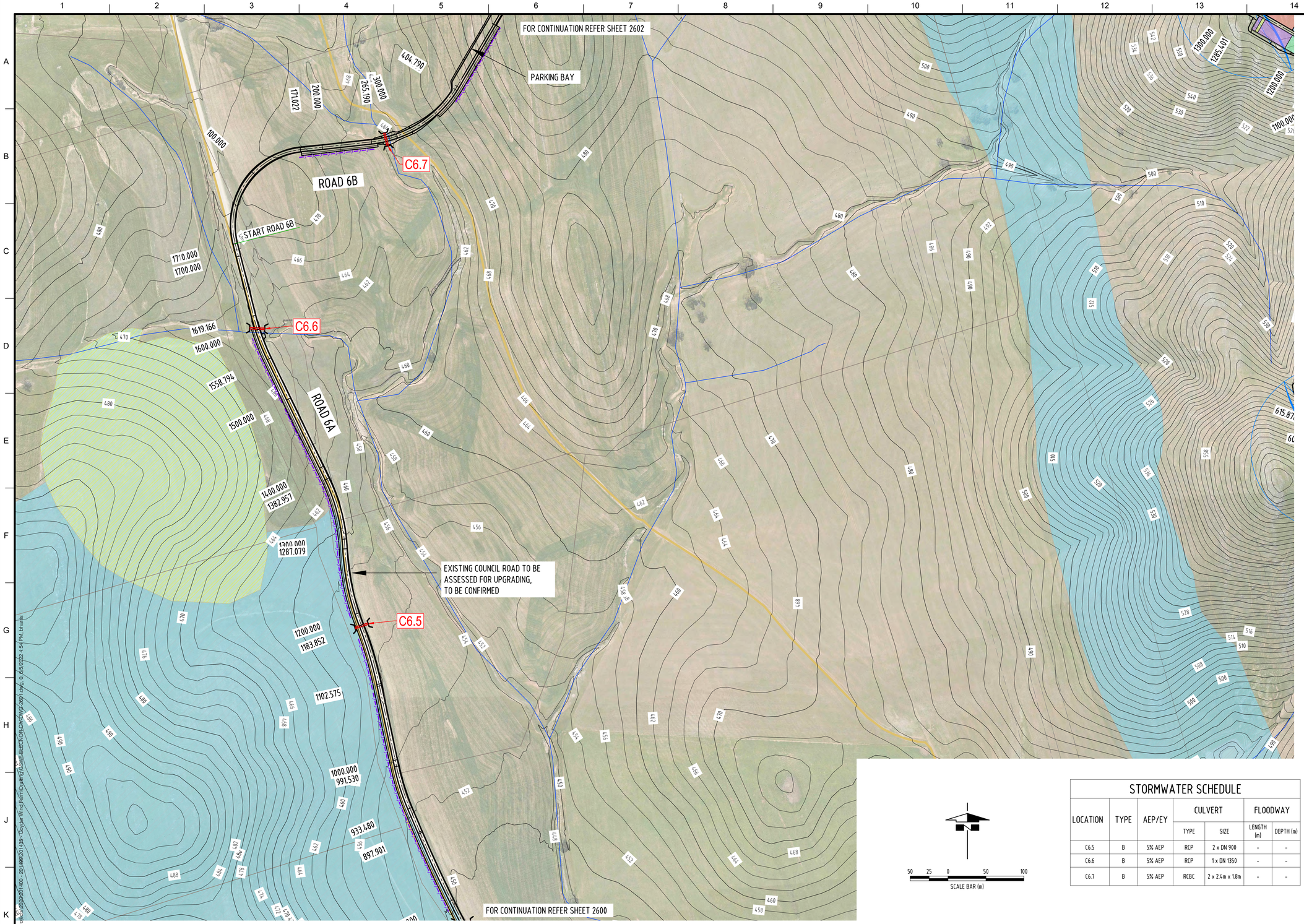


Figure RD-DK-C1 17-3 Single Pipes



NOTE:

1. Not to scale.
2. All dimensions in millimetres.
3. D = Internal pipe diameter.
4. Refer to specification for bedding and backfill requirements



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION — SG001
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

50 25 0 50 100
SCALE BAR (m)

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C6.5	B	5% AEP	RCP	2 x DN 900	-	-
C6.6	B	5% AEP	RCP	1 x DN 1350	-	-
C6.7	B	5% AEP	RCBC	2 x 2.4m x 1.8m	-	-

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
0	ISSUED FOR CONSTRUCTION		BJH	JH	RB	06.05.22
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	30.03.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	25.02.22

REVISION HISTORY

STAGE 1B

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

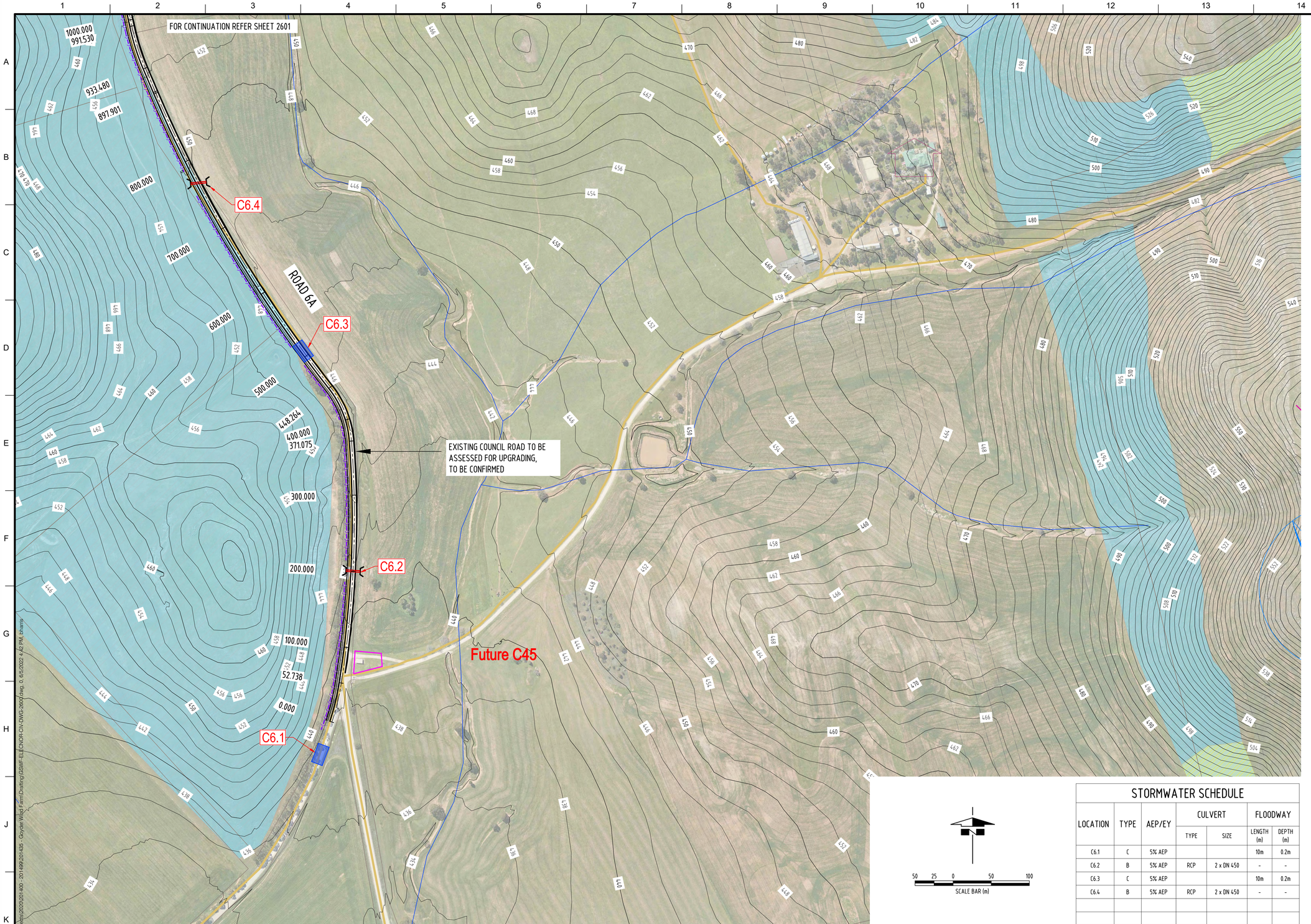
STATUS CONSTRUCTION ISSUE

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2601

PROJECT GOYDER SOUTH WIND FARM

TITLE CIVIL WORKS - PHASE 6 LAYOUT PLAN - SHEET 2

DRAWING No. GSWF-ELECNOR-CIV-DWG-2601 | Rev. 0



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION — SG001
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

50 25 0 50 100
SCALE BAR (m)

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C6.1	C	5% AEP			10m	0.2m
C6.2	B	5% AEP	RCP	2 x DN 450	-	-
C6.3	C	5% AEP			10m	0.2m
C6.4	B	5% AEP	RCP	2 x DN 450	-	-

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
0	ISSUED FOR CONSTRUCTION		BJH	JH	RB	06.05.22
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	30.03.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	25.02.22

REVISION HISTORY

STAGE 1B

WGA WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

STATUS CONSTRUCTION ISSUE

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2600

PROJECT GOYDER SOUTH WIND FARM

TITLE CIVIL WORKS - PHASE 6 LAYOUT PLAN - SHEET 1

DRAWING No. GSWF-ELECNOR-CIV-DWG-2600 | Rev. 0

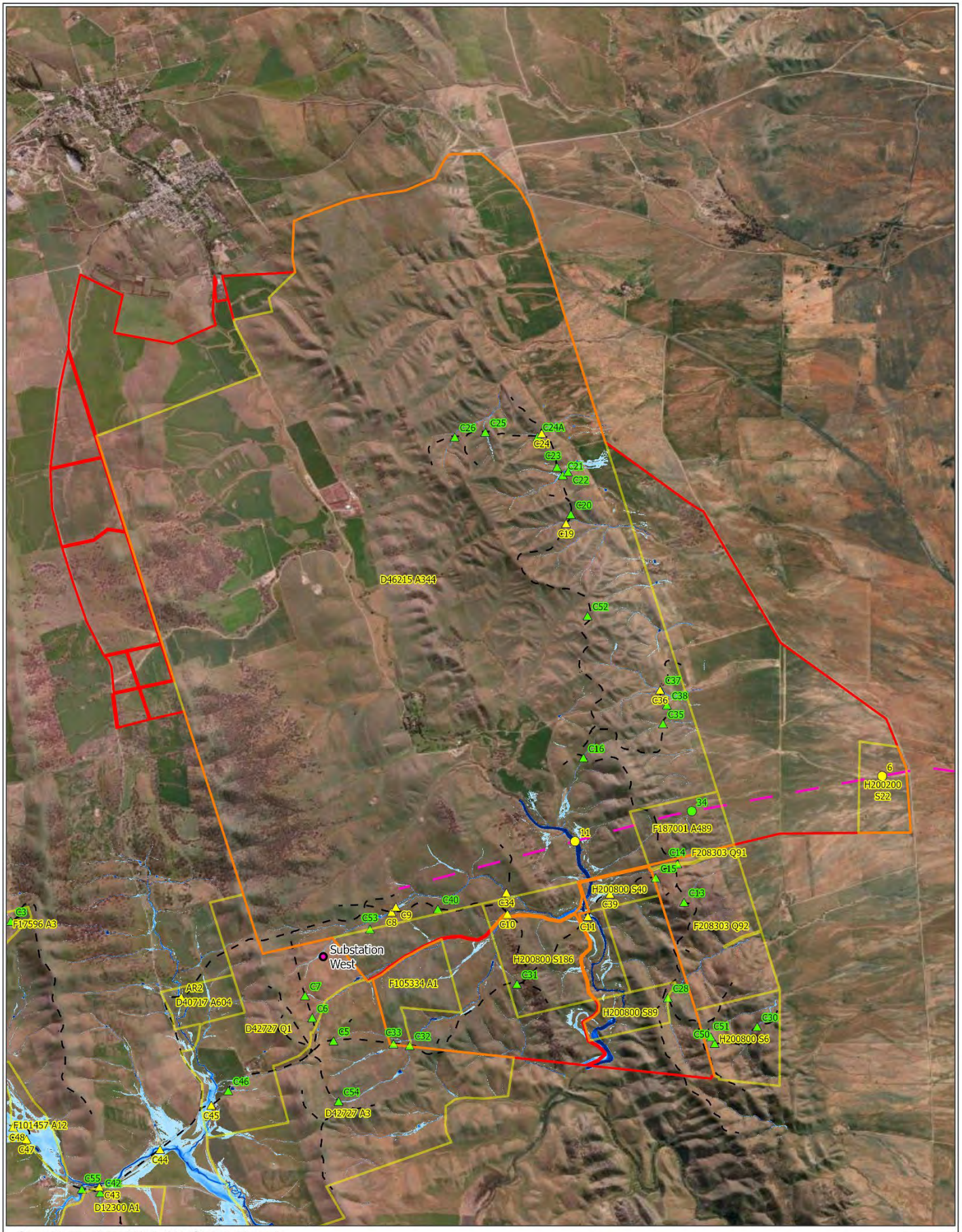
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Crossings – Land Ref #7 (Simon Rowe)

22nd March 2022



Crossings - Land Ref. # 7 (Simon Rowe)

- Land Ref # 7 boundary
- Parcel
- Access track (AR)
- Transmission line
- Substation

5%AEP Max Depth
Value (m)
5.55
0.0

- AR crossing on stream order 3 and above
- AR crossing on stream order 1 and 2
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

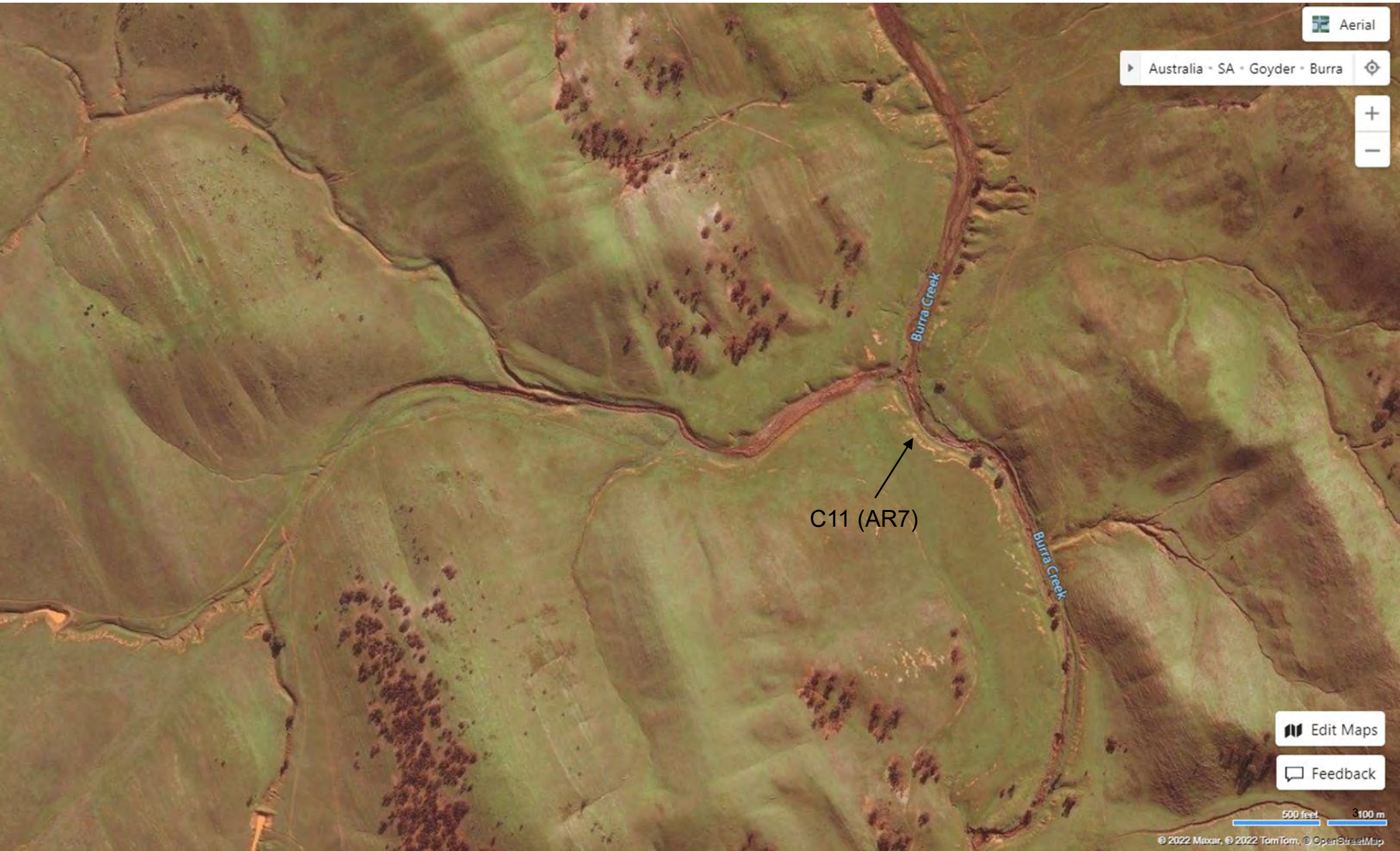
Contact: Simon Rowe
Phone: 0428 822 232
simon@princessroyal.com.au

0 0.48 0.96 1.92
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

eco logical AUSTRALIA
A TETRA TECH COMPANY


Aerial
Australia • SA • Goyder • Burra
Burra Creek
Burra Creek
C11 (AR7)
Edit Maps
Feedback
500 feet
100 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

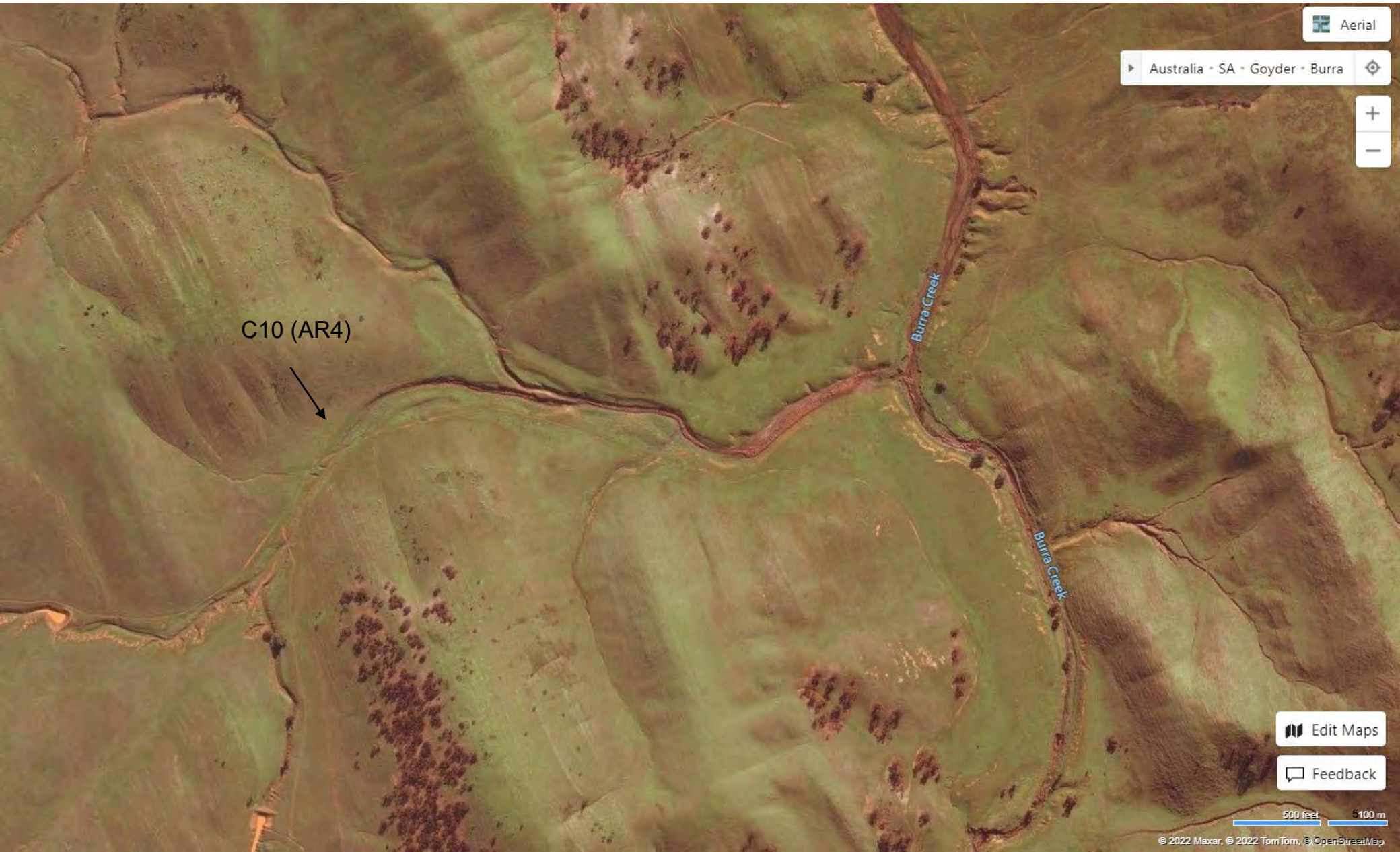
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C11 (AR7)

Road up-grade and
Culvert upgrade to (5) x 3.6x3.0m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022


Aerial
Australia • SA • Goyder • Burra
C10 (AR4)
Burra Creek
Burra Creek
Edit Maps
Feedback
500 feet
100 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C10 (AR4)

Road up-grade and
Culvert upgrade to (2) x 2.4x1.8m RCBCs

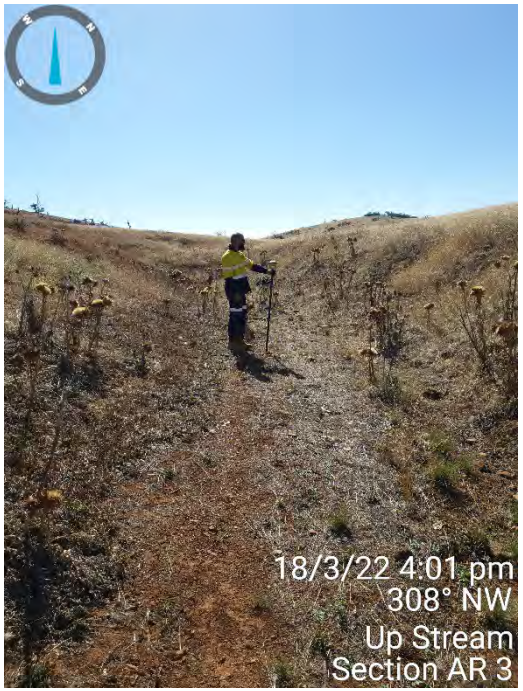
Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

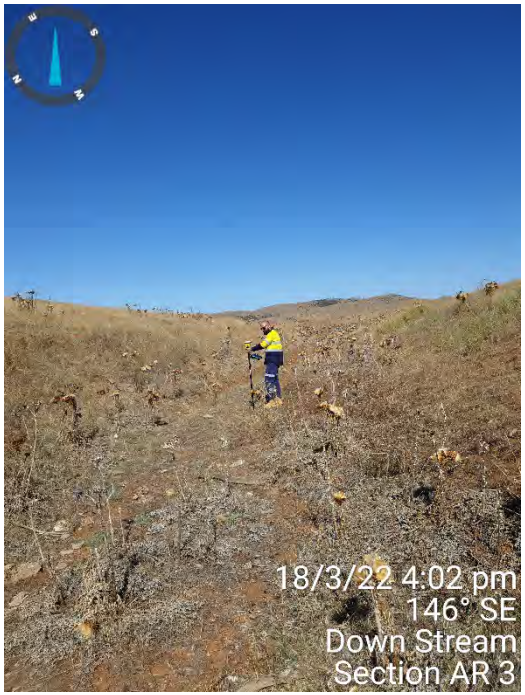
Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022


Aerial
Australia • SA • Goyder • Burra
C34 (AR3)
Burra Creek
Burra Creek
Edit Maps
Feedback
500 feet
100 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C34 (AR3)





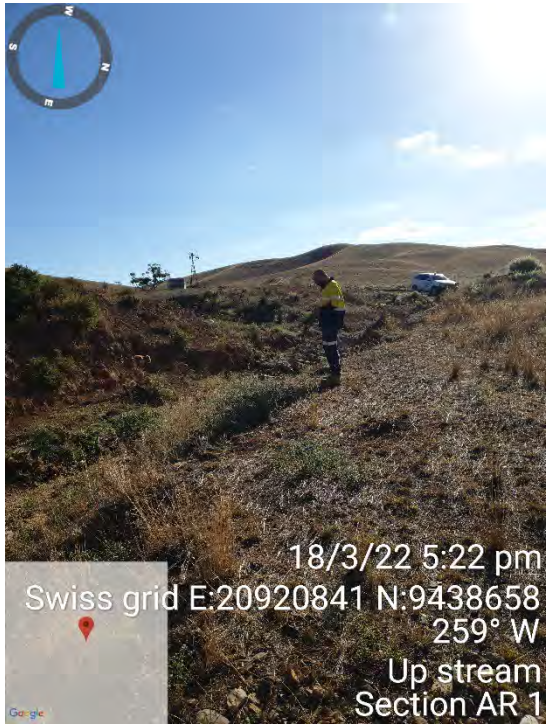
Road up-grade and
Culvert upgrade to (2) x 2.1x1.5m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts


Aerial
Australia • SA • Goyder • Burra
C36 (AR1)
Princess Royal
Burra Creek
Burra Creek
Burra Creek
Edit Maps
Feedback
1000 feet
9250 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

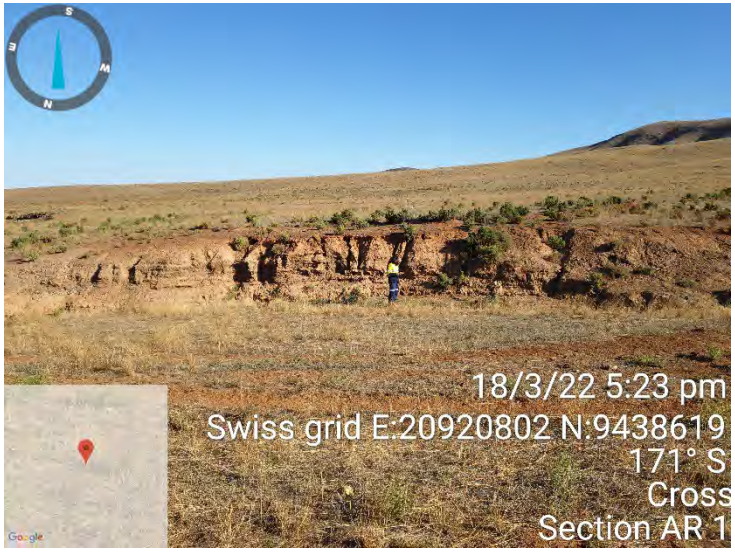
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C36 (AR1)



Road up-grade and
Culvert upgrade to (2) x 2.1x1.2m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts



Date: 22/03/2022


Aerial
Australia • SA • Goyder • Burra
Burra Creek
Burra Creek
C39 (AR9)
Edit Maps
Feedback
500 feet
100 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

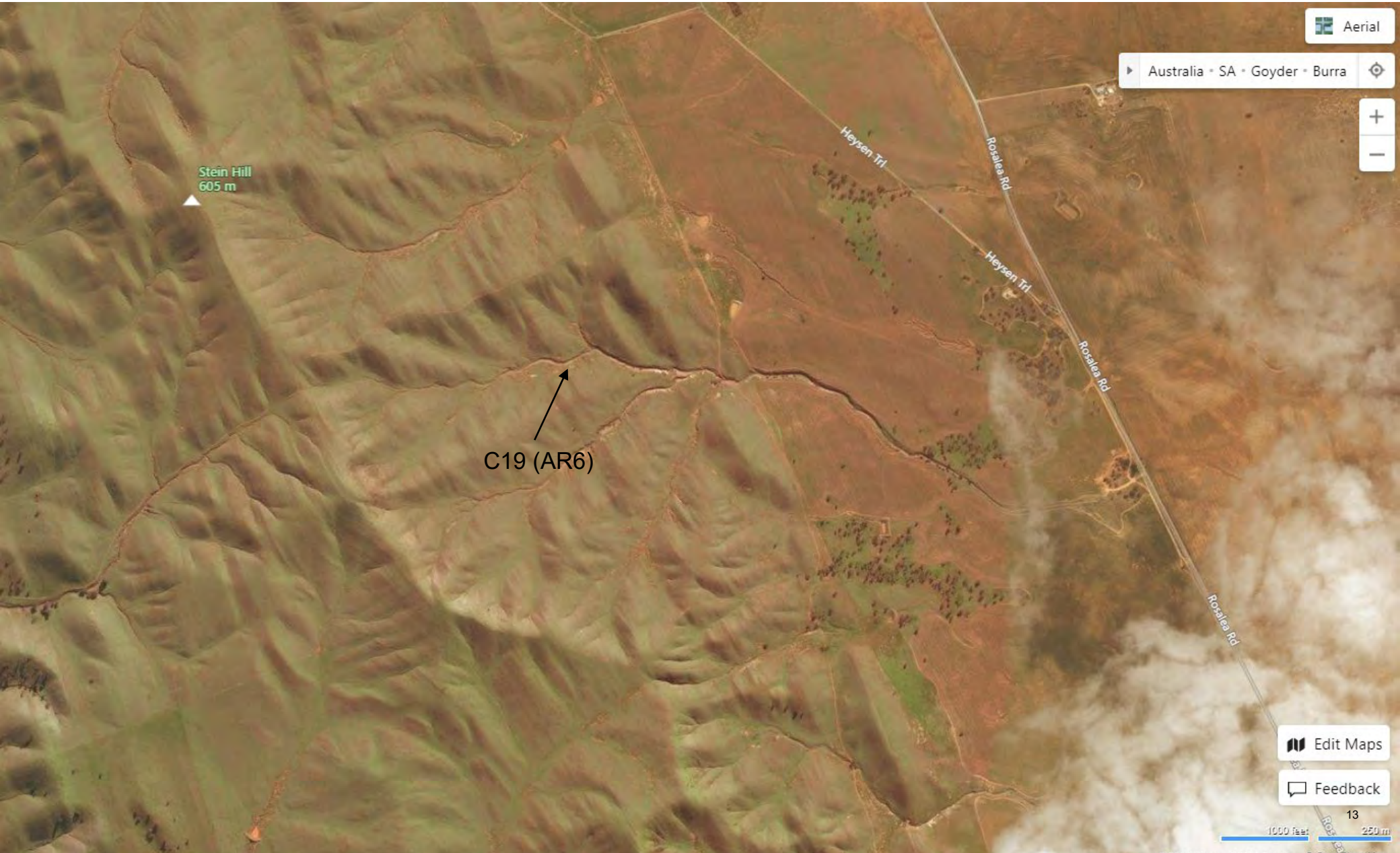
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C39 (AR9)

Road up-grade and
Culvert upgrade to (1) x 2.1x1.2m RCBCs

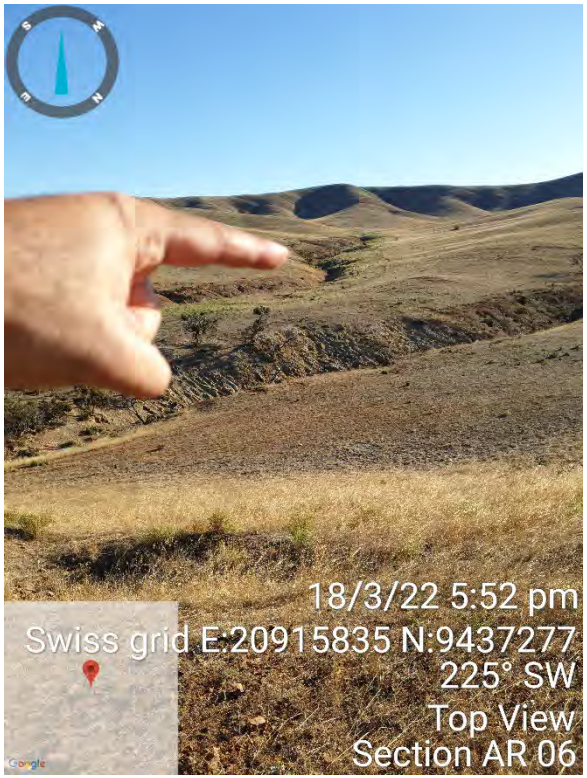
Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022


Aerial
Australia • SA • Goyder • Burra
Stein Hill
605 m
Heysen Trl
Rosalea Rd
Heysen Trl
Rosalea Rd
Rosalea Rd
C19 (AR6)
Edit Maps
Feedback
1000 feet
250 m

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C19 (AR6)



Road up-grade and
Culvert upgrade to (1) x 2.8x1.2m RCBCs

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts


Aerial
Australia • SA • Goyder • Burra
Heysen Trl
Heysen Trl
Heysen Trl
C24 (AR8)
Edit Maps
Feedback
250 feet
1550 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C24 (AR8)

Road up-grade and
Culvert upgrade to (2) x 0.9m RCP's

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022


Aerial
Australia • SA • Goyder • Burra
Burra Creek
Burra Creek
Kooramoora
Burra Creek
C8 (AR5)
Edit Maps
Feedback

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# C8 (AR5)

Road up-grade and
Culvert upgrade to (1) 2.1x1.2m RCBC's
*Subject to change

Installed under the requirements of the Master Specification:
RD-DK-C1 Installation of Stormwater Drainage

Culverts supplied as per:
RD-DK-S1 Supply of Pipes and Culverts

Date: 22/03/2022

SUMMARY SPECIFICATIONS OF ACCESS TRACK CROSSINGS

ID	Latitude	Longitude	Creek order	Peak 5% AEP Flow (m^3/s)	Max depth (m)	Culvert size (m)	Landholder	Land ID	Parcel	Comments	AR_ID	Civil DWG	Civil location
C10	-33.78124785	138.9869463	3	17	1.5	2x2.4x1.8_RCBC	Simon Rowe	7	H200800 S186		4	2203	C2.19
C11	-33.78123393	138.9984291	5	140	3.8	5x3.6x3.0_RCBC	Simon Rowe	7	H200800 S186	Burra Creek Crossing	7	2300	C3.01
C19	-33.727748	138.995148	3	3	1.0	1x1.8x1.2_RCBC	Simon Rowe	7	D46215 A344		6	2311	C3.40
C24	-33.71528329	138.9920555	3	2.1	0.7	2x0.9_RCP	Simon Rowe	7	D46215 A344		8	2313	C3.45
C34	-33.77835504	138.9867437	3	12	1.7	2x2.1x1.5_RCBC	Simon Rowe	7	D46215 A344		3	2203	C2.21
C36	-33.75050474	139.0083278	3	5.2	1.3	1x2.1x1.2_RCBC	Simon Rowe	7	D46215 A344		1	2309	C3.29
C39	-33.77856589	139.0007552	3	4.8	0.5	1x2.1x1.2_RCBC	Simon Rowe	7	H200800 S40		9	2301	C3.02
C8	-33.78093373	138.970695	3	7	0.6	2x 1.8 x 1.2_RCBC	Simon Rowe	7	D46215 A344		5	2603	C2.27

Roads RD-DK-C1 Installation of Stormwater Drainage

17 Appendix 1: Culvert Installation in Fill

Figure RD-DK-C1 17-1 Single and Multiple Box Culverts

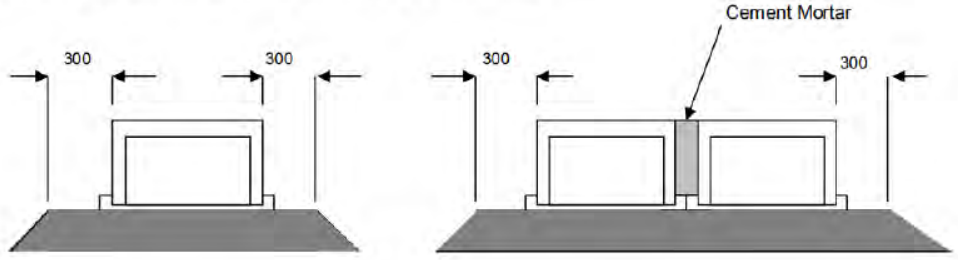


Figure RD-DK-C1 17-2 Multiple Pipes

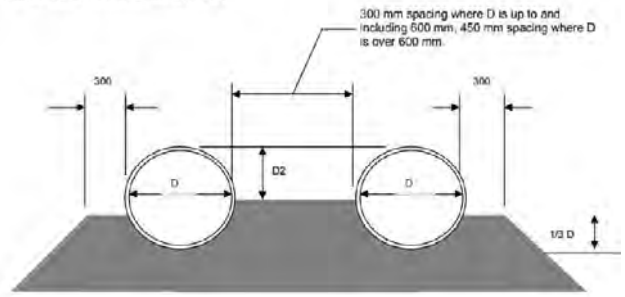
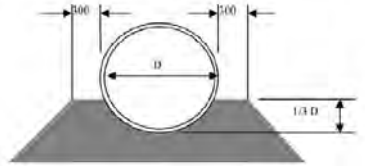


Figure RD-DK-C1 17-3 Single Pipes

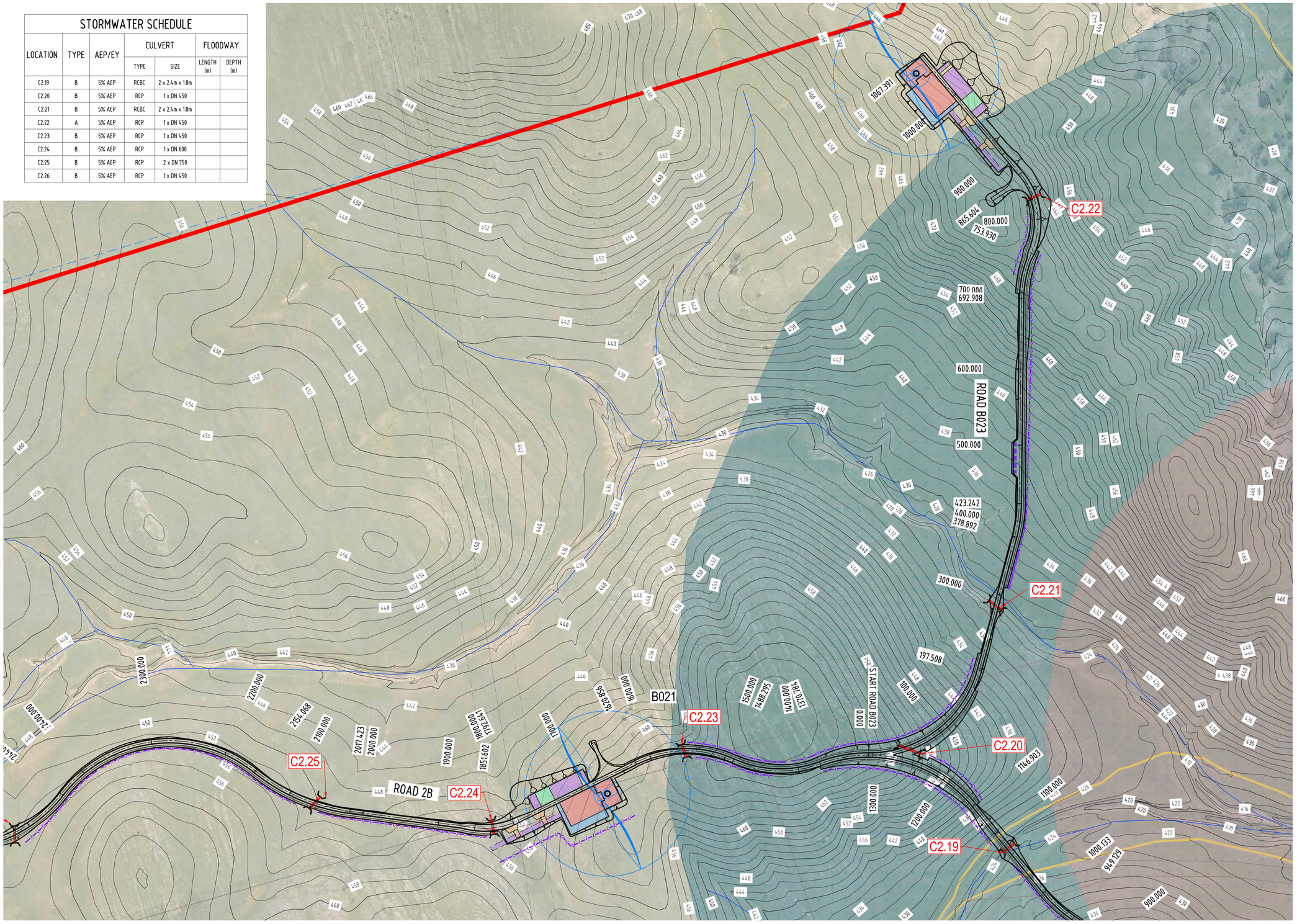


NOTE:

1. Not to scale.
2. All dimensions in millimetres.
3. D = Internal pipe diameter.
4. Refer to specification for bedding and backfill requirements

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C2.19	B	5% AEP	RCBC	2 x 2.4m x 1.8m		
C2.20	B	5% AEP	RCP	1 x DN 450		
C2.21	B	5% AEP	RCBC	2 x 2.4m x 1.8m		
C2.22	A	5% AEP	RCP	1 x DN 450		
C2.23	B	5% AEP	RCP	1 x DN 450		
C2.24	B	5% AEP	RCP	1 x DN 600		
C2.25	B	5% AEP	RCP	2 x DN 750		
C2.26	B	5% AEP	RCP	1 x DN 450		



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

When sheet printed full size, the scale bar is 100mm.

0 50 100mm

50 25 0 50 100
SCALE BAR (m)

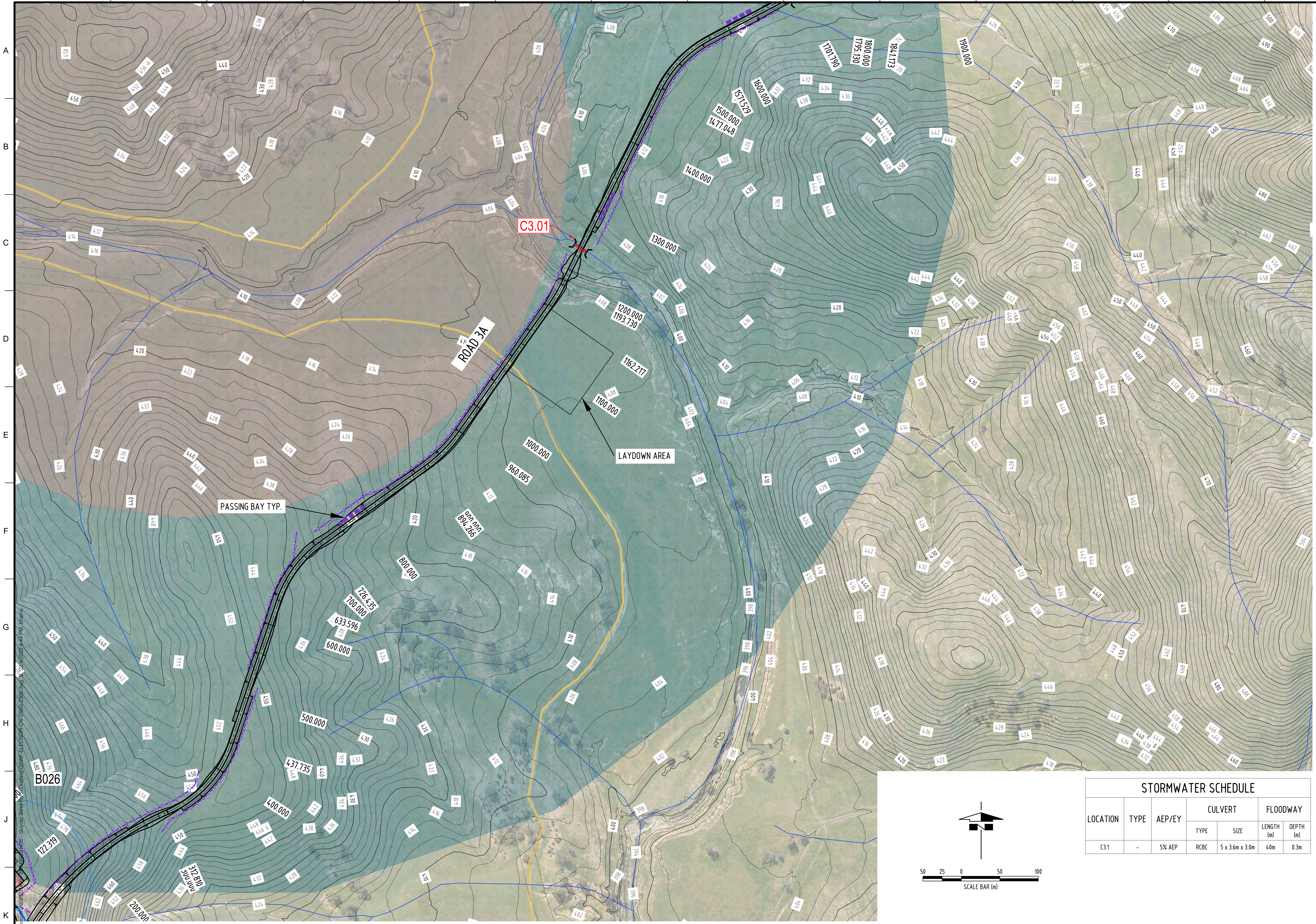
INFORMATION ISSUE
NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	DRAFT	ENG.	CHKD
A	09.03.22	30% DESIGN REVIEW ISSUE	BJH	JH	RB
B	20.05.22	80% DESIGN REVIEW ISSUE	BJH	JH	RB

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

GOYDER SOUTH WIND FARM
1B
CIVIL WORKS - PHASE 2
LAYOUT PLAN - SHEET 4

A1 | DOCUMENT NUMBER | Project Number | Sheet No. | Rev.
Design BJH | Drawn BJH | GSWF-ELECNOR-CIV- | DWG-2203 | B



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- EASTING, NORTHING AND NATURAL SURFACE LEVEL (E:775690.658 N:6388226.781 N.S.74.407)
- WIND FARM ROAD (20.000)
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C3.1	-	5% AEP	RCBC	5 x 3.6m x 3.0m	40m	0.3m

SCALE BAR (m): 50 25 0 50 100

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
B	80% DESIGN REVIEW ISSUE	BJH	JH	RB	03.06.22
A	30% DESIGN REVIEW ISSUE	BJH	JH	RB	22.04.22

REVISION HISTORY

STAGE 1B

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE: A1
SCALE: AS SHOWN
STATUS: INFORMATION ISSUE
NOT FOR CONSTRUCTION

ACONEX DOC No.: GSWF-ELECNOR-CIV-DWG-2300
PROJECT: GOYDER SOUTH WIND FARM
TITLE: CIVIL WORKS - PHASE 3
LAYOUT PLAN - SHEET 1
DRAWING No.: GSWF-ELECNOR-CIV-DWG-2300
Rev.: B

START ROAD B026

ROAD 3G

B030

B025

1B-PCM1

1B-PCM1 & 1B-CM2

C3.41

C3.40

C3.39

C3.38

C3.37

PASSING BAY TYP.

LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
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- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
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- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

SCALE BAR (m): 50 25 0 50 100

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C3.37	B	5% AEP	RCP	DN 450		
C3.38	B	5% AEP	RCP	DN 450		
C3.39	B	5% AEP	RCP	DN 450		
C3.40	B	5% AEP	RCP	2 x DN 1200		
C3.41	B	5% AEP	RCP	DN 750		

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	03.06.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	22.04.22

REVISION HISTORY

STAGE 1B

WGA WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

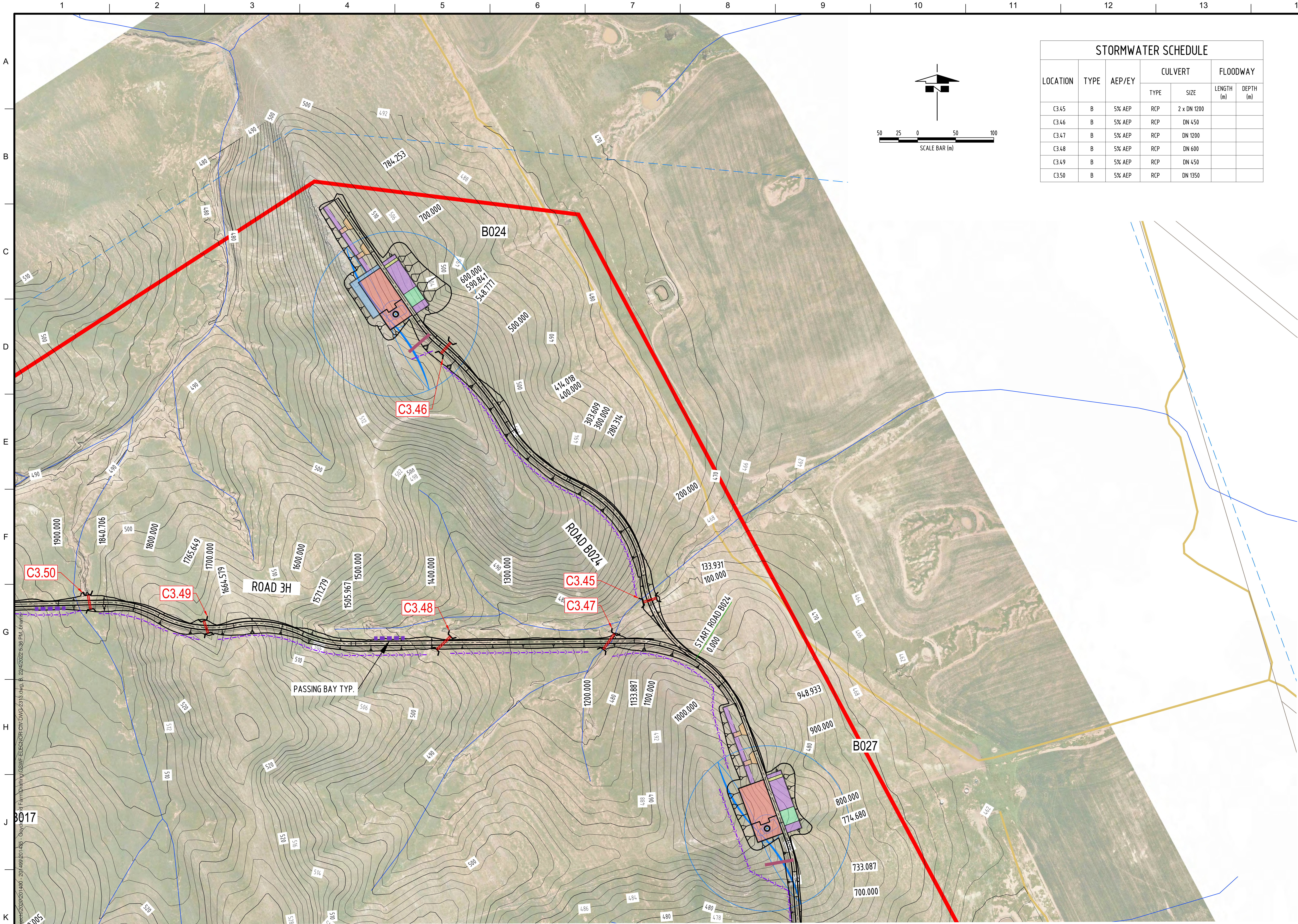
STATUS: INFORMATION ISSUE
NOT FOR CONSTRUCTION

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2311

PROJECT: GOYDER SOUTH WIND FARM

TITLE: CIVIL WORKS - PHASE 3
LAYOUT PLAN - SHEET 12

DRAWING No. GSWF-ELECNOR-CIV-DWG-2311 | Rev. B



STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C3.45	B	5% AEP	RCP	2 x DN 1200		
C3.46	B	5% AEP	RCP	DN 450		
C3.47	B	5% AEP	RCP	DN 1200		
C3.48	B	5% AEP	RCP	DN 600		
C3.49	B	5% AEP	RCP	DN 450		
C3.50	B	5% AEP	RCP	DN 1350		

LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- EASTING, NORTHING AND NATURAL SURFACE LEVEL (E:775690.658 N:6388226.781 N.S.:74.407)
- WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

REVISION HISTORY

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	03.06.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	22.04.22

STAGE 1B

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN · GE · green light elecnor

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2313

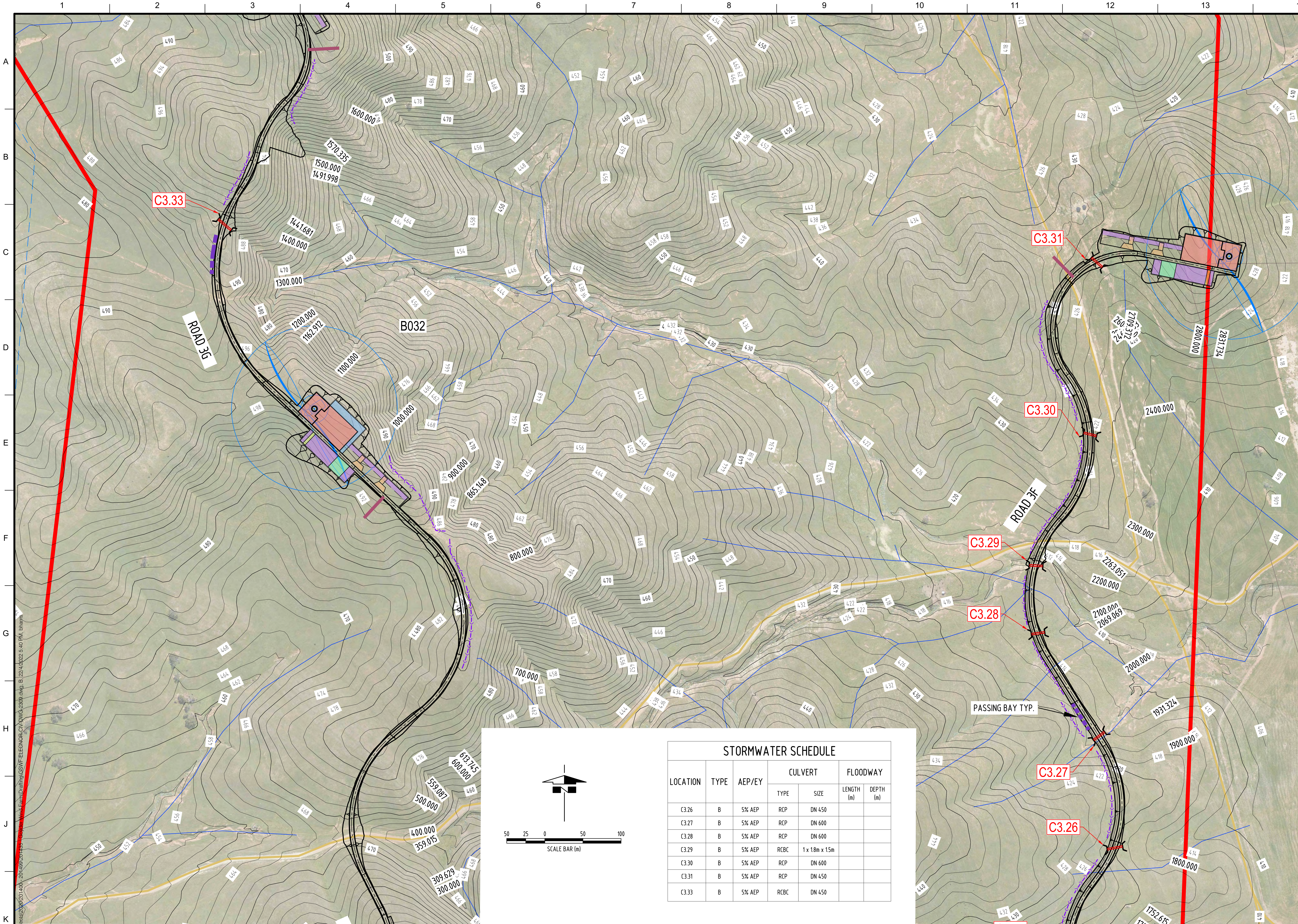
SIZE: A1 | SCALE: AS SHOWN

STATUS: INFORMATION ISSUE – NOT FOR CONSTRUCTION

PROJECT: GOYDER SOUTH WIND FARM

TITLE: CIVIL WORKS - PHASE 3 LAYOUT PLAN - SHEET 14

DRAWING No. GSWF-ELECNOR-CIV-DWG-2313 | Rev. B



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- EASTING, NORTHING AND NATURAL SURFACE LEVEL (E:775690.658 N:6388226.781 N.S.:74.407)
- WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C3.26	B	5% AEP	RCP	DN 450		
C3.27	B	5% AEP	RCP	DN 600		
C3.28	B	5% AEP	RCP	DN 600		
C3.29	B	5% AEP	RCBC	1 x 1.8m x 1.5m		
C3.30	B	5% AEP	RCP	DN 600		
C3.31	B	5% AEP	RCP	DN 450		
C3.33	B	5% AEP	RCBC	DN 450		

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	03.06.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	22.04.22

REVISION HISTORY

STAGE 1B

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2309

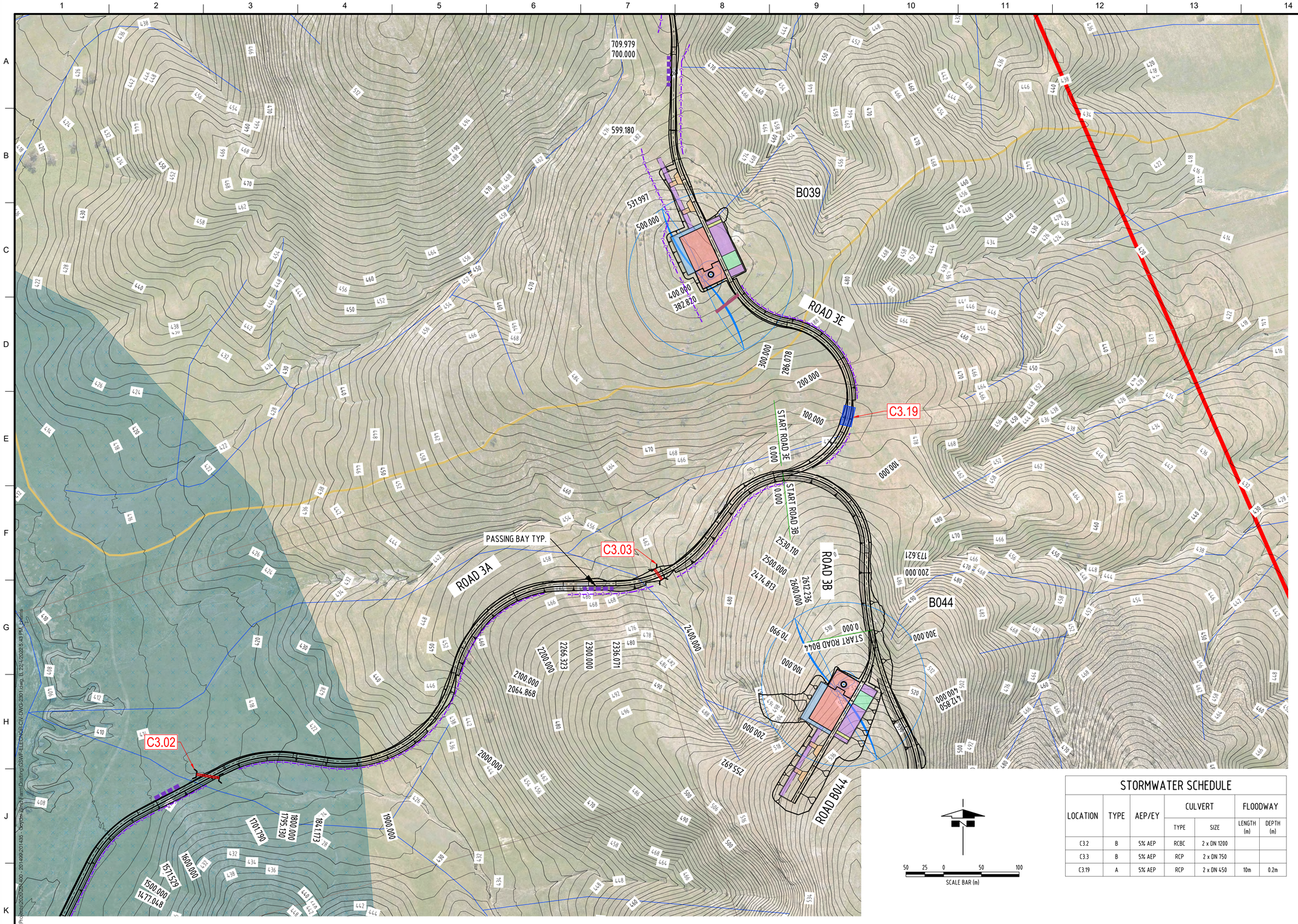
SIZE A1 | SCALE AS SHOWN

PROJECT: GOYDER SOUTH WIND FARM

STATUS: INFORMATION ISSUE NOT FOR CONSTRUCTION

TITLE: CIVIL WORKS - PHASE 3 LAYOUT PLAN - SHEET 10

DRAWING No. GSWF-ELECNOR-CIV-DWG-2309 | Rev. B



LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m (480)
- PROPOSED TURBINE LOCATION (SG001)
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
5. WHERE CULVERTS ARE INSTALLED WITH OUTLET INVERTS BELOW THE NATURAL GROUND LEVEL, CONTRACTOR TO INSTALL A TURN OUT DRAIN TO ENSURE OUTLET IS FREE DRAINING.
6. IT IS RECOMMENDED THAT THE CRANE NOT TRAVEL ALONG THE ACCESS ROAD DURING OR IMMEDIATELY AFTER RAINFALL, DUE TO THE POTENTIAL FOR SOFTENING OF THE BASECOURSE AND THE ASSOCIATED NON-ELASTIC (PERMANENT) DEFORMATION OF THE PAVEMENT.
7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
- LOMANDRA MULTIFLORA (HARD MAT-RUSH) / LOMANDRA EFFUSA (SCENTED MAT-RUSH) MIXED OPEN GRASSLAND
- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
- WEDGE-TAILED EAGLE (WTE) 1 km BUFFER ZONE
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL LIKELY HABITAT
- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

SCALE BAR (m): 50 25 0 50 100

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C3.2	B	5% AEP	RCBC	2 x DN 1200		
C3.3	B	5% AEP	RCP	2 x DN 750		
C3.19	A	5% AEP	RCP	2 x DN 450	10m	0.2m

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	03.06.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	22.04.22

REVISION HISTORY

STAGE 1B

WGA
WALLBRIDGE GILBERT AZTEC
60 Wyatt Street, Adelaide
South Australia 5000
Telephone 08 8223 7433
Email adelaide@wga.com.au

NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

STATUS: INFORMATION ISSUE
NOT FOR CONSTRUCTION

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2301

PROJECT: GOYDER SOUTH WIND FARM

TITLE: CIVIL WORKS - PHASE 3
LAYOUT PLAN - SHEET 2

DRAWING No. GSWF-ELECNOR-CIV-DWG-2301 | Rev. B

SUBSTATION "DESIGNED" BY OTHERS. REFER TO SUBSTATION PACKAGE FOR CIVIL DESIGN, INCLUDING INTERNAL AND EXTERNAL DRAINAGE.

SUBSTATION

B004

ROAD 1B

ROAD 2B

ROAD 2C

ROAD 6B

START ROAD 2C 0.000

C6.11

C6.12

C6.13

C6.14

C6.15

C6.16

C6.17

C6.18

C2.26

C2.27

FOR CONTINUATION REFER SHEET 2602

LEGEND

- EXISTING CONTOURS INTERVAL = 2.0m
- PROPOSED TURBINE LOCATION (SG001)
- E:775690.658 N:6388226.781 N.S.74.407 — EASTING, NORTHING AND NATURAL SURFACE LEVEL
- 20.000 — WIND FARM ROAD
- NEW STORMWATER CULVERT TYPE B
- FLOODWAY TYPE A, C OR D
- ELECTRICAL MV/HV CABLE ROUTE (BY OTHERS)
- DIRECTIONAL CUT OFF DRAIN - TYPE 1
- DIRECTIONAL CUT OFF DRAIN - TYPE 2
- DIRECTIONAL CUT OFF DRAIN - TYPE 3
- STORMWATER BERM

NOTES:

1. DRAWING HORIZONTAL DATUM IS GDA2020, MGA ZONE 54
2. MINIMUM COVER TO RCP CLASS 4 IS 400mm.
3. COORDINATE CULVERT DEPTH WITH BURIED CABLES MIN. 500mm VERTICAL CLEARANCE REQUIRED.
4. CONTRACTOR TO LOCATE ALL HERITAGE AND ENVIRONMENTAL CONSTRAINTS PRIOR TO CONSTRUCTION. ESTABLISH BUNTING OR SIMILAR FOR CONSTRAINTS WITHIN 50m OF CONSTRUCTION WORKS TYPICALLY.
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7. REFER TO SITE CONSTRAINTS DRAWING FOR SPECIFIC ITEM NOTES.

SITE CONSTRAINTS LEGEND

- EXISTING ROADS (INDICATIVE)
- WIND FARM STAGE 1A & 1B BOUNDARY
- PROPERTY BOUNDARY (INDICATIVE)
- WATERWAYS (INDICATIVE)
- PEPPERMINT BOX (EUCALYPTUS ODORATA) GRASSY WOODLAND OF SOUTH AUSTRALIA (CRITICALLY ENDANGERED)
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- WEDGE-TAILED EAGLE (WTE) 500m BUFFER ZONE
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- PYGMY BLUE-TONGUE LIZARD (TILIQUA ADELAIDENSIS) PBTL POTENTIAL HABITAT
- DWELLING
- MET MAST
- CULTURAL HERITAGE SURVEY

STORMWATER SCHEDULE

LOCATION	TYPE	AEP/EY	CULVERT		FLOODWAY	
			TYPE	SIZE	LENGTH (m)	DEPTH (m)
C6.11	B	5% AEP	RCP	2 x DN 900	-	-
C6.12	B	5% AEP	RCP	1 x DN 600	-	-
C6.13	B	5% AEP	RCP	2 x DN 600	-	-
C6.14	B	5% AEP	RCP	2 x DN 600	-	-
C6.15	B	5% AEP	RCP	1 x DN 600	-	-
C6.16	B	5% AEP	RCP	1 x DN 450	-	-
C6.17	B	5% AEP	RCP	1 x DN 450	-	-
C6.18	B	5% AEP	RCP	1 x DN 450	-	-
C2.26	B	5% AEP	RCP	1 x DN 450		
C2.27	B	5% AEP	RCBC	1 x 2.4m x 1.5m		

50 25 0 50 100
SCALE BAR (m)

No.	DESCRIPTION	DES	DRN	CKD	APD	DATE
1	PHASE 2 80% DESIGN REVIEW ISSUE ADDED		BJH	JH	RB	20.05.22
0	ISSUED FOR CONSTRUCTION		BJH	JH	RB	06.05.22
B	80% DESIGN REVIEW ISSUE		BJH	JH	RB	30.03.22
A	30% DESIGN REVIEW ISSUE		BJH	JH	RB	25.02.22

REVISION HISTORY

STAGE 1B

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NEOEN

green light elecnor

SIZE A1 | SCALE AS SHOWN

STATUS CONSTRUCTION ISSUE

ACONEX DOC No. GSWF-ELECNOR-CIV-DWG-2603

PROJECT GOYDER SOUTH WIND FARM

TITLE CIVIL WORKS - PHASE 6 LAYOUT PLAN - SHEET 4

DRAWING No. GSWF-ELECNOR-CIV-DWG-2603 | Rev. 1

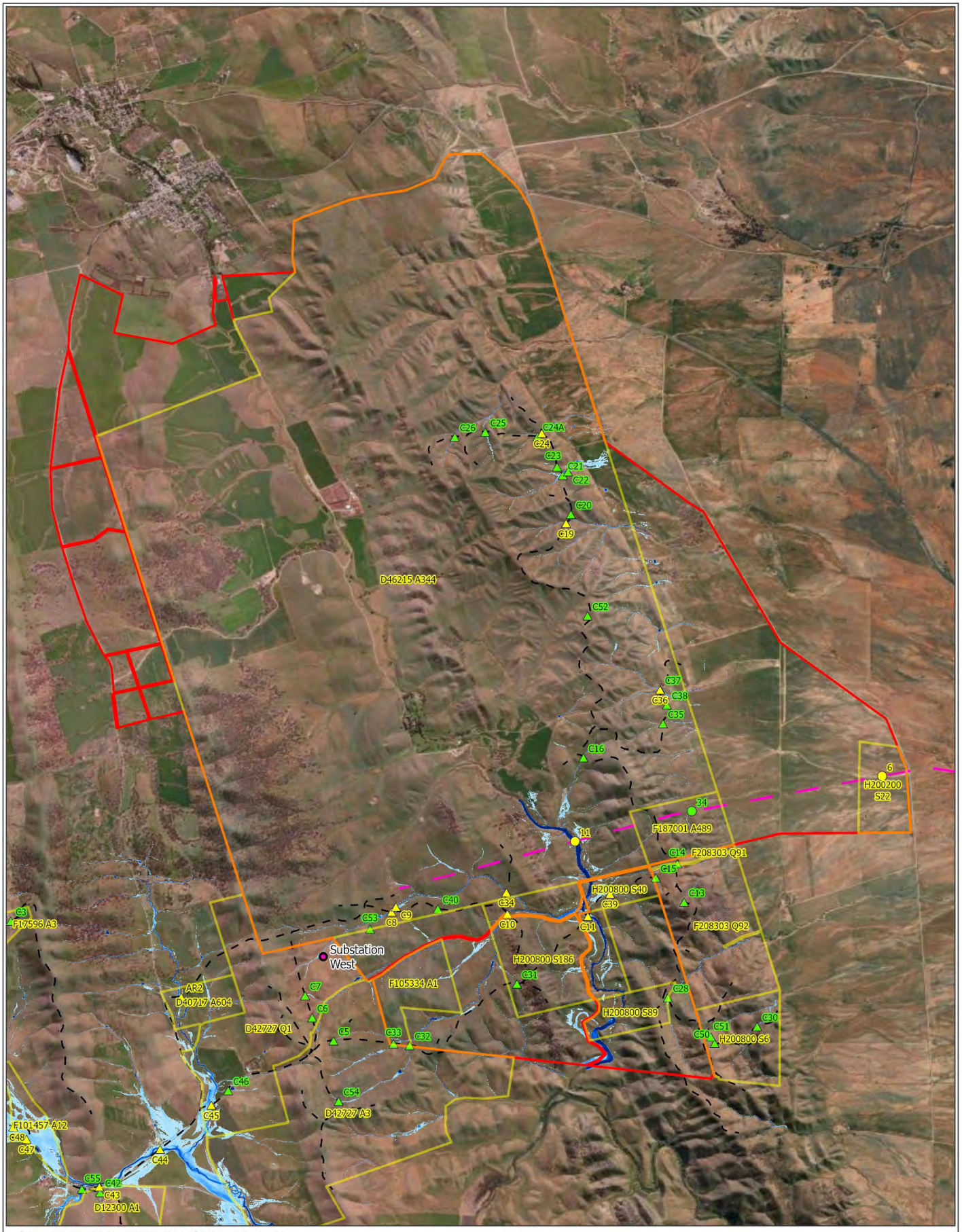
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #7 (Simon Rowe)

22nd March 2022



Crossings - Land Ref. # 7 (Simon Rowe)

- Land Ref # 7 boundary
- Parcel
- Access track (AR)
- Transmission line
- Substation

5%AEP Max Depth
Value (m)
5.55
0.0

- AR crossing on stream order 3 and above
- AR crossing on stream order 1 and 2
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: Simon Rowe
Phone: 0428 822 232
simon@princessroyal.com.au

0 0.48 0.96 1.92
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

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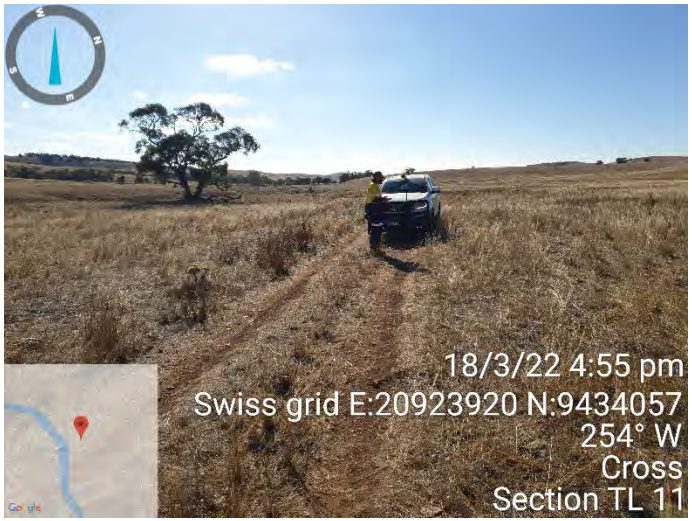
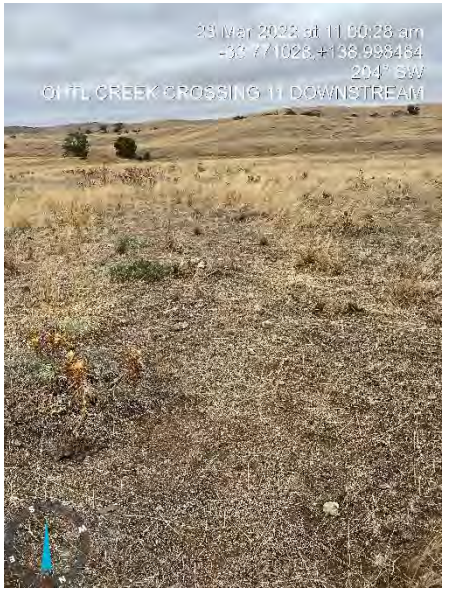
A TETRA TECH COMPANY


Burra Creek
Burra Creek
TL 11
Burra Creek
Kooramoora
Burra Creek
Aerial
Australia • SA • Goyder • Burra
Edit Maps
Feedback
1000 feet
280 m
© 2022 Maxar, © 2022 TomTom, © OpenStreetMap

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 11

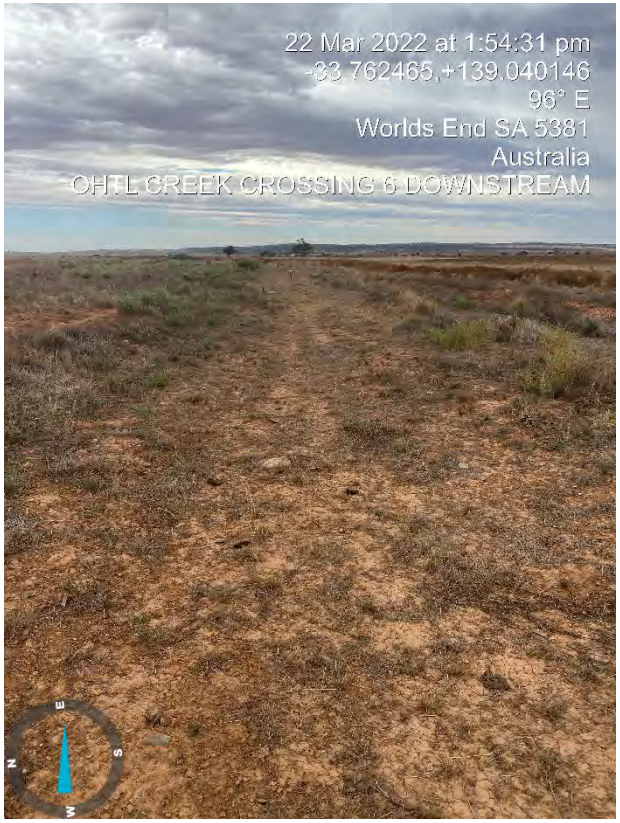


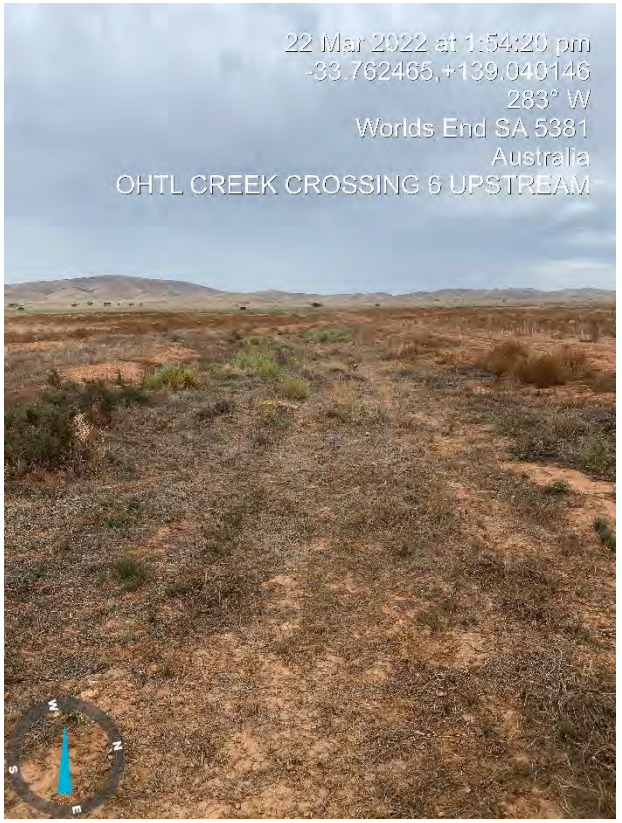


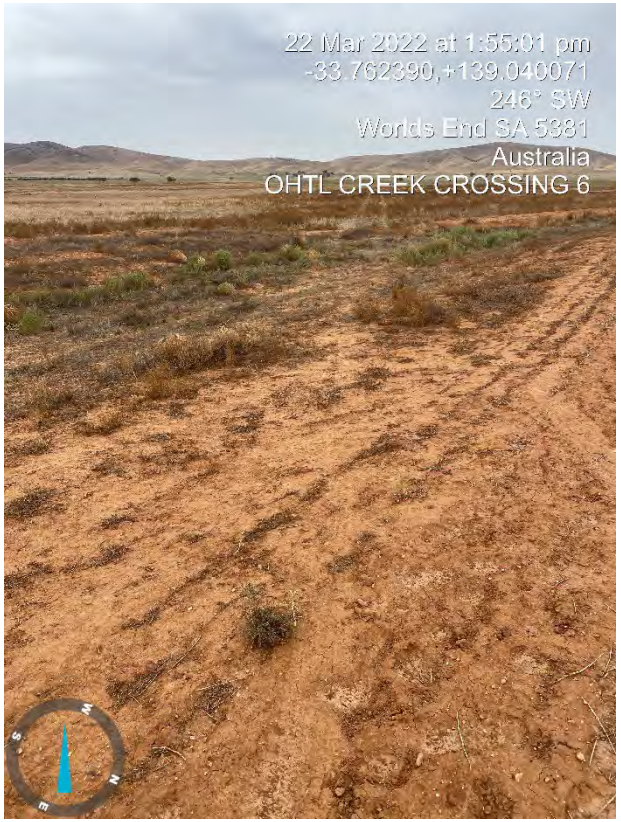
Date: 22/03/2022


Aerial
Australia • SA • Goyder • Worlds End
Top Rd
Duttons Trough Rd
Worlds End Hwy
Duttons Trough Rd
Worlds End Hwy
Top Rd
Top Rd
TL 6
Edit Maps
Feedback
1000 feet
250 m

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 6







Date: 22/03/2022

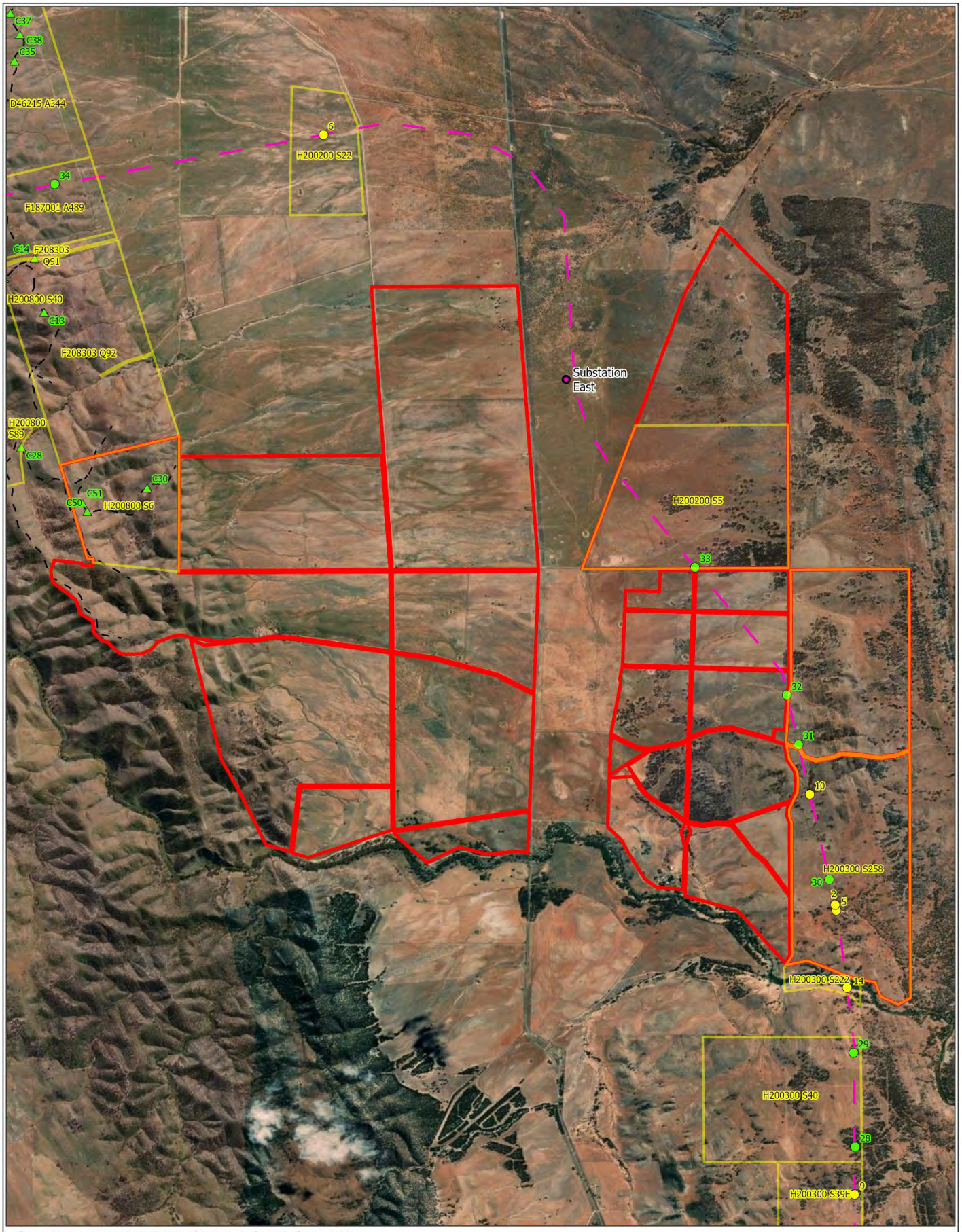
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #9 (Simon & Steph Schmidt)

22nd March 2022



Crossings - Land Ref. # 9 (Simon & Steph Schmidt)

- Land Ref # 9 boundary
- Parcel
- Access track (AR)
- Transmission line
- Substation
- AR crossing on stream order 1 and 2
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: Simon Schmidt
Phone: 0407 817 133
sjs.schmidt@gmail.com

0 0.34 0.67 1.34
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

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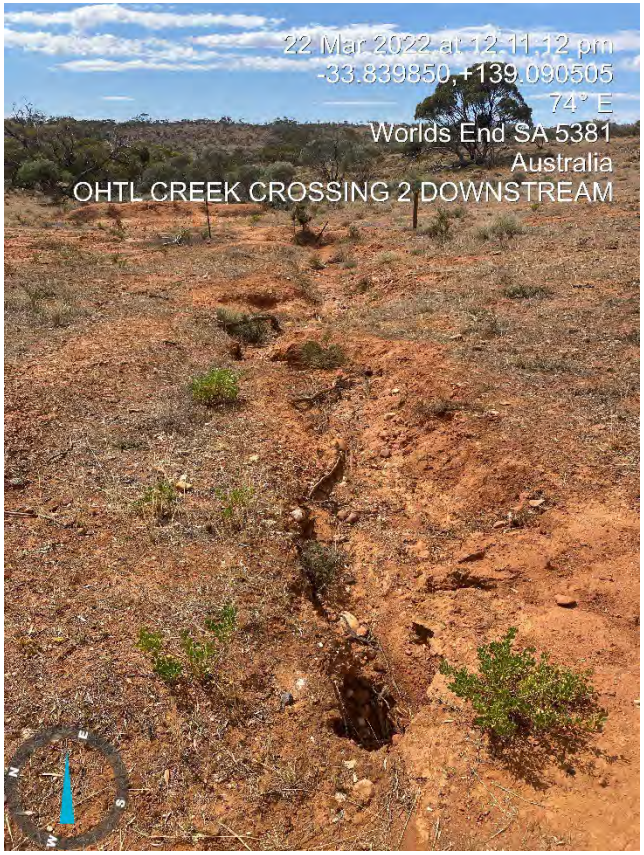
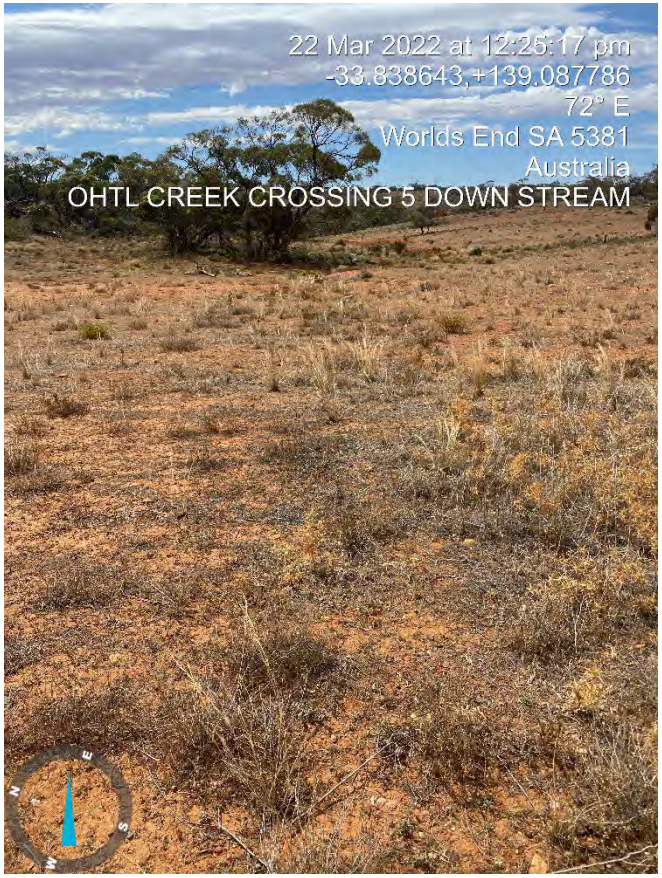
A TETRA TECH COMPANY

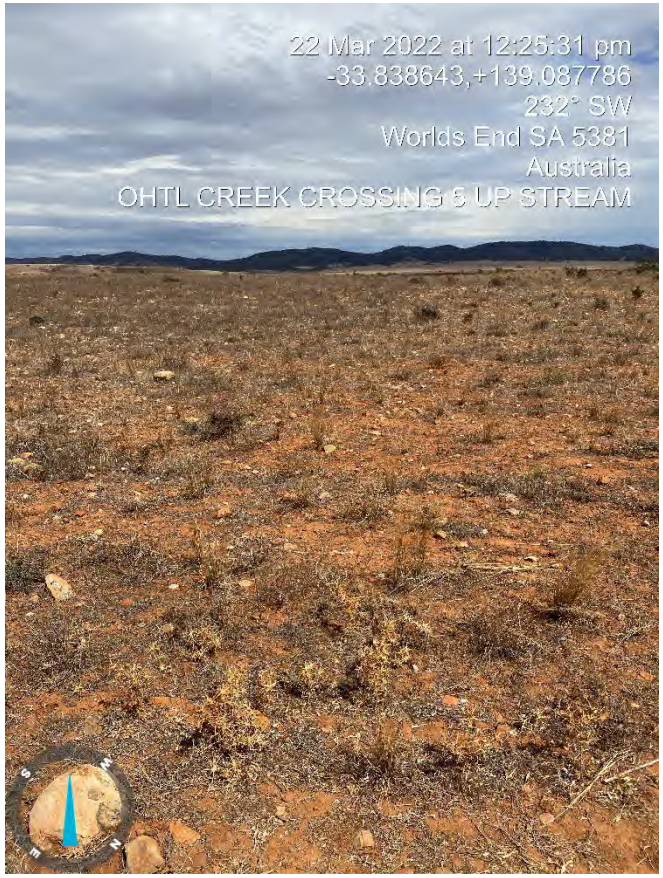
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 2



Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 5





Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 10

Date: 22/03/2022

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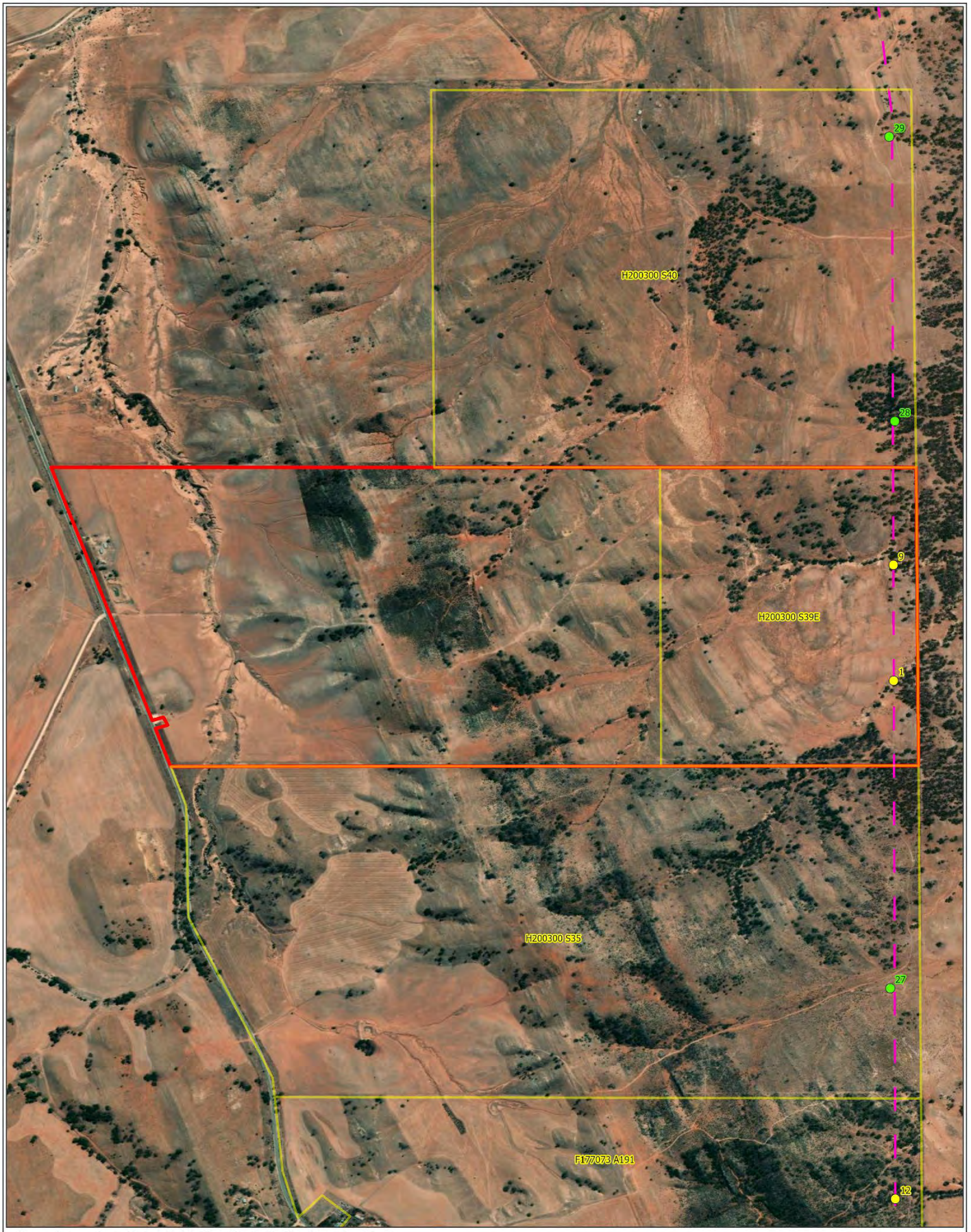
Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #14
(Neville & Jodie-Anne Loffler)

22nd March 2022



Crossings - Land Ref. # 14 (Neville & Jodie-Anne Loffler)

- Land Ref # 14 boundary
- Parcel
- Transmission line
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: Neville Loffler
Phone: 0428 858 113
neville.loffler@bigpond.com

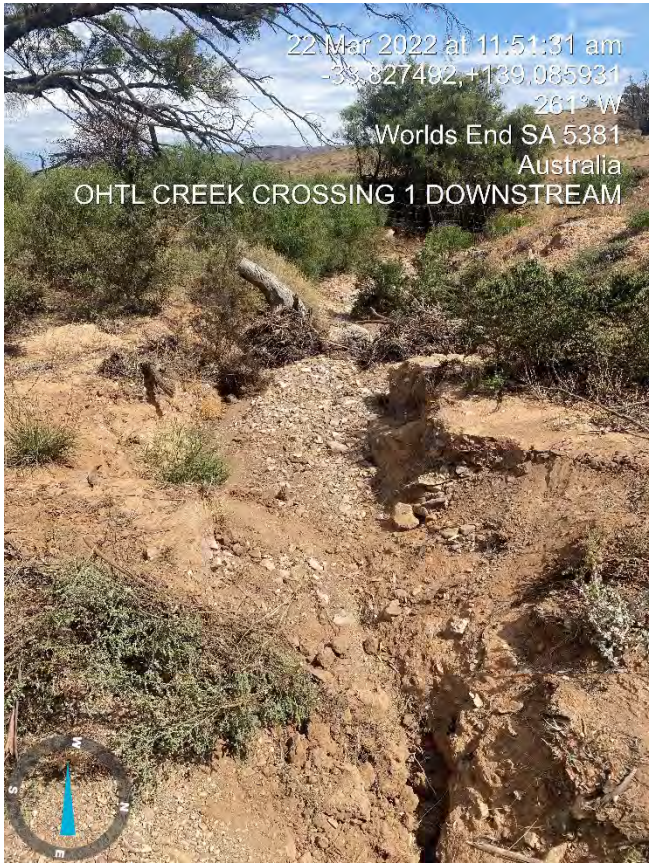
0 0.11 0.22 0.44
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

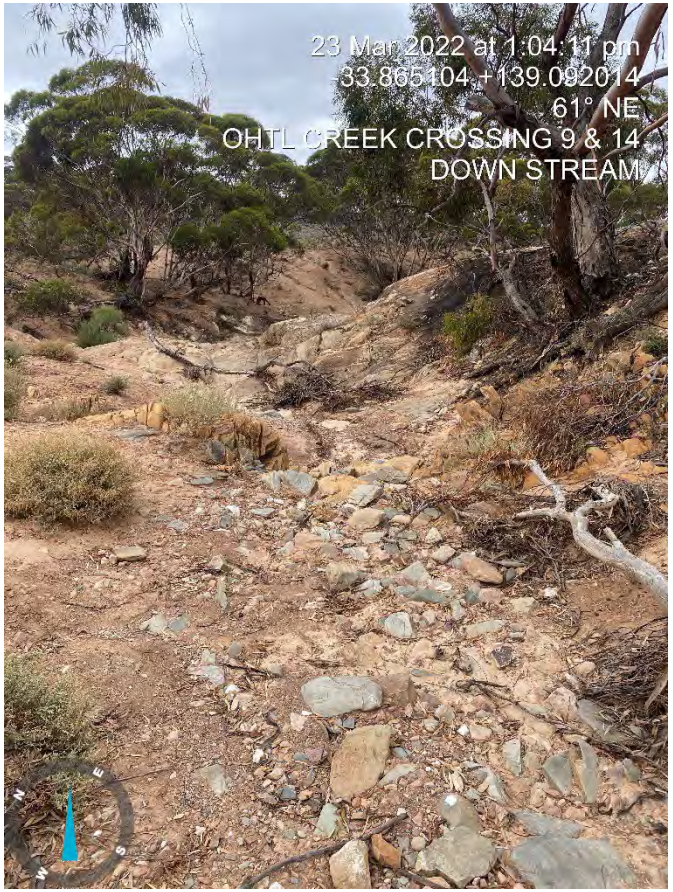
eco logical AUSTRALIA
A TETRA TECH COMPANY

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 1



Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 9



Date: 22/03/2022

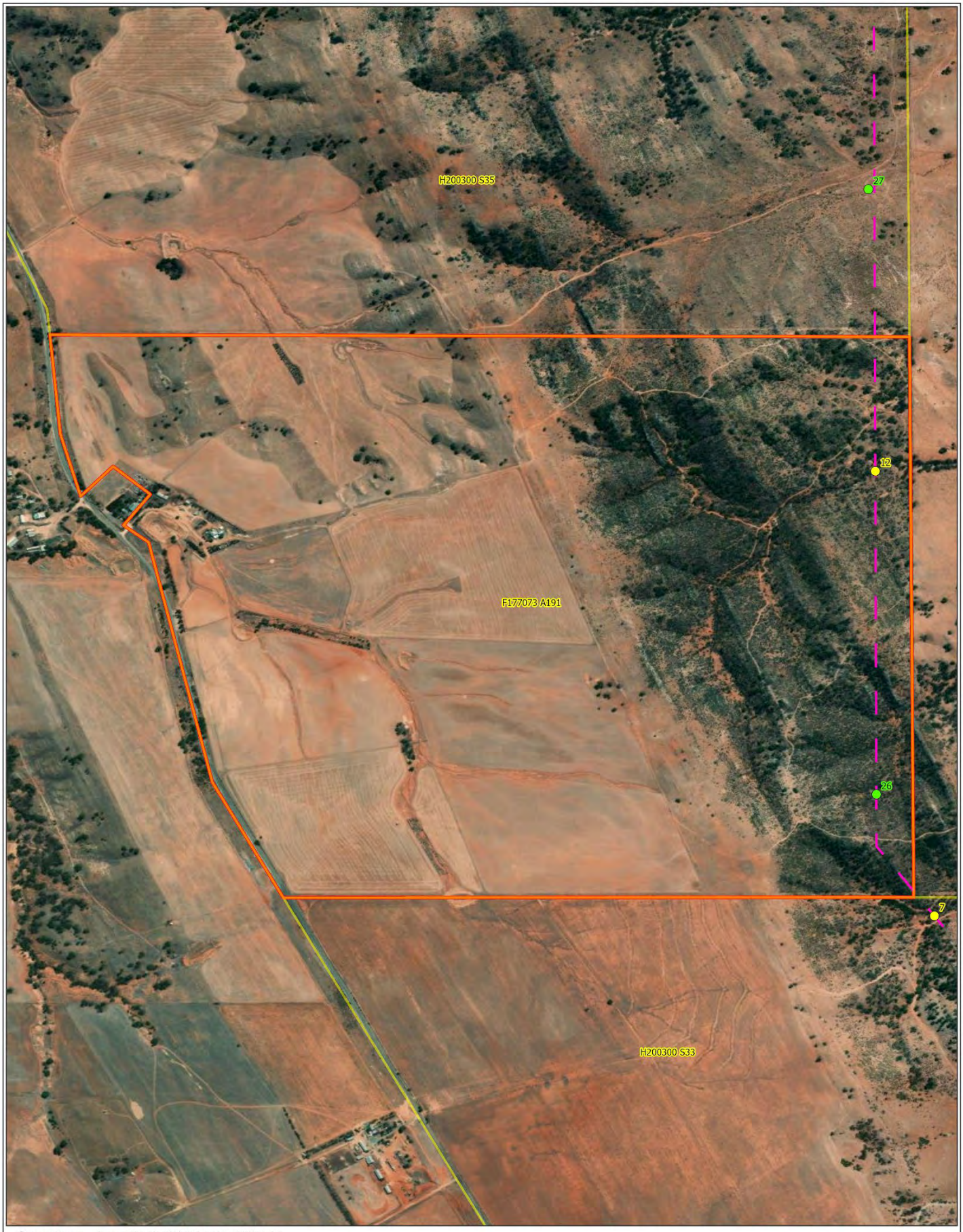
Goyder Wind Farm

Water Affecting Activities
Permit Application Form
Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #16
(Ross Wiech)

22nd March 2022



Crossings - Land Ref. # 16 (Ross Wiech)

- Land Ref # 16 boundary
- Parcel
- Transmission line
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: Ross Wiech
Phone: 0437 311 650
ross.wiech@skymesh.com.au

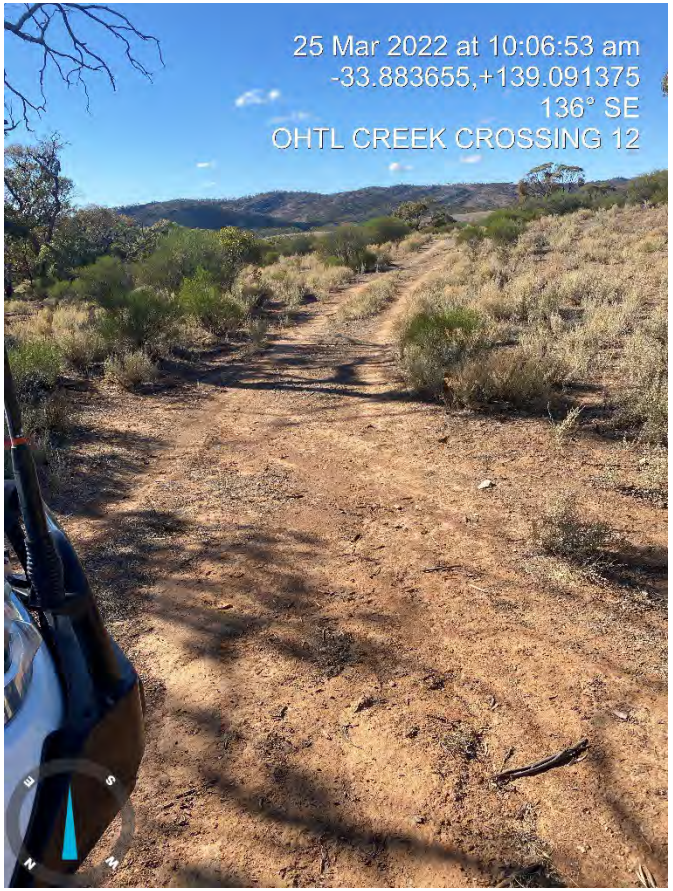
0 0.08 0.17 0.33
Kilometres

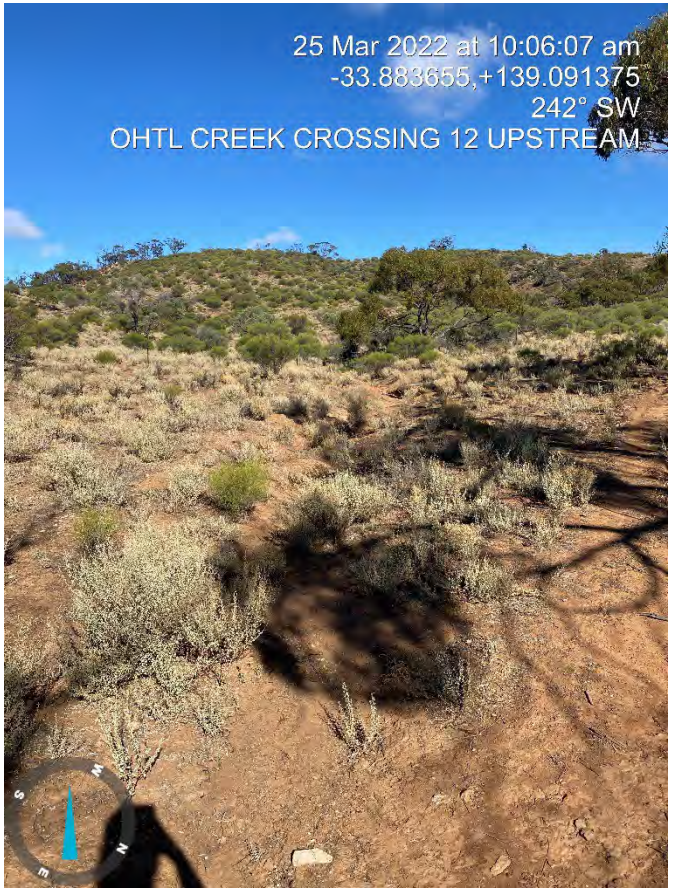
Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

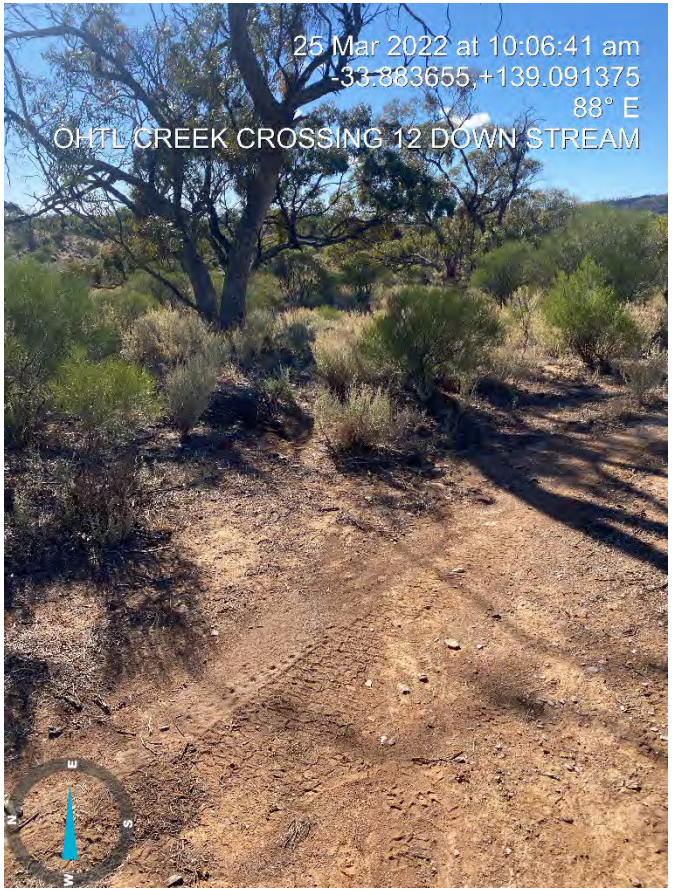
N

eco logical AUSTRALIA
A TETRA TECH COMPANY

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 12







Date: 22/03/2022

Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #17 (Peter Evans)

22nd March 2022

Crossings - Land Ref. # 17 (Peter Evans)

- Land Ref # 17 boundary
- Parcel
- Transmission line
- TL crossing on stream order 3 and above
- TL crossing on stream order 1 and 2

Contact: Peter Evans
Phone: 0418 839 091
peter@evansconsulting.com.au

0 0.12 0.23 0.47
Kilometres

Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

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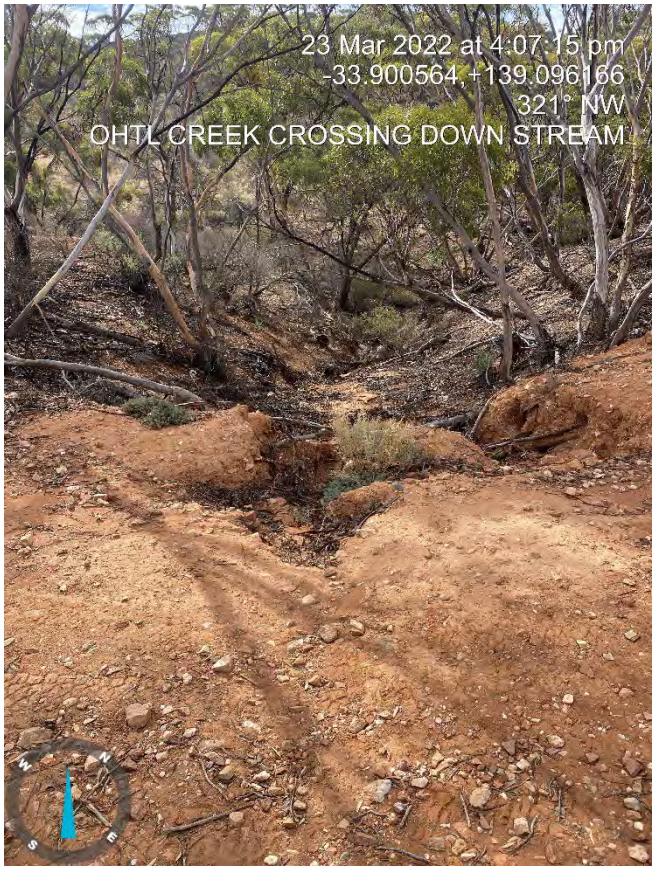
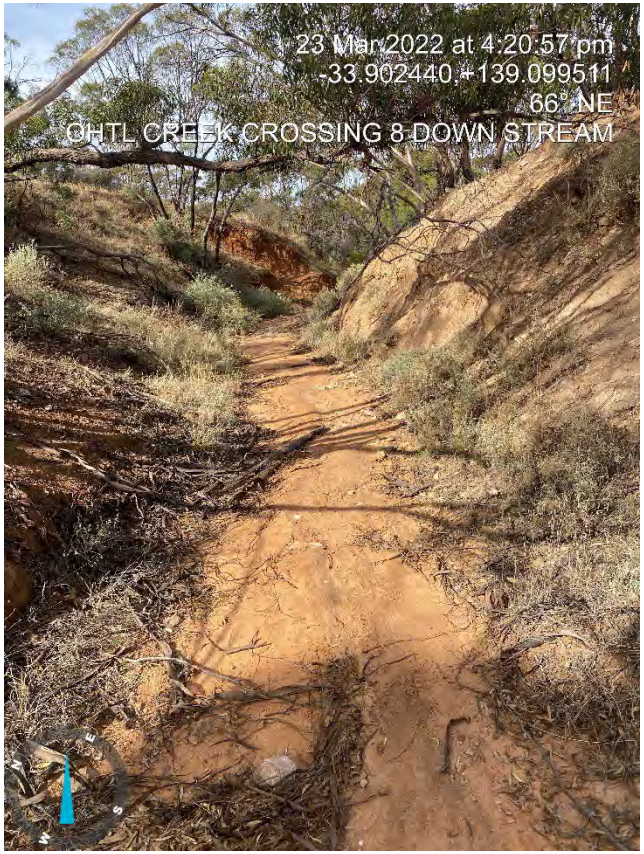
eco logical AUSTRALIA
A TETRA TECH COMPANY

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 7



Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 8



Date: 22/03/2022

Goyder Wind Farm

Water Affecting Activities Permit Application Form Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #21 (Pam Eberhard)

22nd March 2022

Crossings - Land Ref. # 21 (Pam Eberhard)

Land Ref # 21 boundary
Parcel
Transmission line
TL crossing on stream order 3 and above

Contact: Travis Eberhard
Phone: 0419 830 834
peberhard@ozemail.com

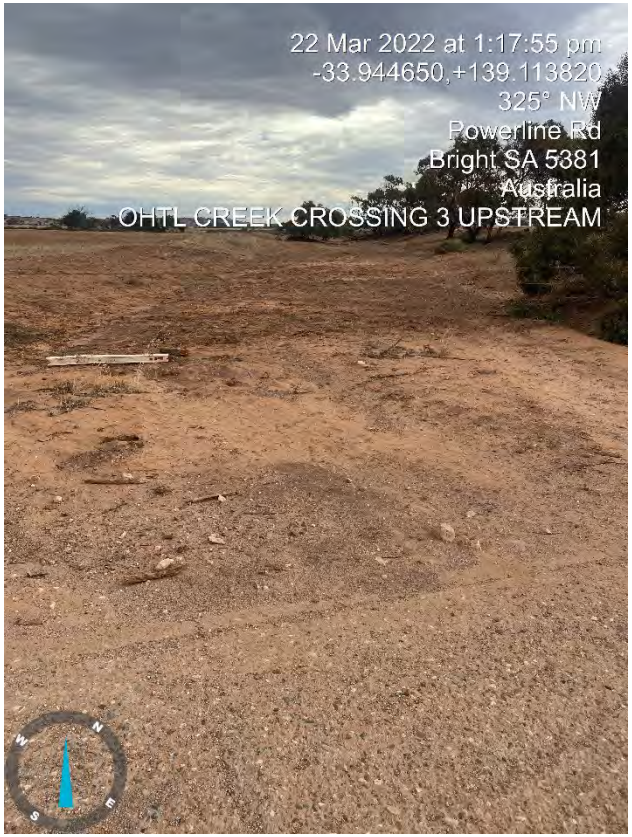
0 0.07 0.14 0.27
Kilometres

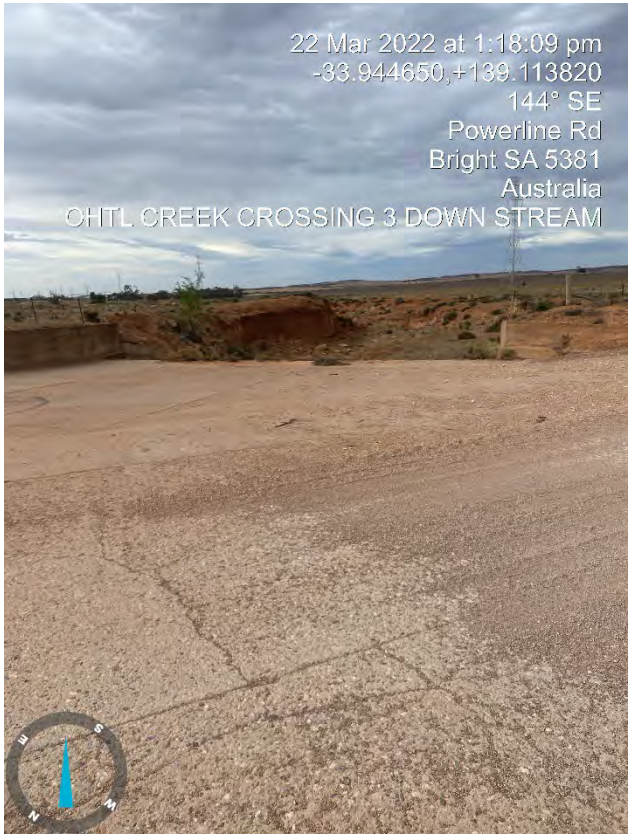
Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

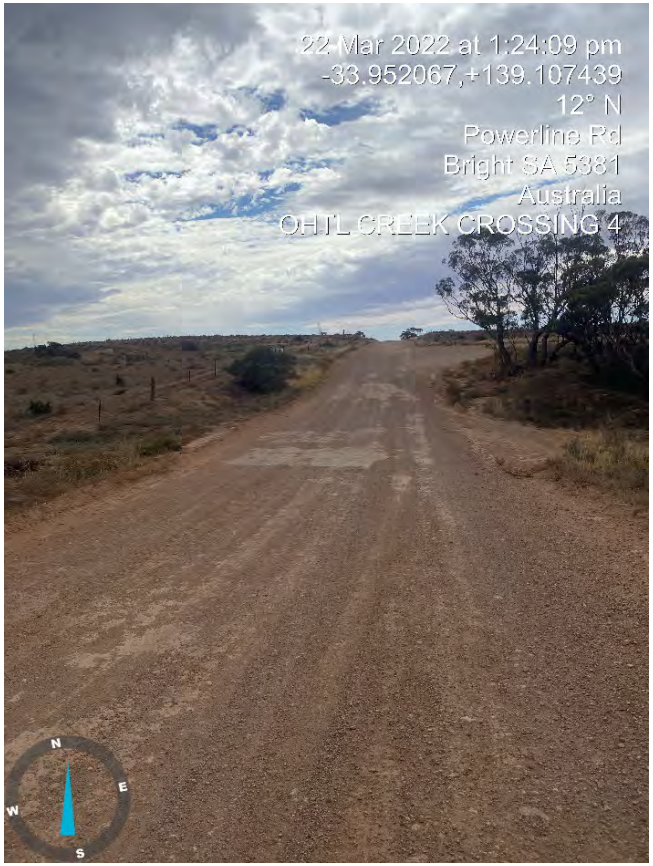
PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 3





Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 4



Date: 22/03/2022

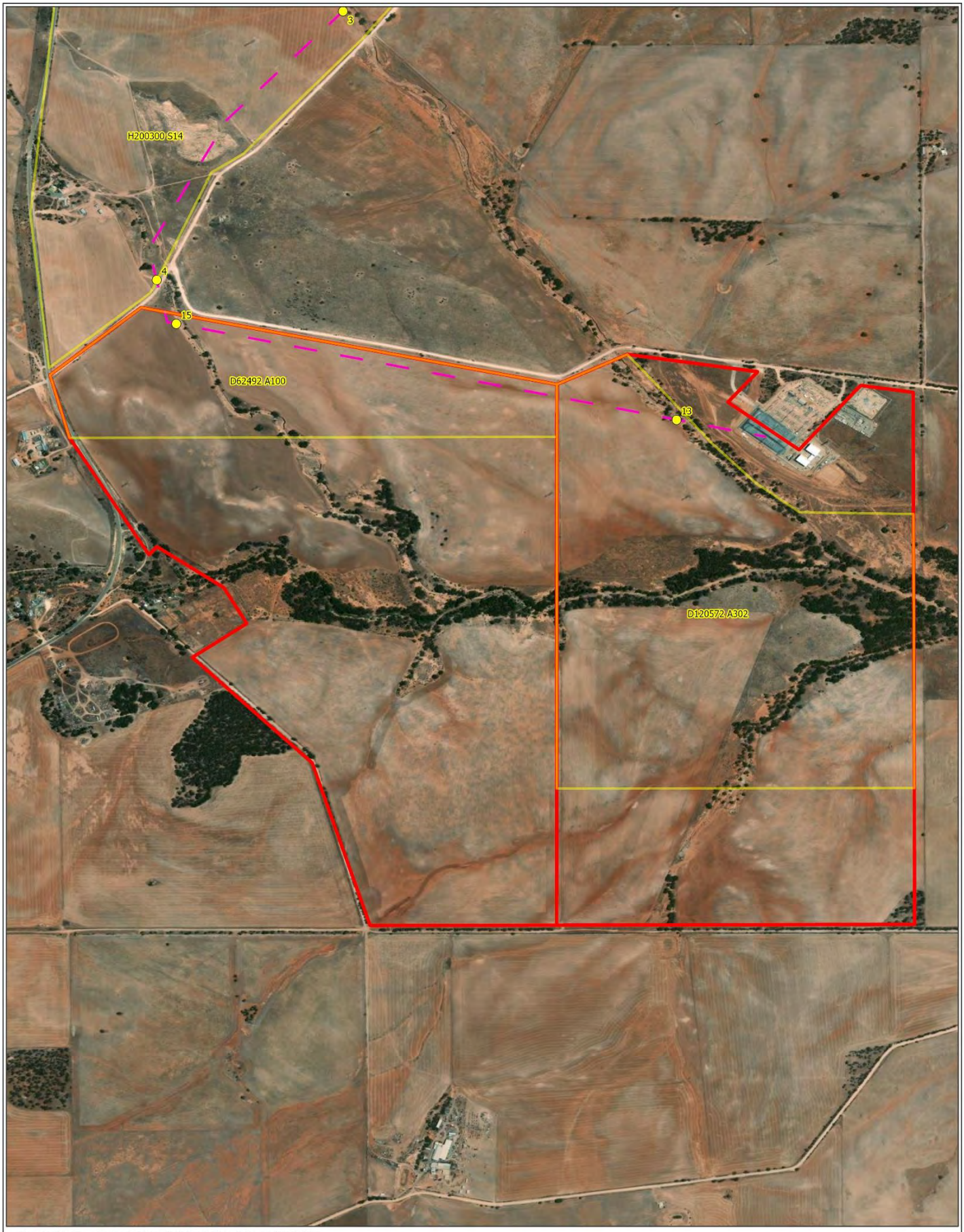
Goyder Wind Farm

Water Affecting Activities
Permit Application Form
Works Plan Site Photographs

Photographs to accompany Map

Transmission Lines – Land Ref #22
(John Lipschinski)

22nd March 2022



Crossings - Land Ref. # 22 (John Lipschinski)

Land Ref # 22 boundary

Parcel

Transmission line

TL crossing on stream order 3 and above

Contact: John Lipschinski

0 0.1 0.21 0.42

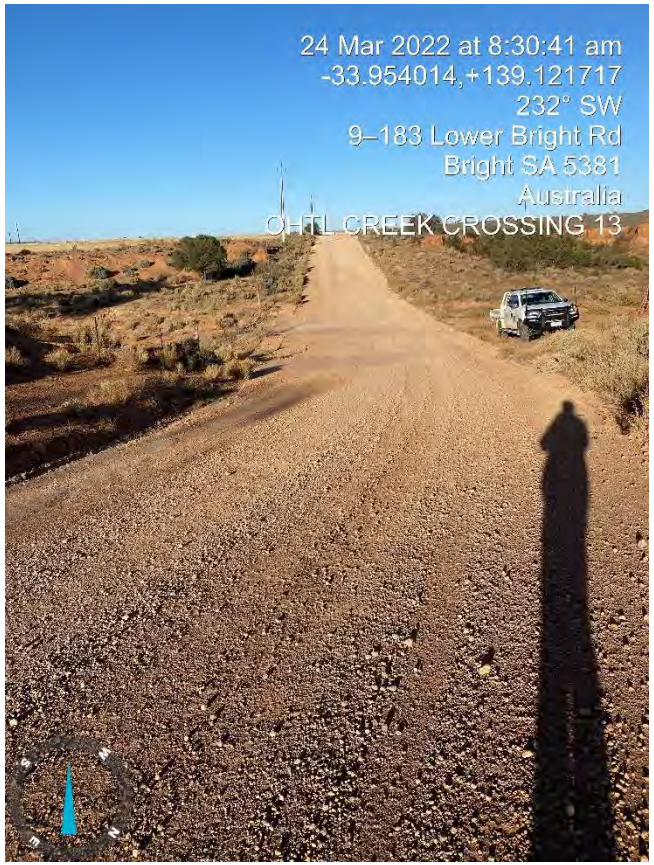
Kilometres

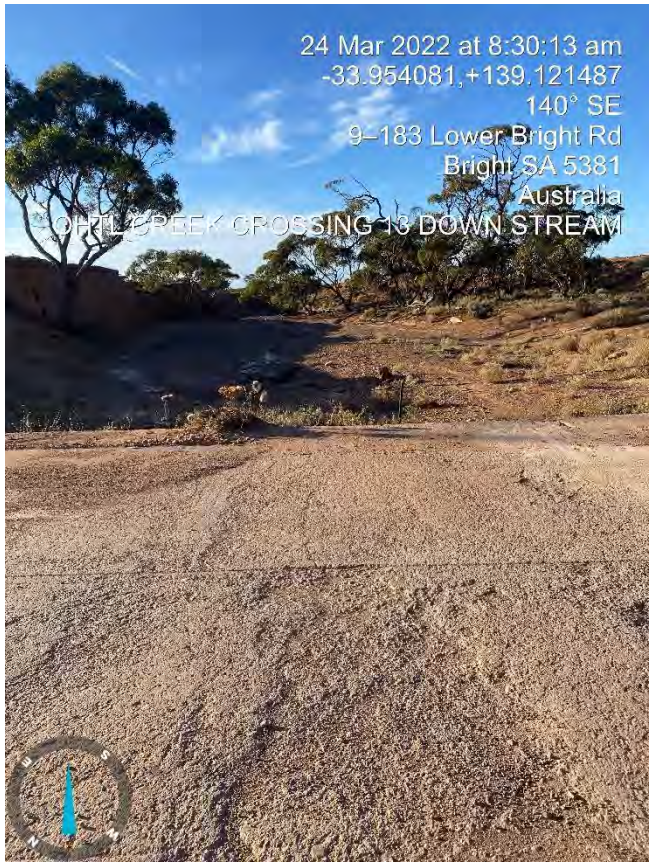
Datum/Projection: GCS GDA 1994
Project: 21ADL20126
Date: 18/03/2022
Created by: AP

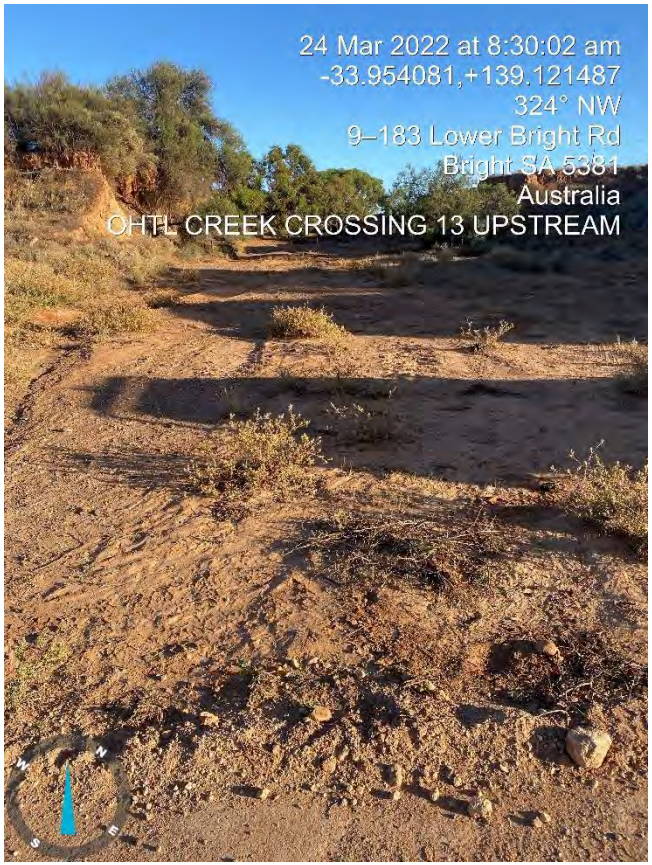
N

eco logical AUSTRALIA
A TETRA TECH COMPANY

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 13







Date: 22/03/2022

PHOTOS OF THE SITE OF THE PROPOSED WORKS: ID# TL 15

No photos to date (13/07/2022)

Appendix C Water Affecting Activities: Project Permits (*to July* 2022)

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21033

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 30 May 2022
Registered on: 2 June 2022
Expiry Date: 31 December 2023

To:
Mr Dylan Giles
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property	
Certificate of Title:	6043 / 237
Property Address:	Springbank Road Burra SA 5417 + road reserve

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Right of Appeal
You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Government of South Australia
Northern and Yorke Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21033

Property Owner:	Angus & Brooke Stockman
Location of Property:	Springbank Road, Burra SA 5453
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Notes:

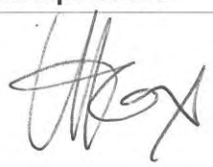
1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21033

Approved by: Delegate **Tony Fox** **General Manager** **Northern and Yorke Landscape Board**			
Signed:		Date:	02/06/2022

Government of South Australia
Northern and Yorke Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21034

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 30 May 2022
Registered on: 2 June 2022
Expiry Date: 31 December 2023

To:
Mr Dylan Giles
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property	
Certificate of Title:	5108 / 770 5108 / 771
Property Address:	Springbank Road Koonooona Road Burra SA 5417 + road reserve

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Right of Appeal
You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Government of South Australia
Northern and Yorke Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21034

Property Owner:	Paul & Josie Thompson
Location of Property:	Koonoona Road, Burra SA 5453
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Notes:

1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

Government of South Australia
Northern and Yorke
Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21035

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 2 June 2022
Registered on: 3 June 2022
Expiry Date: 31 December 2023

To:
Mr Dylan Giles
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property	
Certificate of Title:	5283 / 649 5283/ 652
Property Address:	Koonooona Road Burra SA 5417 + road reserve

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Right of Appeal
You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Government of South Australia
Northern and Yorke Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21035

Property Owner:	David Gebhardt
Location of Property:	Koonoona Road, Koonoona SA 5417
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Notes:

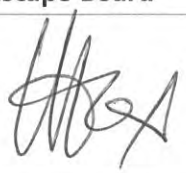
1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21035

Approved by: Delegate **Tony Fox** **General Manager** **Northern and Yorke Landscape Board**			
Signed:		Date:	03/06/2022

Government of South Australia
Northern and Yorke Landscape Board

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21038

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 20 June 2022
Registered on: 21 June 2022
Expiry Date: 31 December 2023

To:
Mr Dylan Giles
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property	
Certificate of Title:	5472 / 67 5189/ 1
Property Address:	Koonooona Road Burra SA 5417 + road reserve

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Right of Appeal
You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Government of South Australia
Northern and Yorke Landscape Board

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21038

Property Owner:	Simon Rowe
Location of Property:	Princess Royal Station Koonoona Road, Koonoona SA 5417
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Notes:

1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N21038

Approved by: Delegate **Rebecca Howard** **Acting General Manager** **Northern and Yorke Landscape Board**			
Signed:		Date:	21/06/2022

Government of South Australia
Northern and Yorke
Landscape Board

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22001

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 11 July 2022
Registered on: 11 July 2022
Expiry Date: 31 December 2023

To:
Mr Dylan Giles
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property	
Certificate of Title:	5472 / 67 (C8, C11, C19, C24, C36) 5189 / 1 (C10, C39) 5695 / 973 (C34)
Property Address:	Princess Royal Station 653 Koonooona Road Burra SA 5417 + road reserve

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Right of Appeal
You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Government of South Australia
Northern and Yorke Landscape Board

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22001

Property Owner:	Simon Rowe
Location of Property:	Princess Royal Station Koonoona Road, Koonoona SA 5417
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
4. Soil excavated for the purpose of this proposal shall be replaced and compacted to prevent accelerated erosion.
5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Notes:

1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22001

Approved by: Delegate **Anthony Fox** **General Manager** **Northern and Yorke Landscape Board**			
Signed:		Date:	11/07/2022

Government of South Australia
Northern and Yorke
Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22002

Pursuant to section 112 of the Landscape South Australia Act 2019
For Water Affecting Activity Permit Application

Dated: 14 July 2022
Registered on: 15 July 2022
Expiry Date: 31 December 2023

Mr Aidan Hargans
Green Light Contractors - Elecnor
4 Commercial Street
Burra SA 5417

Location of Property		
Certificate of Title:	**OHTL crossing #**	
	1, 5, 6, 7, 9, 10, 11	
	2, 3	5513/133
	4	5983/732
	8	5805/514
	ELA TL crossing #	
		5535/196
	7, 8	5315/54
	3, 4	5469/752
	11	5472/67
	6	5513/133
	1, 9	5792/744
	12	5805/514
	15	5906/102
	2, 5, 10	5979/28
	13	6230/207
Property Address:	Road reserves and public lands	

Nature of Water Affecting Activity
104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.

In respect of this proposed Water Affecting Activity you are informed that:

Decision: **Approved**
Number of Conditions: **14**

No work can commence on this Water Affecting Activity unless approval has been obtained.

Government of South Australia
Northern and Yorke
Landscape Board

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22002

Right of Appeal

You have the right of appeal to the Environment, Resources and Development Court within 6 weeks of the date of this decision.

Property Owner:	Public lands
Location of Property:	Burra SA 5417
Nature of Water Affecting Activity:	104 (4) (b): The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse.
Decision:	**Approved**

Conditions of Consent by the Northern and Yorke Landscape Board:

1. This water affecting activity must be completed in accordance with the permit application (including all documents submitted with the application), unless varied by the following conditions.
2. The proposed works must be undertaken in a manner that prevents silt or sediment leaving the site including, but not limited to, the use of erosion and sediment control measures, such as catch/diversion drains, re-vegetation, hay bale barriers, filter fences, sediment traps and basins.
3. All excavated material must be removed from the watercourse and securely stored away from the watercourse to ensure that it does not return to the watercourse.
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5. Destruction of vegetation shall only occur where it will not cause destruction to significant habitat for wildlife. The removal of introduced and exotic vegetation can be undertaken but it shall only be undertaken in a manner that will not cause exacerbated erosion of the bed and banks.
6. There must be a minimum distance of 20 metres between a watercourse and the fuelling site for machinery used to undertake construction.
7. The proposed works shall be kept free at all times of debris to minimise the risk of flooding.
8. Any work must not increase the risk of flooding.
9. After completion of this proposed activity all temporary structures must be removed from the watercourse and the watercourse must be restored to its original character.
10. Any work undertaken in the watercourse must be undertaken during a period of no flow
11. The culvert must not have a detrimental impact on the bed and bank stability of the watercourse, result in an increase in erosion upstream or downstream of the structure or have detrimental off-site impacts. In addition to the design outlined, a rip rap must be installed downstream of the culvert site to prevent erosion downstream of the site.
12. Any imported material used in the works, including fill, sand, soil etc. must be clean and free of weed infestation.
13. This permit approval is for works which must be carried out in accordance with the application submitted for and if there are any alterations to the proposed construction or location, the Board must be notified and permission obtained prior to commencing construction.
14. All building and residual construction material must be removed on completion of the proposed works.

Decision Notification Form

Water Affecting Activity

Permit Reference Number
N22002

Notes:

1. The works must be completed by 31 December 2023.
2. This permit is not transferable.
3. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. In most cases, the clearance of native vegetation requires the consent of the Native Vegetation Council.

Approved by: Delegate **Anthony Fox** **General Manager** **Northern and Yorke Landscape Board**			
Signed:		Date:	15/07/2022

Government of South Australia
Northern and Yorke Landscape Board

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