

Attachment G - Construction Management Plan



ACCIONA Energy Australia
Global Pty Ltd
Karara Wind Farm Project
Construction Management Plan
12525037-REP-KWF-009

July 2020

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1. Introduction

1.1 Project overview

GHD Pty Ltd (GHD) has prepared this Construction Management Plan on behalf of ACCIONA Energy Australia Global Pty Ltd (ACCIONA) in support of a development application for a Material Change of Use for a Wind Farm and Operational Work for Clearing Native Vegetation to facilitate the Karara Wind Farm (the Project).

The Project is located approximately 40 kilometres (km) south-west of the township of Warwick and 70 km south west of Toowoomba. The Project is proposed over 4 freehold lots, totalling approximately 4,680 hectares (ha) and is located within Goondiwindi Regional Council (GRC) and Southern Downs Regional Council (SDRC) Local Government Areas (LGA).

The Project will include the construction and operation of a wind farm involving the installation of up to 20 wind turbines and ancillary infrastructure including:

- Wind turbine foundations and hardstand areas
- Main site access from Carbean Road
- Access tracks
- Overhead 33 kV electrical reticulation
- Underground 33 kV electrical reticulation
- One (1) substation
- Two (2) meteorological masts
- One (1) construction compound
- One (1) laydown area
- One (1) operations and maintenance facility.

1.2 Purpose

This CMP establishes the environmental management procedures and controls to be implemented by ACCIONA, its employees, construction contractors and associated sub-contractors during the construction phase of the project.

This CMP:

- identifies the key activities that are likely to be associated with the construction of the project;
- details the equipment that may be required to undertake these activities
- identifies potential impacts that may occur as a result of these activities
- provides a framework to protect environmental values potentially affected by the construction of the project
- proposes measures to avoid, minimise and mitigate these potential impacts
- identifies performance measures and monitoring requirements to assess the success of the measures adopted during construction of the project.

This CMP is intended to be a guidance document that demonstrates how environmental risks will be managed on site. This document is to be continually developed in more detail as the

Project progresses into detailed design and construction and development permit conditions become available. It may also be updated to reflect changes in legislation.

This CMP is prepared to demonstrate compliance Performance Outcome (PO) 13 of State Code 23: Wind Farm Development. As the project design becomes more refined, construction management requirements will be reviewed and a Construction Environmental Management Plan (CEMP) will be prepared by the Engineering, Procurement and Construction (EPC) Contractor prior to commencement of construction activities. The CEMP will include many of the elements described within this CMP, but will also provide contact details for queries and reporting incidents. The CEMP will be prepared with consideration to any measures proposed within this CMP and any conditions of the project's development permit and other approvals.

1.3 Scope and limitations

This report has been prepared by GHD for ACCIONA Energy Australia Global Pty Ltd and may only be used and relied on by ACCIONA Energy Australia Global Pty Ltd for the purpose agreed between GHD and the ACCIONA Energy Australia Global Pty Ltd as set out in section 0 of this report. GHD otherwise disclaims responsibility to any person other than ACCIONA Energy Australia Global Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. The recommendations in this report are based on assumptions made by GHD described in this report.

GHD has prepared this report on the basis of information provided by ACCIONA Energy Australia Global Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Project description

2.1 Locality

ACCIONA is proposing to develop the Karara Wind Farm comprising up to 20 wind turbines and associated ancillary infrastructure. The Karara Wind Farm is being developed for CleanCo, who will ultimately build, own and operate the wind farm.

The Karara Wind Farm is located approximately 40 km south-west of the township of Warwick and 70 km south west of Toowoomba. The Project is located within Goondiwindi Regional Council (GRC) and Southern Downs Regional Council (SDRC) LGAs. The 20 wind turbines and ancillary infrastructure are located within the GRC LGA, with access to the wind farm sought from Carbean Road which is partially within the SDRC LGA.

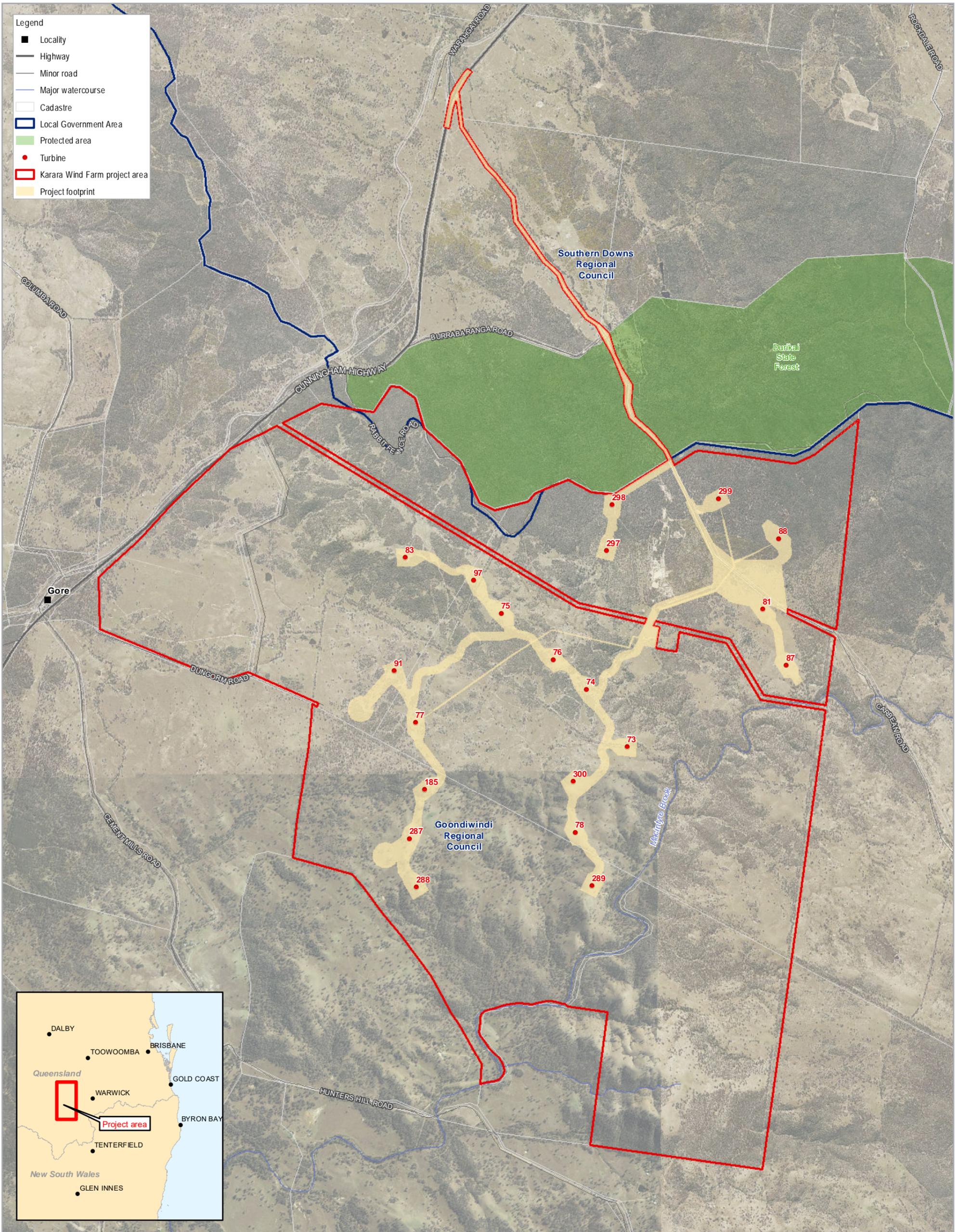
The Project is proposed over four (4) freehold lots, totalling approximately 4,680 ha (Study Area) (Figure 1). The majority of the vegetation across the Study Area has been historically cleared for agricultural purposes; however, some areas of native vegetation remain within the Study Area including Category B Regulated Vegetation.

The Project Footprint includes the outermost extent of the land within which the Project infrastructure is proposed to be located. The Project Footprint is included within the Development Application package. This CMP forms part of the material to support the Development Application.

A 1,500 m setback from existing or approved non-host sensitive land uses has been applied to the development of the layout, and infrastructure has been positioned to avoid and minimise ecological impacts where possible.

Table 2-1 Project areas

Description	Approximate Area (ha)
Study Area – combined total area of participating properties, reserves and easement	4,680
Project Footprint – the corridor within which the Project infrastructure will be located within the Study Area, including requirements for construction and installation of this infrastructure.	338

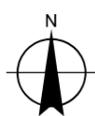


- Legend**
- Locality
 - Highway
 - Minor road
 - Major watercourse
 - Cadastre
 - ▭ Local Government Area
 - ▭ Protected area
 - Turbine
 - ▭ Karara Wind Farm project area
 - ▭ Project footprint



Based on or contains data provided by the State of Queensland 2020.
 In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Paper Size ISO A3
 0 1
 Kilometres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



Acciona Energy Australia Global Pty Ltd
 CMP

Karara Wind
 Farm project area

Project No. 12525037
 Revision No. 0
 Date 29/06/2020

Figure 1

2.2 Design infrastructure

ACCIONA is proposing to develop the Project with up to 20 wind turbines and ancillary infrastructure including:

- Wind turbine foundations and hardstand areas
- Main site access from Carbean Road
- Access tracks
- Overhead 33 kV electrical reticulation
- Underground 33 kV electrical reticulation
- One (1) substation
- Two (2) meteorological masts
- One (1) laydown area
- One (1) operations and maintenance facility.

2.2.1 Wind turbines

The wind turbines will be of the horizontal axis type, with a rotor consisting of three (3) blades. The maximum blade tip height of the wind turbine is to be up to 285 m. The final blade length and hub height will be configured so that the tip height does not exceed 285 m above ground level. Depending on the turbine model selected, turbines may require cable stays connected to the towers to increase stability of the structure.

2.2.2 Turbine foundations

Each turbine foundation will comprise a reinforced concrete slab. Turbine foundations may vary in size depending on imposed loadings, ground conditions, construction methodology and the drainage design.

2.2.3 Hardstands

Each turbine foundation will require an adjacent gravel capped permanent hardstand area, (typically approximately 70 m by 50 m). These hardstand areas are intended to provide a stable base on which to place turbine components ready for assembly and erection, and to locate the crane necessary to lift the turbine components into place.

Additional areas of temporary disturbance will be located adjacent to the hardstand, with dimensions of approximately 84 m by 16 m (for the blade) and approximately 129 m by 20 m (for the crane boom).

2.2.4 Electrical connections, substations and grid connection

Medium voltage electrical reticulation

Power and communication cables will be installed between the turbines and connect back to the substation and the operational and maintenance facility. The underground power and communication cables will be laid in single cable trenches of approximately 600 mm in width and a minimum depth of 1000 mm to allow for continued grazing activities.

Electrical reticulation (33 kV)

The underground power and communication cables will be laid in single cable trenches of approximately 600 millimetres (mm) in width and a minimum depth of 1,000 mm to allow for

continued grazing activities. Where possible these trenches will follow the access tracks to allow for minimum disturbance to the landowners. Underground cables will have markers above ground and two layers of strip protection underground to protect the cables and ensure the safety of the landowners and the wind farm staff.

Wind farm substation

The substation will be the point at which the wind turbine 'strings' connect to the transformer located in the substation. The transformer will then step up the voltage from 33 kV to 330 kV for conveyance of the electricity along the 330 kV OHTL to the national electricity grid.

The proposed substations is anticipated to measure approximately 100 m by 100 m and may contain offices, workshops, switchyard and switch-room, a step up transformer and high voltage equipment. The final dimensions will be subject to detailed design.

2.2.5 Operational and maintenance facilities

Two (2) locations are currently proposed to accommodate an operations and maintenance facility within the Project area; however, only one (1) facility will be developed. The footprint of the operational and maintenance facility measures approximately 100 m by 100 m. These areas typically contain vehicle parking spaces, septic ablutions and wash down areas as appropriate.

2.2.6 Meteorological masts

Locations for two meteorology masts have been assessed to establish measurement of the free stream wind from all directions.

2.2.7 Transport network

Site access

It is anticipated that the Site Access will utilise the existing access point on Carbean Road off the Cunningham Highway to facilitate access to the Project.

These access points will be used during construction and operation of the Project and will be where the majority of all loads will access the Project Site. New fencing alignments, together with grids and gates, will also be installed on site where required.

Internal access tracks

The onsite access tracks have been designed to utilise the existing topography of the land, minimising the amount of land required where possible. Access tracks located in close proximity to regulated vegetation have been refined to avoid and minimise impacts to regulated vegetation where practicable. It is likely that approximately 23 km of access track will be required for the Project, however this will be updated as the Project is further refined. The following design criteria and mitigation measures were applied to the access track layout to mitigate potential impacts:

- Tracks will typically be 5.5 m wide within a construction corridor and will be constructed from crushed blue metal rock.
- Tracks may be wider in some areas to allow for regular passing places, turning areas and to account for site terrain.
- The number of watercourse crossings have been minimised as far as practicable.
- Track margins will be vegetated to reduce potential sediment-laden run-off.

The construction of access tracks will vary depending on localised ground conditions. Conditions impacting construction include the existing vegetation, nature of the topsoil, level of

moisture in the ground, geotechnical base and localised topography. The exact requirement and design of the water course crossings will be confirmed during the detailed design phase and will be based on the detailed geotechnical site investigation and through discussions with the relevant State authorities.

2.2.8 Construction compounds and laydown areas

One location for a temporary construction compound and one location for a laydown area have been considered for the Project. The construction compound is required to accommodate porta cabins (site offices, first aid facilities, canteen facilities, waste disposal and toilets); storage containers for tools and equipment; storage areas for plant, fuel storage, material and components; wash/brush down facilities; and sufficient parking for the workforce, deliveries and visitors.

The laydown area will accommodate temporary storage of construction plant equipment, wind farm components and construction materials prior to moving to their ultimate destination. The areas may also be used for rock crushing and stockpiles. The construction compound and laydown areas will be formed into hardstand.

2.2.9 Utilities

A supply of water for firefighting purposes will be maintained on site during construction in accordance with bushfire management guidelines. Sewerage will be managed by a septic system and will be removed off-site by a certified contractor, or an in-ground septic system with treated liquid influent through ground bio-irrigation (or equivalent) will be installed.

2.3 Construction methodology

Construction of the project will include the following activities, which will at times overlap:

- Detailed site investigations, including the establishment of roads, and clearing for the purposes of micro-siting the turbines
- Obtaining all necessary secondary approvals/permits for construction
- Site mobilisation
- Establishing water supply, through dams and bores
- Possible offsite road works.

For the construction of the Project, the following activities are expected to occur:

- Site establishment (temporary site facilities, laydown areas, equipment and materials)
- Earthworks, paving (with gravel cap) and drainage for access roads and wind turbine hardstands
- Excavation for the foundations
- Construction of wind turbine foundations (bolt cage, reinforcement and concrete)
- Installation of electrical and communications cabling and equipment
- Construction of substation
- Installation of wind turbine transformers, in parallel with electrical reticulation works
- Installation of towers for the wind turbines, delivery of the wind turbine components to the Study Area
- Installation of wind turbines, using large mobile cranes

- Commissioning and reliability testing of wind turbines
- Progressive rehabilitation and restoration of the Study Area where possible.

The activities listed above will predominately occur in the order listed, however, some of these activities will be carried out concurrently to minimise the overall length of the construction programme. Subject to Project approvals, construction is anticipated to commence in 2021 and the Project will be built in around 26 months. During the construction phase, works could potentially occur for six days during each week, 12 hours per day (during day light hours). Under such a scenario, materials would be transported to the Project Site for up to 24 days per month (assuming a four week month). It may be necessary for construction activities to take place on a Sunday or during the night time (for example, the installation of turbines when weather conditions are more favourable).

2.4 Construction equipment and machinery

It is anticipated that the construction work may include excavation, rock hammering, drilling, bulldozing, crushing and screening, concrete batching and, subject to geotechnical conditions, possible blasting. It is anticipated that an on-site borrow pit(s) will be utilised to source much of the required construction material, where possible. The location of any on-site borrow pits will be subject to geotechnical investigation and any necessary approvals for establishment of these borrow pits will be obtained through local governments and the Department of Environment and Science. Noise will be generated by mobile plant such as excavators, bulldozers, mobile cranes and the movement of heavy vehicles. It is expected that the following typical equipment will be used:

- Site mobilisation – road loaders, graders, backhoes, trucks, small crane and generators
- Access tracks and hardstands – road loaders, bulldozers, excavators, graders, scrapers, rollers, articulated dump trucks, belly dumper trucks rock crushing plant, semi-trailers, tractors water carts and hydroseed trucks
- Wind turbines – excavators, rock breaker, concrete trucks, flat-bed trucks, vacuum trucks, large crawler/all-terrain heavy lift cranes, small/medium crawler cranes, generators, tele-handlers, elevated work platforms, drilling rigs;
- Electrical reticulation works – trenchers, backhoes, excavators, graders, tractors, cable laying machines, and small terrain cranes
- Concrete batching plants.

Other equipment and machinery may be required, depending on the nominated construction techniques.

2.4.1 Construction workforce

It is estimated that the workforce required to construct the Project will peak at approximately 40 over a period of approximately 20-26 months. It is likely that the majority of the workers will be accommodated within the workers accommodation proposed as part of the MacIntyre Wind Farm.

2.4.2 Construction water supply

Water will be used during construction for a number of processes including dust suppression and bulk earthworks as necessary. In addition, the workforce will require potable water for drinking and amenities. The construction water supply can be sourced from a range of options including the construction of bores or dams, subject to consultation with regulatory authorities

and landowners. Potable water will likely be provided through the provision of rainwater tanks or through transactions with the local government and associated water reticulation network.

Construction water supply options will be determined during the detailed design of the Project and confirmed with State and local authorities prior to construction. The decisions made regarding construction water supply sources will involve ongoing discourse with landowners and relevant stakeholders.

3. Framework and policies

3.1 Environment and sustainability policy

3.1.1 ACCIONA Integrated Management System Policy

ACCIONA's primary environmental policy is the integrated management system policy (Figure 2).

Policy Statement

Acciona Energy (Acciona) is a leader in the renewable energy sector. Our Integrated Management System (IMS) consolidates our commitment to sustainable development and the provision of quality controlled products and services that meet and exceed customer expectations, protect the environment and the work, health and safety (WHS) of our workers and interested parties.

Our objectives:

- Comply with all statutory requirements, applicable industry standards, and Australian and International Standards and strive for best practice,
- Document processes and provide training, instruction and awareness to workers and interested parties,
- Provide safe plant and equipment through a Hazard Management approach to WHS and environmental issues,
- Establish measurable objectives and targets aimed at the identification, assessment and elimination of WHS hazards/risks and environmental harm,
- Conduct meaningful consultation on WHS issues; provide effective rehabilitation,
- Sustainable development of products and services,
- Establish continuous improvement and effectiveness measures aimed at enhancing customer satisfaction, improving WHS and environmental practices, and
- Provide adequate resources to meet the commitment of this policy.

Board/Directors/Senior Leaders of Acciona are responsible and accountable for providing the necessary resources to implement, promote and continuously improve the IMS.

Managers are responsible and accountable for implementing this policy within their business area(s) and have a duty of care to:

- Provide training and instruction to workers to ensure compliance with legislation, regulations and other obligations, including understanding the IMS,
- Ensure adequate supervision is maintained at all times and systems of work are safe and environmentally compliant, and
- Be actively involved in the development, promotion and implementation of policies and procedures.

Workers are responsible for:

- Compliance with all policies, procedures and instructions,
- Immediately reporting all hazards and incidents to their Supervisor or Manager,
- Taking reasonable care for the environment, their own WHS and that of others, and
- Actively contributing to meaningful and effective consultation.

This policy is applicable to Acciona Energy in all of its functions and operations. It will be reviewed at regular scheduled intervals, and whenever there is any operational, circumstantial or legislative change affecting the IMS.

Brett Wickham
Managing Director



Approved by: B WICKHAM Date: 21 MAY 2018	Uncontrolled when printed	TDS PAUC1 04P97019/01
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Figure 2 ACCIONA Integrated Management System Policy

3.1.2 Responsibilities, authority and commitment

ACCIONA will be responsible for the construction phase and will engage the construction contractors (principal contractor) of the project and will be responsible for the implementation of environmental commitments and delivery of environmental outcomes during the construction of the project.

The following table outlines the responsibilities of those in the construction phase of the project.

Table 3-1 Responsibilities during the construction phases

Applicable personnel	Responsibilities
Project Manager	<ul style="list-style-type: none"> • Handover of design and consent condition requirements to the Construction manager, ongoing oversight and accountability across project delivery • Responsible for managing the construction work timetable in consultation with project personnel listed below.
Construction Manager	<p>The Construction Manager will be responsible for the overall management of the construction of the project and responsibilities will include:</p> <ul style="list-style-type: none"> • Final review and approval of CEMPs • Ensuring any design changes during construction go through ACCIONA's design approval process, including obtaining any necessary additional planning approvals • Responsible for the environmental performance of the construction phase, including a responsibility for the effective implementation of health, safety and environment (HSE) management measures. • Managing community complaints with respect to environmental matters • Responding and reporting on incidents.
HSE Manager	<p>The HSE Manager will be on site for the duration of the construction period. Responsibilities include:</p> <ul style="list-style-type: none"> • Review of CEMPs alongside Construction manager • Undertaking daily and weekly inspections and management alongside HSE supervisor • Provide guidance, support and advice regarding environmental legislation and management • Assist in obtaining any licences and permits required to undertake construction activities • Conduct environmental audits / reviews during all stages to ensure implementation of requirements • Monitor implementation of environmental controls and procedures and ensure they are maintained during all phases of the construction • Report any malfunctions, incidents, emergencies or other environmental incidents to the Construction manager • Ensure that environmental incidents are reported to the Department of Environment and Science (DES) or applicable authorities when necessary • Monitor statutory requirements and compliance via routine environmental monitoring which is recorded and reported

Applicable personnel	Responsibilities
	<ul style="list-style-type: none"> • Monitor implementation and effectiveness of corrective actions to address incidents of environmental non-compliance • Identify if management procedures need review where necessary.
HSE Supervisor	<p>The HSE Supervisor will be on site for the duration of the construction period. Responsibilities include:</p> <ul style="list-style-type: none"> • Delivering site inductions and ensuring all staff / contractors are aware of and understand their responsibilities under the CEMP • Assisting HSE Manager with internal audits • Undertaking daily and weekly inspections and management alongside HSE Manager • Monitor implementation of environmental controls and procedures and ensure they are maintained during all phases of the construction • Report any malfunctions, incidents, emergencies or other environmental incidents to the Construction manager • Ensure that environmental incidents are reported to the Department of Environment and Science (DES) or applicable authorities when necessary • Monitor statutory requirements and compliance via routine environmental monitoring which is recorded and reported • Monitor implementation and effectiveness of corrective actions to address incidents of environmental non-compliance • Identify if management procedures need review where necessary.
Manager, Environment and Planning	<p>The Manager, Environment and Planning will not be located onsite, however, will have the following responsibilities:</p> <ul style="list-style-type: none"> • Engaging environmental specialists as required • Review contractor CEMPs to ensure they align with ACCIONA's EMP • Participating in internal audits • Ensuring environmental incident remedial solutions are effectively implemented • Reviewing and authorising changes to the EMP • Communicating of environmental incidents and breaches to the relevant authorities.
Community Relations Coordinator	<p>The Community relations coordinator will not be located onsite, however, will have the following responsibilities:</p> <ul style="list-style-type: none"> • Managing community complaints

Applicable personnel	Responsibilities
	<ul style="list-style-type: none"> • Preparation of community information materials and communicating with the local community during all phases of the project.
Site Personnel	<ul style="list-style-type: none"> • Construct and implement environmental controls and procedures • Report any malfunctions, incidents, emergencies or other environmental incidents to both the Environmental Manager and the Site manager • Rectify temporary situations that may result in or are resulting in, environmental harm • Undertake environmental monitoring where required.

3.1.3 Legal obligations and compliance

This CMP has been prepared in context with the applicable legislation relevant to the proposed activities and sites at the time of writing. A summary of potential project approvals covered by this CMP is provided in Table 3-2

ACCIONA will ensure that it holds all licenses, permits and approvals relevant to the project and that these are kept up to date. To ensure this occurs, ACCIONA will maintain a register of all licenses, permits and approvals for the Project. ACCIONA must also ensure compliance of the project with the conditions placed on these licences, permits and approvals.

All staff and contractors will be required to comply with the conditions of the approvals, licences and permits.

Table 3-2 Summary of project development approvals

Permit/approval/licence	Why it applies	Relevant legislation	Approving agency
Commonwealth approvals			
EPBC Act Referral	There are known areas of Threatened Ecological Communities, Listed Threatened Species and Listed Migratory Species within the project area which are likely to be impacted as a result of the works.	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Department of Agriculture, Water and the Environment (DAWE)
State approvals			
Development Permit for Material Change of Use for a wind farm and Operational Work for clearing native vegetation	A material change of use (MCU) development permit is required for the development of the wind farm and the OHTL under State Code 23: Wind Farm Development (State code 23) of the State Development Assessment Provisions (SDAP). Furthermore, the Operational Work associated with the proposed clearing of regulated vegetation requires a development permit in accordance with State Code 16: Native Vegetation Clearing (State code 16).	<i>Planning Act 2016</i> <i>Vegetation Management Act 1999</i>	Department of State Development, manufacturing, Infrastructure and Planning
Generation Authority	Section 12(3)(a) of the <i>Electricity Act 1994</i> defines 'operating works' for a generation entity as the generating plant, fuel stocks, electrical and other property used for generating electricity or connecting support to a transmission grid or supply network. Section 25 of the <i>Electricity Act</i> defines a generation entity as '...a person who holds a generation authority'. A generation authority is required which authorises its holder to connect its generating plant to a transmission grid or supply network.	<i>Electricity Act 1994</i>	Department of Natural Resources, Mines and Energy (DNRME)
Operational work for constructing or raising a waterway barrier work	There are a number of mapped waterways under the Queensland Waterways for Waterway Barrier Works GIS layer that intersect the site. Works may require construction of culverts or other waterway crossings. If these works cannot comply with acceptable development criteria, these would require a permit for Operational Work that is the constructing or raising of waterway barrier work.	<i>Fisheries Act 1994</i>	Department of Agriculture and Fisheries

Permit/approval/licence	Why it applies	Relevant legislation	Approving agency
Species Management Program (SMP)	An SMP is required where works interfere with breeding places of native fauna.	<i>Nature Conservation Act 1992</i>	Department of Environment and Science
Permit for movement of excess dimension	Some equipment will be transported to the site in large pieces and may require a permit for movement of excess dimension.	<i>Transport Operations (Road Use Management - Mass, Dimensions and Loading) Regulation 2005</i>	Department of Transport and Main Roads (TMR)
Riverine Protection Permit	Several mapped watercourses traverse the site. Permits under the <i>Water Act 2000</i> for interfering with a watercourse may be required if works result in the excavation, placement of fill or destruction of vegetation with a waterway.	<i>Water Act 2000</i>	DNRME
Local approvals			
Development Permit for Operational Works (Earthworks)	A Development Permit for Operational Works (Earthworks) may be required prior to the commencement of any earthworks or site works on the site. It is noted that the preparation of an Erosion and Sediment Control Plan is required for site disturbance greater than 250 m ² , and is to be submitted as part of Operational Works application.	<i>Goondiwindi Regional Planning Scheme 2018</i> <i>Southern Downs Planning Scheme 2018</i> <i>Toowoomba Regional Council Planning Scheme 2019</i>	Goondiwindi Regional Council Southern Downs Regional Council Toowoomba Regional Council
Development Permit for Operational Works (Access Works)	Development Permit for Operational Works (Access Works) may be required prior to the establishment of any vehicle access and driveways to the site.	<i>Goondiwindi Regional Planning Scheme 2018</i> <i>Southern Downs Planning Scheme 2018</i> <i>Toowoomba Regional Council Planning Scheme 2019</i>	Goondiwindi Regional Council Southern Downs Regional Council Toowoomba Regional Council

Permit/approval/licence	Why it applies	Relevant legislation	Approving agency
A Development Permit for Operational Works (Stormwater Works)	A Development Permit for Operational Works (Stormwater Works) may be required prior to the commencement of any stormwater drainage on the site.	<i>Goondiwindi Regional Planning Scheme 2018</i> <i>Southern Downs Planning Scheme 2018</i> <i>Toowoomba Regional Council Planning Scheme 2019</i>	Goondiwindi Regional Council Southern Downs Regional Council Toowoomba Regional Council

4. Potential impacts and proposed management measures

This CMP provides a discussion of potential impacts and proposed management measures for each of the following environmental elements as they relate to construction of the project:

- Aboriginal and historic heritage
- Air quality and greenhouse gas emissions
- Bushfire prevention and management
- Erosion, sediment control and water quality
- Hazardous substances and risk
- Nature conservation (terrestrial and aquatic flora and fauna)
- Noise and vibration
- Social environment and visual amenity
- Transport and road network
- Waste management
- Weed and pest management.

A separate Erosion and Sediment Control Plan (ESCP) has been developed and is provided in Appendix A. A summary of the recommendations of this ESCP are provided in Section 4.4.

4.1 Aboriginal and historic heritage

A Preliminary Cultural Heritage Assessment Report was prepared for the MacIntyre Wind Farm by Converge in 2012 (Converge, 2012). The purpose of the assessment was to identify those cultural heritage values or features of either an Aboriginal or historic nature which should be protected or conserved when undertaking construction activities.

Historic heritage

The assessment identified eight historic heritage sites, being:

- Carbean Station (-28.35381, 151.62754)
- Carbean Shearing Complex 1 (-28.36316, 151.64182)
- Carbean Shearing Complex 2 (-28.34925, 151.62694)
- Hunters Hill Station (-28.35812, 151.56130)
- Hunters Hill Shearing Complex (-28.35572, 151.55990)
- Weir (-28.35706, 151.56127)
- Well (-28.33500, 151.63942)
- Boundary Rabbit Fence (-28.36357, 151.64292).

An assessment of significance was undertaken and identified that none of the above non-indigenous cultural heritage sites were assessed as demonstrating significance at a State level, as set against criteria provided in Section 35 of the *Queensland Heritage Act 1992*. Carbean Station and Shearing Complex was assessed as having elements of low to moderate significance and are provisionally considered to be of local significance only. None of the proposed works are within proximity to the known heritage sites, with the closest recorded heritage site, the Hunters Hill Shearing Complex located at -28.35572, 151.55990 being approximately 3 km from the construction corridor.

Aboriginal heritage

Based on the Duty of Care Guidelines under the *Aboriginal Cultural Heritage Act 2003*, the inspection identified that the area exhibits evidence of clearing associated with the pastoral industry. For Category 4 of these guidelines, proposed activities must be 'in an area which has previously been subject to significant ground disturbance'. Pursuant to the guidelines, significant ground disturbance means 'disturbance by machinery of the topsoil or surface rock layer of the ground, such as ploughing, drilling or dredging', or 'the removal of native vegetation by disturbing root systems and exposing underlying soils'. However, discussions undertaken with landholders during the assessment identified that properties were cleared through ring-barking and not an extensive pulling or chaining and therefore while extensive vegetation clearing has occurred, ground disturbance is limited. The Assessment concluded that the project area is therefore consistent with Category 5 of the Duty of Care Guidelines as a result of limited ground disturbance.

The Assessment identified sections of the project area to possess higher potential for retaining Aboriginal cultural heritage and include areas of remnant vegetation, permanent or semi-permanent water sources or areas along ride lines.

ACCIONA is in the process of engaging with relevant Aboriginal parties in accordance with the *Aboriginal Cultural Heritage Act 2003*. A Cultural Heritage Management Plan (CHMP) is being drafted and will form the basis upon which aspects of Aboriginal cultural heritage will be managed during the construction phase of the project.

Potential environmental impact

Potential disturbance and/or damage to known and unknown sites of Aboriginal and historic heritage.

Objectives

- To ensure compliance with the *Queensland Heritage Act 1992* and the *Aboriginal Cultural Heritage Act 2003* and *Aboriginal Cultural Heritage Act 2003 Duty of Care Guidelines*
- To ensure all site workers have a knowledge and appreciation of Aboriginal and historic heritage relevant to the locality.

Legislative requirements

- *Aboriginal Cultural Heritage Act 2003*
- *Queensland Heritage Act 1992*.

Measurable target

No damage to known or unknown sites of Aboriginal and historic heritage.

Relevant information

Converge (2012) *MacIntyre Wind Farm: Preliminary Cultural Heritage Assessment Report*.

Table 4-1 Aboriginal and historic heritage environmental mitigation measures

Aspect	Environmental management measures	Responsibility
Works within a Category 5 area under the Duty of Care Guidelines	Development and compliance with a Cultural Heritage Agreement (pursuant to section 23(3)(a)iii of the <i>Aboriginal Cultural Heritage Act 2003</i> (ACH Act) or a Cultural Heritage Management Plan (CHMP) (pursuant to Part 7 of the ACH Act).	Construction Manager HSE Manager
	All works are to be undertaken in accordance with the mitigation measures outlined in the approved CHMP prepared for the project.	
Disturbance from vehicles and machinery	Vehicles and machinery to be restricted to project footprint, where practicable. Where works extend outside of the approved disturbance footprint, a record is to be created in the incident management procedure and an investigation undertaken as to why works extended outside of the approved footprint.	Construction Manager HSE Manager
	Buffer zones of highly visible fencing or mesh around known historic heritage sites are to be implemented during construction to minimise the potential for accidental damage to sites.	
Unexpected finds of cultural heritage material or sites, both non-indigenous and indigenous	All works are to be undertaken in accordance with the <i>Queensland Heritage Act 1992</i> , ACH Act and the Duty of Care Guidelines unless otherwise agreed in a CHMP.	Construction Manager HSE Manager
	All site personnel shall attend environmental training as part of the site induction process prior to entering	

Aspect	Environmental management measures	Responsibility
	<p>the work site. As part of this training, a cultural heritage induction should be delivered to all site personnel before entering the site, with the notification procedure in the event of an unexpected find to be clearly indicated during the induction</p> <p>In the event of a find:</p> <ul style="list-style-type: none"> – All work at the location of potential material or site must cease and reasonable efforts to secure the site should be made, including a buffer zone of 20 metres around the material or site – The material or site should not be removed or disturbed any further (barriers or temporary fences may be erected as a buffer) – Construction Manager should be notified immediately who will then notify the Archaeologist appointed to the project – Archaeologist is to provide management recommendations to the Construction Manager and will liaise (if necessary) with the Department of Environment and Science to ensure compliance with the Queensland Heritage Act 1992 and the ACH Act. 	

Table 4-2 Aboriginal and historic heritage inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Cultural Heritage Induction	For all new site personnel	Training record	HSE Manager
Construction works do not extend outside of approved disturbance footprint	Weekly	Weekly environmental checklist	HSE Manager
Inspection of fencing and mesh around sites	Weekly	Weekly environmental checklist	HSE Manager

Table 4-3 Aboriginal and historic heritage corrective actions

Incident	Corrective action
Construction works extend outside of approved disturbance footprint	As per incident response procedure outlined within the CHMP.

4.2 Air quality and greenhouse gas emissions

The current air quality of the area is typical of that of rural farming areas.

Potential environmental impact

Potential air and dust impacts to sensitive receptors as a result of construction activities attributable to exhaust emissions and fugitive dust.

Objectives

- Compliance with the *Environmental Protection (Air) Policy 2019* (EPP Air)
- Undertake all reasonable and practicable measures to prevent or minimise air and dust impacts to sensitive receptors.

Legislative requirements

- *Environmental Protection Act 1994*
- *Environmental Protection (Air) Policy 2019*.

Measurable target

Negligible air and dust impacts to sensitive receptors.

Table 4-4 Air quality and greenhouse gas emissions mitigation measures

Aspect	Environmental management measures	Responsibility
Air quality	Consider weather conditions and prevailing winds when conducting construction activities that may result in air emissions.	Construction Manager HSE Manager
	Dust suppression (i.e. watering truck) is to be carried out on internal unsealed access roads during drier months to limit generation of dust.	
	A maximum speed limit of 40 km/hr shall apply to access roads and tracks to minimise the potential for dust generation.	
	All temporary soil stockpiles will be covered, stabilised and/or moistened as required to prevent generation of dust particles.	
	Soil stockpiles will be located in areas not susceptible to wind erosion.	
	Stockpiles that are anticipated to be present in the medium and long term are to be covered to minimise dust emissions.	
	All vehicles carrying loads with the potential to create dust shall cover their loads.	
	Minimal ground disturbance during construction to reduce dust emissions.	

	Where possible, temporary construction areas will be rehabilitated as soon as practicable after the completion of construction works.	
Greenhouse gas emissions	Vehicles, plant and equipment will be regularly serviced and comply with Australian Design Standards.	Construction manager
	Where possible, utilise electric generators instead of diesel generators.	HSE manager
	All machinery and equipment are to have proprietary emission control equipment fitted and in working order.	
	When not in use, vehicles and machinery shall be turned off.	

Table 4-5 Air quality and greenhouse gas emissions inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Monitoring of condition of stockpiles and access tracks	Weekly	Weekly environmental checklist	HSE Manager
Undertake inspections/observations of air quality conditions at the site and record findings on a weekly basis.	Weekly	Weekly environmental checklist	HSE Manager

Table 4-6 Air quality and greenhouse gas emissions corrective actions

Incident	Corrective action
Vehicles and equipment servicing not up to date	Vehicles and equipment to be serviced as soon as possible.
Stockpiles and access tracks in poor condition	Stockpiles that are anticipated to be present in the medium and long term to be re-covered to minimise dust emissions.
	Access tracks to be sprayed with a water truck or dust control polymers during windy conditions to minimise potential for dust emissions and to increase safety of users.

4.3 Bushfire prevention and management

The project footprint is within a rural environment with large areas of the site cleared for agricultural purposes, however, pockets of the area contain remnant vegetation. The project footprint is mapped as containing areas of medium to high potential bushfire intensity.

Potential environmental impact

- Risk of fire on site during construction
- Risk of damage to infrastructure
- Loss of and damage to flora and fauna.

Objectives

- To protect works, flora, fauna and habitats and minimise potential damage or loss of machinery, equipment or infrastructure
- To minimise the risk of bushfire
- To control the spread of bushfire in the event of ignition
- To provide adequate response in the event of ignition.

Legislation

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1994*
- *Work Health and Safety Act 2011.*

Measurable target

- No fires as a result of construction activities
- External fires that may threaten the construction site to be controlled.

Table 4-7 Bushfire prevention and management mitigation measures

Aspect	Environmental management measures	Responsibility
General	Development of a site layout which will include inventory and location of all hazardous and combustible chemicals on site, location of water connection and assembly points.	Construction Manager HSE Manager
	Ensure all site personnel are familiar with fire prevention and emergency response actions.	
	Provision of appropriate fire-fighting equipment on site, including fire extinguishers, firefighting water supply, and other suitable equipment for initial response.	
	Ensure local firefighting services have access to the site.	
	Updating local firefighting services of Southern Downs Regional Council and Goondiwindi Regional Council of any changes to work schedules or access agreements.	
	During periods of high fire danger:	

Aspect	Environmental management measures	Responsibility
	<ul style="list-style-type: none"> – firebreaks should be created around each turbine site, OHTL tower site substation site and facilities building – the use of explosives or hot work will be banned. 	
	All built infrastructure, excluding roads and fences, will require a 20 m buffer area, or 1.5 times the tallest adjacent tree to allow for a fire break area.	
	Preparation of an Emergency Plan and submission to Queensland Fire and Emergency Services (QFES).	
	Construction operations shall adhere to regulatory and local fire authorities and comply with fire restrictions (e.g high fire danger and total fire ban days).	
Vehicles	Ensure spark-arrestors are installed and maintained on all vehicles, plant and equipment.	Construction Manager
	Ensure flashback arrestors are fitted to oxygen/acetylene equipment.	HSE Manager
	All vehicles on site are to be equipped with: <ul style="list-style-type: none"> – Dry chemical extinguisher – Appropriately equipped first aid kit – Tow rope or snatch strap – Sufficient fire blankets. 	
Hot work	Ensure a hot works permit is obtained from the site Manager, and only those with the permit undertake hot works.	Construction Manager
	A fire-resistant shield be used to prevent sparks leaving the hot works area.	HSE Manager
	Hot works to be undertaken away from flammable material.	
	Appropriate firefighting equipment is kept on hand.	

Table 4-8 Bushfire prevention and management inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Monitoring fire danger at the site and site water levels	Daily	Daily environmental checklist	HSE Manager
Inspection of fire breaks	Weekly	Weekly environmental checklist	HSE Manager
Vehicles to be checked weekly to ensure mandatory equipment is maintained	Weekly	Weekly environmental checklist	HSE Manager

Table 4-9 Bushfire prevention and management corrective actions

Incident	Corrective action
High fire danger rating for the site	Hot works and any works likely to cause a fire outbreak are to cease until fire danger rating is reduced.
Fire outbreak	Any fire outbreak at or surrounding the site is to be reported immediately to the Site Manager and chief executive office.
Vehicles to have mandatory equipment	If vehicles are lacking equipment, equipment is to be replaced as soon as possible.
Build-up of vegetation in fire breaks	Build-up of vegetation is to be cleared or mowed.

4.4 Erosion, sediment control and water quality

The project area is located on the edge of the Stanthorpe Plateau sub-region of the New England Tablelands Bioregion (adjacent to the Brigalow Belt South Bioregion), and is characterised by low hills and mountains, with large areas of rock outcrop and granite tors.

Elevations across the site range between 630 mAHD in the north and south, and 500 mAHD in the west, with a number of peaks throughout wind farm.

A desktop assessment was undertaken across the proposed project area, which indicated that a range of different soil types are present across the wind farm. This information was obtained from the Department of Natural Resources and Mines for each of the soils types present.

Table 4-10 details the description and approximate locations of the different soils types for the wind farm and OHTL respectively.

Table 4-10 Wind farm soil types

Symbol	Soil description	Location (approximate)	Reference
TUm-D	Shallow, gravelly loams (lithosols) and shallow, gravelly texture contrast soils (soloths, solodics, solodized solonetz). Developed on Traprock.	This soil type is present for the majority of the project area.	Granite and Traprock Area of South Queensland
TD	Shallow, gravelly, texture contrast soils (soloths, solodics, solodized solonetz). Developed on Traprock.	This soil type is present at a number of isolated locations in the project area.	Granite and Traprock Area of South Queensland

Refer to Appendix A for Erosion and Sediment Control Plan.

Potential environmental impact

Release of excess sediment off site into downstream waterways and receiving environment.

Objectives

- Minimise land disturbance and soil exposure
- Divert upslope clean water flows around construction areas to minimise the volume of sediment-laden runoff requiring treatment

- Stabilise and cover exposed soil as soon as practicable
- Progressively rehabilitate disturbed areas.

Legislative requirements

- *Environmental Protection Act 1994*
- *Environmental Protection Regulation 2019.*

Measurable target

- No discharge of sediment-laden runoff from the site
- No significant erosion associated with construction activities.

Relevant information

GHD (2020a) Concept Erosion and Sediment Control Plan

GHD (2020b) Stormwater Management Report

Table 4-11 Erosion, sediment control and water quality mitigation measures

Aspect	Environmental management measures	Responsibility
Erosion control	Minimise disturbance area.	Construction Manager
	Vegetation and topsoil clearing is to be staged and undertaken directly prior to construction works to minimise exposure.	HSE Manager
	Exposed soil is to be stabilised with appropriate cover material as soon as practicable.	
Sediment control	Appropriate sediment controls, based on the estimated annual soil loss at the site, are to be implemented prior to the commencement of construction works.	Construction Manager
	Where exposed soils cannot be stabilised, water tankers shall be deployed to suppress dust.	HSE Manager
	On-site stockpiles are to be located above flood extents, within close proximity to the project and covered, if appropriate.	
	Instream sediment controls may be required where access tracks cross flowing waterways.	
	Water quality monitoring may be required at the site discharge locations to ensure excess sediment-laden runoff is not released off site.	
Drainage control	Divert upslope clean water flows around the construction areas towards site discharge locations.	Construction Manager
	Diversion drains to be constructed to direct on-site sediment-laden runoff towards sediment control devices.	HSE Manager
	Appropriate drainage controls be placed on exposed surfaces, to reduce velocities and minimise soil erosion.	
Waste water	Construction waste water is to be collected in holding tanks and trucked out.	Construction Manager HSE Manager
Stormwater	Stormwater management is to be undertaken in accordance with Stormwater Management Report (GHD, 2020b).	Construction Manager HSE Manager

Table 4-12 Erosion, sediment control and water quality inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Inspection of all erosion, sediment and drainage control measures	At a minimum weekly, and: Daily (during rainfall) Prior to anticipated runoff-producing rainfall, and Following runoff-producing rainfall.	Erosion and Sediment Control Daily/Weekly Inspection Form	HSE Manager
Identification of excessive sediment deposition (whether on or off site)	At a minimum weekly, and: Daily (during rainfall), and Following runoff-producing rainfall.	Erosion and Sediment Control Daily/Weekly Inspection Form	HSE Manager
Identification of construction materials, litter or sediment placed, deposited, washed or blown from the site, including sediment deposition by vehicular movements	Weekly	Erosion and Sediment Control Weekly Inspection Form	HSE Manager
Inspection of litter and waste receptors			
Inspection of oil, fuel and chemical storage facilities			
Inspection of all site discharge points	At a minimum weekly, and: Daily (during rainfall).	Erosion and Sediment Control Daily/Weekly Inspection Form	HSE Manager
Inspection of all temporary flow diversion and drainage works	Prior to anticipated runoff-producing rainfall events.	Erosion and Sediment Control Daily Inspection Form	HSE Manager

Table 4-13 Erosion, sediment control and water quality corrective actions

Incident	Corrective action
Soil erosion	Upslope flow is to be diverted around the erosive area.
	Soil may be require testing to confirm if ameliorates need to be applied.
	Soil is to be stabilised with an appropriate cover material.
Sediment and drainage control failures	Inspection of the controls to determine appropriate rectification measures.
	Controls are to be repaired in accordance with manufacturer's specifications.
	Regularly monitoring controls to assess stability.
Build-up of sediment	Excess sediment is to be removed to ensure controls continue to operate effectively.
	Environmental officer to consider the placement of additional sediment controls upstream of the location of excess sediment deposition.
Off-site discharge of sediment-laden runoff	Environmental officer to assess the source of the sediment-laden runoff.
	Additional sediment controls may need to be installed or areas of exposed soil are to be stabilised.
	Water quality monitoring to be undertaken regularly to ensure sediment-laden runoff is not discharged off site.

4.5 Hazardous substances

Potential environmental impact

- Accidental spills of dangerous goods and substances
- Degradation of water quality, soil and vegetation.

Objectives

- To undertake all reasonable and practicable measures to prevent environmental harm
- To minimise the risk of spills during storage and handling of chemicals and fuels
- To comply with applicable Australian standards, statutory and approval requirements.

Legislation

- *Environmental Protection Act 1994*
- *Work Health and Safety Act 2011.*

Measurable target

- No contamination of water quality, soil and vegetation as a result of the storage and handling of chemicals and fuels

- Appropriate storage of fuels and chemicals
- Adequately maintained spill response kits and procedures.

Table 4-14 Hazardous substances environmental mitigation measures

Aspect	Environmental management measures	Responsibility
Handling and storage of dangerous goods	Dangerous goods will be stored in a designated, secure, bunded area away from watercourses to minimise the potential for spill.	Construction Manager HSE Manager
	Site health and safety officer to manage and store the relevant material safety data sheets (MSDS) for hazardous and dangerous materials and goods in appropriate locations (such as storage area and usage area) readily accessible to all workers.	
	Chemicals and fuels must be stored and handled as per the requirements of the MSDS.	
	Refuelling and transfer operations must be done on a hardstand area with adequate containment systems. Safe handling techniques will be employed during refuelling, such as using pumps, funnels or syphons to prevent spillage.	
	No routine maintenance and servicing to be undertaken on site.	
	Spill kits are to be located on site and positioned in close proximity of locations containing dangerous goods. Spill kits are to contain cleaning materials and absorbents.	
	Spills are to be isolated, stopped and contained and will be cleaned up utilising onsite spill kits. Waste to be placed in a sealed container, suitable to hold such materials and waste to be consigned to a contractor licensed to received such wastes for disposal (refer to Appendix B for spill management procedure).	
	In case of environmental nuisance or harm, the site Manager is to report the incident to the relevant regulatory authorities, including DES.	
	In an instance of a spill, irrespective of the quantity, a report detailing the incident, investigations, corrective actions and monitoring requirements will be prepared.	

Table 4-15 Hazardous substances environmental inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Inspect the condition of containers and bunded areas and ensure no leaks are apparent	Weekly	Weekly environmental checklist	HSE Manager
Inspect spill kits and ensure appropriate equipment is in working order	Weekly and following an incident	Weekly environmental checklist	HSE Manager

Table 4-16 Hazardous substances corrective actions

Incident	Corrective action
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure in Appendix B.
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.

4.6 Nature conservation (terrestrial and aquatic flora and fauna)

An Ecological Assessment Report was prepared for the Karara Wind Farm project area (GHD, 2020). Desktop assessments identified the following ecological values within the desktop search extent which extended 20 km from the centre of the wind farm:

- Essential habitat for seven conservation significant species (five fauna and two flora)
- The Traprock Important Bird Area (IBA) which extends roughly across the wind farm area designated due to an abundance of historical records of the critically endangered regent honeyeater (*Anthochaera phrygia*)
- Historical records of 14 conservation significant species within the wind farm desktop search extent including four plants, six birds, two mammals and two reptiles.

Field surveys confirmed the presence of six conservation significant species within the project area including:

- One TECs - White box –yellow box Blakely’s red gum grassy woodland and derived native grassland TEC
- One flora species –*Tylophora linearis*
- Three bird species – Squatter pigeon (southern) (*Geophaps scripta scripta*), White-throated needletail (*Hirundapus caudacutus*) and Glossy black-cockatoo (*Calyptorhynchus lathamii*)
- Two mammals – Koala (*Phascolarctos cinereus*) and short-beaked echidna (*Tachyglossus aculeatus*).

Nine other conservation significant species were considered likely to occur based on the proximity to recent historical records and the presence of suitable habitat. These included:

- One Three flora species – *Diuris parvipetala* (Slender purple donkey orchid), *Macrozamia conferta* and *Eucalyptus infera* (Durikai mallee)
- Four bird species – regent honeyeater (*Anthochaera phrygia*), painted honeyeater (*Grantiella picta*), swift parrot (*Lathamus discolor*) and powerful owl (*Ninox strenua*)
- Two mammal species – greater glider (*Petauroides volans*) and grey-headed flying fox (*Pteropus poliocephalus*).

Potential environmental impact

- Loss of vegetation and habitat including habitat for conservation significant species and vegetation communities
- Injury and mortality of wildlife
- Habitat fragmentation and reduced connectivity
- Disturbance of wildlife by increased light, noise and vibration
- Habitat degradation through increased dust, run-off and sedimentation
- Disturbance of surface waterways and waterbodies or groundwater systems.

Objectives

- Avoid the unnecessary removal of native vegetation
- Protect native flora and fauna habitat
- Minimise disturbance to native fauna.

Legislative requirements

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1994*
- *Environmental Protection Regulation 2019*
- *Nature Conservation Act 1992*
- *Nature Conservation (Wildlife Management) Regulation 2006*
- *Vegetation Management Act 1999.*

Measurable target

- No damage or clearing of native flora or fauna habitat that is not approved for removal
- No significant adverse impacts to native fauna species.

Relevant information

GHD (2020) Karara Wind Farm Ecological Assessment Report

Table 4-17 Nature conservation mitigation measures

Aspect	Environmental management measures	Responsibility
General	<p>All site personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations with respect to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions.</p>	<p>Construction Manager HSE Manager</p>
	<p>Utilise existing tracks and previously disturbed areas where practicable to minimise clearing required.</p>	
	<p>Micro-siting of infrastructure will occur to minimise impacts to vegetation, threatened ecological communities, threatened flora and riparian vegetation.</p>	
Clearing of vegetation	<p>The extent of vegetation clearing (and no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas prior to clearing activities.</p>	<p>Construction Manager HSE Manager</p>
	<p>If fencing or flagging is in poor condition, it should be replaced as soon as possible to reduce the potential of accidental clearing.</p>	
	<p>Where infrastructure must cross waterways, areas of existing disturbance (i.e. existing tracks) have been selected. Where this is not practicable, the project footprint will be minimised and large habitat trees retained.</p>	
	<p>Where works extend outside of the approved disturbance footprint, a record is to be created in the incident management procedure and an investigation undertaken as to why works extended outside of the approved footprint.</p>	
	<p>No clearing of protected plants listed under the NC Act without appropriate permits in place for their removal.</p>	
	<p>Pre-clearance surveys should be undertaken to identify any threatened plants within the vicinity of the clearing footprint.</p>	
	<p>No clearing of threatened plants is to occur without appropriate permits in place for their removal.</p>	
	<p>All clearing will be supervised by suitably qualified and experienced fauna spotter-catchers. This will involve searching and clearing hollow trees and logs prior to clearing and relocating resident fauna to the nearest suitable, safe habitat outside the clearing footprint.</p>	
	<p>Employ sequential clearing practices and use of a suitably qualified koala spotter.</p>	

Aspect	Environmental management measures	Responsibility
	<p>Cleared vegetation or soil is not to be pushed up against trees, stored against fence lines or within 50 m of waterways.</p> <p>Vegetation is to be reused on site wherever possible (e.g. salvaged, mulched for revegetation areas, hollow logs left for habitat).</p> <p>Topsoil is to be stockpiled and reinstated during rehabilitation processes.</p> <p>Rehabilitation of temporary construction areas will be undertaken sequentially and as soon as practicable after clearing.</p>	
Injury and mortality of wildlife	<p>Pre-clearance surveys will specifically target areas of predicted habitat for conservation significant species that have the potential to occur within the clearing footprint. Pre-clearance surveys will be required as part of the standard requirements of the high risk SMP. Pre-clearance surveys will be undertaken to mark the locations of potential breeding places for conservation significant species.</p> <p>A high risk SMP will be prepared in accordance with the requirements of Section 332 of the <i>Nature Conservation (Wildlife Management) Regulation 2006</i>. Key species likely to be targeted in the high risk SMP include the squatter pigeon, glossy black-cockatoo, bullock jewel butterfly, greater glider, powerful owl and short-beaked echidna.</p> <p>Relocate fauna captured during clearing to an appropriate nearby habitat area.</p> <p>Areas of potential habitat for the squatter pigeon are to be flushed immediately prior to clearing (i.e. spotter-catcher to walk in front of clearing machinery).</p> <p>Employ sequential clearing practices and use a suitably qualified koala spotter during clearing activities.</p> <p>Implement temporary exclusion fencing with highly visible fencing or mesh around areas of high ecological significance.</p> <p>Placement of warning signs around areas of known squatter pigeon habitat and development of a register for squatter pigeon sightings will be maintained.</p> <p>Vehicles to be restricted to 40 km/hr along access tracks.</p>	Construction manager HSE manager
Habitat fragmentation	Construction laydown areas and stockpiles limited to areas that have previously been cleared to minimise unnecessary clearing.	Construction Manager

Aspect	Environmental management measures	Responsibility
and reduced connectivity	Where possible, temporary construction areas will be rehabilitated as soon as practicable after the completion of construction works to reconnect fragmented habitats.	HSE Manager
Disturbance of wildlife through increased light, noise and vibration	Site lighting is to be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive fauna habitat.	Construction Manager HSE Manager
	Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.	
	All construction vehicles to comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.	
	Vehicles and machinery to be switched off when not in use.	
Habitat degradation by increased dust, run-off and sedimentation	Implementation of ESCP.	Construction Manager HSE Manager
	Undertake routine dust suppression and monitoring.	
	All vehicles to stay on designated tracks.	
	Monitor weather conditions and implement temporary controls during extreme weather events.	
	Construction to cease during adverse weather conditions that have the potential to increase dust, increase runoff or sedimentation.	
	Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.	

Table 4-18 Nature conservation inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Weather conditions	Daily	Daily environmental checklist	HSE Manager
Dust inspection	Daily	Daily environmental checklist	HSE Manager
Weekly inspections to assess the implementation of the above mitigation measures	Weekly	Weekly environmental checklist	HSE Manager
Inspection of high visibility flagging and exclusion fencing of environmentally sensitive areas and no-go zones is in good condition	Weekly	Weekly environmental checklist	HSE Manager
HSE Manager Pre-clearing inspection by a suitably qualified fauna spotter/catcher and flushing of known squatter pigeon habitat prior to clearing.	Prior to clearing works	Pre-clearing inspection report	HSE Manager

Table 4-19 Nature conservation corrective actions

Incident	Corrective action
Dangerous weather conditions	Works should cease until weather passes to minimise run-off during wet weather or dust during windy conditions.
Construction works extend outside of approved disturbance footprint	Natural ground surface to be rehabilitated where possible.
	Immediate reinstatement of area where works are beyond approved limits of clearing.
	DES and/or DAWE to be contacted immediately if breach of approved clearing limits occurs.
Temporary disturbance areas	Temporary disturbance areas to be rehabilitated as soon as practicable.
Pre-clearing inspection	If during clearing an active breeding place is identified, works should cease immediately and a fauna spotter/catcher be contacted.
Fauna within clearing area	Relocation of fauna captured during clearing works to an appropriate nearby habitat area to be undertaken by a fauna spotter/catcher.
Damage to high visibility flagging and exclusion fencing	If fencing or flagging is in poor condition, it should be replaced as soon as possible to reduce the potential of accidental clearing.
Injured animals	To be taken immediately to a licensed wildlife carer.

4.7 Noise and vibration

The current noise characteristics of the area are typical of rural farming and agricultural land uses.

The current noise emissions of the area is typical of rural farming and agricultural land uses.

Potential environmental impact

Potential noise and vibration impacts to landholders as a result of construction activities

Objectives

- Undertake all reasonable and practicable measures to prevent or minimise noise and vibration impacts to landholders
- Compliance with *Environmental Protection (Noise) Policy 2019*.

Legislative requirements

- *Environmental Protection Act 1994*
- *Environmental Protection (Noise) Policy 2019*
- *Work Health and Safety Act 2011*
- *AS 2670.2-1990 Evaluation of human exposure to whole-body vibration – Part 2: Continuous and shock induced vibration in buildings (1 to 80 Hz).*

Measurable target

- Negligible noise and vibration impacts to landholders
- Minimal number of noise and vibration related complaints received from landholders during construction.

Relevant information

Marshall Day Acoustics (2020) MacIntyre Wind Farm Pre-development Noise Assessment

Table 4-20 Noise and vibration mitigation measures

Aspect	Environmental management measures	Responsibility
Noise and vibration impacts	Ensure all construction equipment is in good working order, is well-maintained and has up to date service records.	Construction Manager
	Equipment is to be fitted with noise control devices.	HSE Manager
	Vehicles and machinery to be switched off when not in use.	Community relations coordinator
	Materials dropped from heights and into or out of trucks will be minimised.	
	Notification to surrounding landowners of specific activities that may increase noise and/or vibration.	
	Works to occur within approved working hours. As outlined in the EP Act as stated below: <i>'A person must not carry out building work in a way that makes an audible noise –</i> (a) <i>On a business day or Saturday, before 6:30 am or after 6:30 pm; or</i> (b) <i>On any other day, at any time'.</i>	
	Construction to be in accordance with the noise requirements of the Queensland Environmental Protection (Noise) Policy 2019 (EPP).	
	An Out of Hours Work (OOHW) protocol is to be developed by the construction contractor and implemented where required. Where out of hours work are needed for the safe and efficient implementation of the project, such as to align with favourable weather, the level of impacts of OOHW will be considered and consultation with landowners is to be undertaken.	

Table 4-21 Noise and vibration inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Inspection of construction equipment is in good working order and has up to date service records	Weekly	Weekly environmental checklist	HSE Manager

Table 4-22 Noise and vibration corrective actions

Incident	Corrective action
Vehicles and equipment servicing not up to date	Vehicles and equipment to be serviced as soon as possible.
Noise and/or vibration complaint	Inspect the area for where the complaint was made to ensure all equipment and stockpiling is adequately stored.
	If area is untidy or unkempt, undertake measures to rectify.

4.8 Social and visual amenity environment

Construction activities may be visible to varying degrees by people living, working, and travelling through the surrounding rural areas, particularly rural residents and workers within close proximity to the project. However, landscape and visual impacts associated with construction activities are typically of greater magnitude than those associated with operation, although these are temporary in nature.

Potential environmental impact

Potential impacts to surrounding visual amenity

Objectives

No complaints around visual amenity regarding construction activities

Legislative requirements

- *Planning Act 2016*
- *Toowoomba Planning Scheme 2019*
- *Goondiwindi Regional Planning Scheme 2018*
- *Southern Downs Planning Scheme 2018.*

Measurable target

No complaints around visual amenity regarding construction activities

Relevant information

GHD (2020) Landscape and Visual Impact Assessment

Table 4-23 Social and visual amenity mitigation measures

Aspect	Environmental management measures	Responsibility
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Visual amenity	Construction equipment, stockpiles and other visible elements to be located away from views to or from sensitive visual receptors.	Construction Manager HSE Manager
	Should equipment or stockpiles be located in visually prominent locations for any reasonable period of time, incorporate screening measures and practices to keep areas tidy.	
	Provide notification to surrounding properties of upcoming works.	
Disturbance of wildlife through increased light, noise and vibration	Site lighting is to be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive flora habitat.	Construction Manager HSE Manager
	Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.	
	All construction vehicles to comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.	
	Vehicles and machinery to be switched off when not in use.	

Table 4-24 Social and visual amenity inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Undertake a site inspection following a complaint of a visual amenity issue	On a complaints basis	Complaints Register	HSE manager

Table 4-25 Social and visual amenity corrective actions

Incident	Corrective action
Visual amenity complaint	Inspect the area for where the complaint was made to ensure all equipment and stockpiling is adequately stored.
	If area is untidy or unkempt, undertake measures to rectify.

4.9 Transport and road network

Existing access to the site is via Carbean Road, off the Cunningham Highway.

Potential environmental impact

- Potential disruption to landholders and road users as a result of construction activities related to traffic and transportation of construction equipment
- Potential risk to vehicular traffic within the site and adjacent roads, including Carbean Road and the Cunningham Highway.

Objectives

Undertake all reasonable and practicable measures to prevent or minimise disruptions to landholders and road users

Legislative requirements

- *Environmental Protection Act 1994*
- *Transport Infrastructure Act 1994.*

Measurable target

- Negligible impacts to landholders and road users
- Nil safety incidents in regards to traffic and transportation.

Relevant information

GHD (2020) Traffic Impact Assessment

Table 4-26 Transport and road network mitigation measures

Aspect	Environmental management measures	Responsibility
Condition and use of transport routes to site and physical obstructions along access tracks	Employee safety briefings to educate drivers of the requirements of staying alert and driving to the conditions along the project transport routes, particularly when transporting turbine blades.	Construction Manager HSE Manager
	Provide for, where possible, continuous operation of normal traffic along all roads and vehicular access to properties that are on or adjacent to the site.	
	Development of a Traffic Management Plan to manage large oversized deliveries.	
	Development of a Road Use Management Plan in consultation with DTMR and relevant Councils.	
Limited advanced directional signage resulting in the potential for sudden breaking	Implementation of advance directional signs to improve wayfinding for turning traffic.	Construction Manager HSE Manager
Speed limit	On site access tracks and Carbean Road speed limit will be restricted to 40 km/hr.	Construction Manager
	Vehicle monitoring devices to minimise the potential for speeding.	HSE Manager

Table 4-27 Transport and road network inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Inspection of access tracks to ensure any overgrown or fallen vegetation is cleared	Weekly	Weekly environmental checklist	HSE Manager

Table 4-28 Transport and road network corrective actions

Incident	Corrective action
	Access tracks to be graded.

Access tracks in poor condition

Clearing of overgrown or fallen vegetation.

4.10 Waste management

Potential environmental impact

Potential for environmental harm due to improper storage and handling of waste generated during the construction phase.

Objectives

- To minimise potential contamination of soil, water or vegetation from improper storage and handling of waste
- To ensure the project implements and adheres to the waste management hierarchy of avoid, reuse and recycle and where this is not possible, to dispose of waste in the most appropriate manner
- To comply with all statutory and approval requirements.

Legislation

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1994*
- *Waste Reduction and Recycling Act 2011.*

Measurable target

- No land contamination as a result of poor waste management
- Wastes minimised and opportunities for reuse and recycling identified and implemented
- All waste disposal to be carried out by a licensed waste contractor.

Table 4-29 Waste management mitigation measures

Aspect	Environmental management measures	Responsibility
Waste management	All project personnel will be instructed in applicable waste management practices as a part of the environmental induction process.	Construction Manager HSE Manager
	All general refuse and food wastes to be collected and transported to a local government approved disposal site and suitable bins and skips will be provided for waste streams (general, recyclable, metal, and regulated).	
	All construction waste left on site will be kept in an appropriately secured, stacked area.	
	Regulated waste will be stored and appropriately marked, identifying their contents and collected by a licensed waste contractor.	
	No on site burial or burning of waste material.	
	Excavated soils will be reused on site where possible.	

Table 4-30 Waste management inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Housekeeping checks of all waste storage areas	Daily	Daily environmental checklist	HSE Manager

Table 4-31 Waste management corrective actions

Incident	Corrective action
Improper waste management	Inspect waste storage areas.
	If area is untidy or unkempt, undertake measures to rectify.

4.11 Weed and pest management

A low diversity of restricted invasive plant species was recorded within the project area during the GHD surveys (GHD, 2020). Only *Opuntia tomentosa* and *O. stricta* were recorded frequently. The distribution of invasive plant species recorded during field surveys is mapped within the Karara Wind Farm Ecological Assessment Report (GHD, 2020). Density of these species varied, however, typically populations included sparse individuals to 1 m high. Stands of mature individuals were also occasionally recorded.

Pest mammals recorded included the European rabbit (*Oryctolagus cuniculus*), feral cat (*Felis catus*), feral pig (*Sus scrofa*), wild dog (*Canis lupus familiaris*) and red deer (*Cervus elaphus*). Other pest species known to occur in the region and likely to be present include the European fox (*Vulpes vulpes*) and fallow deer (*Dama dama*).

Potential environmental impact

Introduction and/or spread of invasive species, including *Opuntia tomentosa* and *Opuntia stricta*.

Objectives

- To eliminate infestation of invasive weed species present within the project area
- To effectively control weed species within the project footprint
- Minimise the potential for the spread of pest fauna and flora within the project area.

Legislative requirements

- *Environmental Protection Act 1994*
- *Environmental Protection Regulation 2019*
- *Biosecurity Act 2014.*

Measurable target

- No outbreaks of a declared environmental weed
- No introduction of weeds and/or pests on site.

Relevant information

GHD (2020) Karara Wind Farm Ecological Assessment Report.

Table 4-32 Weed and pest mitigation measures

Aspect	Environmental management measures	Responsibility
Introduction and spread of invasive fauna species	All putrescible waste to be stored in secure temporary holding containers and transported off site.	Construction Manager
	Sightings or evidence of pest animals will be recorded during construction in a weed and pest fauna register. If increased densities of pest animals are observed, or new pest animals are identified, humane pest controls will be implemented to manage numbers.	HSE Manager
	Construction staff will not bring domestic animals to the project area.	
Introduction and spread of invasive flora species	Construction contractor to prepare a Weed Management Plan. The Weed Management Plan will include hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation. The Weed Management Plan will include protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density.	Construction manager HSE manager
	A weed survey will be undertaken to confirm the initial extent of weeds on site, including the extent of <i>Opuntia tomentosa</i> and <i>Opuntia stricta</i> .	
	Preliminary weed mapping will be prepared to provide a baseline of existing weed infestation	

Aspect	Environmental management measures	Responsibility
	Declared weeds occurring within the construction footprint will be treated or removed prior to the commencement of construction. Any new weed infestation shall be treated at the earliest stage while small and manageable. If chemical treatment is required, chemicals may be used only in accordance with manufacturer's specifications. Weed control measures are to minimise impacts on native fauna (e.g. use of aquatic and fauna friendly chemicals).	
	All vehicles and equipment initially entering the site must possess a current weed hygiene inspection certificate from an accredited inspection station. Certified vehicles and equipment may continue to re-enter the site without further certification providing that they have remained on well-formed surfaces and the site supervisor is satisfied that they are clean and free of weeds and seeds prior to entry. 'Come clean - go clean'. Any vehicles or equipment not meeting this stringent requirement must not be allowed to re-enter the site unless cleaned and re-certified.	
	Vehicles / equipment travelling from declared weed areas will be required to wash down and possess a current weed hygiene inspection certificate before moving to a declared weed free area.	
	Vehicle access will be restricted to existing roads and tracks where possible.	
	Areas of exposed earth will be minimised and rehabilitated with appropriate non-invasive species.	
	Materials sought from outside the project area, other than those obtained from a quarry, (e.g. fill for access tracks) will be required to hold weed free declarations.	
	A record of all material imported on site is to be maintained. The log is to include material description, quantity, source and deposition at the site.	

Table 4-33 Weed and pest inspection and monitoring

Task	Monitoring frequency	Reporting mechanism	Responsibility
Record sightings or evidence of pest animals or an increase in weeds during construction	Sightings based	Weed and pest fauna register	HSE Manager
Check and clean down all vehicles entering site	For each vehicle entering site	Weed hygiene inspection register	HSE Manager

Table 4-34 Weed and pest corrective actions

Incident	Corrective action
Weed outbreaks	Weed outbreaks are to be controlled and managed, however, herbicide is not to be sprayed near creeks or dams or within two days of rain.

5. Training, competence and induction

5.1 Overview

Well trained and environmentally aware personnel are a key factor in ensuring that all aspects of the project are executed with minimal impacts to the environment and that the highest possible standards of environmental management are met. ACCIONA will ensure that all employees and subcontractors involved with the project receive environmental training appropriate to their role. The provision of training will be in accordance with the training and competence HSE management measures developed for the project.

A comprehensive environmental awareness induction will be provided when personnel commence on the project. Environmental topics will also be included in toolbox talks during construction and other ongoing environmental training is to be provided as appropriate. All training will be guided and maintained by an assessment of training needs.

5.2 Awareness inductions

A comprehensive environmental awareness induction will be provided when personnel commence on the project and is required for all first time visitors to the site. This induction should cover aspects such as:

- The objectives of the EMP and associated control measures
- Guidance on the significance and sensitivity of environmental features at all project sites
- The environmental objectives and policies of ACCIONA
- Individual's and organisation's environmental obligations under relevant environmental legislation
- Guidance on potential aboriginal and historic heritage on site and the appropriate response to unexpected finds
- The potential environmental impacts of construction (where relevant)
- Restricted and 'no-go' areas
- Controls and procedures to prevent impacts
- Responsibilities for environmental monitoring and reporting
- Procedures for responding to environmental incidents and emergencies.

The environmental induction training will be developed prior to construction commencing.

5.3 Tool box talks

All staff and sub-contractors will either be briefed on environmental requirements for specific construction activities or on a site specific basis, concentrating on reinforcing practical measures. It is typical for these briefings to become a part of the Tool Box agenda. Typical topics for tool box talks include:

- Vegetation clearing demarcations
- Vehicle speed limits and refuelling plant and machinery
- Precautions to prevent sediment-laden run-off entering watercourses
- Waste management (including re-use, recycling, segregation, storage and disposal)
- Noise management measures

- Dust control
- Precautions for protected flora and fauna
- Wildlife care
- Aboriginal and historic heritage
- Prevailing and forecast weather conditions.

5.4 Training needs assessment

As part of the HSE Management System, a training needs assessment and training plan will be developed for the project. This plan will identify training requirements for each role within the project and will include environmental and cultural heritage awareness training areas such as:

- Spill avoidance and response
- Incident response
- Incident investigation, reporting and follow-up
- Compliance and General Environmental Duty
- Cultural heritage awareness training
- Environmental auditing
- Emergency response
- Task specific training.

A register of all environmental training delivered during the course of the construction of the project, (including inductions and toolbox talks), will be maintained. The register will be maintained to record training attendance and currency of training for each staff, contractor and visitor.

5.5 Communication

This CEMP will be adequately communicated to all construction personnel. ACCIONA will ensure that the general intent, scope and relevance of these documents are understood by all site personnel.

Environmental issues for the project will be communicated through the following methods.

- Environmental induction programs and training
- Daily toolbox meetings
- Risk workshops
- Management meetings
- Noticeboards
- Environmental reports.

The effectiveness of the communication will be assessed in third party environmental audits as measured through awareness of staff and subcontractors and compliance with day to day site environmental management requirements.

A Communication Strategy will be developed for the construction of the project and will outline the responsibilities and protocols for internal and external communication, including communication with relevant authorities, the media and the public.

5.6 Documentation, document control and records

ACCIONA will ensure that an adequate document control system is in place to ensure that only current documentation is in use.

Records collected as part of environmental management activities will be retained by ACCIONA for the legally required period of time. Environmental records include but may not be limited to:

- Site inspection checklists
- Environmental audit reports
- Training records
- Monitoring data
- Complaints and associated records of communication
- Meeting minutes.

During construction, ACCIONA will make these records available to any relevant authorities and their representatives on request.

5.7 Emergency preparedness and response

ACCIONA will ensure that all staff and sub-contractors have adequate competence and training to respond to environmental emergencies. ACCIONA will establish emergency response teams for the construction phase who will receive special training in emergency response including use of emergency response equipment and consultation with emergency services such as Emergency Management Queensland, Queensland Fire and Emergency Services (QFES), Queensland Police Service (QPS) and Queensland Ambulance Service.

An Emergency Response Plan will be developed and implemented to address incidents such as:

- Environmental spills and leakages e.g. fuel, chemicals or other hazardous substances
- Vehicle collisions
- Fire from within working areas and bushfire
- Storms and severe winds
- On-site security breaches.

The Emergency Response Plan will include emergency procedures, assembly points, and emergency contact details relevant to the project prior to commencement of construction works. The emergency response plan will be developed as part of the project documentation for construction and will reference the CEMP where applicable. The Emergency Response Plan will also link to the Incident Management Procedure (below).

5.8 Incident management

'Environmental harm', as defined in Section 14 of the EP Act is "any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance". If environmental harm does occur during the construction phase of the project, the site Manager will immediately take appropriate action to minimise any adverse environmental impact and promptly report details of the incident to the chief executive officer and relevant agencies (e.g. DES) and emergency services. ACCIONA will carry out any instruction received from the authorised representatives of those relevant agencies.

Environmental near-misses and incidents will be recorded and subsequently investigated whereby appropriate corrective actions will be developed and put in place. An incident investigation procedure and reporting form will be developed by ACCIONA in the unlikely case of such events occurring, and incidents will be reported to Government agencies where it is legislated to do so. Typical information to be recorded in this form includes:

- Time and date of the incident
- Name and contact details of the witness/reporting person
- Location of the incident
- Incident type (near miss, minor/major incident)
- Description of incident (sequence of events, what occurred)
- Cause of the incident
- Corrective actions identified and implemented (including date).

ACCIONA will establish an Incidents Register and all legitimate and verifiable incidents received will be entered into the Register.

The incident and reporting procedure, reporting forms and contact numbers for relevant Project personnel and regulatory Government agencies, will be made available to all relevant staff during site environmental inductions and displayed at all site offices / crib rooms. Contact names and numbers will be updated as required.

5.9 Community consultation and complaints procedure

A Communication Strategy will be developed for the project. ACCIONA will work with affected landowners and other stakeholders to develop suitable communication approaches. It is intended that contact with landholders in particular, as well as other stakeholders, will be coordinated and a single point of contact provided.

Potentially affected stakeholders will be consulted to ensure that disruptions to their daily activities as a result of construction works are kept to a minimum. Every endeavour will be made to notify stakeholders in advance of any planned disruption in accordance with the Communication Strategy.

A procedure for complaints and a complaints investigation reporting form will be developed by ACCIONA and all legitimate and verifiable complaints received will be logged into the Register.

If a complaint is received, the person receiving the complaint is to record details on a complaints reporting form as follows:

- Name and contact details of the complainant
- Date and time of the complaint
- Reason(s) for the complaint (including date and time).

Complaints will be investigated immediately and corrective actions implemented as soon as they are identified. Complaints will be resolved as quickly as possible, in a consultative manner with the complainant. ACCIONA will respond to the complainant in writing and/or by telephone within 48 hours of receipt of the complaint to inform them of the status of the investigation and the timeframe for resolution.

5.10 Environmental reporting

5.10.1 Internal

ACCIONA will be required to report any environmental incidents or breaches. Where there is an obligation to report to relevant authorities, this must also occur within the applicable timeframes.

During construction, the site Manager will be required to prepare and submit a monthly report to the chief executive officer which will include the site inspection records, monitoring results, training undertaken, initiatives, incident records and details of any corrective and preventive actions taken where non-conformances had been identified and all non-conformances that have not been closed-out.

All staff and contractors will be required to report any environmental incidents (including complaints) or breaches of the approval conditions immediately to their supervisors who will then involve the Environmental Manager/Officer and site Manager and implement further actions.

5.10.2 External

Reporting will be undertaken in accordance with the legal obligations and compliance requirements set out for the project. ACCIONA aims to provide timely, relevant and appropriately presented information to government authorities, the local community and the general public on the environmental performance of the project. Reporting commitments under any environmental approval conditions and other legislation will be complied with and may include:

- Monitoring results as required by authorities
- Progress reports as required in approval conditions.

Any significant environmental incidents or serious breaches of the approval conditions will be reported to the relevant authorities in a timely manner and in accordance with legislative requirements.

5.11 Environmental auditing

Audits to verify compliance with all applicable environmental requirements will be conducted at appropriate intervals and will include once during construction and once post-construction. Audits will cover all aspects of the HSE Management System. This will include verifying compliance with at least the following requirements:

- The CMP
- ACCIONA HSE Management Standards
- ACCIONA HSE Compliance Guidelines
- Applicable legislative and approval requirements
- Other applicable environmental requirement.

Audits will be conducted by competent auditors independent of the construction activities being audited. The audit results, conclusions and corrective actions required will be communicated to those responsible for implementing the corrective actions.

An audit report will be prepared to summarise the findings of the audits and any corrective and preventive actions. The environmental audit reports will be made available to relevant environmental authorities as required.

5.12 Review and continuous improvement

ACCIONA will regularly review and (if necessary) update the CMP and all elements of the HSE Management System. The review will take into account the following:

- Conditions received from planning approvals
- Changes in legislative requirements (including conditions of approvals)
- Environmental performance, findings of environmental audits and inspections
- Outcomes of agency consultation
- Outcomes of consultation with communities and resolution of complaints
- Changes in external and internal policies, standards and guidelines.

The review will ensure the continuing suitability, adequacy and effectiveness of the CMP and the HSE Management System. The review will include assessing opportunities for improvement.

6. Conclusion

This CMP demonstrates compliance with PO13 of the State Code 23 for the project by demonstrating mitigation measures to manage adverse impacts on environmental values, water quality objectives, amenity, local transport networks and road infrastructure.

This CMP will be continually developed as design progresses. The CMP will be based on development permit and planning approval conditions, and will take into consideration the information and management measures provided within this document.

Appendices

Appendix A – Concept erosion and sediment control plan



ACCIONA Energy Australia Global Pty Ltd

**Karara Wind Farm Project
Concept Erosion and Sediment Control Plan
12525037-REP-KWF-010**

July 2020

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Appendices

Appendix A – Preliminary erosion hazard assessment

1. Introduction

1.1 Project overview

GHD Pty Ltd (GHD) has prepared this Concept Erosion and Sediment Control Plan on behalf of ACCIONA Energy Australia Global Pty Ltd (ACCIONA) in support of a development application for a Material Change of Use for a Wind Farm and Operational Work for Clearing Native Vegetation to facilitate the Karara Wind Farm (the Project).

The Project is located approximately 40 kilometres (km) south-west of the township of Warwick and 70 km south west of Toowoomba. The Project is proposed over 4 freehold lots, totalling approximately 4,680 hectares (ha) and is located within Goondiwindi Regional Council (GRC) and Southern Downs Regional Council (SDRC) Local Government Areas (LGA).

The Project will include the construction and operation of a wind farm involving the installation of up to 20 wind turbines and ancillary infrastructure including:

- Wind turbine foundations and hardstand areas
- Main site access from Carbean Road
- Access tracks
- Overhead 33 kV electrical reticulation
- Underground 33 kV electrical reticulation
- One (1) substation
- Two (2) meteorological masts
- One (1) construction compound
- One (1) laydown area
- One (1) operations and maintenance facility.

Two (2) locations are currently proposed to accommodate an operations and maintenance facility within the Project area; however, only one (1) facility will be developed.

1.2 Purpose of this report

This Concept Erosion and Sediment Control Plan (CESCP or Report) has been prepared at the development application stage and provides preliminary guidance to help identify appropriate site erosion and sediment control (ESC) management measures to reduce potential adverse impacts during the construction phase of the project. It is expected that prior to any construction activity along the alignment, a detailed site specific Erosion and Sediment Control Plan (ESCP) will be developed by the Contractor as part of the Construction Management Plan (CMP). The Contractor should review this preliminary guidance and provide greater detail based on construction methodology and timing of works.

This Report does not prescribe or locate any permanent or temporary erosion or sediment control measures in detail; however, it provides indicative locations for ESC devices as one measure of meeting the Contractor's responsibilities.

During preparation of the detailed site specific ESCP, as a minimum, the Contractor should comply with the International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (2008) as outlined below:

- Ensure appropriate soil data is collected and site constraints identified

- Ensure appropriate consideration of erosion and sediment control requirements, site constraints and environmental issues occurs before, during and following the construction phase
- Identify and manage erosion hazards associated with any onsite land disturbance activity
- Demonstrate to the Department of Environment and Science (DES) that the erosion and sediment controls meet best practice requirements during construction works to preserve surrounding environmental values.

This Report has been prepared to respond to the relevant requirements of State Code 16: native Vegetation Clearing (State Code 16) and Performance Outcome 13 of State Code 23: Wind Farm Development (State Code 23).

This CЕСCP has been reviewed by a Certified Professional in Erosion and Sediment Control (CPESC). As part of the preparation of the site-specific ESCP, the ESCP will require the certification of a Registered Professional Engineer of Queensland (RPEQ) and CPESC.

1.3 Scope

The following outcomes will be delivered in this Erosion and Sediment Control Site Assessment Report:

- Identification of disturbed catchment areas throughout the project site, where applicable
- Identification of the type of controls likely required for each disturbed catchment and indicative locations
- Preliminary guidance on erosion and sediment control measures
- Preliminary sketches displaying the type and indicative location of the erosion and sediment control types.

1.4 Relevant guidelines and legislation

Sediment and erosion controls should be established to comply with the relevant legislative requirements outlined below, as well as Books 1 – 6 of the *Best Practice Erosion and Sediment Control*, International Erosion Control Association (Australasia) (IECA 2008).

1.4.1 Environmental Protection Act 1994

All persons have a legal duty under the *Environmental Protection Act 1994* section 319 to take all reasonable and practicable measures to minimise or prevent environmental harm. Such harm can be caused if sediment from construction sites enters (washes, blows, falls or otherwise) into stormwater drains, roadside gutters or waterways. Stormwater runoff must be managed so that it is not released into waters, a roadside gutter, or stormwater drain at more than 50 mg/L Total Suspended Solids (TSS). Under section 443 of the *Environmental Protection Act 1994* a person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance (e.g. placing a stockpile adjacent to a waterway).

In addition, people who are in positions of management in a corporation have an additional duty under the *Environmental Protection Act 1994* to ensure that their corporation complies with the Act. This means supervisors need to take reasonable and practicable steps to ensure that the people under their control do not breach environmental laws.

People who become aware of environmental harm in association with their work (e.g. significant loss of sediment from their site works into a watercourse) have a legal duty under the *Environmental Protection Act 1994* to notify DES.

1.4.2 Environmental Protection Policy (Water and Wetland Biodiversity) 2019

This policy sits under the *Environmental Protection Act 1994*. The *Environmental Protection Policy (Water and Wetland Biodiversity) 2019* provides environmental values and water quality objectives for Queensland waters. These are utilised when determining environmental harm and to inform other statutory and non-statutory decisions. The water quality objectives assist in identifying whether the environmental values are protected. These values and objectives should be utilised when determining risk of environmental harm from water releases or runoff, and appropriate erosion and sediment controls implemented.

1.4.3 Planning Act 2016 and Planning Regulation 2017

The *Planning Act 2016* is the mechanism for assessing all developments within Queensland. This Act establishes the process for sustainable planning and development assessment in an ecologically sustainable way. This project will be subject to assessable development triggers under the Planning Act and subordinate regulation, which will each require erosion and sediment control risks to be approved as part of those specific activities. This Report forms part of the Development Application package under State Code 16: Native Vegetation Clearing and State Code 23: Wind Farm Development.

1.4.3.1 State Code 16: Native Vegetation Clearing

State Code 16 is contained within the State Development Assessment Provisions (SDAP) and lists numerous POs that must be addressed by a proposal to clear native vegetation when such an activity qualifies as assessable development. Importantly, relevant to this project and this Report are the requirements within PO11 and PO12 to ensure that vegetation clearing does not result in accelerated soil erosion, and protects bank stability of watercourses.

1.4.3.2 State Code 23: Wind Farm Development

State Code 23 is contained within the SDAP and details the requirements when preparing development application for material change of use for new or expanding wind farms. Relevant to this project and this Report are the requirements within PO13 regarding the need to avoid, minimise and mitigate adverse impacts on environmental values through construction activities.

1.5 Limitations

This report: has been prepared by GHD for ACCIONA Energy Australia Global Pty Ltd and may only be used and relied on by ACCIONA Energy Australia Global Pty Ltd for the purpose agreed between GHD and the ACCIONA Energy Australia Global Pty Ltd as set out in Section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than ACCIONA Energy Australia Global Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report, are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by ACCIONA Energy Australia Global Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Site description

2.1 Location

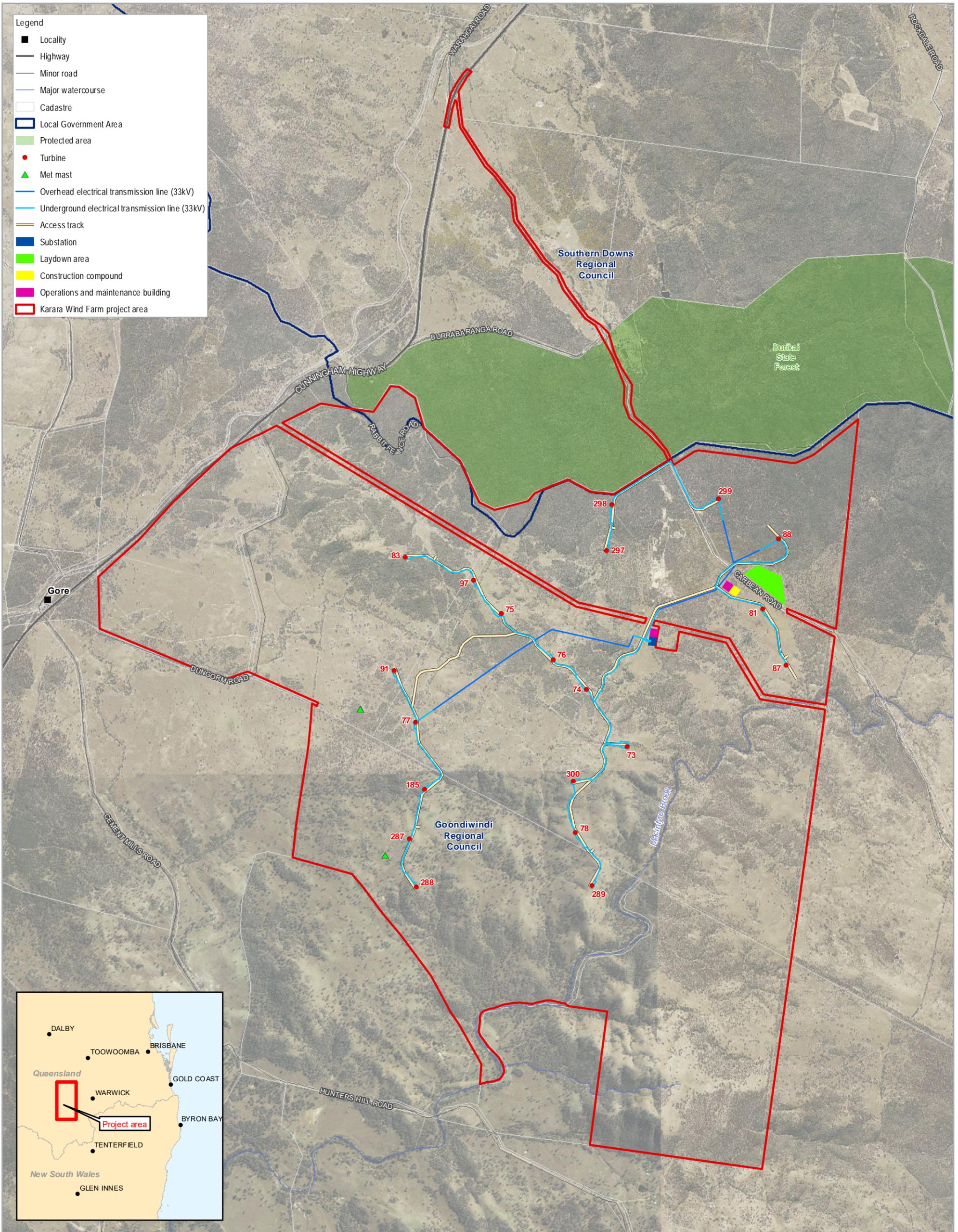
The Karara Wind Farm is located approximately 40 km south-west of the township of Warwick and 70 km south west of Toowoomba. The Project is located within Goondiwindi Regional Council (GRC) and Southern Downs Regional Council (SDRC) LGAs. The 20 wind turbines and ancillary infrastructure are located within the GRC LGA, with access to the wind farm sought from Carbean Road which is partially within the SDRC LGA.

The Project is proposed over four (4) freehold lots, totalling approximately 4,680 ha (Study Area). The majority of the vegetation across the Study Area has been historically cleared for agricultural purposes; however, some areas of native vegetation remain within the Study Area including Category B Regulated Vegetation.

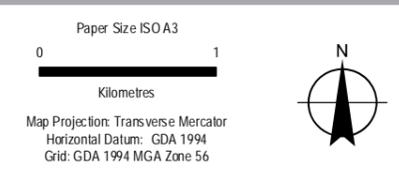
The Project Footprint includes the outermost extent of the land within which the Project infrastructure is proposed to be located. The Project Footprint is included within the Development Application package. This ESC assessment report forms part of the material to support the Development Application.

A 1,500 m setback from existing or approved non-host sensitive land uses has been applied to the development of the layout, and infrastructure has been positioned to avoid and minimise ecological impacts where possible.

The proposed layout of the wind farm is highlighted below in Figure 2-1.



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Project boundary and layout

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Figure 2-1

2.2 Topography

The project is located on the edge of the Stanthorpe Plateau sub-region of the New England Tablelands Bioregion (adjacent to the Brigalow Belt South Bioregion), and is characterised by low hills and mountains, with large areas of rock outcrop and granite tors.

Elevations across the site range between 630 mAHD in the north and south, and 500 mAHD in the west, with a number of peaks throughout wind farm.

2.3 Vegetation

The project site is located within an undulating landscape that has been subject to intensive historical land clearing and decades of sheep grazing. This activity has led to widespread vegetation loss and long-term exposure of surface soils to the elements, particularly along the ridgeline where the construction of infrastructure is proposed.

Areas of high ecological value border the study area to the north east within the Durikai State Forest, with large patches of remnant vegetation occurring within the northern portion of the wind farm. These areas provide habitat for a range of flora and fauna, including numerous conservation significant species. The detailed design of the project will aim to avoid these high ecological value areas, and during construction, erosion and sediment control measures are to be implemented to avoid the release of disturbed runoff into these areas.

Proposed turbine locations are located on elevated rocky rises that have been subject to high levels of disturbance from historical land clearing and sheep grazing. These are fringed by patches of remnant and regrowth vegetation that provide potential habitat for a range of conservation significant species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or *Queensland Nature Conservation Act 1992* (NC Act).

2.4 Geology

A desktop assessment was undertaken across the project site, to collate information in relation to the geology across the wind farm. This information was obtained from the Department of Natural Resources and Mines 1:100,000 mapping scale for the underlying geology present.

Table 2-1 details the description and approximate locations of the geology underlying the wind farm. The geology of the wind farm predominantly consists of sedimentary rock, in the form of siltstone and mudstone.

Table 2-1 Wind farm surface geology

Symbol	Rock unit name	Dominant rock type	Lithological summary	Location (approximate)
Ctx	Texas beds	Sedimentary Rock	Thin to thick-bedded, volcaniclastic arenite, siltstone, mudstone and slate; local phyllite; sporadic lenses of jasper, chert, limestone and mafic volcanics; rare conglomerate.	This geology type is present for the majority of the proposed wind farm.
Ctx/al	Texas beds/al	Arenite-Mudrock	Arenite, siltstone and mudstone affected by metasomatic quartz-tourmaline alteration.	This geology type is present in the southern portion of the proposed wind farm.

2.5 Soils

A desktop assessment was undertaken across the project site, which indicated that a range of different soil types are present across the wind farm. This information was obtained from the Department of Natural Resources and Mines 1:250,000 mapping scale for each of the soils types present.

Table 2-2 details the description and approximate locations of the different soils types for the wind farm.

Table 2-2 Wind farm soil types

Symbol	Soil description	Location (approximate)	Reference
TUm-D	Shallow, gravelly loams (lithosols) and shallow, gravelly texture contrast soils (soloths, solodics, solodized solonetz). Developed on Traprock.	This soil type is present for the majority of the project site.	Granite and Traprock Area of South Queensland
TD	Shallow, gravelly, texture contrast soils (soloths, solodics, solodized solonetz). Developed on Traprock.	This soil type is present at a number of isolated locations in the project site.	Granite and Traprock Area of South Queensland

2.5.1 Soil sodicity

Sodic (dispersive) soils are soils that have a high proportion of sodium ions, relative to the amount of other cations within their chemical composition. They are considered 'sodic' when the amount of sodium impacts and degrades the soils properties through weakening the bonds between the soil particles. Soil sodicity is a natural feature of many Queensland soils types, with approximately 45% considered sodic in nature.

Sodic soils are structurally unstable in water, and tend to break down into their basic particles. These soils are highly susceptible to 'chemical erosion' processes on slopes areas, or where soils are exposed or disturbed.

Figure 2-2 details the distribution of naturally occurring sodic soils across Queensland, with the project site highlighted in red.

The subsoils found within the project site are likely non-sodic to variable. It is recommended that prior to detailed design and the construction of the wind farm, soil sodicity be identified and characterised as part of the site specific Erosion and Sediment Control Plan by the Contractor, to ensure adequate treatment of sodic soils is undertaken by implementing appropriate erosion and sediment controls, as well as soil treatments.

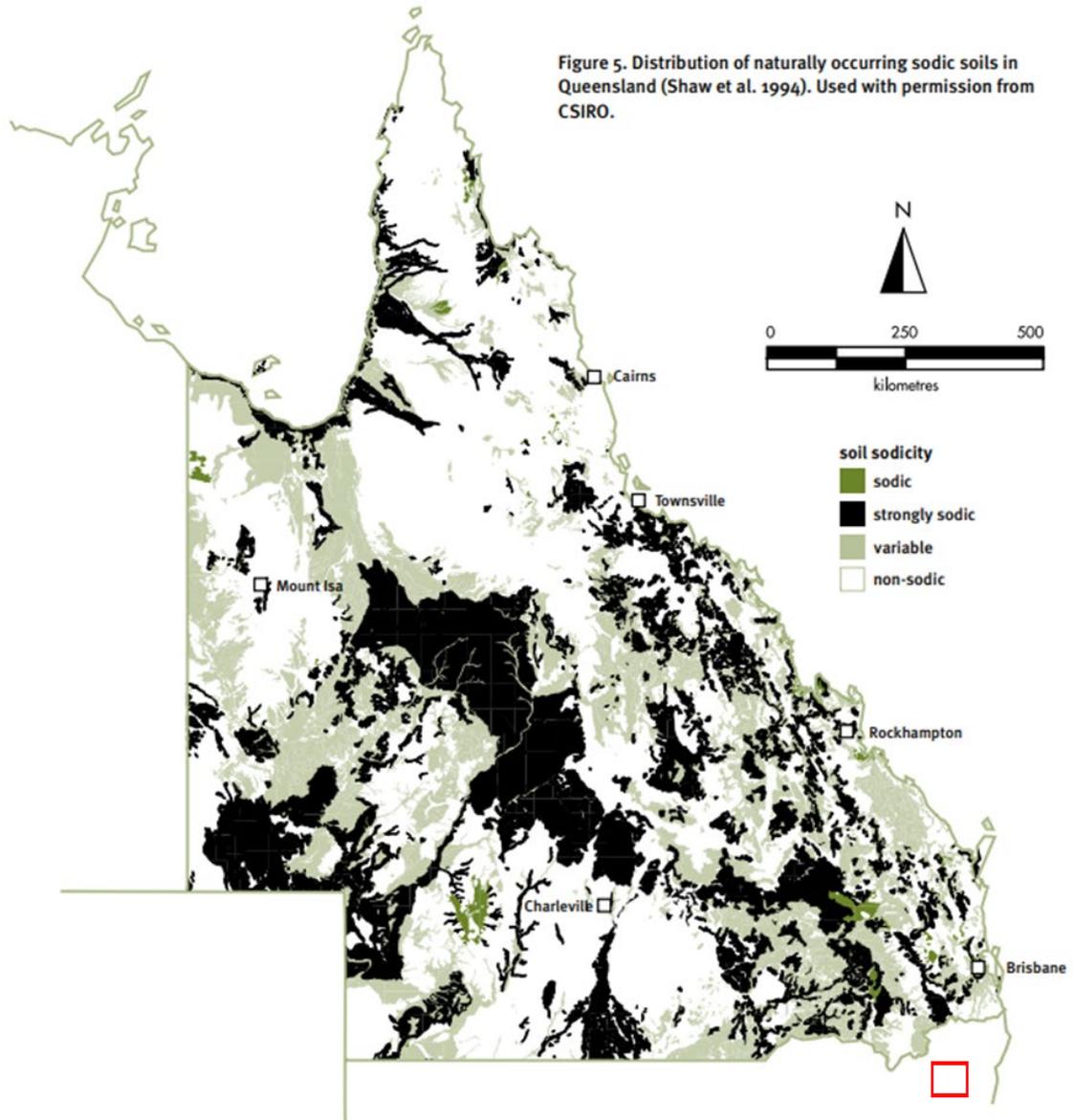


Figure 2-2 Distribution of naturally occurring sodic soils in Queensland

2.5.2 Soil erodibility

Soil erodibility is a function of the rate of infiltration at the surface, permeability of the soil and the coherence of the soil particles. To assist with the determination of soil erodibility, a number of field and/or laboratory tests can be undertaken including tests for dispersion, pH and sodicity.

Sub-surface geology needs to be identified and characterised prior to the development of the site-specific Erosion and Sediment Control Plan by the Contractor, to appropriately identify soils within the project site that are highly erodible and implement erosion and sediment controls accordingly.

2.6 Hydrology and drainage

There are a number of waterways traversing the wind farm footprint, all of which flow in a south westerly direction and ultimately discharge into Macintyre Brook, approximately 3.5 km south west of the project site. The proposed access tracks for the wind farm footprint cross a number of low to moderate risk waterways as shown on Figure 2-3.

The potential for ecological impact at waterway crossings was determined through intersect analysis using the Department of Agricultural and Fisheries Queensland Waterways for waterways barriers work data set. This data set provides an indication of the risk of impact due to crossing waterway barrier works, based upon a categorisation of mapped waterways, as set out in Department of Agriculture and Fisheries Code for Self-assessable Development – Minor Waterway Barrier Works, Part 3 Culvert Crossings, Code Number, WWBW01 April 2013 (DAF, 2013).

The DAF manual applies to new, or replacement of existing, waterway barriers. Waterways are classified as either low (green), moderate (amber), high (red), major (purple) risk of impact. Two access track waterway crossings are proposed within the wind farm footprint, as detailed in Table 2-3, which may require the incorporation of culvert crossing for example, a bottomless, box, pipe, slab, open or arch culvert underneath the access tracks.

Table 2-3 Karara access track waterways crossing classifications

Waterway Barrier Works risk category	Northern catchment
Purple (Major)	0
Red (High)	0
Amber (Moderate)	1
Green (Low)	1

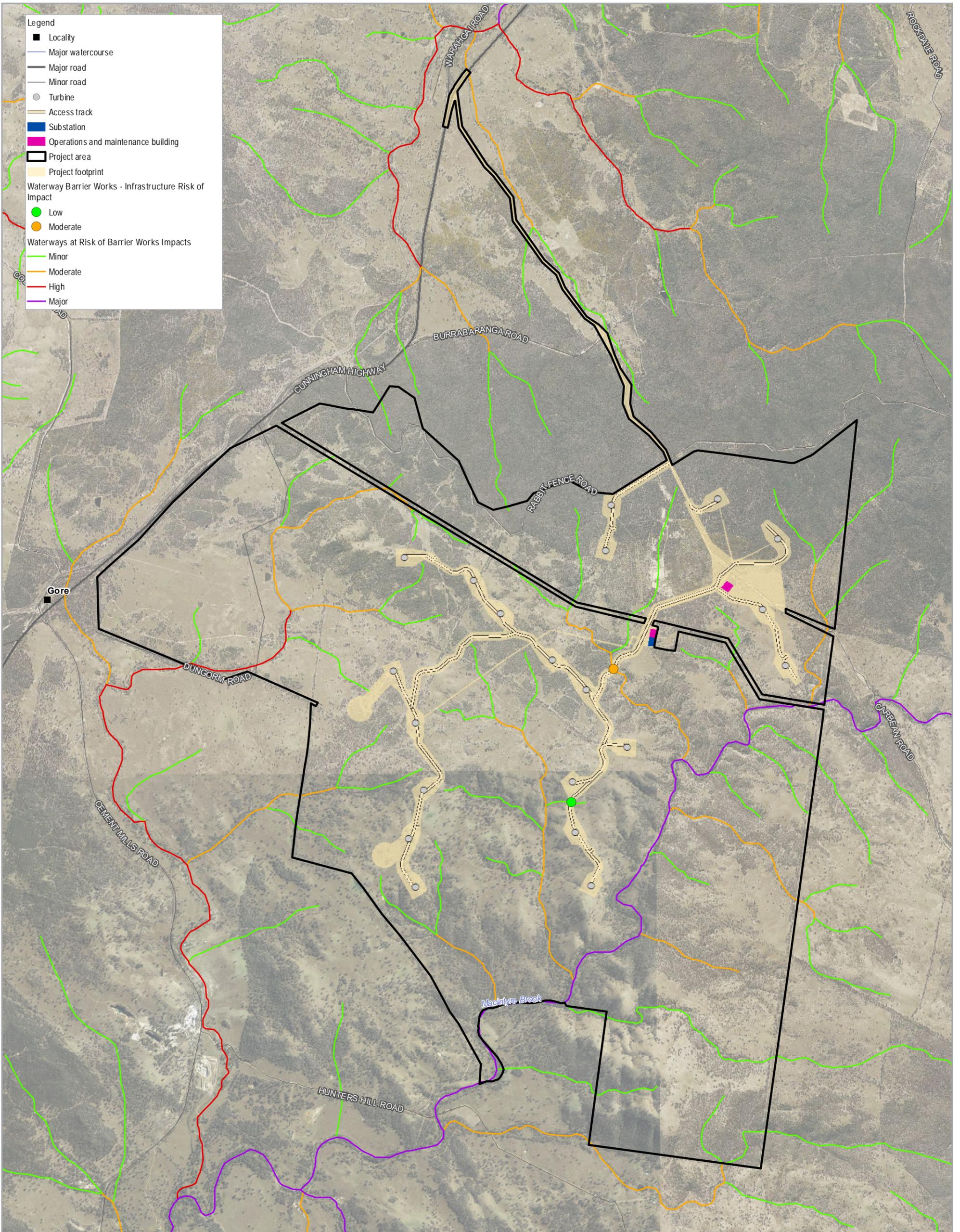
Waterway crossings, in the form of fords or culverts, can physically impact aquatic fauna habitat, stream stability and fish passage, by the removal of riparian and in-stream vegetation, and disturbance and blockage to the bed and bank of the waterway which can potentially increase sedimentation or alter geomorphic processes of bed and banks.

As a minimum, the following requirements must be met for the waterway crossing with high, moderate and low classification as outlined in Waterway Barrier Works guidance, as part of the detailed design of waterway crossings as outlined in Table 2-4.

Table 2-4 Waterway crossing requirements

Waterway Barrier Works risk category	Minimum requirements
Moderate	<ul style="list-style-type: none"> • Works must commence and finish within a maximum time of 360 calendar days and instream sediment and instream silt control measures associated with the works must be removed within this period • The crossing must have a minimum (combined) culvert aperture width of 2.4 m or span 100% of the main channel width • All new or replacement culvert cells must be installed at or below bed level. The internal roof of the culverts must be >300 mm above 'the commence to flow' water level • Where the cell is installed at less than 300 mm below bed level, the culvert floor must be roughened throughout to approximately simulate natural bed conditions • The culvert must be installed at no steeper gradient than the waterway bed gradient • Apron and stream bed scour protection must be provided in line with the design requirements of the guidelines.
Low	<ul style="list-style-type: none"> • Works must commence and finish within a maximum time of 360 calendar days and instream sediment and instream silt control measures associated with the works must be removed within this period • In all crossings the minimum (combined) culvert aperture width must be 1.2 m or span 100% of the main channel width • All new or replacement culvert cells must be installed at or below bed level • The culvert must be installed at no steeper gradient than the waterway bed gradient • Apron and stream bed scour protection must be provided in line with the design requirements of the DAF, 2013.

The project is located within the upper reach of the Macintyre Brook sub catchment, referred to as the Northern Catchment, as outlined in Figure 2-4. The catchment discharges through the Macintyre Brook from the south west of the catchment flowing off site at one distinct location. This portion of the Macintyre Brook travels approximately 5.8 km to the south west of the project boundary before converging with a downstream tributary.



Legend

- Locality
- Major watercourse
- Major road
- Minor road
- Turbine
- Access track
- Substation
- Operations and maintenance building
- ▭ Project area
- ▭ Project footprint

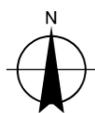
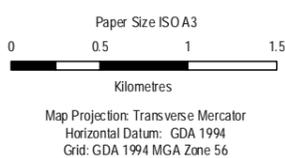
Waterway Barrier Works - Infrastructure Risk of Impact

- Low
- Moderate

Waterways at Risk of Barrier Works Impacts

- Minor
- Moderate
- High
- Major

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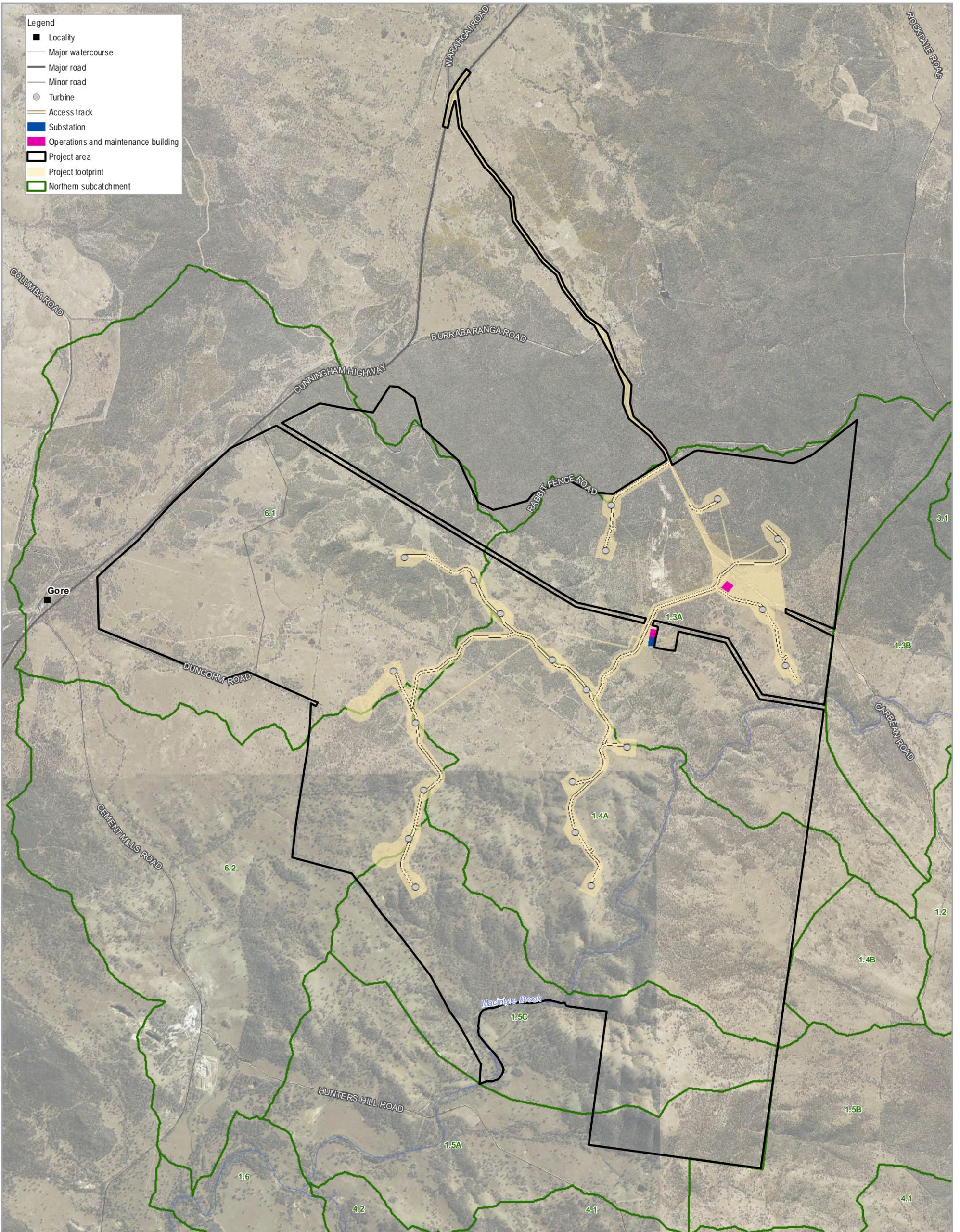


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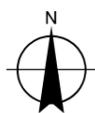
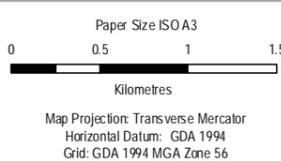
Waterway barrier works

Figure 2-3



- Legend**
- Locality
 - Major watercourse
 - Major road
 - Minor road
 - Turbine
 - Access track
 - Substation
 - Operations and maintenance building
 - ▭ Project area
 - ▭ Project footprint
 - ▭ Northern subcatchment

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Catchment boundaries

Figure 2-4

2.6.1 Receiving water quality objectives

The Healthy Waters Management Plan (HWMP) is a planning mechanism to improve the quality of Queensland waters. It aims to meet the requirements set out in the Environmental Protection (Water) Policy 2009 (EPP Water), this being the subordinate legislation of the Environmental Protection Act 1994 (Qld).

Receiving Water Quality Objectives (WQOs) are tangible long-term objectives to protect the environmental values (EV) for specific receiving waters. WQOs outline the measures, levels or indicators of water quality that are adopted to preserve the prescribed EVs of a catchment. In accordance with the HWMP (DES, 2019), the project site is located within the Trap Rock catchment in the Border Rivers basin. The specified receiving WQOs for consideration for the proposed development area are detailed below in Table 2-5.

Table 2-5 Receiving water quality objectives, HWMP (DES, 2019)

Water Quality Objective	Trap Rock catchment waters (Low Flow)	Trap Rock catchment waters (High Flow)
Turbidity (NTU)	4	9
Total Phosphorus ($\mu\text{g/L}$)	30	40
Total Nitrogen ($\mu\text{g/L}$)	520	600
Dissolved Oxygen (% Sat.)	60-100	60-100
pH	7.1-8.0	6.9-7.7
Salinity	N/A	N/A
Temperature (Monthly median with the range)	Between the 20th and 80th percentiles of natural monthly water temperature	Between the 20th and 80th percentiles of natural monthly water temperature
Electrical Conductivity ($\mu\text{S/cm}$)	290	215
Total Suspended Solids (mg/L)	5	10
Alkalinity (mg/L as CaCO_3)	40	55
Oxidised Nitrogen ($\mu\text{g-N/L}$)	6	Insufficient data to develop a target value
Ammonium N ($\mu\text{g-N/L}$)	10	Insufficient data to develop a target value
Filterable Reactive Phosphorus ($\mu\text{g-P/L}$)	8	Insufficient data to develop a target value
Sulphate as SO_4 (mg/L)	25	18
Chlorophyll-a ($\mu\text{g/L}$)	Insufficient data to develop a target value	Insufficient data to develop a target value

3. Construction activities and erosion risk assessment

The section provides an overview of the activities likely to occur throughout the construction of the windfarm and associated ancillary infrastructure that may have the potential to cause soil erosion across the project site.

3.1 Construction infrastructure

As part of the construction of the wind farm, a variety of ancillary infrastructure is proposed, throughout the construction and operation phases. The proposed construction infrastructure includes:

- Up to 20 wind turbines
- Access tracks
- Wind turbine foundations and hardstands
- Wind monitoring towers
- Laydown areas
- Operations and maintenance facilities
- Substation
- Construction compounds.

Site access

It is anticipated that the Site Access will utilise the existing access point on Carbean Road off the Cunningham Highway to facilitate access to the wind farm.

This access point will be used during construction and operation of the wind farm and will be where the majority of all loads will access the site. New fencing alignments, together with grids and gates, will also be installed on site where required.

Access tracks

The internal access tracks have been designed to utilise the existing topography of the land, minimising the amount of land required where possible. Access tracks located in proximity to regulated vegetation have been individually refined to avoid and minimise impacts to regulated vegetation. It is likely that approximately 23 km of access track will be required for the wind farm, however this will be updated as the design is further refined. The following design criteria and mitigation measures were applied to the access track layout to mitigate potential impacts:

- Tracks will typically be 5.5 m wide within a construction corridor and will be constructed from well graded crushed rock
- Tracks may be wider in some areas to allow for regular passing places, turning areas and to account for site terrain
- The number of watercourse crossings have been minimised as far as practicable, with the possibility of larger waterways requiring the introduction of culverts or ford crossings
- Track margins will be vegetated to reduce potential sediment-laden run-off.

The construction of access tracks will vary depending on localised ground conditions. Conditions impacting construction include the existing vegetation, nature of the topsoil, level of moisture in the ground, geotechnical base and localised topography.

3.2 Land disturbance activities

Land disturbance activities that are expected to occur during the design, preconstruction and/or construction phases of the project include:

- Soil and geotechnical investigations, as part of the detailed design
- Detailed site investigations, including the establishment of roads, and clearing for the purposes of micro-siting the turbines
- Site mobilisation and establishment (temporary site facilities, laydown areas, equipment and materials)
- Possible off-site road works
- Installation of wind monitoring towers and establishment of roads and clearing for their installation.
- Clearing and grubbing (including vegetation removal)
- Earthworks, paving (with gravel cap) and drainage for access roads and wind turbine hardstands
- Excavation for the foundations
- Construction of wind turbine foundations (ground anchors, bolt cage, reinforcement and concrete)
- Installation of electrical and communications cabling and equipment
- Installation of towers for the wind turbines, delivery of the wind turbine components to the site
- Installation of wind turbines (nacelles and blades), using large mobile cranes
- Commissioning and reliability testing of wind turbines
- Site stabilisation
- Progressive rehabilitation/landscaping of the site where possible.

The activities listed above will predominantly occur in the order listed, however, some of these activities will be carried out concurrently to minimise the overall length of the construction programme.

3.3 Rainfall and erosion risk

Rainfall data presented in Table 3-1 was sourced from the Bureau of Meteorology (BOM, 2020) Leslie Dam Weather Station (Station ID: 041445), which is located approximately 20 km north east of the project. The majority of rain falls between October and March, with the highest mean rainfall occurring in December with 97.8 mm and the lowest mean rainfall occurring in August with 31.0 mm. The mean maximum temperature for the area is 24.9 °C, whilst the cooler months have a mean minimum temperature of 10.5 °C.

The rainfall and erosion risk for the project has been determined according to the criteria listed in Table 33 from IECA, 2008 (refer to Table 3-2).

Table 3-1 Rainfall and erosion risk for Leslie Dam Weather Station

	January	February	March	April	May	June	July	August	September	October	November	December
Average rainfall (mm)	88.0	73.0	56.6	34.6	37.0	35.2	39.2	31.0	34.6	64.2	68.2	97.8
Erosion risk rating	M	M	M	L	L	L	L	L	L	M	M	M

Table 3-2 Erosion risk rating based on average monthly rainfall (IECA, 2008)

Erosion risk rating ^[1]	Expected 24 hour rainfall	Average monthly rainfall
Very Low	0 to 2 mm	0 to 30 mm
Low	2+ to 10 mm	30+ to 45 mm
Moderate	10+ to 25 mm	45+ to 100 mm
High	25+ to 100 mm	100+ to 225 mm
Extreme	> 100 mm	> 225 mm

Note: [1] Erosion risk rating based on worst case of expected rainfall within any 24-hour period or average monthly rainfall.

3.4 Preliminary erosion hazard assessment

Soil erosion hazard refers to the susceptibility of a parcel of land to the prevailing agents of erosion. The preliminary erosion hazard assessment adopted is based on the 'point score hazard assessment system' established in IECA (2008) and is included as Appendix A.

Based on this assessment, the site is considered to be 'high risk' erosion hazard as the total score is 29 (disturbances with scores <17 are considered 'low risk').

As the preliminary erosion hazard assessment of the proposed construction identifies that the project is 'high risk', the revised universal soil loss equation (RUSLE) is required to estimate the annual soil loss from the proposed development without controls, as part of the site specific Erosion and Sediment Control Plan.

It is noted that the preliminary erosion hazard assessment was completed for the project as a whole, and it is expected that selected areas of the construction site will reveal lower erosion risk than others. During the development of the site-specific Erosion and Sediment Control Plan, a more detailed erosion hazard assessment will be undertaken to determine the minimum required erosion and sediment controls.

3.5 Construction staging and timing

Land disturbance activities are expected to occur across both the wet and dry seasons. Ideally, the majority of the land disturbance or minor earthworks within or near waterways would be completed between April and September, with the remainder of the works completed during the wet season, which typically begins in October and lasts through to March, to avoid the potential risk of increased soil erosion.

Staging of works can be the most effective tool to minimise erosion risk, however ultimately the Contractor will be responsible for determining appropriate construction staging. At present, it is

anticipated that construction will generally begin in the northern portion of the wind farm area, and progress in a southerly direction.

The works schedule should also consider the expected and predicted rainfall forecast for the region. In particular, clearing and rehabilitation activities shall aim to avoid periods of predicted significant rainfall. These factors are of the greatest importance when works are programmed to occur within or adjacent to major waterways. Clearing and revegetation activities shall be halted during periods of significant rainfall, and appropriate temporary control measures may be required to be implemented and closely monitored during these events.

The Contractor shall ensure implementation of erosion and sediment controls, and shall also keep a record of rainfall forecast for the following week. Rainfall in excess of 10 mm significantly increases erosion risk. Therefore, the Contractor will have to ensure that there are no unprotected exposed surfaces, and that all sediment controls are functioning and have the required capacity prior to predicted (greater than 50% chance) rainfall events of greater than or equal to 10 mm.

4. Erosion and sediment control measures

The Contractor is responsible for implementing all erosion and sediment control measures and these must be implemented in accordance with best practice principles. A range of control measures are available for use across the project site, and those recommended in this section are based on the IECA '*Best Practice Erosion and Sediment Control*' documents (2008). The selection and implementation of appropriate ESC measures is dependent on a number of factors including the anticipated disturbance duration, slope, soil characteristics and availability of materials etc.

All erosion, sediment and drainage control measures must remain in place until all construction works are completed and surfaces are stabilised and revegetated.

4.1 Erosion control

Erosion is dependent on the likelihood and intensity of predicted and/or expected rainfall. Where construction activities are scheduled during the dry season when rainfall is unlikely or limited, the required erosion protection measures may be significantly less than if construction was to occur during the wet season (IECA, 2008).

Erosion control devices should be employed as soon as reasonably practicable to limit soil erosion, and to protect the exposed areas of soil from raindrop impact erosion. Best practice land erosion control and site rehabilitation is largely dependent on the likelihood and timing of rainfall and wind events.

Refer to Table 4.4.7 of the IECA Manual (summarised below as Table 4-1) for best practise measures associated with site rehabilitation depending on the overall site erosion risk based on monthly erosivity, determined in Section 3.3.

Table 4-1 Best practice erosion requirements.¹

Risk	Best practice requirements
All cases	<ul style="list-style-type: none"> • All reasonable and practicable steps taken to apply best practice erosion control measures to completed earthworks, or otherwise stabilise such works, prior to anticipated rainfall – including existing unstable, undisturbed, soil surfaces under the management or control of the construction works.
Low	<ul style="list-style-type: none"> • Land clearing prior to the commencement of construction work to be limited to a period of time agreed upon by the parties • Disturbed soil surfaces stabilised with minimum 70% cover within 30 days of completion of works within any area of a work site • Unfinished earthworks are suitably stabilised if rainfall is reasonable possible, and disturbance is expected to be suspended for a period exceeding 30 days.
Moderate	<ul style="list-style-type: none"> • Land clearing prior to the commencement of construction work to be limited to a period of time agreed upon by the parties • Disturbed soil surfaces stabilised with minimum 70% cover within 20 days of completion of works within any area of a work site • Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 3 m vertical increments wherever reasonable and practicable • Unfinished earthworks are suitably stabilised if rainfall is reasonable possible, and disturbance is expected to be suspended for a period exceeding 20 days.

Minimise disturbance area

Although the proposed maximum construction footprint has been pre-defined, the area of disturbance shall be minimised by the Contractor through staged clearing activities, where possible. Specifically, the clearing phase shall minimise encroachment on sensitive areas, such as riparian vegetation, waterways and any mapped regional ecosystems. Exclusion zones are to be clearly set out and marked prior to clearing and bulk earthworks, as per the approved project footprint.

Vegetation clearing

Any vegetation to be retained on site shall be clearly marked to mitigate the risk of accidental clearing occurring. Where vegetation clearing is necessary, any cleared vegetation shall be mulched and/or retained for use, to provide a temporary blanket for erosion control on cleared slope batters or used as topsoil bunds for clean water diversion. Any mulch that is generated from the clearing activities may be used as temporary ground cover.

Vegetation clearing adjacent to waterways shall be minimised, where possible, and delayed until absolutely necessary. Progressive stabilisation and, where possible, revegetation of disturbed areas shall occur as reasonably practicable.

If vegetation clearing is required to be carried out well in advance of earthworks, the clearing contractor shall aim to remove only woody vegetation, leaving the understory growth. Grubbing

¹ Reproduced from Table 4.4.7 of IECA (2008).

and removal of ground cover and understory is to be delayed until immediately prior to construction works occurring within that particular stage of development.

Groundcover and surface treatments

Revegetation and ground coverage of low-growing ground cover vegetation can be one of the most effective forms of permanent erosion controls (IECA, 2008). Vegetation and groundcover increases the surface roughness, slowing stormwater runoff, protects the soil against raindrop impact and reduces the evaporation losses from the underlying soil.

Soil stabilisation techniques that may be applied across the project site include those detailed below in Table 4-2.

Table 4-2 Soil stabilisation techniques

Technique	Typical use
Soil binders	<ul style="list-style-type: none"> • Stabilisation of exposed soil surfaces and stockpiles to control wind and raindrop impact erosion • Control of raindrop impact erosion on flat and mild slopes, greater than 1V:3H.
Erosion control blanket	<ul style="list-style-type: none"> • Temporary erosion control on exposed soils not subjected to concentrated flow • Temporary control of raindrop impact erosion on earth embankments before and during the revegetation phase.
Gravelling	<ul style="list-style-type: none"> • Protection of non-vegetated soils from raindrop impact erosion • Stabilisation of hardstand areas including site office area, process areas, temporary car parks and access roads.
Heavy mulching	<ul style="list-style-type: none"> • Stabilisation of soil surfaces that are expected to remain non-vegetated for medium to long periods • Suppression of weed growth on non-grassed areas.
Light mulching	<ul style="list-style-type: none"> • Control of raindrop impact erosion on flat and mild slopes. May be placed on steeper slopes with appropriate anchoring • Control water loss and assist seed germination on newly seeded soil.
Revegetation	<ul style="list-style-type: none"> • Temporary and permanent stabilisation of soil • Stabilisation of long-term stockpiles • Includes turfing, hydromulch, and other native seed blends.

4.2 Sediment control

Sediment control techniques shall be applied across the disturbed areas to limit mobilisation of, and settle mobilised, soil particles across the site. Sediment control techniques slow the movement of water and allow the influence of gravity to settle out particles before discharging into the receiving environment.

Sediment control devices

Required sediment controls are site specific and are determined through calculating the estimated annual soil loss at the site, based on site conditions and proposed works. In accordance with IECA (2008), the RUSLE should be used to estimate this annual soil loss. Based on the determined annual soil losses, all sediment control measures must be designed to satisfy, as a minimum, the design standard outlined in Table G7 of IECA. It is a requirement of the Contractor to determine this soil loss, and associated sediment controls, as part of the site-specific Erosion and Sediment Control Plan.

Sediment control techniques that may be applied within the project site are detailed in Table 4-3.

Table 4-3 Sediment control measures

Sheet flow techniques	Minor concentrated flow techniques
• Buffer zones	• Check dam sediment trap
• Compost berm	• Coarse sediment trap
• Fibre roll	• Filter tube dam
• Filter fence	• Modular sediment trap
• Mulch berm	• Sediment basin
• Sediment fence - woven fabric	• Rock filter dam
• Sediment fence - non-woven composite fabric	

Instream works

Where the access tracks and other infrastructure pass through waterways, the need for additional sediment controls within the waterways may be required to prevent excess sediment from discharging off site and impacting on the downstream environment. During the construction of any works within a waterway, including temporary roadways, in addition to the above sediment controls, silt curtains, rock filter dams or instream bunds may require implementation depending on the state of the waterway.

Sediment controls within a waterway must ensure that control measures do not impede fish passage.

Dust suppression

The most effective control measure against wind erosion is revegetation, however in some cases this is not reasonably practicable until the end of the construction period. In the interim, water tankers shall be employed to suppress dust on site during construction periods and other times, as necessary. Exposed channel surfaces must be rehabilitated as soon as practicable to minimise the potential environmental risk and in accordance with Table 4.4.7 of the IECA Manual.

Stockpile management

Large stockpiling sites and site laydown and office facilities are to be located in defined areas, above flood extents and within close proximity to the main site access ways. Sediment fencing and diversion drains are to be implemented downslope and upslope of all stockpiles, respectively, if demanded by the site conditions.

Stormwater discharge off site

Stormwater is discharged from the project site into a number of large and small tributaries that pass through the project site, and ultimately flow into the Macintyre Brook. It is likely that these are active waterways that contain water during the construction works. As bulk earthworks within these areas involve the construction of infrastructure within the waterways, as well as minor bank re-grading, water quality monitoring may be required to be undertaken as part of construction works.

4.3 Drainage control measures

The primary functions of drainage control measures are to minimise the risk of erosion, minimise the risk to the adopted erosion and sediment control measures, control the velocity and location of water flowing through the site, and to appropriately management 'clean' and 'dirty' water flows through the site during construction.

Proposed measures for the project site are as follows, noting that these best practice measures are to be applied only where upstream waters intercept the construction works area, if necessary:

- During all phases of construction, the management of upstream waters must be considered and appropriately managed. Upstream water must be either diverted, banded or pumped through the site during periods of low flows. During periods of high flows, the Contractor must ensure upstream flows are channelled through the site via stabilised drainage paths.
- Provide diversion works (for example, clean water topsoil bunds) to direct clean water flows from external catchments upslope of the project site towards existing discharge points, where possible. Diversion drains are to be constructed as trapezoidal bunds or channels and appropriately lined to minimise the risk of scour occurring.
- Provide diversion drains (dirty water channels) to direct dirty water flows from internal catchments towards sediment treatment devices, where necessary.
- Rock check dams are to be placed within the cleared areas where on slopes, where required, to reduce runoff velocities and minimise soil erosion caused during rainfall runoff events.

Low gradient slopes

The proposed wind turbines and wind farm supporting infrastructure are generally located on ridge lines where the land is characterised by a low gradient. Appropriate drainage controls that may be applicable to the site in these areas are detailed in Table 4-4.

Table 4-4 Low gradient drainage control measures

Technique	Typical use
Catch drain	<ul style="list-style-type: none"> • The collection and diversion of sheet flow across a slope or around soil disturbances • Best used in non-dispersive soils, otherwise the drain must be lined with non-dispersive soils (minimum 100 mm thick) prior to placement of channel liner.
Compost berm	<ul style="list-style-type: none"> • Primarily used as a sediment filter berm, but can be used as a flow diversion bank • Used when onsite land clearing produces sufficient quantities of organic matter.
Flow diversion banks (earth, sandbags, etc)	<ul style="list-style-type: none"> • Flow diversion at the base of fill slopes • Cross drainage on unsealed roads • Flow diversion upslope of excavation and trenches.

High gradient slopes

The proposed access tracks connecting the wind turbines and other support infrastructure are distributed throughout the project on both flat and sloped land. Drainage controls more suited to sloped surfaces, with the aim of reducing soil erosion, are detailed in Table 4-5.

Table 4-5 Drainage slope control measures

Technique	Typical use
Chute	<ul style="list-style-type: none"> • Discharge of concentrated flows down steep slopes • Temporary drainage down the face of newly formed road embankments.
Level spreader	<ul style="list-style-type: none"> • Conversion of minor concentrated flows back to sheet flows • Discharge of flows down grassed slopes • Discharge of sheet flow into bushland.
Slope drain	<ul style="list-style-type: none"> • Discharge of minor flows down steep slopes • Discharge of minor flows through bushland and other areas where it is essential to minimise disturbance to vegetation and soil.

Excessive flow velocities can cause channel erosion, usually along the invert (bottom) of the drain. This type of erosion is usually found in newly formed drains, before stabilisation has occurred. The velocity of the flow can be reduced through:

- Increasing the width of the bottom of the channel
- Reducing the gradient of the bed slope
- Increasing the channel roughness.

In most cases, it is usually more practicable and economical to line the channel instead of attempting to reduce slope gradient and widening drains. Channel lining options and their typical use are detailed below in Table 4-6.

Table 4-6 Channel lining options

Technique	Typical use
Vegetation	<ul style="list-style-type: none"> • Permanent lining of low velocity chutes, catch drains and diversion channels.
Erosion control matting	<ul style="list-style-type: none"> • Temporary or permanent scour protection of medium velocity drains. Includes the use of erosion control mesh made from jute or coir.
Rock lining	<ul style="list-style-type: none"> • High velocity drainage channels • Drainage chutes • Sediment basin spillways.

5. Monitoring and maintenance

5.1 Site inspections and monitoring

5.1.1 General

In accordance with Section 7.2 of the IECA Manual, the Contractor shall make allowance for the preparation of a formal monitoring and maintenance program prior to site establishment. The monitoring and maintenance program shall make allowance for required site inspections (detailed in Section 5.1.3), monitoring of erosion and sediment control devices (which may include the inclusion of water quality monitoring) and reporting of results, inspections and non-compliance.

5.1.2 Responsible persons

In accordance with Chapter 7 of the IECA Manual, the Contractor shall generally be responsible for all items prescribed in this Report. The Contractor shall identify appropriate persons (i.e. HSE Manager) to ensure compliance with erosion and sediment control requirements and objectives for the project duration.

In addition to the erosion and sediment control elements detailed in this report, the Contractor shall also ensure the following general management practices are incorporated:

- Establish an erosion and sediment control training program for site staff
- Appropriately control subcontractors and material suppliers
- Suitably control site traffic to minimise dust generation and undesirable soil compaction outside designated access roads
- Maintain adequate supplies of emergency erosion and sediment control materials and ensure that these items are available at all times, particularly prior to imminent rainfall
- Establish an appropriate site inspection routine as well as the staff responsible for these inspections.

For further information regarding general construction practice and the management of construction sites, refer to Chapter 7 of the IECA Manual and the IECA 'Site Management' fact sheet.

5.1.3 Inspections and monitoring

General

Site inspections and monitoring are to be undertaken in accordance with Sections 6.17, 7.4, 7.6 and Appendix I of the IECA Manual and as detailed below. ESCPs are living documents that can and should be modified as site conditions change, or if the adopted measures fail, to achieve the required treatment standard. When a site inspection detects a notable failure in the adopted ESC measures, the source of the failure must be investigated and appropriate amendments made to the site and the plans.

Inspections

The IECA Manual requires that all erosion and sediment control measures be inspected as follows:

- Daily site inspections (during rainfall):
 - All drainage, erosion and sediment control measures (when work is occurring on site)

- All instream erosion and sediment control measures (when work is occurring on site)
- Occurrences of excessive sediment deposition (whether on or off site)
- All site discharge points.
- Weekly site inspections:
 - All drainage, erosion and sediment control measures (when work is not occurring on site)
 - All instream erosion and sediment control measures (when work is not occurring on site)
 - Occurrences of excessive sediment deposition (whether on or off site)
 - Occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements
 - Litter and waste receptors
 - Oil, fuel and chemical storage facilities.
- Prior to anticipated runoff-producing rainfall (within 24 hours of rainfall occurring):
 - All drainage, erosion and sediment control measures
 - All temporary flow diversion and drainage works
- Prior to rainfall event of sufficient intensity and duration to cause runoff (within 18 hours of rainfall occurring):
 - All drainage, erosion and sediment controls
 - All temporary flow diversion and drainage works
 - All instream erosion and sediment control measures.
- Following runoff-producing rainfall (within 18 hours of rainfall event):
 - All drainage, erosion and sediment control measures
 - All instream erosion and sediment control measures
 - Occurrences of excessive sediment deposition (whether on or off site)
 - Occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements.

Water quality monitoring

If water quality monitoring is required during construction works, it shall be undertaken in accordance with Section 7.5 of the IECA Manual for the water quality objectives outlined in Section 2.6.1.

As mentioned in Section 2.6, surface water discharges from the project at one distinct location. Water quality sampling and analysis should be undertaken at this location while a rain event is occurring. As the majority of these discharge points are located within waterways, water quality monitoring should also be undertaken at undisturbed upstream locations, if available.

Where access tracks or other works are being completed within or adjacent to a waterway, water quality monitoring should be undertaken simultaneously upstream and downstream of this location to assess potential impact.

If the water quality objectives are not met, additional water quality monitoring may be required to assess the effectiveness of remediation erosion and sediment control measures.

5.1.4 Maintenance

Any erosion and sediment control failures or excess sediment build up identified during the site inspections is to be rectified as soon as practicable following identification.

Any sediment removed from devices should be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.

5.1.5 Reporting

It is recommended that site check sheets be filled out weekly, and monthly reports be completed by the Contractor. Monthly reports shall include water quality monitoring reports (if required), details of the performance of the site's monitoring and maintenance activities, non-compliances and corrective actions implemented.

As the site has been identified as 'high risk' (see Section 3.4), the Contractor shall also engage an independent, appropriately qualified person (i.e. CPESC) to undertake regular erosion and sediment control audits to confirm compliance with best practice.

A register should be maintained for the duration of the project site works, and should be available for review during site inspections undertaken by a regulatory authority. Any environmentally relevant incidents which occur on the site should be recorded, and also be available for review during site inspections undertaken by regulatory authorities.

If erosion and sediment controls have been found to be deficient or failed in service, due to unforeseen circumstances, corrective action is to be undertaken immediately which may include modifications to the approved ESCP. Such modifications are to be approved by the Contractor.

5.2 Wet weather preparedness

In accordance with the IECA Manual, the project site shall be appropriately prepared for both likely and unlikely wet weather conditions. The Contractor shall consider developing a wet weather preparedness plan to establish appropriate erosion and sediment control measures and actions that may be implemented prior to a predicted wet weather event.

The following erosion and sediment control measures may be considered appropriate for inclusion within the wet weather preparedness plan:

- Inspect the condition of all erosion and sediment control devices on site to ensure that these measures are operationally effective prior to the rainfall event
- Establish temporary flow diversion up-slope of open, newly formed batters
- Stabilise all drainage pathways and exposed surfaces still subject to construction with temporary erosion and sediment control techniques (i.e. erosion control blankets, hydraulic blankets and mulching)
- Secure erosion control blankets with additional anchorage such as sandbags, rocks or timber stakes
- Ensure overflow weirs of any sediment basins or rock filter dams are structurally sound to withstand greater flow rates should the capacity of basins and dams be exceeded by the predicted weather event.

5.3 Non-conformance and corrective actions

Where an environmental non-conformance occurs regarding erosion and sediment control (loss of sediment from the site, accidental discharge of sediment into adjacent waterways, riparian zones or drainage lines), the Site Manager shall immediately inform the Contractor and the DES

of the incident. The Site Manager must also prepare a monthly report detailing any incidents of environmental nuisance and non-conformance for review by DES, if requested.

The Contractor has a responsibility to report to DES all major environmental incidents that risk causing environmental harm under the *Environment Protection Act 1994*.

Where an environmental incident occurs, the following mitigation strategies shall be adopted as a minimum:

- All non-conformances and incidents are to be corrected as soon as possible and strategies implemented to reduce the likelihood of the incident reoccurring
- Containment of the sediment laden runoff, where possible
- The HSE Manager is to review the erosion and sediment control measures in place for effectiveness and check maintenance records
- An incident / accident report is to be completed for all non-conformances and incidents.

Where incidents have occurred, the Contractor shall ensure that all reasonable and practical control measures are implemented for future operations. This may include reviewing water quality monitoring data, where exceedances have been found, and implementing additional and/or alternative controls to achieve the required environmental outcomes.

6. Conclusion

This Report has been produced to demonstrate the management of erosion and sediment hazards and risks for the proposed project, and demonstrates compliance with relevant requirements within State Code 16 and State Code 23.

Further recommendations for erosion and sediment controls relevant to this project are:

- Undertake site investigations to confirm geotechnical and soil conditions (characterisation of dispersive and sodic soils) that will inform the site-specific ESCP
- Prepare a site-specific Erosion and Sediment Control Plan as part of the CMP for the project, in accordance with the IECA guidelines and recommendations provided in this Report and any development permit conditions, prior to any disturbance occurring within the project.

7. References

- Bureau of Meteorology 2020. *Climate data online*. Commonwealth of Australia.
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Queensland Government.
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- Department of Environment and Science 2019. *Healthy Waters Management Plan: Queensland Border Rivers and Moone River Basins*, Brisbane, Queensland Government.
- Department of Natural Resources, Mines and Energy 2018. *Queensland Globe*, State of Queensland.
- Department of State Development, Manufacturing, Infrastructure and Planning 2018. Planning Guidelines. *State Code 16: Native Vegetation Clearing*, State of Queensland.
- Department of State Development, Manufacturing, Infrastructure and Planning 2018. Planning Guidelines. *State Code 23: Wind farm development*, State of Queensland.
- Environmental Protection Act 1994. Queensland Government.
- Environmental Protection Policy (Water and Wetland Biodiversity) 2019. Queensland Government.
- IECA 2008. *Best Practice Erosion and Sediment Control*, International Erosion Control Association (Australasia), Picton. NSW.
- Planning Act 2016. Queensland Government.
- Planning Regulation 2017. Queensland Government.
- Queensland Nature Conservation Act 1992. Queensland Government.

Appendices

Appendix A – Preliminary erosion hazard assessment

Erosion Hazard Assessment

Project Name: ACCIONA Karara Wind Farm

Site Address: via Carbean Road, off Cunningham Highway, GORE QLD 4352

Table 1 Erosion Hazard Assessment

Controlling Factors	Point System	Fairview Resource Reserve Phase 2 - Average
Item 1 – Average slope of Disturbance Area		
not more than 3%	0	2
more than 3% but not more than 5%	1	
more than 5% but not more than 10%	2	
more than 10% but not more than 15%	4	
more than 15%	6	
Item 2 – Soil Classification Group		
GW, GP, GM, GC	0	3
SW, SP, OL, OH	1	
SM, SC, MH, CH	2	
ML, CL, or if <i>imported fill</i> * is used, or if soils are untested	3	
<i>*Soils are crushed mudstone</i>		
Item 3 – Emerson (Dispersion) Class Number		
Class 4, 6, 7, or 8	0	4
Class 5	2	
Class 3, (default value if soils are untested)	4	
Class 1 or 2	6	
Item 4 – Anticipated Duration of Soil Disturbance		
not more than 1 month	0	6
more than 1 month but not more than 4 months	2	
more than 4 months but not more than 6 months	4	
more than 6 months	6	
Item 5 – Area of Disturbance		
not more than 1000 m ²	0	4
more than 1000 m ² but not more than 5000 m ²	1	
more than 5000 m ² but not more than 1 ha	2	
more than 1 ha but not more than 4 ha	4	
more than 4 ha	6	
Item 6 – Waterway Disturbance		
No disturbance to a watercourse, open drain or channel	0	2
Involves disturbance to a constructed open drain or channel	1	
Involves disturbance to a natural watercourse	2	
Item 7 – Rehabilitation Method		
Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method)		0
not more than 1%	0	
more than 1% but not more than 5%	1	
more than 5% but not more than 10%	2	
more than 10%	4	
Item 8 – Receiving Waters		
Saline waters only	0	2
Freshwater body (e.g. creek or freshwater lake or river)	2	
Item 9 – Subsoil Exposure		
No subsoil exposure except of service trenches	0	2
Subsoils are likely to be exposed	2	
Item 10 – External Catchments		
No external catchment	0	1
External catchment diverted around the soil disturbance	1	
External catchment not diverted around the soil disturbance	2	
Item 11 – Road Construction		
No road construction	0	2
Involves road construction works	2	
Item 12 – pH of soils to be revegetated		
more than pH 5.5 but less than pH 8	0	1
other pH values, or if soils are untested	1	
TOTAL SCORE		29
		High Risk Site.

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
REV0	N Ambrey	S Petersen P Bradley		G Squires		02/07/2020

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Appendix B – Spill Management Procedure

Overview

Spill kits contain absorbent materials appropriate to the potential type and size of spill that they may be required to address. Spill kit contents are appropriate for the type and volume of fuels and chemicals stored within the engineering facility.

Spill kit locations

Spill kits, personal protective equipment (PPE), operator instructions and emergency procedure guides for the management of wastes and chemicals associated with the activities conducted at facility are located within the main workshop as well as within the sandblasting workshop. Workers should be aware of the locations of the spill kits in the event of a spill.

Spill procedure

General

Spills of wastes, contaminants or other materials must be cleaned up as quickly as practicable, taking into account appropriate health and safety precautions in relation to the material spill.

All spills of fuel or other hazardous materials to land must be cleaned up using the spill equipment available onsite, using dry methods.

Spills must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or materials to any stormwater drainage system, roadside gutter or waters.

Spill response

1. Identify the source of the spill, and contain where possible
2. Identify the spill material, and review risk controls if material safety data sheets are available
3. Clean up spill using spill kit or appropriate absorbent material, and employing appropriate PPE. Dispose of waste appropriately
4. Notify the Site Manager. If the spill is greater than 20 litres, the Site Manager will report the spill to DES
5. Restock or replace the spill kit.

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